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To Conquer or Compel: War, Peace and Economic Development

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To Conquer or Compel War, Peace, and Economic Development*

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Abstract

Theories of economic development suggest variously that national income increases or decreases the propensity for states to fight, while systematic evidence of the impact of development on warfare is ambiguous or non-existent. The lack of empirical support for nominally opposing claims can be reconciled if elements of both perspectives are partially correct. We use a formal model to construct an explanation linking economic development with interstate conflict that resolves contradictory theories and a relative paucity of evidence. Development increases the ability of states to project power while decreasing the willingness of states to engage in conflict over certain issues. High income states fight less often to conquer tangible assets or territory, but fight more often to compel adherence to preferred policies and to police the global commons.

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1 Introduction

Students of international relations have long discerned in economic processes forces capable of transforming the politics of nations. Thucydides blamed Athenian lust for empire on the city's precipitous rise in economic fortunes. Over two thousand years later, Lenin argued forcefully that nineteenth century capitalism lead to imperialism. In contrast, scholars like Montesquieu, Smith, and Angell suggested ways that prosperity could bring peace. More recently, the increasing pace of economic development has ignited diverse speculation about how wealth influences interstate conflict. Countries are said to become more warlike as they get richer. Economic development increases the resources available to sovereigns, allowing for the accumulation and projection of military power. Development may even spur aggression through the drive to acquire raw materials and markets. Countries are also said to become more peaceful with prosperity. Economic development reduces the benefits (or increases the costs) of coercing populations, territory, and resources. Occupying armies are more expensive or less effective even as lootable assets can decline in value.

A conventional approach to resolving theoretical controversy is to let the data decide. Comparative testing relies on external validity to adjudicate the correctness of causal accounts where plausible explanations offer differing predictions.¹ Unfortunately, the available evidence of a causal linkage between economic development and conflict is ambiguous or non-existent. Qualitative research offers anecdotal support for (Angell 1933; Rosecrance 1985, 1996; Brooks 1999) and against (Carr 1939; Schweller 1998; Waltz 1999, 2000) the assertion that development encourages peace. Quantitative studies of conflict have also largely failed to clarify the relationship between development and dispute propensity.² The most common measure of economic development, average national income (GDP/population), has not produced a consistent systematic relationship between development and war or peace (Richardson 1960, East & Gregg 1967, Rummel 1967, Bremer 1992). Contrasting predictions combined with the lack of empirical support have led to the conclusion that economic development is largely inconsequential to interstate conflict (Maoz & Russett 1992).³

¹Comparative tests are problematic when theories are vague, data are noisy, and when no consensus exists about the appropriate paradigm or baseline statistical model. Still, we muddle through because an answer is necessary.

²Development is one of the most robust determinants of intrastate conflict (Collier & Hoeffler 2004, Elbadawi & Hegre 2008, Fearon & Laitin 2003). The argument here reconciles discrepant results for intra- and inter-state conflict.

³Lemke (2003) advocates research on development and conflict, while critiquing standard cross-sectional models.

We thus begin with two riddles. First, why do plausible arguments in the theoretical literature lead to contradictory conclusions about the effect of development on war and peace? Second, why is there so little evidence of a relationship between economic development and conflict, given that the theoretical arguments appear plausible? Using current claims and available evidence, it is possible to construct a more coherent and empirically grounded theory of development and war. In particular, we argue that contrasting explanations of the effects of development on dispute behavior are reconcilable. Prosperity does bring peace, but it also increases conflict. High income states are better equipped to project power abroad even as they are less inclined to seek physical conquest of resources and territory. Development makes states more likely to use force farther from home to influence global politics, but less likely to seek to subjugate neighbors. Resolving apparently contradictory claims also leads to better statistical evidence of the linkages between war, peace, and development. By itself, average national income is statistically insignificant, but even the crude effort to disaggregate the contrasting effects of development offered here leads to robust findings.

Whether economic development brings peace or aggression (or neither or both) is far from trivial. The twentieth century witnessed both unprecedented increases in the prosperity of some of the earth's citizens and warfare of unprecedented intensity and slaughter. To what degree these events foreshadow conditions in the twenty-first century will depend on our ability to unravel the tangled causal logic linking development to militarized violence. After reviewing the relevant literature, we identify elements of existing accounts that are most likely to prove empirically valid. Physical limitations on states preclude certain conflicts, either because opponents are distant, or because the cost of fighting exceeds any possible benefit for either party. Development increases the capacity of states to project power beyond their own borders, adding to the number of opponents a state may engage through violence. Conversely, development involves changes in the nature of economic production that discourage using force for certain ends. Traditional economies are intensive users of productive factors that are relatively easily captured through war (land, rooted labor, fixed capital). Post-industrial economies depend instead on factor inputs that are difficult to coerce (skilled labor, intellectual and financial capital), even as the cost of occupation increases. Development has contrasting effects, increasing policy conflicts while reducing fights over territory.

2 Studies of Economic Development and Interstate Conflict

It has long been argued that prosperity discourages conflict by making aggression unprofitable.⁴ One line of reasoning suggests that cultural/political factors such as nationalism make it difficult for states to occupy one another (Gilpin 1981).⁵ Identification with a large territory can serve as a commitment mechanism, stiffening resistance so that aggressors face an “all or nothing” decision (Goemans 2006). Another set of arguments claim that changes in the nature of modern economies create states that are disinclined to aggression (Rosecrance 1985).⁶ Still a third version suggests that modernization makes states unpalatable as targets of conquest (Brooks 1999). We focus on the last two forms of the argument, which appear at once more tractable and logically compelling.⁷

It has also long been argued that modernity encourages conflict by making aggression easier or more fruitful. Marxists argue that capitalist countries fight wars of expansion to capture markets and manage overproduction (Hobson 1938[1905], Lenin 1970[1916]). Other scholars see development combining with population growth to generate “lateral pressure” (Choucri and North 1975, 1989).⁸ Ashley argues that “war is mainly explicable in terms of differential growth...” (1980, page 3). Perhaps the most pervasive approach in international relations is to treat economic development as a permissive condition for conflict. Prosperity is an obvious source of military might.⁹ Development also increases state capacity and thus a state’s ability to project power (Kugler & Arbetman 1997).

Faced with unprecedented economic growth, researchers, politicians, and ordinary citizens of the world must ask whether modernity promises the best or worst of times in international affairs. For centuries, anecdotes and an intuitive set of logics have provided opposing views with the plausibility to persist, while the impetus of prevailing wisdom has tended to shift with evolving social trends, intellectual prejudices, or contemporary events, rather than through improved logic or systematic

⁴The review here is necessarily idiosyncratic. See Modelski & Thompson (1996) and Boehmer (2001) for more detailed literature reviews. For a discussion of the effects of war on economic development, see Thies & Sobek (2010).

⁵The argument is effectively the contradictory logic to the Huntington (1996) clash of civilizations thesis.

⁶Mueller (1989) claims that warfare has fallen out of fashion, that it is no longer acceptable behavior. Yet, other “unacceptable” behaviors such as gambling, drug use, and prostitution are also widely practiced (Kaysen 1990).

⁷The recent literature has shown less interest in nationalist “quagmire” arguments (see, Brooks 1999). Whether this is appropriate or not, it does not appear that cultural or other local factors interfere with our statistical tests.

⁸Zuk (1985) rejects the thesis that resource shortages lead to major power expansion. Tir & Diehl (1998) find “substantial limits to the validity of extending overcrowding arguments to ... interstate relations” (1998, page 336).

⁹The notion that development causes war is widespread but under-theorized (Lieberman 1996). “Very few existing analyses devote more than a page or two to the economic benefits of conquest” (Brooks 1999, page 648, fn. 1).

evidence. Modelski notes that “Where Comte and Spencer were struck by the antagonism between war and the industrial regime, observers at the turn of the century reached almost the opposite conclusion” (1961, page 120). The ebb and flow of optimism about a developmental peace continues, largely due to the absence of a “virtuous cycle” between what we know and how we explain it.

Theory evolves most rapidly in the presence of robust empirical evidence. Unfortunately, available evidence is weak or non-existent. Quantitative tests using a standard indicator of national income (Gross Domestic Product per capita) yield statistically insignificant results (Richardson 1960, East & Gregg 1967, Rummel 1967, Maoz & Russett 1992), while studies reporting a positive (Wright 1942) or negative (Bremer 1992) relationship appear to lack key control variables. Hegre (2000) finds that developed states are less dispute prone. However, use of Cox regression means that the identified relationship is relative to the baseline hazard of war in dyads. Because the argument put forward by development theorists is basically temporal, use of the Cox model is potentially suspect. Similarly, Peceny et al. (2002) find that developed dyads are less disputatious, but the use of a dummy variable for dyadic development omits much of the variation of interest while possibly capturing covariates of development, such as democracy, and intergovernmental organizations.

Little if any ambiguity exists concerning the relationship between development and *intrastate* conflict (Collier & Hoeffler 2004, Elbadawi & Hegre 2008, Elbadawi & Sambanis 2002, Ellingsen 2000, Fearon & Laitin 2003). Wallensteen et al. note that “it has been repeatedly observed that the onset of internal wars is related to the level of economic development” (2001, page 21). Fearon & Laitin find that GDP/pop. “is strongly significant in both a statistical and substantive sense” even when controlling for other factors including region, ethnicity, religion, prior conflict, territory, regime type and stability and foreign involvement” (2003, page 83). Hegre et al. (2001) find a curvilinear relationship between economic development and civil conflict similar to Hibbs (1973).

Research on globalization paints a dynamic picture of two distinct worlds, one in which development and economic integration have taken hold and in which peace and political stability prevails, and a second world in which the forces of economic modernization are resisted and in which strife and instability persists (Barber 1992, 1996; Friedman 1999; Inglehart and Norris 2001). Globally integrated dyads are more peaceful (Gartzke, Li & Boehmer 2001, Gartzke & Li 2003). Yet, it has

proven harder to assess the impact of the *fruits* of globalization, rather than economic ties, per se. We must wonder whether traditional motives for predation remain, held in check only by a veneer of inhibition about upsetting precarious prosperity, or whether global economic forces have altered incentives on a more fundamental level, so that states no longer covet the property of other polities.

