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Comparing New Theory with Prior Beliefs: Market Civilization and the Democratic Peace

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Stuart Bremer counseled against the falsificationist convention of testing new models against the null hypothesis of no model. Instead, new models should be compared against prior beliefs, and theories should compete, whenever possible, on a field of equivalent test conditions. This article applies Stuart Bremer's notion of comparative theory testing by comparing a new model of contract norms with the prior institutionalist model of democratic peace. On a field of equivalent test conditions it is found that the hypothesis for contract norms (that the democratic peace is contingent upon economic development) is thousands of times more likely to be true than the hypothesis for institutionalist theory (that democracy pacifies all dyads regardless of economic conditions). Democracy appears to be a significant force for peace only in dyads that are above the median income: the richest 45%. The results indicate that scholars of war should update the widespread prior belief that democracy, alone, causes peace.

Keywords democratic peace, interstate conflict, political economy

JEL Codes N40, O17, P14, P16, P26, P29, P48

“To raise the level of cumulative knowledge in the scientific study of war,” advised Stuart Bremer, we need “more comparative and competitive theory testing” (Bremer, 1996, 1). While Bremer’s contributions to the scientific study of war in the areas of testing national capabilities (Singer, Bremer, & Stuckey, 1972; Bremer, 1980), simulation (1977), probabilistic inference (1992), the dyad-year (ibid.), multivariate analysis (ibid.), democratic peace (1992, 1993b), the evolution of war (1993a, 1995), and data generation (Jones, Bremer, & Singer, 1996), are well known, what is perhaps less well known is his abiding interest in the philosophy of science.¹ One outcome of this interest was a growing concern over the utility of falsificationism: the prevailing view that we accede to the “truth” by successfully eliminating false theories. As Bremer was apt to point out, most philosophers of science no longer accept falsificationism as a valid means of accumulating knowledge (Laudan, 1990). This is because causation cannot be observed: we observe instead the results of hypothesis tests. The construction of these tests requires the adoption of numerous auxiliary assumptions, particularly in the concretization of measures. This means that it is possible to “falsify” a theory when it is in fact true simply because one assumption in the construction of the test is in error. Since we can never be certain that all of the auxiliary assumptions in the test itself are correct, we can never falsify a theory (or hypothesis) with certainty (see also Bremer, Regan, & Clark, 2003, 8–9).

For this reason Bremer sought to bring into the scientific study of war the notion of testing theories (or hypotheses) not against the null conclusion of no relationship

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¹I can also add Stuart Bremer’s unfailing dedication to his graduate students, of which I was very fortunate to have been one.

(falsificationism), but against other theories, an approach that might be called comparative model testing (Bremer, Regan, & Clark, 2003, 9). To illustrate the point, Bremer used the analogy of a horse race:

In a falsificationist horse race, horses (theories) are eliminated from the field as the race (research) goes on until one horse (the truth) remains, while in a comparativist horse race, horses are never eliminated from the field, they merely fall behind (sometimes so far behind that they are off the horizon) and the race focuses upon a few horses who contend for the lead. The comparativist horse race is endless and does not have an ultimate winner, but not all horses are equal. Horses near the front are likely to have more merit than those at the rear, and those inclined to wager on horses would be well advised to bet on one of the former rather than the latter. If one horse is able to hold the lead for a long time, some observers may conclude that the race is over and declare a winner, but there is no valid logical reason to do so. We can never be sure that another horse may take the lead on the next lap. (Bremer, 1996, 1)

In short, all knowledge should be treated as provisional and subject to continuous updating in light of accumulating evidence (Bremer, Regan, & Clark, 2003, 8). The veracity of new theories (or hypotheses) should be compared not against the null hypothesis of no relationship (i.e., that they are better than no theory at all), but against the veracity of leading prior theories. Moreover, because test auxiliary assumptions can be in error, the use of identical auxiliary assumptions, wherever possible, in comparative tests equalizes errors across theories (Bremer, 1996).

This article applies Stuart Bremer's notion of competitive theory testing by comparing the relative veracity of a new theory, contract norms, with the prior hypothesis of democratic peace. The democratic peace hypothesis asserts that, whether or not democratic states are more peaceful than other states, the relatively low probability of militarized conflict among them is unlikely to be attributable to chance. Today few would disagree with the validity of Bruce Russett's (1990) assertion, now over a decade old, that the democratic peace is "one of the strongest nontrivial or nontautological generalizations that can be made" in the field of international relations. In this way the democratic peace offers a powerful prior hypothesis against which the veracity of new models can be tested. The theory of contract norms yields the competing test hypothesis that the democratic peace is not independent but contingent upon economic development. While previous studies have confirmed this hypothesis (Hegre, 2000; Mousseau, 2000; Mousseau, Hegre, & Oneal, 2003), the ramifications for the democratic peace seems to have escaped many scholars, with published studies repeatedly asserting that democracy has an independent impact on peace among nations (e.g., Reiter & Stam, 2002; Lake, 2003; Reuveny & Li, 2003).

