Built to Last:
Understanding the Link between Democracy and Conflict in the International System.[1]

We revisit Gartzke and Weisiger's (2014) claim that development and dyadic difference, rather than democracy or a strong democratic community, drive peace and conflict in the international system. In so doing, we identify important inconsistencies in their theoretical argument, as well as extensive instability and errors in their empirical tests. Corrected analyses support Kadera, Crescenzi, and Shannon's (2003) conclusion that a materially strong global democratic community dampens the onset of militarized violence. In addition, we show that an accurate interpretation of models including Gartzke and Weisiger's dyadic difference variable actually supports the conclusion that dyadic democracy reduces conflict. We recommend moving toward a more productive analysis of the interdependence between regime dynamics, political economy and violence through: better theorizing about the emergence of market structures and their pacifying effects, treating global economic and democratic effects as complementary, research designs that carefully adhere to logic, and a continued practice of sharing replication files.

[1] The authors thank the *International Studies Quarterly* editors for considering this response and for procuring the necessary replication files. They also thank Frederick Boehmke, Douglas Dion, Andrew Enterline, Stephen Gent, Dina Zinnes, and anonymous reviewers for their insightful comments and critiques. Replication files are available at http://www.isanet.org/Publications/ISQ/Replication-Data and http://dx.doi.org/10.15139/S3/11903.

For many scholars, a democratic peace emerges from properties of states that make them less likely to engage in civil violence (Hartzell, Hoddie and Rothchild 2001) and interstate conflict[2], more likely to peacefully resolve disputes between them (Lefler 2015; Melin 2011), or more likely to cooperate with and durably commit to one another (Leeds 1999; Leeds and Savun 2007, Martin 2000). But do causal forces beyond individual states or dyads play a role in producing global peace? Kant's conceptualization certainly was a systemic one, and a variety of other international phenomena, such as norms (Fazal 2007), financial crises (Mosley 2009), gender subordination (Sjoberg 2013) and gender-hierarchical structures (Sjoberg 2012) are understood as part of broad, historical and social processes. Extant research suggests that there is indeed a causal connection between democracy and war (Crescenzi and Enterline 1999; Crescenzi, Kadera, Mitchell and Thyne 2011; Harrison 2010; Kadera, Crescenzi, and Shannon 2003), but Gartzke and Weisiger (2014) offer an alternative explanation of systemic peace. They argue that two dynamics have fooled scholars into thinking democracy matters. First, they contend that economic development, not democracy, is the fundamental driver of conflict (or its absence), and that as states become wealthier they are less likely to use violence as a foreign policy tool. Second, Gartzke and Weisiger reason that the proliferation of democracy causes more violence when it brings about an increase in what they refer to as *dyadic difference*, the tensions that emerge when two states with different regime types interact. Here, we reevaluate Gartzke and Weisiger's critique, underscoring problems with their theory's logic and challenges inherent in the specifications of the statistical models. We then reanalyze their empirical models, correcting many of the most serious issues, and find that the support for the global and dyadic democratic peace remains robust.

Understandably, questioning conventional wisdom is difficult by nature. And we do not intend to offer a stalwart or unthinking defense of the democratic peace. Challenging the democratic peace can promote theory development and the accumulation of

[2] Quackenbush and Rudy (2009) thoroughly review studies advancing the monadic democratic peace, and find some support for it in statistical analyses of militarized dispute initiation, but not in tests of militarized dispute involvement.

knowledge. The scholarly community must remain open to debate, as the alternative leads to stagnant and incomplete understandings of the world.

Nevertheless, the best critiques are logically sound, innovative, and empirically robust. They guide new understandings and avenues of research. As we demonstrate below, Gartzke and Weisiger's theoretical argument is logically inconsistent with respect to the effect of economic development at the international system level. In addition, their discussion of the notion of dyadic difference and regime type heterogeneity in the system is not new, but rather one of the fundamental building blocks of the theoretical model first developed by Gleditsch and Hegre (1997) and extended by us (Kadera et al. 2003). Importantly, this notion of *mixed dyads* (dyads where one state is democratic and the other is not) is not based on hypocritical behavior of democracies, a property Gartzke and Weisiger suggest is necessary for systemic democratic peace theories.

Setting aside the theoretical issues, we reanalyze Gartzke and Weisiger's empirical models and find additional problems. Their models analyzing the international system suffer from mulitcollinearity and time series problems, and remedying these problems weakens their conclusions. The operationalization of global democracy is also consequential. We reevaluate their dyadic analyses as well, and find that Gartzke and Weisiger's measure of dyadic difference tests for neither dyadic difference nor the democratic peace. Deciphering what they have actually tested, we find that their own results support, rather than undermine, the democratic peace. We conclude with an agenda for a more productive line of future research, and a recommendation that it is time for scholars to move past challenges and defenses of the basic democratic peace hypothesis.