A large and sophisticated literature explores the related question of cross-border economic linkages and their effects on interstate conflict (Bliss & Russett 1998; Keohane & Nye 1989; Oneal & Ray 1997; Oneal et al. 1996; Oneal & Russett 1997, 1999; Polachek 1980, 1997; Polachek et al. 1999).¹⁰ Yet, here too the magnitude (Morrow 1999) and/or robustness (Beck, et al. 1998) of these relationships has been called into question. One potential advantage of economic development is that it directly addresses the fundamental transformation of state interests. Rather than simply constraining or informing an otherwise rapacious state, development must alter the very interests nations have in pursuing conflict. In any case, trade and development are related but distinct economic processes. Indeed, advocates of a developmental peace argue that, rather than deterring aggression, economic modernity causes states to lose much of their value for the fruits of victory.

Evidence that modern economies still covet conquest would seem to refute the developmental peace. Liberman (1996) argues that military occupation of industrialized countries can prove more profitable than pillaging the poor, provided that occupiers are willing to be ruthless. Brooks (1999) takes issue with Liberman's research design and challenges some of Liberman's own evidence. By examining only cases in which aggression occurred, Liberman cannot say whether conquest is becoming less prevalent. At the same time, Soviet occupation of Eastern Europe, Liberman's only post-World War II example, was ruinously expensive (Bunce 1985). The Soviet Union appears to have stayed in Eastern Europe largely for geo-strategic reasons (Gorbachev 1995, pages 368–375; Rice 1986). Indeed, the relevant question for Liberman is not whether conquest can be made to pay, but whether the use of force is more lucrative than alternatives, such as negotiation or trade.¹¹

Though absent in dyads, a developmental peace is implied at different levels of analysis. The overall frequency of warfare has declined in recent years (c.f. Eriksson & Wallensteen 2004, Gled-

¹⁰See McMillan (1997) and Mansfield & Pollins (2001) for reviews of the literature on interdependence and conflict.

¹¹Liberman seems to acknowledge that this is not the case. "I leave aside external and noneconomic costs and benefits, such as the war costs of taking territory and defending it from outside powers" (Liberman 1996, page x).

itsch et al. 2002). Great power wars in particular have become scarce. Goldstein (2002), Holsti (1991), and Huth & Allee (2003) all find that fighting over territory is declining over time. Several authors note that, among states that experience disputes, territory remains a prominent reason for conflict (Hensel 2000; Vasquez 1993, 2001). However, the proportion of wars that are associated with territory, and the probability of a territorial war are two different things. Territorial disputes are much more likely to escalate to war (Senese & Vasquez 2003; Vasquez 2004; Vasquez & Henahan 2001, 2004). Territory can nevertheless remain a prominent cause of the wars that actually occur, while declining rates of warfare are attributable to a reduced tendency toward territorial conflict.

Several studies report that the effect of democracy on conflict is conditioned by development (Hegre 2000, Mousseau 2000, Mousseau, Hegre & Oneal 2003). Development and an interaction term between development and democracy appear significant in statistical models of militarized interstate disputes (MIDs). Only developed democracies appear to benefit from democratic peace. However, this still begs the question of what it is about development that discourages conflict. Developed non-democracies may also be less prone to engage in conflict. Conversely, the effects of development and democracy may differ across different types of disputes (Lu & Thies 2010).

Boehmer & Sobek (2005) find a curvilinear relationship between development and militarized disputes in a statistical model of monad (state) years. Poor states cannot project power while the rich do not desire to make war. Middle income states are the most dispute prone. Their use of linear and squared terms helps to identify contrasting implications of development, but it also obscures important conceptual distinctions between supply-side and demand-side effects (opportunity and willingness). The former imply a hard constraint; poor states cannot fight, while the latter impinges on developed countries as a function of preferences that remain obscure. The state-level research design of Boehmer & Sobek (2005) also cannot distinguish contrasting motivations of development. As the literature implies, rich states may be *both* more and less willing to fight, depending on the objectives for which force is contemplated. Below, we specify and disentangle these competing incentives, while also explicitly addressing the strategic setting in which these incentives operate.

3 Theory: How Development Influences Interstate Conflict

Saddam Hussein's invasion of Kuwait in the summer of 1990 brought about a direct confrontation between Iraq and the United States. While nations often fight because they both want the same thing, the goals of opposing sides in the Gulf War could not have been more different. Iraq sought to conquer valuable territory and tangible assets. The United States, for its part, was primarily concerned with compelling Iraq to withdraw its military forces and recognize *ex ante* territorial boundaries.¹² Left unaddressed in official statements and policy debates was the possibility that the United States could have used the war as a pretext to take physical possession of the oilfields it wrested from Iraq. In effect, the U.S. was demonstrating a preference for influence over occupation, while Iraq had done just the opposite. As an oil importing country, the United States might have benefitted from a cheap source of petroleum, but it appears that occupation of the Kuwaiti oilfields was recognized to be more costly or problematic than purchasing fuel on the open market. Iraq, in contrast, seems to have concluded that occupation of the very same oilfields would prove profitable.

Numerous factors might have contributed to differences in the way that the United States and Iraq exercised force.¹³ Here, we focus on the effect of economic development in altering national incentives to compete and possibly fight. Economic development changes how nations construct their armed forces (Gartzke 2001). The militaries of rich nations are intensive users of capital goods (ships, tanks, and aircraft), relying less on labor (sailors, soldiers, and airmen). Development also arguably changes the objectives nations have in using military violence. Developed countries are less inclined to seek to control physical territory. At the same time, developed countries should be more interested to seek to shape how nations behave, and how they interact. This shift in emphasis by developed states has been masked by the contrasting effects of economic development on conflict; developed states are not (much) less warlike, but they tend to fight over different things.

Force can be used either to conquer or to compel. Conquest is basically taking things (territory or other property), while compelling involves altering behavior (policies, practices). Development

¹²This difference in goals also helps to explain why the United States was able to organize a coalition to prosecute the war, while Iraq chose to "go it alone." U.S. objectives were policy-oriented and could be shared without diluting their value. To form a coalition, Iraq would have had to be willing to divide up its plunder.

¹³We consider and address a number of alternative explanations in the empirical sections later in this paper.

changes the calculus between these two alternatives, making conquest more costly and less rewarding, while increasing the value of compelling compliance in an increasingly integrated global system. Conquest involves establishing physical control over territory. Occupiers can extract rents, or directly exploit resources. Rent seeking can benefit the state to the extent that the cost of rule is smaller than the benefits extracted. Modernity potentially squeezes the margins of conquest at both ends, making subjugation more expensive while the value of the tangible assets that can be extracted is reduced by a secular decline in the value of “lootable” assets (Rosecrance 1985, Brooks 2005).

Despite its mineral wealth, for example, Iraq’s economy is basically traditional, with abundant unskilled labor and limited ability to absorb financial and intellectual capital. The United States, in contrast, is the largest developed economy in the world. Labor is skilled and expensive, while capital is abundant and relatively cheap. On purely economic grounds, the United States and other prosperous powers are generally better off “outsourcing” the control and exploitation of foreign territories, even those containing considerable mineral wealth. Globalization has simultaneously increased the dependence of productive economies on foreign markets, led a greater portion of the surplus from exchange to be mobile and therefore more difficult to capture with territory, and ensured that the most dynamic component of national economies is external to national borders. Rich states therefore have a more intense interest in controlling the terms under which states and other actors interact at the international level, and in efficiently policing the global commons.

Just as one can differentiate modes of conflict, it is possible to distinguish between different objectives in fighting. Imagine that actors compete over two basic categories of issues. First, actors can assert or dispute rights over tangible resources or property. To simplify, let us think of these assets as productive factors or, equivalently as *inputs* to the production process. Alternately, actors can compete or enforce prerogatives over intangible benefits that accrue only indirectly from production. Again, we can think of these prerogatives as policies or, equivalently as control over the surplus created by the interaction of actors through markets, institutions and other mechanisms. Domestically, one of the functions of government is to enforce property rights. Government can redistribute the inputs to production. But the other thing that governments do is to assign prerogatives through policies. These policies are still distributive, but they focus on the allocation

of benefits or welfare, rather than redistributing tangible, productive assets. Sovereigns can take or protect physical property, or they can assign rights or duties to various social processes. The state can, for example, tax either the holders or the sale of property. These two interventions are separable. In the first case, property rights are partially transferred to the state. In the second case, property rights remain in private hands (one need never pay the tax if one never sells one's property), but some of the surplus from any exchange is extracted by the state.

The manner and the degree to which government redistributes through control of property or through managing interactions depends on the extent to which the society has integrated and members have become specialized. Rent-seeking on property can extract value up to the point where the property owner is indifferent between maintaining property rights and paying the tax, or relinquishing claims to the property. Taxes on the exchange of property, on the other hand, are bounded by the surplus. As the level of interaction increases domestically, the value in controlling how interactions will take place, what kinds of interactions are acceptable and which are not, and in allocating portions of the surplus are bound to increase. It is important to recognize that this is far from a purely economic process, though we have stated it in economic terms here. Having the ability to reward or punish relationships, organizations or institutions has important distributional consequences within a society. For example, the fact that gay marriage is not formally recognized by U.S. federal authorities means that, in effect, homosexuals and others are subsidizing heterosexual union, despite the fact that property rights to labor, privacy, etc. are equal under the law.

The same dynamic between control of tangible and intangible goods occurs at the international level, but the absence of central authority means that enforcement is more complex and problematic. Again, nations can seek to control the tangible inputs to production, or the intangible products of international interaction. The former is intuitive; resources (land, minerals, rooted labor) are private goods generally associated with territory (Goertz & Diehl 1992, Vasquez 1993). States benefit from a given resource only by depriving others of access, often through physical control of the territory where the resource is located. Gains from interaction are multifaceted and more complex. Governments have substantial autonomy within their own borders, but nations must compete — and compromise or fight — in establishing policies whose impact extends beyond sovereign

territory. The ability to compel other nations to comply with a given set of policies is an expression of power with benefits that, though intangible, are no less valuable to the victor. International gains take many forms, including security, influence over third parties, and the (re)distribution of the economic surplus from international commerce. For example, as a result of the Gulf War, the United States was able to ensure a cheap, steady supply of oil. Interaction generally increases in economic development. Nations that are more active internationally create externalities that affect the interests of other states. Control over policies and the policing of the international commons impacts which states benefit and which nations are forced to bear disproportionate burdens.¹⁴

One remaining distinction should be made between attempts to conquer tangible goods and efforts to compel acquiescence to intangible policies or prerogatives. If the acquisition of territory and other productive assets allows for the aggrandizement of one state's prosperity or power, other states must become threatened. Resources are finite and competition for them is zero-sum, calling into play the logic of the security dilemma (Herz 1950, Jervis 1978). Conversely, policies that benefit one nation can still provide more or less benefit to other states, so that the degree of compatibility of interests among states will vary over policy issues in a way not possible over resources. The potential for overlap in state interests over policies but not over resources suggests that competition over resources and territory is inherently more conflictual, provided that both parties see benefit in controlling the same tangible goods. While we do not explore the non-zero sum features of gains from international interaction theoretically, we need to keep them in mind when assessing empirical relationships. States' policy goals will often be similar enough so that each prefers compromise to a violent confrontation. The implication is that conflicts over policies can be relatively less frequent and potentially less intense than conflicts over resources. There is substantial support in the literature for the notion that states fight more often and more intensely over territory than over policy differences (Goertz & Diehl 1992, Vasquez 1993).¹⁵ There are also reasons to believe that territory is less easily divisible than are policies (Toft 2003, Walter 2003).¹⁶

¹⁴Fearon (1998) shows that competition over the terms of cooperation increases as the value of cooperation increases.