This study advances on previous studies in at least three ways. First, as advised by Stuart Bremer, the two hypotheses are re-examined in a comparative test with equal sets of epistemic assumptions. Second, Bremer showed that neighbors make up the most dangerous dyads. Since economic development is a critical factor in allowing nonneighbors to fight each other, I equalize the two hypotheses of democratic peace and contract norms by observing the population of neighboring states. In this way I show how the contingent impact of development on peace is not only significant, but quite substantive. Lastly, Ray (2003) has emphasized how models with too many independent variables may mask substantive underlying results. Herein I include a smaller set of independent variables that are theoretically derived. After reviewing the theoretical bases for the competing hypotheses, I construct the

equivalent test conditions and report the results. I conclude with an interpretation of the results consistent with the view of comparative model testing.

Prior Theory: Institutionalism

The story of the rise in popularity of the democratic peace proposition illustrates the debilitating role of human bias, and the essential role of scientific method, in the accumulation of knowledge (Mousseau, 1998, 24–28). For many years the hegemony of realist belief appears to have prevented, at least in print, the observation that the rarity of wars between democratic nations was meaningful. The first published report of the democratic peace appeared not in an international relations journal but in a sociological journal whose author was an industrial engineer (Babst, 1964). For twelve years Babst's observation remained seemingly ignored until Small and Singer (1976) asserted, without evidence, that it must be attributed to other factors. It is Rudolf Rummel (1979, 1983) who deserves credit for tenaciously challenging prevailing notions. After several critics failed to refute Rummel's proposition in prominent journals (Wiberg, 1982; Chan, 1984; Weede, 1984; Vincent, 1987), Levy (1988, 88) rightly concluded that the democratic peace is the closest approximation to an "empirical law" we have in international politics.

Stuart Bremer's famous "Dangerous Dyads" article (1992) provided an early confirmation of the phenomena against competing theories. Long a student of power in international relations (Singer, Bremer, & Stuckey, 1972), Bremer concluded that his results "give stronger endorsement to the idealist prescription for peace than to the realist one" (Bremer, 1992, 338). While a number of scholars subsequently sought to disprove the pacifying impact of democracy (e.g., Farber & Gowa, 1995; Green, Kim, & Yoon, 2001), they have been broadly superseded by numerous later studies that support the proposition (e.g., Raknerud & Hegre, 1997; Mousseau & Shi, 1999; Russett & Oneal, 2001; Reiter, 2001; Reuveny & Li, 2003).

Today the success of the democratic peace hypothesis can be credited with a rise in popularity of institutionalism in the subfield of war studies, a paradigm that treats institutions exogenously. Normative accounts emphasize the norms associated with democratic institutions (Dixon, 1994; Russett, 1993, 30–38); structural accounts emphasize the dependency of foreign policy decision makers on electorates whose values and preferences are assumed and treated as constants across nations and time (Lake, 1992; Russett, 1993, 38–40; Fearon, 1994; Bueno de Mesquita et al., 1999; Schultz, 2001; Reiter & Stam, 2002). While some studies have emphasized that a third factor may yet explain both democracy and peace (e.g., Gates, Knutsen, & Moses, 1996; Thompson, 1996; Gartzke, 1998; James, Solberg, & Wolfson, 1999), the overwhelming starting point of most scholars in the democratic peace research program today is institutionalist.

Yet just as realist hegemony once constrained scholars from recognizing the evidence for democratic peace, today institutionalist hegemony may be constraining scholars from recognizing the possibility that the democratic peace may be substantially conditioned by economic development. Using conventional measures and data, I tested and confirmed an interaction of democracy with development on militarized conflict (Mousseau, 2000). The significance of the interaction term has since been reconfirmed by Hegre (2000) and Mousseau, Hegre, and Oneal (2003). The theoretical implication follows that democracy alone does not have the peaceful residual effect many attribute to it. If democracy does not pacify relations among poor states, then democracy alone cannot explain the democratic peace among rich states. The following section offers an account for the economic limitation to the democratic peace.