Theory First

We agree with several aspects of Gartzke and Weisiger's article. One is that "important questions remain about how democracy causes peace at the system level" (p.131). We also concur that scholars should consider the economic behavior of democracies and the use of market influence as potential causal mechanisms of cultivating and preserving democracy and peace. And like Gartzke and Weisiger, we are not wed to the idea that the democratic peace is a given, or that it is inevitable. Despite this common ground, we are concerned about the logical consistency underpinning Gartzke and Weisiger's investigation of the

impact of systemic and dyadic democracy on the occurrence of militarized violence. Here we examine an ecological fallacy in their theory, and then demonstrate how hypotheses are better derived from our theoretical model (Kadera et al. 2003), which is in turn based on other democratic peace scholarship.

The Ecological Fallacy of Development and Peace

The central theoretical argument set forth by Gartzke and Weisiger is that when aggregated to the system level, economic development, not democracy, is the purveyor of peace. Gartzke and Weisiger argue that prosperity leads to peace because:

> Integration into the global economy creates efficiencies that make nations more prosperous, but developed countries are also more vulnerable to the destabilizing effects of external conflict. Developed nations are bound to care more about the conflict behavior of other nations, since conflict in turn affects prosperity (137).

In addition, Gartzke and Weisiger see an opportunity mechanism at work: "Development also provides the means to discourage destabilizing violence, either through reward or through punishment" (137). Together, the decreased willingness to fight (because it disrupts prosperity) and the increased opportunity to coerce reduce global levels of interstate conflict. This logic leads Gartzke and Weisiger to their Hypothesis 4: "Increases in economic development at the systemic level should result in a reduction in the number of militarized disputes" (137).

Several problems cause us to question this logic. First, the proposition that the pursuit of wealth and prosperity produces peaceful states is a conditional one, and Gartzke and Weisiger's theory does little to pin down how that conditionality translates into a global peace. States' paths to prosperity are often riddled with conflict. Competition over the resources that fuel prosperity suggest that the pursuit of wealth and economic growth can trigger violence as often as they mitigate conflict. Although Gartzke and Weisiger suggest that developing states can produce high rates of conflict if developed states derive too little from conflict management or benefit from permitting conflict or pursuing it themselves (137), they give us no *a priori* method for determining when developed states are (dis)interested in peace. In short, Gartzke and Weisiger offer no clear theoretical

mechanism aggregating individual states' levels of development to global patterns of conflict.

Moreover, for Gartzke and Weisiger's hypothesis to be distinct, their theory must demonstrate that development's pacific effect is not simply a product of increased capabilities. And for systemic development to supersede democratic community as a causal mechanism for global peace, its underlying theory requires emergent properties derived uniquely from development (and not democracy). This is like arguing that the Atlantic Charter's consequences for post-WWII politics were attributable to only Clauses Four (free trade), Five (economic cooperation) and Seven (freedom of the seas). Even the Fifth clause would be suspect, as it simultaneously calls for advancement of social welfare along with economic cooperation.

Third, even if we accept the premise that wealth generates peace, increased prosperity for one state does not imply that the entire system becomes more peaceful. Development occurs unevenly across space and time. Heterogeneous development inevitably creates haves and have-nots, such dynamics could plausibly cause war. Without a logical argument causally linking a state's development to implications at the systemic level, the conclusion that one state's prosperity should contribute to world peace is difficult to embrace.

Gartzke and Weisiger claim that systemic democratic peace scholars' work similarly suffers from logical flaws. They reason that "democracy cannot simultaneously be associated with peace at both the dyadic and systemic levels, and yet remain unobserved at the monadic level, at least not unless democracies are engaged in a surprising amount of hypocrisy" (130). This critique is anchored in Gartzke and Weisiger's suspicion that democracies do not genuinely hold peaceful norms that they externalize (135). But duplicitous behavior by democracies is not essential for a theory of systemic democracy and peace. Our formal model (Kadera et al. 2003), for example, does not assume that democracies are insincere, but it yields scenarios under which the system exhibits high levels of democracy and low levels of violence.[3] We now turn to a brief discussion of the

[3] This component of our 2003 model was not empirically evaluated because the focus of that research was on the survival of democracies.

model's core argument in order to demonstrate how more careful reasoning, facilitated by mathematics, can produce logically sound predictions. Notably, Gartzke and Weisiger had earlier noted that "Kadera et al. (2003) provide a rigorous deductive model ensuring that their hypotheses follow closely from the chosen logical primitives" (Gartzke and Weisiger 2006, 20-21).[4] At the core of that model is an argument that the collection of democratic states' pacifying effect is rooted in the requirement that democracies be *capable*; the notion of democratic community influence is a product of democracy and material strength.

Thinking Theoretically about Democracy and Conflict

To uncover the logic linking democracy and conflict, scholars consider the question at all three levels: are democratic states more peaceful than other states, are democratic dyads more peaceful than other dyads, and is the international system more peaceful as it becomes more democratic? The focus on the systemic question is the most infrequent, perhaps because we have only one system to observe. Additional issues make system-level analyses particularly challenging, the most famous of which is a variant of the ecological fallacy (Sprout and Sprout 1957, Alker 1969, Telhami 1990, Starr 1991, Ray 1998, Ray 2000). Simply put, it is often a mistake to assume that the sum of individual state (and dyadic) behavior can be attributed to individual states (and dyads), and *vice versa*.