¹⁵Boix (2003) demonstrates that autocrats flourish in a world in which leaders can effectively capture the productive wealth of a society. Democracy occurs when mobile capital allows wealthy elites to overcome the commitment problem implied in redistributive politics. These societies are presumably also less appealing to foreign invaders.

¹⁶While readily divisible in nominal terms, territory houses populations reluctant to be split up (Goemans 2006).

4 Modeling Development and Conflict

We next present a formal model that solidifies the intuition that development decreases conflict over resources/territory, while increasing policy conflict. We follow the modeling tradition that emphasizes the decision to initiate war (c.f. Jackson & Morelli 2007), though it is also possible to interpret the process in terms of rent-seeking (c.f. Hirshleifer 2001), as shown in Appendix A.¹⁷

4.1 The Building Blocks of the Model

Two nations, unimaginatively labeled country 1 and country 2, compete over possession of inputs to production and over control of the gains from international interaction. Without loss of generality, we assume that country 1 decides whether to initiate a contest with country 2. Country 1 chooses between maintaining the status quo (R), initiating conflict to acquire more territory (T), or fighting to influence country 2's policies or politics (F). Country 2 is not modeled as a strategic player.¹⁸

Payoff functions are discussed below. The payoff from peace (R) is as follows for country 1.

$$\pi_1^R = y_1 + \varphi S \tag{1}$$

where y_1 = the production output of country 1, S = the surplus available to be divided between country 1 and country 2, and where φ = the share of S obtained by country 1.

Similarly, $\pi_2^R = y_2 + (1 - \varphi)S$, where y_2 = production output of country 2. Thus, the payoff each country receives in the peaceful status quo includes its economic production as well as its share of any gains from trade, security or influence over the policies of the other nation in the system.

The production functions are the widely used Cobb-Douglas: $y_1 = AK_1^a L_1^b$, $y_2 = BK_2^c L_2^d$.

Following convention, economic output is assumed to be an increasing function of the total factor

¹⁷Countries resolve their differences diplomatically as well as through force (Fearon 1995). Bargaining failures are an additive component of the processes leading to war, since the lack of a motive for conflict is sufficient to explain the *absence* of military disputes (Gartzke 1999, Reed 2003). Omitting bargaining from the model could lead to incorrect estimates of the probability of conflict due to economic development, but should not interfere with comparative statics estimates of the *relative size* or *direction* of these effects. Since incorporating bargaining makes the model complex, analytically intractable, and since it does not promise any additional insights, we omit bargaining from the model.

¹⁸The model's predictions hold for more complicated frameworks. Obviously, the results are analogous if the roles are inverted (country 2 decides whether to initiate conflict). We could also focus on a dynamic setting where in each period with some probability one of the two countries can choose whether to initiate conflict. In a dynamic game with infinite horizon the Folk theorem applies and cooperation can be sustained through trigger strategies.

productivity (A, resp. B), physical capital and territory (K_1 , resp. K_2) and labor (L_1 , resp. L_2).

The gains available to states from interacting can be approximated by the gravity model commonly used in trade theory (Isard 1954, Bergstrand 1985). In particular, $S = \frac{ky_1y_2}{e} = \frac{kAK_1^aL_1^bBK_2^cL_2^d}{e}$, where e = distance, k = parameter capturing other factors. Introducing y_1 and S in π_1^R , we obtain:

$$\pi_1^R = AK_1^aL_1^b + \varphi \frac{kAK_1^aL_1^bBK_2^cL_2^d}{e} \quad (2)$$

In the event of conflict, we assume that some proportion C of productivity is lost to fighting.¹⁹ Country 1 is assumed to appropriate in territorial conflict a share s_1^T of country 2's territory and capital, while country 2 is able to appropriate a share s_2^T of country 1's territory and capital.²⁰ For simplicity, the size of s_1^T and s_2^T (and also of s_1^F below) are treated as exogenous in this baseline framework. Respective shares are related to the fighting strength of the countries and we can think of them as depending on economic, social and geographical characteristics.²¹ The payoffs of conflict over territory are expressed as follows for country 1 (analogous payoffs exist for country 2):

$$\pi_1^T = s_1^TK_2 + (1 - C_1^T)A [(1 - s_2^T)K_1]^a L_1^b + \varphi \frac{k(1 - C_1^T)AK_1^aL_1^b(1 - C_2^T)BK_2^cL_2^d}{e} \quad (3)$$

where C_1^T = portion of country 1's productivity lost as friction (analogous definition for C_2^T).

Thus, country 1's payoff is composed of its remaining GDP, of the territory and capital it acquires through conflict, and of its part of the gains from economic and political interaction.²²

We assume that territorial conflict involves appropriating territory and capital, K , rather than stealing labor, L , or total factor productivity (TFP), B . While not critical for our results — the predictions of the model survive if we allow states to capture the whole of GDP — arguments in the literature claim that it is harder to appropriate TFP or labor, especially from economically developed countries. Use of this “worst case” assumption avoids conflating our theory with claims

¹⁹The predictions of the model are robust to alternative ways of characterizing war friction. In Appendix A we detail one such alternative in which C is treated as the opportunity cost of foregone productive activities.

²⁰We can set $s_1^T = 1 - s_2^T$ and interpret s_1^T as the probability that country 1 appropriates all of country 2's capital.

²¹As discussed in Appendix A these parameters could be made endogenous and could depend for example on fighting efforts. Such an interpretation would be consistent with rent-seeking models but does not alter our results.

²²It is necessary to make assumptions about the timing of territorial conflict: First, war destroys a part C of a state's productivity. The corresponding decimated output is the one relevant for S . Second, capital is appropriated (as “victory” follows “onset”). The model's predictions are robust to other assumptions about the timing of war.

about the shifting effectiveness of appropriating other factors, though this may also be the case.

The payoffs for policy conflict are displayed below for country 1 (it is analogous for country 2).

$$\pi_1^F = (1 - C_1^F)AK_1^aL_1^b + s_1^F \frac{k(1 - C_1^F)AK_1^aL_1^b(1 - C_2^F)BK_2^cL_2^d}{e} \quad (4)$$

where s_1^F = the part of S captured by country 1, C_1^F = the portion of country 1's productivity that is lost as friction from fighting over policy (an analogous definition applies to C_2^F).

Thus, the payoffs of country 1 under policy conflict are composed of its GDP and its revised share of the gains from economic and political interaction with country 2.

4.2 Explaining Conflict Onset

We can start by discussing under what conditions country 1 prefers territorial conflict (T) to retaining the peaceful status quo (R). This condition can be expressed as follows:

$$\begin{aligned} \pi_1^T - \pi_1^R &= s_1^T K_2 + AK_1^a L_1^b [(1 - s_2^T)^a (1 - C_1^T) - 1] \\ &\quad + \varphi \frac{kAK_1^a L_1^b BK_2^c L_2^d}{e} [(1 - C_1^T)(1 - C_2^T) - 1] > 0 \end{aligned} \quad (5)$$

Partial derivatives $\frac{\partial(\pi_1^T - \pi_1^R)}{\partial A} < 0$, $\frac{\partial(\pi_1^T - \pi_1^R)}{\partial B} < 0$ and $\frac{\partial(\pi_1^T - \pi_1^R)}{\partial K_1} < 0$, yield the following threshold:

$$A^T \equiv \frac{s_1^T K_2}{K_1^a L_1^b [1 - (1 - s_2^T)^a (1 - C_1^T)] + \varphi \frac{kK_1^a L_1^b BK_2^c L_2^d}{e} [1 - (1 - C_1^T)(1 - C_2^T)]} \quad (6)$$

$A^T > 0$ always holds. If $A < A^T$ country 1 prefers territorial conflict. If $A > A^T$ it prefers peace.

We use total factor productivity to represent development. These concepts are strongly related, and all of today's developed countries exhibit high total factor productivity. If country 1 is developed (implying $A > A^T$), initiating territorial conflict is not worthwhile. Rising factor productivity increases the cost of fighting over territory (higher opportunity costs from foregone production and lower gains from interaction). A similar threshold exists for country 2's productivity level B .

$$B^T \equiv \frac{e \{s_1^T K_2 + AK_1^a L_1^b [(1 - s_2^T)^a (1 - C_1^T) - 1]\}}{\varphi kAK_1^a L_1^b K_2^c L_2^d [1 - (1 - C_1^T)(1 - C_2^T)]} \quad (7)$$

If $B > B^T$, territorial conflict is not appealing to country 1. If the gains from interaction with country 2 are large enough, it becomes too costly to fight over territory. Please note that, for similar levels of A and B , the magnitude of this effect is smaller for B than for an equivalent increase in A . Interestingly, increasing K_1 would have a very similar effect as an increase in A and would also deter country 1 from initiating territorial conflict. An increase in K_2 has ambiguous effects.

We can also analyze the condition under which policy conflict (F) is preferred to peace (R):

$$\pi_1^F - \pi_1^R = -AK_1^a L_1^b C_1^F + \frac{kAK_1^a L_1^b BK_2^c L_2^d}{e} [s_1^F(1 - C_1^F)(1 - C_2^F) - \varphi] > 0 \quad (8)$$

Note that when two countries are completely symmetrical they never have incentives to fight over policy. A necessary condition for country 1 to fight over policy is that it receives a small share φ of the gains of interaction, relative to the costs and benefits of fighting, i.e. $s_1^F(1 - C_1^F)(1 - C_2^F) - \varphi > 0$.