New Theory: Market Civilization

While institutionalist theory assumes that the preferences of electorates are constant, in previous studies I showed how the preferences of electorates may vary according to economic conditions (Mousseau, 2000, 2003a). In brief, in developing countries, economic dependency on friends, family, and informal networks tends to encourage feelings of in-group parochialism, collective responsibility within the group, and loyalty to group leaders. In more developed countries, in contrast, dependency on contracting on the market tends to encourage feelings of universal empathy and identity (because strangers regularly interact on the market), individualism, freedom, and tolerance (because individuals face few obligations beyond what they explicitly volunteer in contracts), and respect for impartial and equal law among strangers (because dependency on contracting creates a widespread interest in the impartial and equal enforcement of contracts).²

Institutionalism notwithstanding, the evidence is overwhelming that the values of electorates do vary, and vary robustly with economic development (Durkheim, 1984 [1893]; Polanyi, 1957 [1944]; Weber, 1958 [1904–5]; Lipset, 1959; MacPherson, 1977 [1962]; Braudel, 1979; Inkeles & Diamond, 1980; Lipset, Seong, & Torres, 1993; Chu, Hu, & Moon, 1997; Inglehart, 1997; Hofstede, 2001).³ Moreover, this simple theory of value change coherently integrates longstanding research in sociology (Durkheim, 1984 [1893]; Macpherson, 1977 [1962]), anthropology (Harris, 2001 [1979]), and economics (Polanyi, 1957 [1944]; Braudel, 1979), and thus potentially offers the long-sought “mortar” connecting multiple but disparate “blocks” of research programs discussed by Bremer (1993a, 2; see also Mousseau, 2003b, 488–490). It also offers “a single theoretical framework to understand domestic and international security issues” (Werner, Davis, & Bueno de Mesquita, 2003): in developing countries facing the cultural change of a rise in contracts, the model predicts a rise in antimarket mass movements (e.g., communism, fundamentalism, ethnic nationalism, and radical Islam), and specifically explicates sectarian and terrorist forms of violence (Mousseau, 2003a). It also offers a model of state making (Lemke, 2003), offering an account not only for stable democracy but also the origin and character of the modern interstate system (Mousseau, 2002b, 106–107). Beyond explanatory power, the theory has now successfully predicted several new and important facts. These include the economic conditionality to the impact of democracy on interstate cooperation (Mousseau, 2002a), interstate agreement (Mousseau, 2003b), and respect for human rights within nations (Mousseau & Mousseau, 2003).

In the subfield of interstate war, the theory predicts perpetual peace to emerge among nations as contract-oriented development liberalizes the culture and stabilizes democracy. It is thus a dynamic “process” rather than a static “variance” theory (see Bremer, 1993a, 9). At the end of this process the leaders of newly emerged market democracies—but not necessarily the other democracies—are constrained by liberal electorates to largely behave, in domestic and foreign affairs, in accordance with the contracting norms of respect for

²For elaboration on this process, see Mousseau (2003a, 2005).

³No competing theory for this value change has emerged as broadly convincing (see Mousseau, 2003b, 487–488). For an observation that it is contract-oriented development in particular that gives rise to value change, rather than any form of development, see Braudel (1979). In the large-*N* studies that have reported the correlation of liberal values with development, the overwhelming majority of the developed countries in the samples have had predominantly contracting economies, defined as the condition where most individuals obtain their incomes and consumer goods on the market in the form of contracting. This condition includes the social democracies (where individuals typically obtain their jobs and houses on the market with contracts) but excludes countries with fascist or communist states and those with oil-dependent economies (where individuals typically obtain their jobs and houses not by contracting with strangers but from the state or through family ties).

individual freedom and rights, tolerance, equity, and the rule of equal law. This broadly constrains foreign policy makers of contract democracies to promote and abide by international law and to respect the rights of other states that appear to do the same. This effectively proscribes the leaders of contract democracies from moving up the steps to war with one another (Vasquez, 1993), making the purposeful threat or use of force among them highly unlikely. This also fosters a natural alliance among contract democracies against states that seek imperial expansion in violation of international law (Mousseau, 2000, 480–481; Mousseau, Hegre, & Oneal, 2003, 285–286) or that abuse the perceived rights of individuals (Mousseau, 2003a, 13–14).

In this way, I have suggested, contract development gives rise to “market civilization”: a distinct culture and world view that binds people across indigenous cultures and nations. This process completes rather than contradicts institutionalist theory. This is because institutionalist theories assume that institutions constrain leaders to their electorates, and characteristically treat the preferences of electorates as assumed and constant. Contract norms theory also assumes that institutions constrain leaders to their electorates, but allows the preferences of electorates to vary. More importantly, it explicates these preferences. The modeling of preferences is a crucial but mostly neglected starting point of any social science theory and is a theoretical advance that others have called for (Moravcsik, 1997; Wendt, 1999; Keohane, 2001, 1).