In 1997, Gleditsch and Hegre published an integrated analysis of the democratic peace at all three levels of analysis (monadic, dyadic, and systemic). They mathematically demonstrate how states' democratic characteristics affect dyadic and systemic outcomes. In doing so, Gleditsch and Hegre carefully establish the logic of dyadic difference:

> Imagine that we have no democracies in the system at all. In that case, the frequency of war in the system is a function only of the probability of war among nondemocracies. If we introduce one democracy, the frequency of war must go up because (N - 1) dyads now become politically mixed with a higher probability of war, but there are as yet no double democracies where the probability of war is zero. On the other hand, if all countries but one are democratic, increasing democratization must decrease the frequency of war

[4] Another point on which we agree.

in the system because the last (N - 1) remaining mixed dyads are replaced by double democracies (1997:301).

This logic serves as a foundational component of the dynamic model of systemic democratic community, war, and democratic survival (Kadera et al. 2003). In that model, r_i refers to state i's regime characteristics, with $0 \leq r \leq 0.5$ indicting values ranging from pure autocracy to anocracy and $.5 < r \leq 1$ indicating regime values ranging from weakly to fully democratic. The level of conflict between state i and state j is expressed as c_{ij}. Using these basic elements, the authors construct a function *f*, the "dyadic regime effect on dyadic conflict" (Kadera et al. 2003, 237):

$$\begin{aligned} f(r_i, r_j, c_{ij}) &= \delta_{dd} c_{ij} r_i r_j, && if\ r_{i,j} > 0.5 \\ &= \delta_{nn}(1 - r_i)(1 - r_j), && if\ r_{i,j} \leq 0.5 \\ &= \delta_{nd}(1 - r_i)(1 - r_j), && if\ r_i > 0.5\ and\ r_j \leq 0.5 \end{aligned}$$

Where the δs are parameters and $\delta_{dd} < 0, \delta_{nd} > \delta_{nn} > 0$.

This effect varies depending on the type of dyad–democracy-democracy (dd), nondemocracy-nondemocracy (nn), or nondemocracy-democracy (nd). Regime (in)compatibility, akin to Gartzke and Weisiger's notion of dyadic difference, is thus represented by the various dyad types, the extent to which the states comprising them are highly autocratic or democratic, and their associated tendencies for augmenting or abating the conflict between them. Democratic dyads reduce extant conflict between them ($\delta_{dd} < 0$). Jointly autocratic dyads are prone to increasing their violence, but mixed type dyads are "the most escalatory" ($\delta_{nd} > \delta_{nn} > 0$) (238).[5]

Two points are worth stressing here. First, the notion that dyadic difference is dangerous is perfectly compatible with systemic models of regime and conflict dynamics that predict a democratic peace. Second, deriving systemic patterns in democracy and conflict from an aggregation of dyadic tendency is a complex and much discussed exercise (Gleditsch and Hegre 1997; Kadera et al. 2003; Ray 2000). Ray is particularly interested in the consequences of regime heterogeneity, and Crescenzi and Enterline (1999) relatedly

[5] We do not have space to represent the full model here, but encourage readers to (re)discover the original work.

demonstrate how aggregation might be only meaningfully achieved at regional, rather than global, levels. As such, it makes no sense to us that Gartzke and Weisiger hypothesize that heterogeneous populations of regime types in the system lead to violence (hypothesis 2), and that dyadic difference leads to violence (hypothesis 3), but that democracy in the system is unrelated to peace (hypothesis 1). Indeed, previous research transparently demonstrates how global democratic peace can emerge.

In sum, Gartzke and Weisiger approach a complex substantive topic with causal arguments that are too casually developed. Without a sound theoretical framework to understand the connections between development, difference, and conflict, their subsequent empirical research is of limited value. Not everyone in this business feels that way, however, so in the next section we take a closer look at the empirical models that drive Gartzke and Weisiger's conclusions that development and difference predict conflict and that democracy does not.

Rethinking Research Design Choices in the System Level Analysis

Our analysis begins by adhering to the data provided by Gartzke and Weisiger's replication files and preserving the structure of their models except when we explicitly fix specification problems that we have uncovered. As such, we revisit Gartzke and Weisiger's analyses on their own terms, so to speak, and nevertheless find key issues that, once resolved, undermine their substantive conclusions. We then also introduce a more complete measure of global democracy that we developed in our previous work (Kadera et al. 2003), which yields results consistent with the previous literature's expectations.

Gartzke and Weisiger's first assessment of global peace uses a negative binomial model to analyze the factors associated with the total number of fatal militarized interstate disputes (MIDs) begun in each year from 1816 to 2001. To test their first hypothesis, that "systemic democracy is unrelated to systemic peace," they introduce the variable *Average Polity*, which is the "mean [P]olity score in the system" (138).[6] In one model (Model 6 of

[6]In the body of the text, Gartzke and Weisiger call the variable *AveragePolity*, but *AveragePolity* does not appear in any of their tables. Where we would expect it, we find the variable *Democracy*, which appears to correspond with the variable labeled *avepol* in their replication files.