In this case $\frac{\partial(\pi_1^F - \pi_1^R)}{\partial B} > 0$ clearly always holds, while $\frac{\partial(\pi_1^F - \pi_1^R)}{\partial A} > 0$ holds for large values of k , B and K_2 , and small values of e and φ . Whether the left hand side of the expression (8) above is positive or negative does not depend on A , but only on B . It becomes worthwhile to start policy conflict rather than to remain at peace if B is above the following threshold, i.e. $B > B^F$.

$$B^F \equiv \frac{eC_1^F}{kK_2^c L_2^d [s_1^F(1 - C_1^F)(1 - C_2^F) - \varphi]} \quad (9)$$

To summarize, in a more developed world (larger A and B) the scope for policy conflict increases. For the sake of completeness, we also compare territorial conflict (T) and policy conflict (F).

$$\begin{aligned} \pi_1^T - \pi_1^F &= s_1^T K_2 + AK_1^a L_1^b [(1 - s_2^T)^a (1 - C_1^T) - (1 - C_1^F)] \\ &+ \frac{kAK_1^a L_1^b BK_2^c L_2^d}{e} \left[\varphi(1 - C_1^T)(1 - C_2^T) - s_1^F(1 - C_1^F)(1 - C_2^F) \right] \end{aligned} \quad (10)$$

As mentioned earlier, policy conflict is only feasible if $s_1^F(1 - C_1^F)(1 - C_2^F) - \varphi > 0$. If this condition does not hold, we can simply refer to the earlier comparison between T and R . If this condition holds, then it must also be that $\varphi(1 - C_1^T)(1 - C_2^T) - s_1^F(1 - C_1^F)(1 - C_2^F) < 0$. If C_1^T and C_1^F are of a similar magnitude, then $(1 - s_2^T)^a (1 - C_1^T) - (1 - C_1^F) < 0$ must also hold. Under these

mild conditions, as expected $\frac{\partial(\pi_1^T - \pi_1^F)}{\partial A} < 0$ and $\frac{\partial(\pi_1^T - \pi_1^F)}{\partial B} < 0$. As our two-state world becomes more developed, territorial conflict tends to subside, and conflict over policy becomes more likely.

Figure 1 displays the three outcomes that result from country 1's decision, given particular parameter values.²³ Productivity/development (A) is on the x-axis, while the status quo share of the gains from interaction (φ) is on the y-axis. Territorial conflict dominates for low levels of development, while higher development moves country 1 towards either peace or policy conflict.

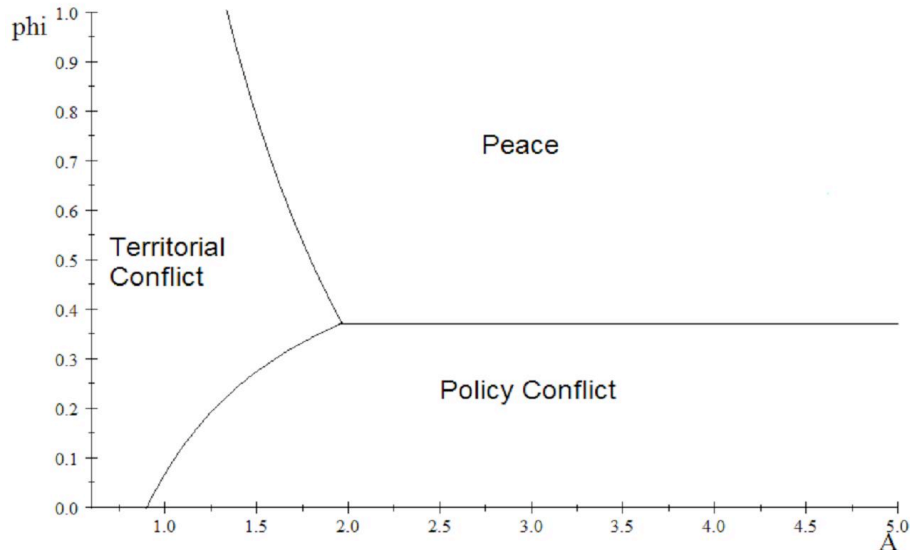


Figure 1: Three outcomes in the model of development and conflict

4.3 Hypotheses

We conclude this section by discussing links between the theory and the empirical world. Parameter values will vary for numerous exogenous reasons. Similarly, development will not cross appropriate thresholds for every country during the period for which data are available. Nevertheless, increasing development should tend to push productivity from below to above threshold levels A^T , B^T and B^F . Given the comparative statics, we can test these relationships using standard statistical techniques.

First, as the model demonstrates, increasing productivity (A) decreases the tendency for states to experience conflicts over territory/resources. Since this result is monadic (country 2 is a non-

²³ $s_1^T = s_2^T = s_1^F = 0.5$, $C_1^T = C_2^T = C_1^F = C_2^F = 0.1$, $B = 1$, $K_1 = 1$, $K_2 = 3$, $L_1 = L_2 = 1$, $a = c = e = k = 1$.

strategic actor), adopting the “weak link” approach is appropriate (Dixon & Goertz 2005).²⁴

Hypothesis 1 *Dyads are **less likely** to experience a territorial dispute the more developed the least developed state in the dyad.*

The complement to the territorial claim involves disputes not involving territory. Again, as the model reveals, development makes policy conflict more attractive as the gains from interaction grow larger. Developed states are more willing (and better equipped) to focus on issues not directly related to territory/resources. The intensity and overall propensity toward conflict behavior may decline, as policy disputes appear more amenable to negotiation and bargained solutions. We again adopt the weak link approach as an appropriate representation of this implication of the model.

Hypothesis 2 *Dyads are **more likely** to experience a non-territorial dispute the more developed the least developed state in a dyad.*

Development increases both the ability of states to project power and the value of influence in distant places. We can use the known relationship between territorial conflict and contiguity to construct additional hypothesis (Vasquez 1993). Claims about contiguity and development only indirectly test predictions of the model. However, it is worth better understanding the relationship between proximity and development (Diehl 1991, Hensel 2000), even while additional assessment may be useful. Economic development should tend to increase conflict in non-contiguous dyads.

Hypothesis 3 *Non-contiguous dyads containing developed states are more likely to experience militarized disputes than non-contiguous dyads containing at least one developing state.*

Developed countries should be better able to fight neighbors as well as distant states. They should be less interested in fighting neighbors, however, given the close relationship between contiguity and territory. The model also suggests that developing states should be more inclined to attack prosperous neighbors. Developed neighbors are predicted to be particularly peace prone.

Hypothesis 4 *Contiguous dyads containing two developed states are less likely to experience militarized disputes than contiguous dyads containing at least one developing state.*

²⁴It does not follow that the effect should be observable monadically, because other aspects of conflict are strategic.

5 Research Design

To assess the relationship between development and militarized conflict, we examine data covering the post-World War II period. We also extend the analysis over the period 1816-2000 using a slightly cruder indicator of economic development. As a baseline, we begin with a statistical model of conflict developed by Oneal & Russett (1999), thus limiting the need for detailed description of the variables and allowing for a broader comparison of our results. There is potential bias in analysis of militarized conflict, given the large disparity between events (“1’s”) and non-events (“0’s”). For this reason, we estimate coefficients using rare events logit (King & Zeng 2001a, 2001b) within the *Stata* software package. Independent variables are lagged by one year to address endogeneity. We use the Beck, Katz and Tucker (1998) method of temporal splines to control duration dependence.

5.1 Data

Many of the variables used in the study are generated using the EUGene software package (Bennett & Stam 2000). Additional variables are from other sources detailed below. A *Stata* “do” file is available from the authors that replicates all aspects of data construction and empirical analysis.

5.1.1 Dependent Variables

We examine three dependent variables from the militarized interstate disputes (MIDs) dataset (Gochman & Maoz 1984; Jones et al. 1996). First, we use a dummy for MID “onset” as defined by Maoz (1999), where (1) is a dispute, and (0) is no dispute.²⁵ Second, we use the two state-level revision type variables in the MID data (*mzrevt11* and *mzrevt12*: 0=none, 1=territory, 2=policy, 3=regime, 4=other) to differentiate between disputes involving territory and those involving non-territorial conflict. Finally, we distinguish between casualty-producing, and non-casualty MIDs using the variable *mzfatald* (0=no battle deaths, 1=1 to 25 deaths, 2=26 to 100 deaths, 3=101 to 250 deaths, 4=251 to 500 deaths, 5=501 to 999 deaths, 6=at least 1000 battle deaths). Additional discussion of these variables and related issues appears below as needed in the results section.²⁶

²⁵The Maoz dataset omits dyads where states fight on opposite sides, but not against each other (e.g. Soviet Union and Thailand in the Vietnam conflict). Our results can also be generated using the standard “COW” dispute data.

²⁶We plan subsequent analysis on data on territorial conflict (Tir et al. 1998; Huth & Allee 2003; Hensel 2001).

5.1.2 Key Independent Variables

Recall that development is expected to decrease conflicts over territory, while increasing non-territorial disputes. At the same time, developed countries should be more able but less willing to fight with neighboring countries (over territorial issues), while both more willing and able to fight distant states (over policy, regime or other issues). We thus need to examine two variables, one for development, and the other for the interaction between development and distance or contiguity.

- *Economic development*: The consensus measure of development, GDP per capita, has yielded mixed or inconclusive results in other research (Boehmer 2001, Maoz & Russett 1992). We suspect that the insignificance of per capita GDP is due to the contrasting effects of development on territorial versus non-territorial disputes. *Development (Low)* measures the lower of the two per capitized GDP statistics in a dyad. These data come from Gleditsch (2002).²⁷

In addition to GDP, we measure development as per capita energy consumption using the Composite Indicators of National Capability (CINC) component *energy*, which indicates national energy consumption in thousands of coal-ton equivalents (Small & Singer 1982, Singer 1990). These data have been widely used elsewhere as a proxy for GDP (Lipset 1959; Burkhart & Lewis-Beck 1994; Hegre et al. 2001) and are available over a longer time period.

- *Development* \times *Contiguity*: A second pair of variables isolates the effect of prosperity on likely subjects of territorial aggression.²⁸ A decline in the value of conquest should most affect relations with neighbors, where territorial claims are most common and occupation most practical. The interaction should be associated with a lower likelihood of a MID.