Because the model explicates preferences in the contracting economy and predicts contract norms as the antecedent cause of both liberal democracy and peace, it offers contract culture as the elusive third, or confounding, variable long sought by detractors of the democratic peace proposition (Gates, Knutsen, & Moses, 1996; Thompson, 1996; Gartzke, 1998; James, Solberg, & Wolfson, 1999). I am unaware, however, of any data that specifically captures contract culture, whether measured in economic structure (e.g., contracting data) or values (e.g., surveys), across nations over extensive time periods. As Bremer (1992) emphasized, wars and militarized disputes are rare events that can only be modeled in large temporal and spatial analyses. The theory is readily testable, however, because virtually all democratic nations with developed economies have had predominantly contracting economies, and all other nations have not (Mousseau, 2002a, 149). This means that all developed democracies have been market democracies, and the interaction of democracy and development captures the predicted antecedent condition of contract norms.

In this way, contract culture is the predicted confounding variable that predicts both democracy and peace, but the contingent role of development in the democratic peace is the test hypothesis. In my experience some readers will object to the suitability of the test hypothesis on the grounds that the interaction of development and democracy is not a direct measure of contract norms and its supposed liberal values. This objection is specious, however, because we can never be certain with any measure that the meaning we ascribe to it is in fact “true”: there can always be competing theory (if not now, then at any time in the future) that gives an indicator a different meaning than the one we assign it. Indeed, this is primarily why Stuart Bremer rejected falsificationism in favor of comparativism. An example is offered with the ubiquitous use of capability to gauge power. We can never know whether capability actually measures power; we just assume it as one of numerous auxiliary assumptions and test if a theory’s prediction with regard to the indicator is supported. Whether capability actually measures power can never be determined, but we may be convinced that the measure is valid to the extent that any theory that asserts that capability measures power emerges as convincing, or, to use Bremer’s horse-race analogy, is near or in the lead of competing theories. I add that, unlike the linkage of capability and power, there is a great deal of evidence linking contracting norms and liberal values with developed democracy (Durkheim, 1984 [1893]; Polanyi, 1957 [1944]; Weber, 1958 [1904–5]; Lipset,

1959; Macpherson, 1977 [1962]; Braudel, 1979; Inkeles & Diamond, 1980; Lipset, Seong, & Torres, 1993; Chu, Hu, & Moon, 1997; Inglehart, 1997; Hofstede, 2001).

In this way, the theory of contract norms successfully predicted the economic limitation to the democratic peace as a novel fact (Hegre, 2000; Mousseau, 2000; Mousseau, Hegre, & Oneal, 2003). Is it time for students of conflict to update our prior beliefs? If democratic institutions alone cause peace, then they should do so among all nations regardless of third-variable conditions. If contracting norms of electorates in developed democracies cause the peace among democracies, then the democratic peace should be contingent on economic development. The following section constructs the equivalent test conditions for comparing the veracity of these competing hypotheses. This test will show that in a direct head-to-head test, the contingent hypothesis cannot be ignored by scholars of war.

Equivalent Test Conditions

In comparative theory testing, advised Stuart Bremer (1996, 1), hypotheses should compete “on a level playing field.” That is, the models should be tested under a common set of rules and uniform standards. Ad hoc or idiosyncratic alterations to the data or measures raise the specter that the results may be attributable to the inequitable treatment of auxiliary theory rather than to the theories themselves. Therefore, to the extent that competing theories share common interpretations of data, samples, and measures, a contest using these common auxiliary assumptions, while unlikely to settle a dispute, will “shed considerable light on the relative epistemic merit of the theories tested” (ibid.). To construct a common set of rules and uniform standards I drew on the EUGene data generation program (Bennett & Stam, 2000) in the construction of the sample and all of the measures. Bremer (1992) was in the forefront of adopting the dyad-year as the unit of analysis, an approach also used here.