Gartzke and Weisiger's Table 1), they also include a "quadratic systemic democracy variable," *Average Polity*^{2}, in an effort to control for a "non-monotonic relationship between average democracy and international conflict" (138). Testing their second hypothesis, that increases in the system's regime heterogeneity produces more MIDs, Gartzke and Weisiger use a variable labeled *Difference*, the annual standard deviation of state Polity scores (which range between -10 and 10)[7]. Lastly, they measure systemic *Development* by using the COW measure of energy consumption, which is one of six measures of national material capabilities used in the Composite Index of National Capability (CINC) scores (Singer, Bremer, and Stuckey 1972). Because Gartzke and Weisiger refer to their measure as "global per capita energy consumption," we suspect they sum all states' energy consumption in a given year and divide by world population. Their control variables at the systemic level include trade dependence, the total number of states, and the chronological year, all of which are operationalized in rather standard ways.

Gartzke and Weisiger's model specification choices warrant a closer look. To begin, we look at the correlations across the independent variables, as reported in Table 1. Several of the variables are very highly correlated, particularly with time (*Year*) and the number of states in the system. This suggests Gartzke and Weisiger's approach, especially their decision to ignore relevant time-series lessons conveyed by Crescenzi and Enterline (1999), is problematic.

[7] Variable values in their replication files indicate that Gartzke and Weisiger switch to a somewhat unusual 0-10 Polity scale when measuring dyadic democracy variables in other analyses (Table 3, 141). No explanation is given.

Table 1: Correlations Across Independent Variables

	Polity Average	Polity Avg^2	Difference	Development	Trade	States	Year
Polity Average	1.00						
Polity Avg^2	0.19	1.00					
Difference	-0.19	0.10	1.00				
Development	0.04	**0.61**	**0.70**	1.00			
Trade	-0.09	0.00	-0.03	0.02	1.00		
States	0.14	**0.67**	**0.61**	**0.93**	0.08	1.00	
Year	0.12	**0.57**	**0.78**	**0.95**	**0.95**	**0.94**	1.00

Concerned that ignoring these controls undermines existing studies' findings, Gartzke and Weisiger worry that "even just the number of independent states in the system, might better account for broad changes in conflict behavior" (131). A bit later on, Gartzke and Weisiger mention "secular change in a number of processes" (138) as justification for the *Year* and *States* controls, but we find this rationale to be thin. Their related claim that "the proliferation of new states can easily be mistaken for an increase in systemic conflict" is also unclear. We disagree that including these controls is "prudent" (138), and the collinearity problems bear this out. An alternative is to theorize these temporal changes (Achen 2005). The challenge is that key over-time changes are captured by shifts in explanatory variables already under consideration: the prevalence of democracy, difference, and development. The populations of democracies and developed states co-evolve, which in turn produces changes in the occurrence of dyadic difference. Lacking a theory of that co-evolution, it is best to avoid the inclusion of such broad, atheoretical trends.

Nevertheless, we proceed with a closer look at this systemic analysis as if there are no major problems with the Gartzke and Weisiger models, focusing on Gartzke and Weisiger's most complete models, Models 5 and 6 from their Table 1 (p. 139). According to these two models, neither *Average Polity* nor *Average Polity*^{2} has an impact on the number

of newly begun fatal MIDs. In Models A and B of our Table 2, we replicate the results for Gartzke and Weisiger's fullest model of fatal MID onset. As is the case in Gartzke and Weisiger's original work, systemic democracy appears to be unrelated to the system-wide onset of violence.

Our first concern is that the *Average Polity* and *Average Polity*^{2} variables fail to account for the strength of the democratic states in the system, which was a key innovation in our earlier work (Kadera et al. 2003). We therefore replaced this measure with Gartzke and Weisiger's alternative measure of systemic democracy, *DemPower*, which Gartzke and Weisiger themselves introduce later on in their article, and its square. According to their text, this variable construction "adjusts average democracy scores to account for state capabilities" (131). This construction is imprecise, an important point to which we will return, but since Gartzke and Weisiger use this specification, we began with it.[8] Model C in Table 2 represents this alternative specification, and the results markedly change. By simply using the *DemPower* measure instead of *Average Polity*, we demonstrate that global democracy does reduce global levels of violence. Using the empirical range for *DemPower* (-.312 to .128) and the estimated coefficients for *DemPower* and *DemPower*^{2} produce a monotonic decline in the *Number of Fatal MIDs* as *DemPower* rises because the upturn from the squared term is not reached before *DemPower* reaches its maximum.[9] Thus, the overall impact of global democratic power on fatal MIDs is negative.

We were surprised by Gartzke and Weisiger's decision to use *DemPower* rather than the more complete measure of global democratic strength, *Democratic Community*, which we developed in our earlier work (Kadera et al. 2003). Our measure reflected the idea that an improved representation of global democracy would integrate the material capabilities

[8] Although Gartzke and Weisiger attribute their use of *DemPower* to a recommendation from our 2003 work, we do not recognize this variable. Gartzke and Weisiger's replication files only give the values of *DemPower*, not its raw components or the algorithm for determining its values, and their text gives an incomplete operationalization (131).

[9] A possible explanation for why Gartzke and Weisiger get no significant results for *Average Polity*^{2} is because they also include *Difference* in their models. In principle, both *Average Polity*^{2} and *Difference* account for the prevalence of mixed dyads in the system.

of democracies, the extent to which they were democratic, and their numeric prevalence, all relative to parallel features of the world's autocracies. Our read of Gartzke and Weisiger's text is that their intention was to represent this focus on democratic community strength with their *DemPower* variable, but we could not fully understand or replicate this measure. What we do know is that some observed values of *DemPower* are negative, so the variable does not simply sum democracies' share of global capabilities, which would result in only positive values. And we know that *DemPower*'s values do not match up with the specification for *Democratic Community*.