5.1.3 Additional Variables

- *Democracy*: We measure democracy using the Polity IV data (Jagers & Gurr. 1995). Polity data provide two eleven-point indexes of regime type based on formal constraints on the executive and institutional support for democracy (Gurr et al. 1989; Marshall and Jagers

²⁷We take the natural log of GDP/population. Coefficient estimates using the unlogged variable are comparable.

²⁸Each linear term in an interaction matrix must be interpreted as if the other linear terms equal zero (Braumoeller 2004). This is not a problem here, as *Contiguity* is dichotomous. All of the interacted terms are also highly statistically significant. Finally, we also examine the effects of the key linear term (*Development*) in separate samples.

2002). We prepare monadic values by combining Polity democracy (DEMOC) and autocracy (AUTOC) scales as follows, $[(\text{DEMOC}_i - \text{AUTOC}_i) + 10]/2$, (where $i \in [A,B]$).²⁹

- *Trade dependence*: Dependence is measured as the sum of bilateral imports and exports for a country, divided by gross domestic product (GDP) (Oneal & Russett 1997). We again use the Gleditsch (2002) data and adopt the weak link assumption to construct a dyadic measure.
- *Geographic Contiguity and Distance*: Given the role of willingness in this study, and the interaction between opportunity/willingness and proximity, it is particularly important to address the effects of proximity. Neighbors are generally more likely to fight than states that are geographically distant. *Contiguity* is a dichotomous variable for dyadic partners with shared land borders or that are separated by less than 150 miles of water, either directly or through ongoing colonial possessions. Contiguity is expected to increase the likelihood of a MID. *Distance* is the natural logarithm of the great circle distance between national capitals, or of the closest major cities for large countries. Distance should diminish militarized disputes.
- *Major Power Status*: Major powers are more active internationally and fight more often. We include a dummy variable, *Maj. Power*, coded “1” if at least one state in a dyad is a major power according to the COW criteria. We also examine dummies for the United States and for the EU in additional tests in Appendix C (these results are substantially the same).
- *Allies*: Studies commonly include a measure for alliance ties (Oneal & Russett 1997, Russett & Oneal 2001). *Alliance* codes the presence of a defense pact, neutrality pact, or entente using COW Alliance codings (Singer & Small 1966, Small & Singer 1990, Gibler & Sarkees 2004).³⁰
- *Capabilities*: COW CINC scores measure material capabilities, computed as the weighted average of a state’s share of total system population, urban population, energy consumption, iron and steel production, military manpower and military expenditures. *Capability Ratio* equals the CINC owned by the least powerful state, divided by the sum of CINC’s in the dyad ($0 \leq \frac{\text{CINC}_{\text{low}}}{\text{CINC}_A + \text{CINC}_B} \leq 0.5$). Higher ratios should (i.e. parity) should increase disputes.

²⁹This construction differs from Oneal and Russett in that we add 10 and divide by 2 to yield the 0 to 10 range of the Polity data. We find equivalent results using interpolated values or replacing missing values with the mean.

³⁰A dummy variable that coded only the presence of defense pacts produced equivalent results.

- *Dyad Longevity*: A variety of factors associated with the duration of the dyadic relationship may mistakenly be attributed to a causal variable that changes over time (Daxecker 2007). Culture, politics, and the sampling problem in the MIDs data associated with “sovereignty,” while not modeled here directly, are addressed by a variable measuring the age of a dyad.
- *Temporal Dependence*: We control for temporal dependence using the Beck, Katz & Tucker (1998) technique. We construct four spline variables for each of the dependent variables by interpolating the splines from the Beck, Katz & Tucker dummy matrix Tucker (1999).

6 Results

In the sections below, we first report results of statistical tests of an interaction between economic development and contiguity in order to assess hypotheses 3 and 4. We deal with these hypotheses first because doing so involves a minimal change to the basic Oneal & Russett (1999) specification. We next examine separately the impact of development on territorial disputes and the influence of development on non-territorial (policy) conflict. In addition to the results discussed in the text, Appendix C provides an analysis and justification for the claim that neighbors fight over territory, while Appendix D reviews a detailed list of possible alternative explanations or confounding factors.

6.1 Interacting Proximity and Development

Table 1 lists coefficient estimates, standard errors, and other statistics for four regressions estimating the relationship between economic development and MID onset. Results for the spline variables are omitted to save space. Model 1 serves as a baseline, including only the overall linear effect of economic development. Development is not statistically significant. Model 2 adds the interaction term between development and contiguity. Results with the combination of linear term and interaction are much different. Both development variables are statistically significant at the 0.1% level. Signs for each development coefficient are also in the directions anticipated by hypotheses 3 and 4.

The substantive effect of development on conflict can be seen in Figures 2 and 3. In each figure, the vertical axis represents the probability of a dispute. The horizontal axis reports average national

Table 1: (Re)Logit Models of Economic Development and Militarized Interstate Disputes

D.V.: MID Onset (Maoz)	1: Baseline (1950–2000)	2: Interact Contiguity	3: Interact Distance	4: Energy Use (1816–2000)
Development (Low)	-0.103 (0.118)	0.422**** (0.130)	1.287** (0.471)	0.531**** (0.109)
Develop. × Contig.		-0.695**** (0.159)		-0.662**** (0.172)
Development/Distance			-9.227*** (3.320)	
Democracy (Low)	-0.102*** (0.033)	-0.098**** (0.030)	-0.150**** (0.029)	-0.091**** (0.019)
Democracy (High)	0.128**** (0.027)	0.133**** (0.028)	0.091**** (0.028)	0.106**** (0.020)
Trade Dep. (Low)	-0.792 (10.880)	1.924 (8.609)	11.299**** (2.779)	
Contiguity (dummy)	3.153**** (0.255)	8.525**** (1.319)	2.329**** (0.245)	2.744**** (0.200)
Distance (ln)	-0.163**** (0.030)	-0.154**** (0.030)	-2.024**** (0.543)	-0.150**** (0.024)
Maj. Power (dummy)	1.357**** (0.208)	1.339**** (0.208)	2.692**** (0.273)	1.194**** (0.151)
Alliance (dummy)	-0.193 (0.157)	-0.139 (0.152)	-0.116 (0.285)	-0.093 (0.123)
Capability Ratio	1.391*** (0.466)	1.370*** (0.466)	2.377**** (0.655)	1.085*** (0.348)
Intercept	-4.885**** (0.371)	-9.028**** (1.059)	7.945 (4.137)	-5.379**** (0.200)
N	370307	370307	360358	491581

Significance : * : 5% ** : 1% *** : 0.5% **** : 0.1% Standard errors appear in parentheses.
Intercept and temporal spline variables suppressed. Details and additional results available from the authors.

income in percentiles. Each figure plots the predicted relationship between development, proximity, and MIDs using the CLARIFY software package (Tomz, et al. 2003).³¹ Both figures also include

³¹CLARIFY creates probability distributions around point estimates from regression coefficients by resampling. Alex Weisiger generously shared a STATA “do” file automating the process of calculating and plotting these values.

dashed lines representing the 95% confidence intervals. Figure 2 examines the effect of development on contiguous dyads. Figure 3 reports the effect of economic development on non-contiguous dyads.

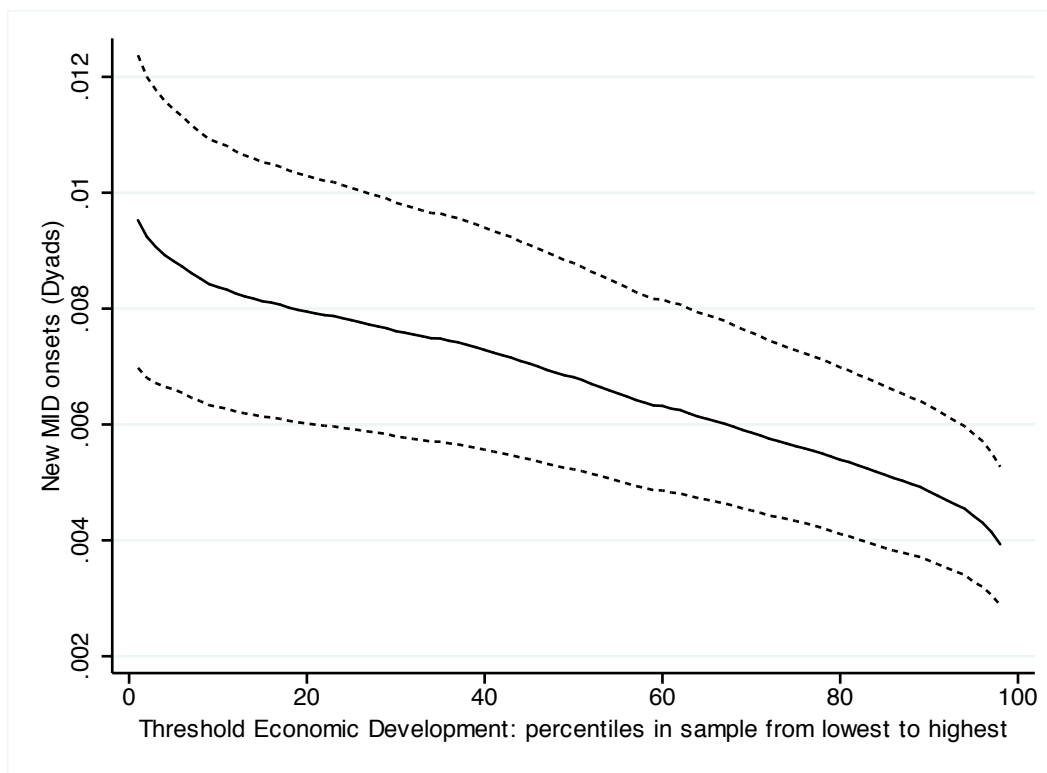


Figure 2: Prob(MID) for Values of Development in Contiguous Dyads (Model 2)

Two conclusions emerge from a comparison of the two figures. First, development clearly has a statistically significant, monotonic effect on whether states fight. Second, the nature of the relationship is contingent on contiguity. Neighbors fight less as they develop. Non-contiguous dyads do the opposite, becoming more disputatious as members develop economically. Note also that the probability of a MID in contiguous dyads is much higher than for non-contiguous dyads. The most disputatious neighbors (developing states) have a dispute probability of almost 0.1, while the most conflict prone non-contiguous dyads have a dispute probability of less than 0.0006. If the number of distant dyads and neighbors were equivalent, then the effect of development for contiguous dyads would overwhelm that of non-contiguous dyads. There are of course many more non-contiguous dyads. The result is that there is no overall effect of development on militarized

disputes (Model 1), but disaggregating by proximity reveals contrasting relationships. Neighbors fight less as they become more developed economically while distant states become more conflict prone, even accounting for the effects of capabilities, trade, regime type, and other variables.