A critical variable in the present study is economic development, and less developed states are far less likely than others to have the capability to fight one another unless they are geographically contiguous. It is a relatively simple matter to order troops to fire across an international land border. To move troops over water, however, is much more complex. It is this fact of warfare, for example, that protected Great Britain from numerous threats from the European continent over a period of several centuries. To make credible threats over water a state typically must have a highly trained bureaucracy (military and civilian) that can organize the movement of troops and keep them fed and supplied with arms over long distances. This bureaucracy must draw on sophisticated divisions of labor and high levels of education associated not with poverty but economic development. Also, an advanced industrial infrastructure is needed to pay for, design, build, and maintain the ships and planes considered necessary to move troops over seas and maintain their support over large distances. Some less developed countries now purchase planes from developed nations. To credibly threaten to extend and maintain significant air and naval forces over seas, however, remains a capability that is mostly in the hands of countries with highly developed economies.

While standard controls for geographic contiguity, distance, and size of armed forces may be aimed, at least in part, to control for this varying opportunity to fight across dyads, we cannot be certain that these measures fully account for the loss of strength over seas and with distance. For instance, it is highly unlikely that the developing countries of Pakistan and Mexico have ever had the capability to credibly confront one another. Yet each is in the most powerful decile of nations as measured by the CINC index (below). I suspect that this may explain why Bremer (1992) found, while observing a global sample, that development has a positive impact on the probability of war onset. Indeed, during

the years 1920 to 2000, fully 89% of disputes among less developed countries (defined as those below the median) occurred among directly contiguous neighbors. Since development is a crucial variable in the comparative test, it follows that to level the playing field across the competing theories we must hold opportunity constant by observing the universe of neighboring interstate (nondirected) dyads: those that are directly contiguous by land. Because data on development are increasingly sparse and less reliable as we go back in time, I conduct the test on the universe of neighboring dyads from the years 1920 to 2000.

Bremer (1993a) advised that we maintain a distinction between the onset of militarized conflict and its duration. Accordingly, the dependent variable is a dichotomous indicator of whether or not a militarized conflict began in a dyad-year (Jones, Bremer, & Singer, 1996). I use Maoz's & data (1999) to consider only those dyad dispute onsets where the states confronted one another directly, rather than indirectly through collaborators. To reduce possible bias in the test conditions I consider the onset of fatal disputes, rather than every threat, demonstration, or use of force. The Correlates of War data are gleaned from Western media sources. A small use of force, such as a gunshot fired across an international border, is far more likely to be recorded if it occurs in the developed world than the developing world (Mousseau, Hegre, & Oneal, 2003, 291).

Confirmations of the economic conditionality to the democratic peace have measured economic development using both gross domestic product and energy consumption (Hegre, 2000; Mousseau, 2000; Mousseau, Hegre, & Oneal, 2003). Here I use energy consumption per capita, as data on energy consumption and total population can be easily retrieved from the COW Composite Index of National Capabilities (CINC) data set (Singer, Bremer, & Stuckey, 1972) available in the EUGene data generation program. In standard form, I logged energy consumption per capita and assessed dyadic development with the level of development of the less developed member of the dyad. For ease of interpretation I centered this term, $Development_L$, at the median.

To gauge democracy I obtained the most recent update of the Polity IV data series using EUGene (Jagers & Gurr, 1995). As suggested by Marshall and Jagers (2003, 16), I use the 21-point (−10 to 10) Polity2 measure to assess democracy. This measure treats regime interruptions as missing values, assigns interregnums a "0," and for regime transitions averages the regime score before the transition period with the regime score at the end of the transition period. To assess dyadic democracy I gauge the Polity2 score of the less democratic member of the dyad, a variable I call $Democracy_L$. To be consistent with the $Development_L$ measure, I centered this term at the median.

The data are aggregated annually, and Polity IV assigns the Polity2 status for a state as observed at the end of the year. However, according to the Polity IV DURABLE variable, a major regime transition occurred in 23% of dyad-years in the sample (as indicated with a score of 0). This means that 23% of the observations may be in substantial error on the key variable $Democracy_L$. To address this concern I omitted these cases from observation.⁴ These operationalizations yielded 353 fatal militarized conflict onset years in the sample of 10,503 neighboring dyad years with data on both democracy and development.

In a recent article Ray (2003) argued quite persuasively that in tests structured in the logic of confirmation we should cease the norm of controlling for a variable simply because it has an impact on the dependent variable. Instead we must differentiate between confounding, intervening, and complimentary variables, and interpret their effects accordingly (see also

⁴A more common solution to this problem is to lag all the independent variables by one year (e.g., Bremer, 1992). However, this solution simply lags potentially inaccurate observations and may cause errors in other independent variables. Further tests showed that omission of these cases has no substantive impact on the results.