We therefore replaced *DemPower* with our measure of *Democratic Community*, first on its own (model D), then with its square (model E), and then while controlling for trade (model F). This measure is operationalized by taking each state in the international system for any given year and calculating the product of its Polity score and its CINC score. We then sum these products to get an annual systemic score. The indicator captures changes in regime quality and material capabilities. As capabilities concentrate among autocracies, this score turns negative. When capabilities concentrate among democracies, it is positive. As states become more democratic, the score increases. Reversions to autocracy dampen the overall strength of the democratic community.[10] Again, the results are noticeably different from the replicated Gartzke and Weisiger results. In all three models, as the global democratic community strengthens, the incidence of fatal MIDs decreases. Moreover, trade loses statistical significance.[11]

This reanalysis points to three conclusions. First, replication is not merely about reproducing published results. Unless measurement procedures and data sources are known, we cannot fully replicate analyses (Dafoe 2014; King 1995). Second, operationalization of variables representing global democracy must be tied to their

[10] Complete instructions for the components and specification of the *Democratic Community* variable are available in our replication files.

[11] These models are still problematic even with our measure of democratic community, and we do not suggest that they are now ideal. Our intent is to demonstrate that Gartzke and Weisiger's conclusions hinge on measurement choices for global democracy.

conceptualization and theorized understandings of how they affect militarized violence. Not only did Gartzke and Weisiger's *Polity Average* measure not capture our notion of a strong democratic community, but their *Development* measure did not incorporate the hegemon's interest in peace maintenance that was crucial to their theory. Third, all of the global democracy measures except Gartzke and Weisiger's *DemPower* are correlated with a decrease in the onset of fatal MIDs. Does this mean our knowledge concerning the impact of democracy is shaky? No. We systematically demonstrated that democratic community was a better theoretical concept and empirical predictor of conflict over a decade ago, so we were not surprised by *Polity Average*'s poor performance. Given this previous research and that Gartzke and Weisiger themselves shift to other measures of global democracy later in their article, their focus on averaged Polity scores limits their study's ability to inform our understanding of what drives systemic peace.

Table 2. Replication and Diagnostics of Gartzke & Weisiger's Negative Binomial Analysis of a **Systemic** Democratic Peace

Model Reference	(A)	(B)	(C)	(D)	(E)	(F)
D.V. # Fatal MID Onsets	Model 5 Replicated	Model 6 Replicated	Democratic Power, Nonlinear Factors	KCS Democratic Community	Democratic Comm, Nonlinear Factors	Democratic Comm & Trade
Variable	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Polity Average	-.038 (.069)	-.071 (.066)				
Polity Average^2		.004 (.014)				
Democratic Power			**-30.427** (11.34)**			
Democratic Power^2			**225*** (65.63)**			
Democratic Community				**-.128* (.053)**	**-.114* (.055)**	**-.136* (.06)**
Democratic Comm^2					-.005 (.014)	
Difference	.869*** (.24)	.736*** (.224)	.908*** (.196)			
Development	-.952** (.417)	-1.128*** (.394)	-1.314*** (.370)	-.875* (.385)	-.870* (.381)	-.858* (.426)
Trade	-57.01** (21.49)		-46.238* (20.21)			**-27.759 (19.307)**
# of Countries	.017* (.007)	.012* (.005)	.015* (.007)	-.001 (.003)	.0005 (.004)	-.001 (.005)
Year	0.0008 (.014)	.011 (.011)	-.006 (.012)	.037 (.006)***	.035*** (.006)	.037 (.007)***
Constant	-3.496 (25.3)	-24.52 (18.78)	-14.96 (22.42)	68.9*** (11.25)	-66.3*** (11.74)	69.6*** (13.7)
ln (α)	-3.391 (1.506)	-3.802 (2.082)	-3.76 (1.92)	-2.491 (.745)	-2.629 (4.605)	-2.415 (.665)
N	113	186	113	186	186	113
Log pseudo-like	-203.318	-275.745	-200.174	-284.597	-284.5	-211.8
χ^2	147.67***	239.77***	145.94***	199.6***	198.48***	115.16***

Deviations from Gartzke and Weisiger's findings are in **bold**. Sig.: ***: 0.1% **: 1% *5%. Values in parentheses are standard errors. All tests are two-tailed.