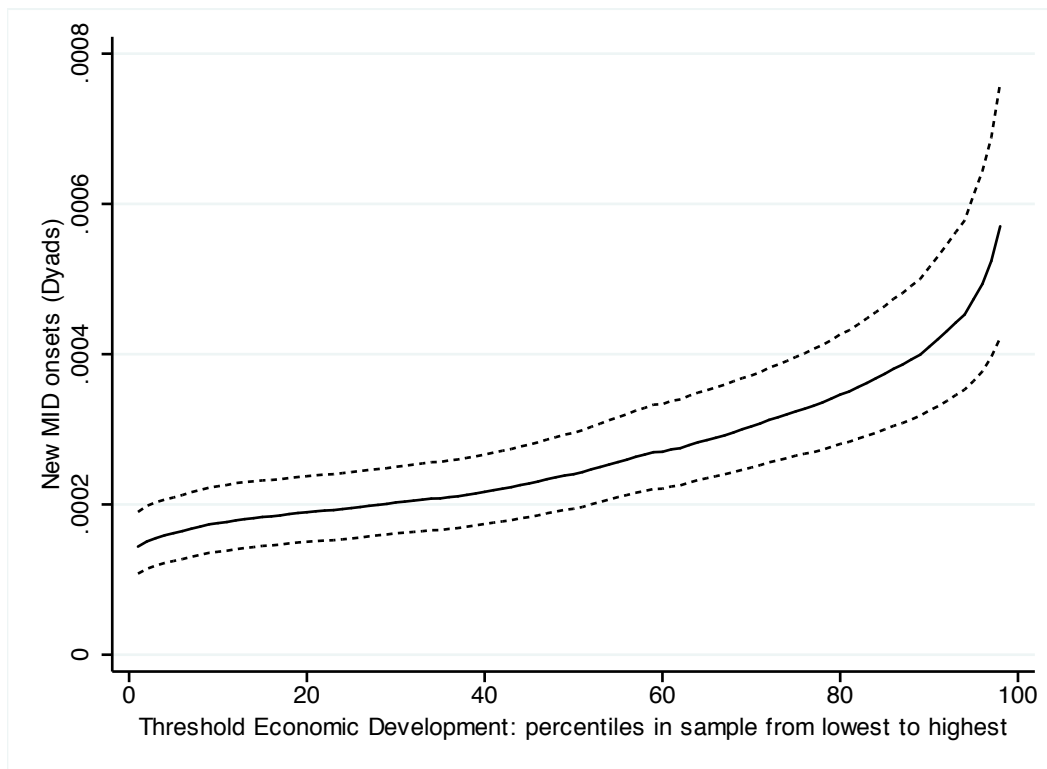


Figure 3: Prob(MID) for Values of Development in Non-contiguous Dyads (Model 2)

It is also informative to examine the relationship between development and conflict using a metric measure of distance. Model 3 in Table 1 substitutes distance for contiguity in the interaction term with development. Results using distance are essentially the same as those using contiguity. This is important because it addresses a potential concern about using contiguity as a proxy for material versus policy disputes. Studies have noted that contiguity does more than simply dichotomize distance (Diehl 1985, Senese 2005). While the evidence is not yet clear, some have argued that contiguity also contains information about the interests/preferences/willingness of states (Herz 1951, Siverson & Starr 1991). To the degree that contiguity and distance differ, these differences do not appear to impinge on the relationships of greatest interest here.

Figure 4 plots the effect of development and distance on disputes. In the figure, the vertical axis reports the probability of a militarized dispute in a given dyad year. The axis on the right represents increasing distance. GDP decreases on the other axis from front to back, creating a region of “rich neighbors” in the foreground. A “ridge” runs through the figure from “poor neighbors” to “rich strangers.” Conflict moves farther from home as states become richer.

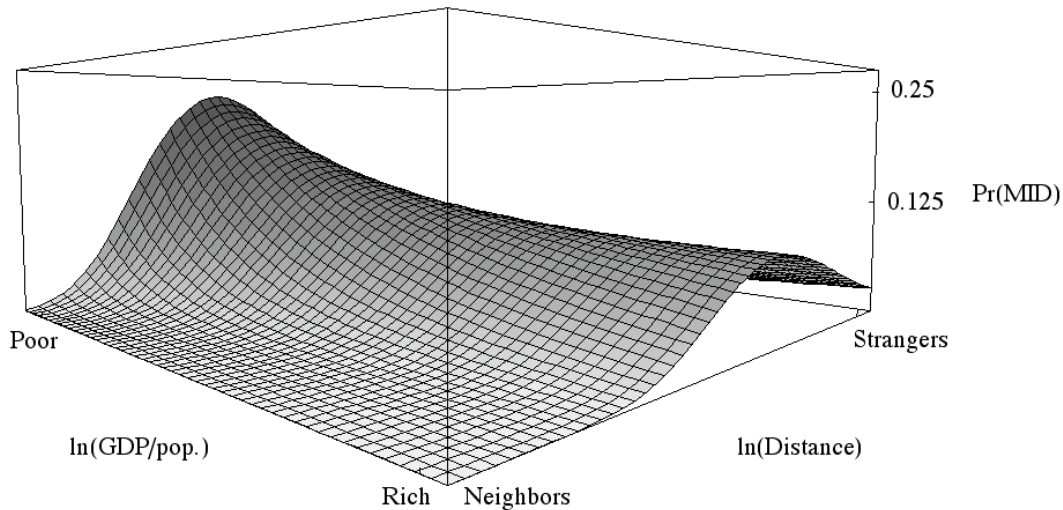


Figure 4: Prob(MID) for Values of Development and Distance (Model 3)

The final regression in Table 1 substitutes COW energy consumption per capita for GDP per capita. Use of *Energy Use* makes it possible to examine a longer time series (1816 - 2000). We drop the trade variable because of missing data. Even where the trade variable is significant, as in Model 3, the contrasting effects of development remain statistically significant. The results are equivalent to Models 2 and 3 in Table 1, indicating that the findings are quite general for the modern era.

6.2 The Effect of Development on Territorial Disputes

While the relationships reported in Table 1 support hypotheses 3 and 4, and help to explain some of the variation in conflict behavior in contiguous and non-contiguous dyads, a more precise test of our argument involves distinguishing between territorial/resource disputes and policy/regime conflicts. Table 2 lists three regressions estimating the probability of territorial MIDs. Non-territorial MIDs

are coded as non-disputes. We drop the interaction term with contiguity, since only territorial MID's now appear in the sample, and add *Development (High)*, so that the effects of disparate development are also captured in the regressions. If developed states are less likely to experience territorial conflict regardless of the characteristics of their partners, then high values of either variable should be associated with fewer territorial disputes. *Development (Low)* is statistically significant and negative, indicating that developed states have fewer territorial disputes. However, while *Development (High)* has a negative sign, the coefficient is not significant. Both states must be developed to reduce territorial conflict. Otherwise, the less developed state retains an interest in territory, forcing the developed state to protect itself. Note that democracy does not discourage territorial conflict, though regime type difference increases the risk of territorial disputes (Huntington 1993).

In Model 5, the dependent variable is coded as “1” if there is a MID in a given dyad year and the COW revision type code for either dyad member reports that the dispute is territorial. In Model 6, we further restrict the sample of disputes to territorial MID's involving battlefield fatalities.³² Resource competition implies an intensity of conflict that may not include minor disputes. The MID coding of “territory” includes disputes that are only nominally over resources, such as conflicts involving posturing by rivals (# 608, “1958-1959 Berlin Deadline Crisis”), militarization of strategic geography (# 1135, “Occupation of Abu Musa and the Tunbs Islands”), or symbolic or identity-driven conflicts (# 2059, “Macedonian Question”). There may also be reporting bias in these data. Denser media coverage of developed countries is more likely to document minor interstate disputes. Limiting analysis to casualty-producing MID's reduces the sample of dispute onsets by 65%,³³ increasing standard errors, but the smaller sample addresses both potential problems. Weaker results for territorial MID's with casualties might suggest cause to question the study's findings. In fact, the size of the coefficient for *Development (Low)* increases by half in this smaller sample.³⁴ In other respects, these results are largely unchanged. Model 7 relies on energy consumption to measure economic development, extending the temporal domain with similar results. Finally, it might be argued that these results reflect a lessening of tensions in Europe and other regions

³²*Development (Low)* remains significant even when both sides must have territorial revision codes (only 67 MID's).

³³There are 790 territorial dispute onsets and 280 fatal territorial onsets from a total of 2601 MID's in the sample.

³⁴The standard error increases by about one third, reflecting a loss in information given the smaller sample of 1's.

Table 2: (Re)Logit Estimates of Economic Development and Territorial MIDs

D.V.: MID Onset (Maoz)	5: Either State Rev. Type = 1	6: Fatal MID Rev. Type = 1	7: Energy Use Rev. Type = 1
Development (Low)	-0.499**** (0.155)	-0.730**** (0.208)	-0.574** (0.216)
Development (High)	-0.021 (0.276)	-0.010 (0.310)	-0.034 (0.168)
Democracy (Low)	-0.042 (0.044)	-0.022 (0.067)	-0.072 (0.037)
Democracy (High)	0.169**** (0.047)	0.228**** (0.056)	0.150**** (0.041)
Trade Dep. (Low)	4.417 (9.071)	-8.719 (36.732)	
Contiguity (dummy)	4.332**** (0.468)	5.192**** (0.776)	3.630**** (0.310)
Distance (ln)	-0.206**** (0.045)	-0.304**** (0.067)	-0.199**** (0.036)
Maj. Power (dummy)	0.112 (0.287)	-0.444 (0.333)	0.256 (0.168)
Alliance (dummy)	-0.527 (0.291)	-0.609 (0.338)	-0.243 (0.186)
Capability Ratio	0.795 (0.851)	1.065 (0.972)	1.017 (0.640)
Dyad Duration	0.015**** (0.003)	0.017**** (0.004)	0.013**** (0.002)
Intercept	-3.666 (2.020)	-4.043 (2.266)	-6.783**** (0.364)
N	370307	370307	491581

Significance : * : 5% ** : 1% *** : 0.5% **** : 0.1% Standard errors appear in parentheses.