Blalock, 1979, 468–477). Confounding variables must plausibly offer at least a partial explanation for both X and Y. They offer “competing” explanations because they may account for any impact of X on Y. Intervening variables may partially explain Y but are also theorized to be partially explained by X. It is therefore not logical to include them in any test of a theory that asserts that X has some impact on Y (Ray, 2003, 5; see also King, Keohane, & Verba, 1994, 173). Complimentary variables are unrelated to X but may partially explain Y. Because they account for some variance in Y not related to X, their exclusion may mask or weaken the observable impact of X on Y (Blalock, 1979, 474; Ray, 2003, 8–10).

Accordingly, a number of “standard” control variables in the quantitative conflict literature are not included in this comparative test. The theory of contract norms predicts contract development to cause democratic stability, mutual alliance formation, international organization membership, and increased foreign trade (Mousseau, 2000, 482; 2002a, 151). These variables are thus not confounding but intervening, and are appropriately omitted.⁵ However, I do include control for past conflict and relative capability. Some have argued that peace may have some impact on democracy, even at the dyadic level (Gates, Knutsen, & Moses, 1996; Thompson, 1996; James, Solberg, & Wolfson, 1999). Others argue that past militarized conflict increases the odds of later militarized conflict (Beck, Katz, & Tucker, 1998). This means that a dyad’s history of peace offers a plausible explanation for both democracy and peace and is thus a confounding variable that probably should be controlled in a rigorous test. Relative capability has a well-established impact on militarized conflict (Bremer, 1992) but is not correlated with democracy or development. I include control for this variable because it is complementary: exclusion may mask or weaken the observed impacts of democracy, development, or their interaction on militarized conflict.

The variable Conflict History is the exponential function of the years that have passed without a militarized dispute; it equals $2(-y/5)$, where y is the number of years in peace. This function, recommended by Raknerud and Hegre (1997), is similar to the spline function suggested by Beck, Katz, & Tucker (1998) (Mousseau, Hegre, & Oneal, 2003, 294). The variable Relative Capability is the level of the stronger state’s CINC score divided by the weaker state’s score (logged). Summary statistics of the variables can be seen in Appendix I; a correlation matrix of the independent variables can be seen in Appendix II.

Results

Model 1 in Table 1 reports the test of the prior democratic peace model. As can be seen, democracy appears to be a significant force for peace. The Democracy_L coefficient (−0.192) is negative and significant at the usual thresholds. Development_L (−0.208) also appears to have a negative and significant impact on militarized conflict.⁶ The control variables are significant and in their expected directions: power imbalances appear to favor

⁵Trade interdependence (the ratio of trade to gross domestic product) is not the same as foreign trade per capita, and only the latter is a clear predicted outcome of contract culture. As seen in Appendix II, trade interdependence (data obtained from Oneal & Russett, 1999) and the interaction of development and democracy correlate at only 0.06. Further tests confirmed that inclusion of trade interdependence does not substantively affect the results, and inclusion of this term reduces the number of observations by 34%. In the spirit of Ray (2003), I opted to report the tests without control for trade interdependence. See Mousseau (2005) for elaboration of how, from the perspective of transaction norms theory, under certain conditions interstate trade may foster tensions within and between nations.

⁶However, we cannot conclude from this that development is a force for peace among nonneighbors. See Mousseau (2000, 489–495) and Bremer (1992), among others, for analyses showing that development (independent from its interaction with democracy) is a force for militarized conflict in analyses of all dyads, most of which are not neighbors.

TABLE 1 Comparative test of democratic peace and market civilization

Parameters	Null model: Democratic peace	Challenging model: Market civilization
Democracy _L	-0.192 (0.075)	-0.003 (0.079)
Development _L	0.0108 -0.208 (0.074)	0.9741 -1.273 (0.247)
Democracy _L *development _L	0.0050	<.0001
Capability ratio	-0.277 (0.052)	-0.264 (0.051)
Conflict history	<.0001 0.483 (0.036)	<.0001 0.480 (0.035)
Intercept	<.0001	<.0001
Log-likelihood	-2.005 -1264.8	-1.644 -1249.7

Cases: 10,503; Events: 353. Standard errors in parentheses. Probabilities in third row of each cell.

peace (coefficient -0.277); past conflict appears to increase the probability of new conflict (coefficient 0.483).

The second model in Table 1 tests the hypothesis for market civilization: that the democratic peace does occur but is contingent upon economic development. This is achieved by including the interactive term Democracy_L *development_L. The critical test is in the model log-likelihoods (Bremer, 1996, 24). While a value of 0 would indicate a perfect fit between the model and data, log-likelihoods have no lower limit. Thus a log-likelihood is meaningful only in comparison to other estimates using the same data (Bremer, 1992, 333). In this case the difference in the log-likelihoods of Models 1 and 2, $e^{15.1}$, indicates that Model 2 is about 3.5 million times more likely to be true than Model 1. This difference is significant at the 0.000001 level ($\chi^2 = 30.11$, $df = 1$). In this way, the result of the comparative test is clear: the data indicate that it is thousands of times more likely that the impact of democracy on peace is conditional to level of development (Model 2) than otherwise (Model 1).