Rethinking Research Design Choices in the Dyadic Analysis

In order to speak to the dyadic democratic peace literature and to test two of their hypotheses at the dyadic level, Gartzke and Weisiger also conduct logit analyses of fatal MID onsets between pairs of states. The full Gartzke and Weisiger dyadic model is Model 14 in their Table 3, replicated as Model G in our Table 3.[12] The independent variables include *Systemic Democracy* (identical to *Average Polity* in Table 2), *Systemic Development* (identical to *Development* in Table 2), *Systemic Difference* (identical to *Difference* in Table 2), *Dyadic Democracy* (*low*) (the Polity score of the least democratic member of the dyad), *Dyadic Development* (a dyadic version of *Development*), *Dyadic Difference* (the difference between the dyad's highest and lowest Polity scores), and several controls. Based on this, Gartzke and Weisiger conclude that neither systemic nor dyadic democracy contributes to peace. Alliances also do not affect the onset of fatal MIDS. Given the rich literature establishing the robust contributions of democracy and alliances to the onset of interstate disputes, we took a closer look. We find that Gartzke and Weisiger's decision to leave out the *Systemic Democracy*^{2} term–the very same variable they earlier included to account for possible nonlinear effects of global democracy on conflict–biases the results in favor of their hypotheses. Additionally, their simultaneous inclusion of the *Dyadic Democracy* (*low*) and *Dyadic Difference* variables leads to an unexpected test of the impact of the *most democratic* state in the dyad rather than dyadic regime incompatibility. Addressing these issues yields results consistent with the democratic peace literature.

[12] Gartzke and Weisiger use RElogit. We use logit to replicate (almost exactly) their results and for all analyses in Table 3. In all of the models with a squared term (Models B, C, H, I, and J) we first centered the variable before squaring it. We ran these models with and without centering, with no significant differences in substantive results.

In our Table 3, Model H adds *Systemic Democracy*^{2}, which leads to a statistically significant effect. Over *Systemic Democracy*'s empirical range (-7.45 to 2.943), the net effect is an inverted-U.[13] Model I in Table 3 adds our 2003 *Democratic Community* variable and its square, the former being statistically significant and positive and latter being statistically significant and negative.[14] Again (over *Democratic Community*'s observed range, -5.945 – 5.603), an increase in global democracy initially spurs hostility up to some threshold, after which, it is pacifying. Increased global levels of democracy dampen dyadic conflict.

Second, we investigated one of Gartzke and Weisiger's key variables, *Dyadic Difference*. They measure this variable by shifting states' Polity scores to a 0-10 scale, then subtracting the lower Polity score from the higher for each dyad-year.[15] But when *Dyadic Democracy (low)* is included in the same model, as it is in Gartzke and Weisiger's analyses, the estimated coefficient on *Dyadic Difference* represents the effect of *Dyadic Democracy* (*high*). This leaves Gartzke and Weisiger without a test of dyadic regime incompatibility. Consider a simple logit with *Dyadic Democracy* (*high*) and *Dyadic Democracy* (*low*) as predictors:

$$\text{Prob(FatalMIDOnset)} = \frac{1}{1 + e^{-(\alpha\ Dyadic\ Democracy\ (low) + \beta\ Dyadic\ Democracy\ (high))}}$$

Compare that to Gartzke and Weisiger's specification using *Dyadic Democracy (low)* and *Dyadic Difference*:

$$\text{Prob(FatalMIDOnset)} = \frac{1}{1 + e^{-(\gamma\ Dyadic\ Democracy\ (low) + \delta\ Democractic\ Difference)}}$$

[13] Given our suspicion that *Democratic Difference* and a squared global democracy term both test for the inverted-U, we also ran Models H and J with *Democratic Difference* removed. The results are nearly identical to those reported in Table 3, except that *Systemic Development* loses statistical significance.

[14] In the uncentered version of model H, the coefficient for Democratic Community is statistically insignificant, but the coefficient for the squared term is negative and significant.

[15] In the analyses that generate Gartzke and Weisiger's Models 1-12 (Tables 1 and 2), a Polity scale between -10 and 10 is used. In Models 13-15 (Table 3), they shift to the use of an adjusted Polity scale between 0-10. No explanation is given.

Substituting and rearranging,

$$\text{Prob(FatalMIDOnset)} = \frac{1}{1 + e^{-((\gamma-\delta)\ Dyadic\ Democracy\ (low)+\delta\ Dyadic\ Democracy\ (high))}}$$

Now let us evaluate the effects of democracy using Gartzke and Weisiger's own model, as specified in Model G of Table 3. Model G's coefficient on *Democratic Difference*, $\delta = .105$, is properly understood as the coefficient on *Dyadic Democracy* (*high*). The coefficient on *Dyadic Democracy (low*), γ in the equations above, is -0.047. Thus, the true effect of *Dyadic Democracy* (*low*) is γ-δ = -0.047 - 0.105 = -.152, a more pronounced effect for the dyad's least democratic regime than γ = -0.047.

Therefore, we re-estimate Gartzke and Weisiger's model (Model G) without the difference variable (Model J), returning to the common technique of measuring the least democratic state in the dyad rather than the most (cf. Dixon 1993; Maoz 1997; Russett 1994). The results are in line with the extant literature. Dyadic *and* systemic democracy have negative and statistically significant impacts on the probability of fatal dispute onset. Moreover, the presence of an alliance between the states in the dyad has a negative, statistically significant effect on conflict onset.