Intercept and temporal spline variables suppressed. Details and additional results available from the authors.

where borders have stabilized, and norms have been established to address territorial conflicts (Zacher 2001, Fazal 2007). For this reason, we add a variable coding the number of years a dyad has been in existence. *Dyad Duration* should account for learning, norm creation or other related processes within the dyad. Surprisingly, the variable is positive and highly statistically significant.

6.3 The Effect of Development on Non-Territorial Disputes

We next assess a dependent variable based on the MID revision types for non-territorial disputes, with results reported in Table 3. Findings are again consistent across the three regressions in the table. Developed countries are more likely to experience non-territorial disputes. Boehmer & Sobek (2005) suggest that development should have a non-linear effect on dispute propensity. While the relationship does not hold for territorial conflict, adding the development quadratic variable does provide a better fit for the impact of development on non-territorial disputes.³⁵ Democracy also differs in its impact between territorial and non-territorial disputes, with *Democracy (Low)* significantly reducing the probability of non-territorial disputes. Major power status, which has no effect on territorial disputes, significantly increases conflict over policy, regime status, and other non-territorial issues. *Dyad Duration* again increases the likelihood of militarized conflict.

Turning to additional details of the models in Table 3, Model 8 reports the impact of development and other variables on disputes in which either dyadic member was coded as having largely non-territorial aims. It is also possible to use only MIDs where both states in the dyad are listed in the COW revision type codes as engaging in non-territorial conflict, though the number of such cases is relatively small.³⁶ Results are also generally comparable, though statistical significance is lower. Model 9 restricts the sample to non-casualty producing non-territorial conflicts. The fact that the results are largely unchanged suggests that the distinction is not critical; the important difference is between territorial and non-territorial MIDs. Finally, Model 10 using energy consumption shows that the effect of development on policy conflict is consistent over time.

Figure 5 depicts the estimated relationship between development and non-territorial disputes, based on Model 8. Non-territorial conflict increases for most values of development, though the most developed dyads are significantly less likely to fight. The concave relationship between development and conflict appears to conform with Boehmer & Sobek (2005). Yet, this resemblance is superficial and incomplete. First, the effect of economic development is concave only for policy/regime

³⁵With three development variables — linear, squared, and cubed — none of the variables is statistically significant. We also examined a dependent variable coded “1” only for revision type two (policy) MIDs. Using this stricter coding (724 MID cases), both the linear and squared development variables remain highly statistically significant ($p = 0.001$).

³⁶Roughly 65% of the dyadic MID onsets coded as “territorial” in this study have no fatalities. About 75% of non-territorial MIDs involve no casualties (1029 of 1376), and over 83% of policy MIDs are not deadly (603 of 724).

Table 3: (Re)Logit Estimates of Economic Development and Non-Territorial MIDs

D.V.: MID Onset (Maoz)	8: Either State Rev. Type \neq 1	9: Non-fatal MID Rev. Type \neq 1	10: Energy Use Rev. Type \neq 1
Development (Low)	4.334**** (1.217)	4.817**** (1.371)	0.269*** (0.089)
Development (Low²)	-0.277**** (0.078)	-0.298**** (0.087)	
Democracy (Low)	-0.117**** (0.025)	-0.103**** (0.026)	-0.119**** (0.018)
Democracy (High)	0.075**** (0.022)	0.081**** (0.023)	0.067**** (0.017)
Trade Dep. (Low)	9.316 (7.708)	3.975 (9.531)	
Contiguity (dummy)	2.795**** (0.309)	2.788**** (0.321)	2.200**** (0.237)
Distance (ln)	-0.133**** (0.030)	-0.116**** (0.031)	-0.116**** (0.024)
Maj. Power (dummy)	1.399**** (0.197)	1.424**** (0.199)	1.184**** (0.156)
Alliance (dummy)	-0.246 (0.188)	-0.367 (0.205)	-0.186 (0.142)
Capability Ratio	0.800 (0.422)	0.970* (0.454)	0.662 (0.350)
Dyad Duration	0.009**** (0.002)	0.009**** (0.002)	0.011**** (0.002)
Intercept	-22.710**** (2.020)	-25.758**** (5.358)	-5.837**** (0.207)
N	370307	370307	491581

Significance : * : 5% ** : 1% *** : 0.5% **** : 0.1% Standard errors appear in parentheses.

Intercept and temporal spline variables suppressed. Details and additional results available from the authors.

conflict. As we have seen, the probability of territorial/resource disputes declines monotonically in economic development.³⁷ Second, the relationship here reflects dyadic interactions and the use of

³⁷Plotting the results for territorial disputes is not necessary, since this relationship is a simple monotonic function.

the threshold weak link assumption.³⁸ Developed states must be fighting with moderately developed, rising powers in order for these states to appear more conflict prone. Only dyads containing two highly developed states are less likely to experience policy conflict. Satiation (i.e. corner solutions) occur in our model where developed states have managed to capture much of what they want. If as discussed policies are non-zero sum, then states with similar policy interests need not fight.³⁹ Third, given the results for contiguity, it also appears that developed states are particularly likely to agree with neighbors over policy issues, perhaps because development and other variables such as democracy tend to cluster geographically (Gleditsch 2003). At the same time, developed states more often dispute issues with distant states. This implies that developed nations are more likely to fight over policy differences, where they exist, as indicated by hypothesis 2.

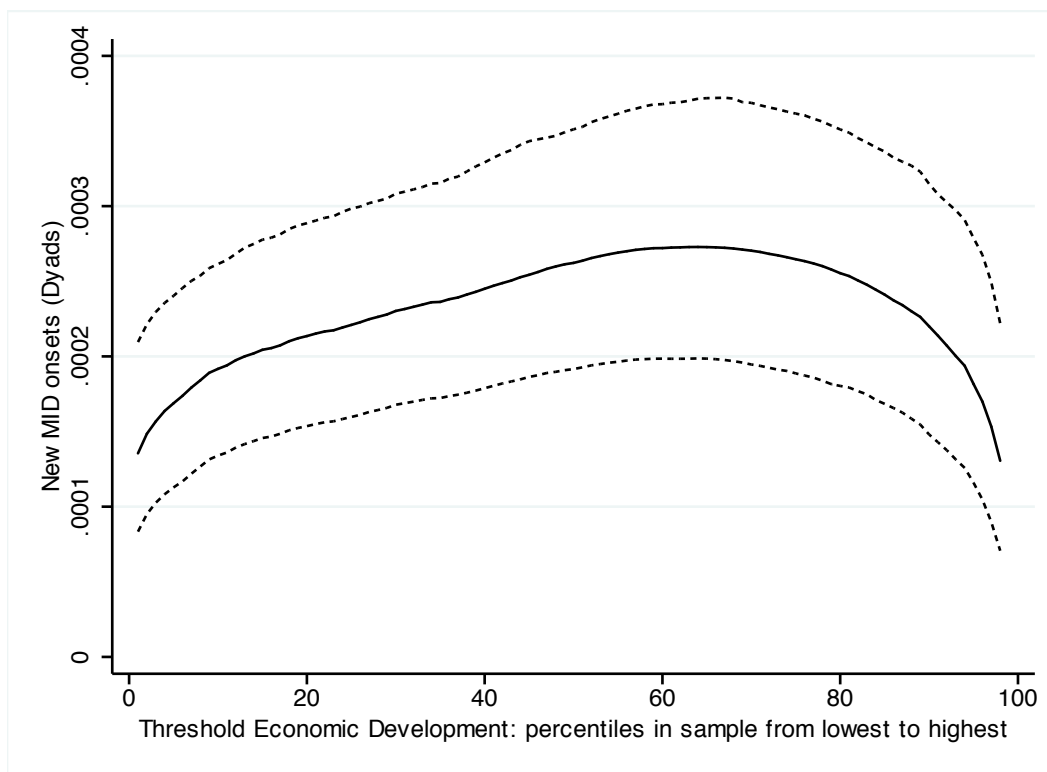


Figure 5: Prob(Non-territorial MID) for Values of Development and Development² (Model 8)

³⁸ *Development (high)* is not significant in the regression, indicating that the weak link approach is adequate.

³⁹ Power transition theory makes similar claims about the satisfaction of status quo powers, but focuses on material capabilities, rather than economic development (Organski 1958, Organski & Kugler 1980, Lemke 2002). Developed countries also have a broader “menu” of non-military means for obtaining preferred policies, including sanctions, intergovernmental organizations, and foreign aid (c.f., Baldwin 1985, Chan & Drury 2000, Alesina & Dollar 2000).

7 Conclusion

There are of course many reasons why the results reported here may not completely characterize the relationship between economic development and interstate conflict. Future processes might depart from historical patterns. Alternately, better measurement might reveal other trends. More careful estimation could conceivably demonstrate that rich states are as likely to conquer as compel. Nevertheless, the results reported here appear to be robust to numerous alternative explanations.

We are left with the possibility that economic development has two contrasting effects on conflict; an increase in the tendency to fight for influence (where needed) and a decrease in the motivation to capture real estate. A stronger economy brings with it the potential to exercise force at greater distances from the homeland, broadening the number of possible targets for coercion. Yet, the general tendency is for developed countries to fight less often than they might. Capacity and inclination are operating in opposite directions, particularly with regard to territorial disputes. Contiguous neighbors are the most obvious target for revisionist warfare. Yet, at least one appeal of conquest is removed if the benefits of occupation fail to meet costs. A secular decline in commodity prices and an increase in the value of skilled labor ensure that the fruits of conquest are more equivocal for developed states. Indeed, the recent precipitous rise in commodity prices may be cause for some concern. Alternately, it could be that developed countries are reluctant to engage in conquest because aggression disrupts markets at home. Further research is required to determine whether development acts more to inhibit aggression from or toward developed states.

World peace is a long way off, but you may be able to see some of it from the results reported here. Previous reports stressing the essential irrelevance of economic development for interstate peace certainly merit some additional skepticism. Development, while a mixed bag, seems on the whole to offer a means for reducing the intensity, and in some cases the frequency, of interstate disputes. Territory has historically formed the basis for the bloodiest and most intractable wars. We show that the intensity of interstate violence among developed countries is much lower than among developing countries. It is more than speculation to conclude that warfare in modernity involves smaller and/or less protracted contests. If economic development broadens to include more of the world's nations, one can hope that peace, if partial and incomplete, will eventually follow.