Turning to the substantive meaning of this result, the conditional relationship between Democracy_L and Development_L in Model 2 means that the coefficients and standard errors for each of these constituent terms applies only when the other has a value of zero, their medians (Friedrich, 1982). Thus, we can immediately see that at median levels of development, democracy appears to have no significant impact on militarized conflict among nations (coefficient -0.003). To ascertain the significance of democracy on conflict across levels of development, I calculated the conditional t values for the Democracy_L coefficient and present the results in Figure 1.⁷

⁷The t value for the conditional effect of b_1 on Y can be calculated as

$$(b_1 + b_3(e))/\text{SQRT}(\text{variance}(b_1) + e^{2*}\text{variance}(b_3) + 2*e*\text{covariance}(b_1, b_3)),$$

where b_1 and b_2 are the constituent terms and b_3 is the interactive term (Friedrich, 1982, 820). The covariance of democracy and the interactive term in model 2 is -0.00173 .

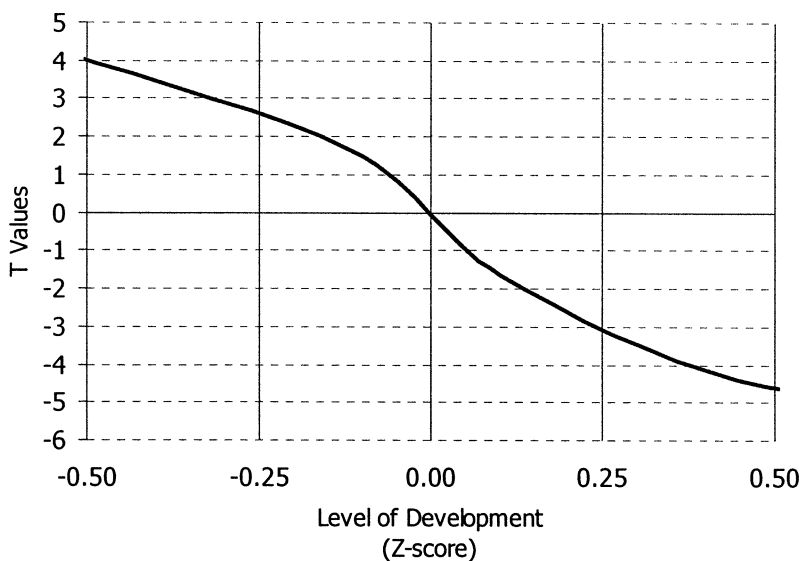


FIGURE 1 Direction and significance of democracy on militarized conflict across levels of development.

As can be seen in Figure 1, at very low levels of development democracy appears to be a significant force not of peace but of militarized conflict. At the development level of -0.11 , the t value is 1.64, indicating a significance level of 0.10 (two-tailed test). Dyads at this level of poverty or poorer include 41% of those in the sample. As discussed elsewhere, this positive impact of democracy on conflict in poorer countries may be attributable to a less liberal, and more nationalistic, political culture in poorer countries, where leaders are constrained by clientelist-oriented electorates to pursue more parochial perceptions of national interest than they otherwise would (Mousseau, 2002a, 154–155). With democracy status defined as those states scoring higher than 5 on the Polity2 scale as recommended by Marshall and Jaggers (2003), we get 81 neighboring democratic dyads in the year 2000, the last year of the sample. Of these, it appears that 7, or 9%, are significantly *more* dangerous than they otherwise would be *because* they are democratic. These more-dangerous neighboring democratic dyads are: Namibia and Botswana, Mozambique and Malawi, Mozambique and South Africa, Namibia and South Africa, India and Nepal, India and Bangladesh, and Indonesia and Papua New Guinea. Nor should we assume that these are immature democracies. While one regime was just 1 year old in the year 2000, the 9 others ranged in age from 6 to 50 years, with an average age of 17 years (as indicated by the DURABLE variable in Polity IV).