Table 3. Replication and Diagnostics of Gartzke & Weisiger's Analysis of a **Systemic and Dyadic** Democratic Peace

Model Reference:	(G)	(H)	(I)	(J)
DV: Fatal MID Onset (yes/no)	G& W Model 14: Replicated	Nonlinear Systemic Democracy	Nonlinear Democratic Community	Dropping Dyadic Difference
Variable	β (SE)	β (SE)	β (SE)	β (SE)
Systemic Democracy	-.053 (0.034)	**-.131*** (.041)**		**-.094* (.041)**
Systemic Democracy^2		**-.044*** (.012)**		**-.041*** (.012)**
Systemic Development	-.643*** (.130)	-.423** (.156)	-.196* (.102)	-.498*** (.146)
Systemic Difference	.65*** (.085)	.359** (.122)		.451*** (.127)
Democratic Community			**.141*** (.037)**	
Democratic Comm^2			**-.044*** (.009)**	
Dyadic Democracy (low)	-.047 (.038)	-.048 (.038)	**-.109** (.035)**	**-.096** (.033)**
Dyadic Development	-.078 (.062)	-.071 (.06)	-.0430 (.046)	-.033 (.043)
Dyadic Difference	.105*** (.023)	.107*** (.023)		
Distance (ln)	-.239*** (.058)	-.241*** (.056)	-.224*** (.057)	-.229*** (.057)
Contiguity (dummy)	1.535*** (.426)	1.504*** (.422)	1.523*** (.432)	1.494*** (.433)
Alliance (dummy)	-.239 (.167)	-.243 (.167)	-.317 (.170)	**-.372* (.173)**
Capabilities (ratio)	2.495*** (.451)	2.487*** (.449)	2.409*** (.475)	2.42*** (.475)
Major Power (dummy)	1.656*** (.176)	1.655*** (.174)	1.611*** (.184)	1.662*** (.183)
Constant	-9.035*** (.717)	-7.181*** (.911)	-4.576*** (.510)	-7.346*** (.926)
N	619,104	619,104	619,104	619,104

Deviations from Gartzke and Weisiger's findings are in **bold**. Sig.: ***: 0.1% **: 1% *5%. Standard errors in parentheses. All tests are two-tailed.

Moving Forward: Asking Better Questions in Search of Complex but Stable Answers

Moving systemic scholarship past contrived debates about whether democracy or development produces peace requires us to theorize about how geopolitical environments emerge and how they shape state behavior. In particular, we still need to understand when systemic conditions are conducive to the emergence of economic interdependence between states, and how that interdependence might constrain or bolster different regime types.[16] Puzzling out the effects of global economics on states and their interactions requires better theories of how states and markets shape the economic environment within which regimes become more or less democratic (Li and Reuveny 2003, Milner and Kubota 2005) and leaders make decisions (Buzan 1984; Crescenzi 2005; Gowa 1994; Hirschman 1945). Rather than extrapolating state-level claims to the system-level using overly simplistic aggregation rules, we must pay attention to market structure and the potentially pacifying effects of economic exchange.

Can we separate global democracy's effects from the global economy's? Probably not, and we doubt that resolving this false dichotomy is useful. The *Democratic Community* concept was designed to integrate democratic norms and principles with the opportunities generated by economic and military strength. Additional evidence that democracy and development are complementary explanations is found in the consistent findings we present herein: both are reliable predictors of global peace. Those who insist that militarized violence can only be influenced by democracy *or* economics are obligated to provide a theory that is clear enough to generate predictions and guide empirical tests that distinguish when one factor is driving peace and the other is not.

Hampered by measurement issues and *ad hoc* model specification decisions, Gartzke and Weisiger's empirical findings are unstable. Shifting to an additive statistical model with no connection between theoretical argument and empirical model structure, they inadvertently fail to compete their notion of dyadic difference with the dyadic democratic peace. As such, they fail to provide useful tests of the democratic peace at any level of analysis. Advances in knowledge require careful mapping between theory and empirics.

---

[16] If only we knew something about how economic interdependence affects the onset of violence.

Keen observers will note that this is easier said than done. But given the extraordinary amount of effort already spent attacking and defending the notion that democracy can somehow insulate states from fighting, and given the vast (some might say, paradigmatic) body of evidence supporting this notion, the need for theoretical and empirical rigor has never been higher. Put simply, the brush has been cleared, and the easy questions have been answered. Proceeding with the more difficult issues of identifying causal mechanisms and challenging the homogeneity of the democratic peace will require transparency and rigor in theory development as well as empirical testing.

Kantian theories are not the only ones to benefit from the openness and transparency of empirical research. Gartzke and Weisiger illustrate the universal importance of replication files for understanding research design procedures such as variable measurement. Although their article conveyed the conceptual gist of *Dyadic Difference*, its specific structure and the consequences of that structure for their findings were ultimately found in the replication files. With space constraints imposed on articles, communicating measurement and testing decisions becomes more challenging but not less important.

References

Achen, Christopher H. (2005) Let's Put Garbage-Can Regressions and Garbage-Can Probits Where They Belong. *Conflict Management and Peace Science*, 22(4): 327-339.

Alker, Hayward R. (1969) A Typology of Ecological Fallacies. In *Quantitative Ecological Analysis in the Social Sciences,* edited by Mattei Dogan and Stein Rokkan. M.I.T. Press.

Buzan, Barry. (1984) Economic Structure and International Security: The Limits of the Liberal Case. *International Organization* 38(4): 597–624.

Crescenzi, Mark J.C. (2005) *Economic Interdependence and Conflict in World Politics*. Lanham: Lexington Books.