As can be seen in Figure 1, democracy appears to be a significant force for peace (at the 0.10 level, two-tailed test) only when the level of development is 0.10 standard deviations or more above the global median. This excludes 55% of dyads from enjoying democracy's peaceful effects. With democracy status defined as those states scoring higher than 5 on the Polity2 scale, in the year 2000 we get five additional neighboring dyads where democracy cannot be inferred to promote peace at the 0.10 confidence level. These are Guatemala and Honduras, El Salvador and Honduras, Nicaragua and Honduras, Mexico and Guatemala, and Guatemala and El Salvador. Nor should we assume that these are immature democracies: in the last year of the sample the five regimes that make up these five dyads ranged in age from 3 to 18 years old, with an average age of 10 years.

In sum, the results of the comparative test indicate that it is thousands of times more likely that the democratic peace is a phenomenon limited to nations with above-median levels of development than it is that democracy impacts all nations equally, regardless of wealth. Democracy does not have a pacifying impact on nations with economies at or below the median level of development.

Discussion and Conclusion

A student of the philosophy of science, Stuart Bremer embraced the view that a new theory or hypothesis should be tested not against the null hypothesis that it is better than no model at all, but against leading competing, or prior, theories and hypotheses. One way to achieve this, he advised, was to make use of identical auxiliary assumptions wherever possible and to compare the veracity of new models against the old using identical test conditions. In this article I sought to apply Stuart Bremer's notion of comparative theory testing to my own work on transaction norms. I set my model to compete with the leading prior model, the democratic peace. Using identical test conditions, the results indicate that the hypothesis for contract norms (that the democratic peace is contingent upon economic development) is thousands of times more likely to be true than the hypothesis for institutionalism (that democratic institutions, alone, cause peace).

The results indicate that we should update the widespread prior conclusion that democracy, alone, causes peace. As of this writing the provisional state of knowledge is that democracy has no statistically significant impact (at usual thresholds) on peace among the poorest half of interstate dyads. This indicates that institutionalist theory, which predicts democratic institutions, alone, to cause peace, does not offer a complete account of the phenomenon.

We cannot conclude from these results, however, that the "winning" contract norms explanation for democratic peace is true. As Bremer advised, the results of hypothesis tests should always be treated as provisional (Bremer, Regan, & Clark, 2003, 8). This is because their construction requires the adoption of numerous auxiliary assumptions, particularly in the concretization of measures. It is possible to "falsify" a theory when it is true simply because one assumption in the construction of the test is in error. Since we can never be certain that all of the auxiliary assumptions in the test itself are correct, we can never falsify a theory (or hypothesis) with certainty (see also Bremer, Regan, & Clark, 2003, 8–9).

In this case, a key auxiliary assumption in the concretization of measures is that the interaction of development and democracy indicates the presence of contract norms in a country. This assumption may well be in error, and there are all sorts of potential reasons for the results beyond the theory of contract norms. For instance, it is possible that the path of causation could start with democracy, causing contract-oriented development (though the state of evidence at this writing does not support this direction, see Moore, 1995, and Burkhart & Lewis-Beck, 1994). Even if alternative explanations for the results are not known today, they may be devised in the future.

As Bremer was apt to point out, all we can do is compare the epistemic status of theories against each other at any moment in time. In this case, as of this writing no one has showed how there is error in the empirical confirmations of the conditional role of development in the democratic peace. Nor has anyone offered a competing account (in print at least) of the phenomenon. This means that as of this writing we should provisionally conclude, to use Stuart Bremer's analogy of the horse race, that as an explanation for democratic peace the contract norms model is competing favorably with the previous leader, institutionalism.

Those inclined to wager (conduct research) are advised to consider placing their bets on market civilization.

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Appendix I Descriptive statistics of the variables

Variable	Mean	Std. dev.	Minimum	Maximum
Democracy	-1.62	1.00	-2.56	0.45
Development	0.40	1.00	-0.55	6.27
Democracy*development	-0.30	1.91	-16.04	1.68
Capability ratio	1.67	1.40	0.00	7.27
Conflict history	-7.19	9.09	-73.60	0.00
Trade interdependence ^a	0.00	0.01	0.00	0.17

N = 10,503.

^a*N* = 6,961.

Appendix II Pearson correlations of the independent variables

	(1)	(2)	(3)	(4)	(5)	(6)	
Democracy	(1)	1.00					
Development	(2)	0.35	1.00				
Democracy*development	(3)	0.24	-0.68	1.00			
Capability ratio	(4)	0.01	0.00	0.00	1.00		
Conflict history	(5)	-0.27	-0.12	-0.04	-0.06	1.00	
Trade interdependence ^a	(6)	0.47	0.44	0.06	-0.14	-0.16	1.00

N = 10,503.

^a*N* = 6,961.