Crescenzi, Mark J. C., and Andrew J. Enterline. (1999) Ripples from the Waves? A Systemic, Time-Series Analysis of Democracy, Democratization, and Interstate War. *Journal of Peace Research* 36(1): 75–94.

Crescenzi, Mark J.C., Kelly M. Kadera, Sara McLaughlin Mitchell, and Clayton L. Thyne. (2011) A Supply Side Theory of Mediation. *International Studies Quarterly* 55(4): 1069–1094.

Dafoe, Allan. (2014) Science Deserves Better: The Imperative to Share Complete Replication Files. *PS, Political Science & Politics* 47(01): 60-66

Dixon, William J. (1993) Democracy and the Management of International Conflict. *Journal of Conflict Resolution* 37(1): 42–68.

Fazal, Tanisha. (2007) *State Death: The Politics and Geography of Conquest, Occupation, and Annexation*. Princeton, NJ: Princeton University Press.

Gartzke, Erik, and Alex Weisiger. (2014) Under Construction: Development, Democracy, and Difference as Determinants of Systemic Liberal Peace. *International Studies Quarterly* 58(1): 130–145.

Gleditsch, Nils Petter, and Håvard Hegre. (1997) Peace and Democracy Three Levels of Analysis. *Journal of Conflict Resolution* 41(2): 283–310.

Gowa, Joanne. (1999) *Ballots and Bullets: The Elusive Democratic Peace*. Princeton, NJ: Princeton University Press.

Harrison, Ewan. (2010) The Democratic Peace Research Program and System-level Analysis. *Journal of Peace Research* 47(2): 155–165.

Hartzell, Caroline, Matthew Hoddie and Donald Rothchild (2001) Stabilizing the Peace after Civil War: An Investigation of Some Key Variables. *International Organization* 55(1): 183-208.

Hirschman, Albert O. (1980) *National Power and the Structure of Foreign Trade*. University of California Press.

Kadera, Kelly M., Mark J. C. Crescenzi, and Megan L. Shannon. (2003) Democratic Survival, Peace, and War in the International System. *American Journal of Political Science* 47(2): 234–247.

King, Gary. (1995) Replication, Replication. *PS: Political Science and Politics* 28(3): 444-452.

Leeds, Brett Ashley. (1999) Domestic Political Institutions, Credible Commitments, and International Cooperation. *American Journal of Political Science* 43(4): 979-1002.

Leeds, Brett Ashley, and Burcu Savun. (2007) Terminating Alliances: Why Do States Abrogate Agreements? *Journal of Politics* 69(4): 1118-1132.

Lefler, Vanessa. (2015) Strategic Forum Selection and Compliance in Interstate Dispute Resolution. *Conflict Management and Peace Science* 32(1): 76–98.

Li, Quan, and Rafael Reuveny. (2003) Economic Globalization and Democracy: An Empirical Analysis. British Journal of Political Science 33(1):29-54.

Martin, Lisa L. (2000) *Democratic Commitments: Legislatures and International Cooperation*. Princeton, NJ: Princeton University Press.

Maoz, Zeev. (1997) The Controversy over the Democratic Peace: Rearguard Action or Cracks in the Wall? *International Security* 22(1): 162–198.

Melin, Molly. (2011) The Impact of State Relationships On If, When, and How Conflict Management Occurs. *International Studies Quarterly* 55(3): 691-715.

Milner, Helen, and Keiko Kubota. (2005) Why the Move to Free Trade? Democracy and Trade Policy in the Developing Countries. *International Organization* 59(1): 107-143.

Quackenbush, Stephen L., and Michael Rudy. (2009) Evaluating the Monadic Democratic Peace. *Conflict Management and Peace Science* 26(3):268-285.

Ray, James Lee. (1998) Does Democracy Cause Peace? *Annual Review of Political Science* 1(1): 27–46.

Ray, James Lee. (2000) On the Level(s): Does Democracy Correlate With Peace? In *What Do We Know about War?*, edited by John A. Vasquez. Rowman & Littlefield.

Russett, Bruce. (1993) *Grasping the Democratic Peace: Principles for a Post-Cold War World*. Princeton, NJ: Princeton University Press.

Singer, J. David, Stuart Bremer, and John Stuckey. (1972). Capability Distribution, Uncertainty, and Major Power War, 1820-1965. in Bruce Russett (ed) *Peace, War, and Numbers*, Beverly Hills: Sage, 19-48.

Sjoberg, Laura. (2012) Gender, Structure, and War: What Waltz Couldn't See. *International Theory* 4(1): 1-38.

Sjoberg, Laura. (2013) *Gendering Global Conflict: Toward a Feminist Theory of War*. New York: Columbia University Press.

Sprout, Harold, and Margaret Sprout. (1957) Environmental Factors in the Study of International Politics. *The Journal of Conflict Resolution* 1(4): 309–328.

Starr, Harvey. (1991). Democratic Dominoes Diffusion Approaches to the Spread of Democracy in the International System. *Journal of Conflict Resolution* 35(2) 356-381.

Telhami, Shibley. (1990) *Power and Leadership in International Bargaining: The Path to the Camp David Accords*. New York: Columbia University Press.