Appendix A: Rent-Seeking Interpretation of the Model

In the main version of the model in the text, contest success and the losses from fighting are exogenous. In contrast, the rent-seeking literature (Hirshleifer 2001) treats these factors as endogenous. Success depends on fighting effort as well as how countries budget for production or appropriation.

Imagine as before that country 1 chooses between R , T and F in the first stage. In the second stage, optimal levels of fighting effort are chosen. If R is chosen the game finishes after the first stage. If T is selected, in the second period both players choose what part of their time budget to use for territorial appropriation, Q , and what part for productive activities, L . Similarly, when F is selected in the first stage, both players decide in stage two what time to allocate for fighting over policy, G , or for production, L . Thus, the time constraints $L_1 + Q_1 = 1$, and $L_1 + G_1 = 1$, respectively, must hold. For modeling the shares we can use the standard ratio form contest success functions (c.f. Skaperdas 1996): $s_1^T = \frac{Q_1}{Q_1+Q_2}$, $s_2^T = \frac{Q_2}{Q_1+Q_2}$, $s_1^F = \frac{G_1}{G_1+G_2}$, $s_2^F = \frac{G_2}{G_1+G_2}$. The loss of fighting now corresponds to the foregone gains from production: $C_1^T = Q_1$, $C_2^T = Q_2$, $C_1^F = G_1$, $C_2^F = G_2$. This game can be solved through backward induction. In such a framework the previous result of the comparison between T and R would continue to hold: $\frac{\partial(\pi_1^T - \pi_1^R)}{\partial A} < 0$ and $\frac{\partial(\pi_1^T - \pi_1^R)}{\partial B} < 0$. The comparison between F and R would also have the same structure as in the main text, although now s and C would be endogenous. Under mild conditions our previous results continue to hold.

Appendix B: Allowing for Joint Territorial and Policy Conflict

We can also build a simplified “rent seeking”-style model that allows for both territorial and policy conflict to occur at the same time. This version of the model has the advantage that it predicts how fighting effort would be allocated across both types of conflict. Countries 1 and 2 have the option to choose between productive activities, L , fighting over policy and output, G , and appropriating territory, Q . Formally, this can be expressed by the time (budget) constraint listed below (A1).

$$L_i + G_i + Q_i = 1 \tag{A1}$$

where $i = 1, 2$, refers to country 1 and country 2.

The payoff functions of country 1 and country 2 are as displayed below.

$$\pi_1 = s_1^F(y_1 + y_2) + s_1^T(T_1 + T_2) \quad (\text{A2})$$

$$\pi_2 = s_2^F(y_1 + y_2) + s_2^T(T_1 + T_2) \quad (\text{A3})$$

where s_1^F = share of output secured by country 1, s_1^T = share of territory secured by country 1, s_2^F = share of output secured by country 2, s_2^T = share of territory secured by country 2, y_1 = production output of country 1, y_2 = production output of country 2, T_1 = initial territory endowment of country 1, T_2 = initial territory endowment of country 2. $s_1^F = 1 - s_2^F$, $s_1^T = 1 - s_2^T$.

In this simplified framework territory does not enter the production functions, but has a value of its own, which could for example be related to prestige or to future gains from natural resources.

Outputs for the two countries are given by the simplified production functions $y_1 = AK_1L_1$ and $y_2 = BK_2L_2$, respectively, where A and B are the total factor productivities and K_1 and K_2 are the capital levels. The results also hold for more complex production functions and for the inclusion of territory. The same contest success functions are included for the shares s as in Appendix A.

For simplicity we solve the model for symmetrical players, with $A = B$, $K_1 = K_2 = K$ and $T_1 = T_2 = T$ (for asymmetric parameter values only numerical solutions exist). Introducing the contest success functions, as well as the production functions and the time constraints into the equations (A2) and (A3), we obtain the following expressions for each country's payoffs.

$$\pi_1 = \frac{G_1}{G_1 + G_2}(AK(1 - G_1 - Q_1) + AK(1 - G_2 - Q_2)) + \frac{Q_1}{Q_1 + Q_2}2T \quad (\text{A4})$$

$$\pi_2 = \frac{G_2}{G_1 + G_2}(AK(1 - G_1 - Q_1) + AK(1 - G_2 - Q_2)) + \frac{Q_2}{Q_1 + Q_2}2T \quad (\text{A5})$$

Taking the derivatives of (A4) with respect to G_1 and Q_1 , and the derivatives of (A5) with respect to G_2 and Q_2 , we obtain the first order conditions. Substituting and reformulating we can compute Nash equilibrium levels of territorial and policy fighting for interior solutions.

$$Q^* = Q_1 = Q_2 = \frac{T}{AK} \quad (\text{A6})$$

$$G^* = G_1 = G_2 = \frac{1}{2} - \frac{T}{2AK} \quad (\text{A7})$$

We can use the signs of the partial derivatives to assess the likelihood of conflict: $\frac{\partial Q^*}{\partial A} = -\frac{T}{A^2K} < 0$, $\frac{\partial G^*}{\partial A} = \frac{T}{2A^2K} > 0$, $\frac{\partial Q^*}{\partial K} = -\frac{T}{AK^2} < 0$, $\frac{\partial G^*}{\partial K} = \frac{T}{2AK^2} > 0$. The more developed a country, the less resources it devotes to territorial conflict, and the more it focuses on issue/output conflict.

Appendix C: Relationship Between Territory and Contiguity

Most territorial disputes occur between neighbors.⁴⁰ This relationship has been extensively documented in other studies (Vasquez 1993, 2001, 2004). Table 4 also provides a cross-tab of two dichotomous variables, contiguity and territorial MIDs. Figures are reported both for all MIDs and just for those MIDs involving fatalities. Values in parentheses (soft brackets) are column percentages. Of the 790 MIDs that the Correlates of War project identifies as territorial, 644 involve contiguous states (over 81%), while 248 of 280 fatal MIDs are among contiguous states (over 88%). The difference in samples between contiguous and non-contiguous dyads is statistically significant.

Table 4: Relationship between Contiguity and Territorial MIDs
(soft brackets = column percentages, hard brackets = fatal MIDs)

	Territorial MID [+ Fatalities]?		Total
	No	Yes	
Contiguous MID?			
No	845 [959] (46.66 [41.32])	146 [32] (18.48 [11.43])	991 (38.10)
Yes	966 [1,362] (53.34 [58.68])	644 [248] (81.52 [88.57])	1,610 (61.90)
Total	1,811 [2,321]	790 [280]	2,601
$\chi^2(1) = 185.189 [94.650], \text{Prob.} = 0.0000$			

⁴⁰Even using a strict definition of contiguity (direct contiguity of sovereign states), Hensel finds that “both contiguity and territory are involved in over half of all full-scale wars” in the period 1816 to 1992 (Hensel 2000, page 70).

Appendix D: Tests of Possible Confounding Variables

We conducted additional regression analyses in order to assess whether the study’s findings are spurious. To save space, we provide only a brief summary. Key findings remain basically unaltered.

Variables are organized into four categories: political, economic, demographic, and geographic. Table 5 lists the additional variables. It can be argued that the effect of development is really a proxy for other elements of prosperity or power. A dummy variable for major power status is already included in the analysis. We also coded a dummy variable for the United States (*US*).⁴¹ While positive and significant, the *US* dummy by itself and in combination with other variables does not alter the results of in the study. In fact, estimates of the coefficients for *Development* and the interaction term with contiguity become slightly larger after including the US dummy.

Security communities, or political unions might account for the observed impact of development (Deutsch 1978). The European Union probably constitutes the strongest case for this kind of neighborhood effect. We coded a dummy variable, *EU*, equal to one if both states in a dyad are EU members. The EU dummy is negative but not statistically significant and has no effect on *Development* or the interaction with contiguity. We also replaced the CINC ratio variable with the lower and higher dyadic values. This allows us to distinguish between the effect of the capability ratio, and a threshold effect. The United States and Venezuela, for example, are much more likely to experience a dispute than Paraguay and Sao Tome Principe, even though the CINC ratios of these two dyads are similar (0.03327 versus 0.03323 in 1990). Both CINC variable are insignificant.

Boehmer & Sobek (2005) identify a non-linear relationship between development and its square. We replicated their findings in dyadic analysis and also added their *Development*² term to Model 2 and Model 3. All three development variables (linear, square, and interaction term) remain highly statistically significant in the expected direction. We then explored these relationships on territorial and non-territorial disputes separately. *Development*² has no effect or appears to weakly increase dispute propensity over territory, while not altering the effect of linear *Development* and the interaction with contiguity. The text details the effect of *Development*² on non-territorial disputes.

⁴¹The US is only the second most active conflict participant. Between 1946 and 2000, there are 155 dyad years of disputes involving the US, while the Soviet Union/Russia is a member of 175 dispute dyad years in the same period.

Table 5: Additional Control Variables

Category	Variable	Purpose	Effect
Political	USA	Superpower/Heg. in dyad	Sig. (+)
Political	EU	European Community dyad	Sig. (-)
Political	CINC	Capabilities (low)	Sig. (+)
Pol./Econ.	Dem. x Dev.	Mousseau (2000)	Sig. (-)
Economic	Dev. x Dev.	Boehmer & Sobek (2005)	Sig. (-)
Economic	Openness	Overall trade (low)	None
Economic	GDP	Economic size (low)	None
Economic	Oil	Fearon & Laitin (2003)	Sig. (+)
Demographic	Pop.	Population (low)	None
Demographic	Pop. Density	# people/km ² (low)	None
Demographic	Arable Pop.	# arable acres/person (low)	None
Geographic	Area	# km ² total (low)	None
Geographic	Coast	# km coastline (both)	Sig. (+)
Geographic	Boundary	# km land border (both)	None
Geographic	Dyad Bndry.	# km dyadic border	None
Geographic	Neighbors	# contiguous states	None

Mousseau (2000) provides evidence that development conditions the effect of democracy on conflict. We replicated the interaction between democracy and development and add the interaction between development and contiguity. *Dev. x Dem.* is statistically significant at the 5% level, while *Development* and its interaction with contiguity are both significant at the 0.1% level. The interaction between development and democracy is not statistically significant for territorial disputes alone, or for non-territorial disputes with the Boehmer & Sobek (2005) interaction variable.

It might be that the average income of individuals within the society is less important than total national income. Gross Domestic Product for the poorer state in the dyad proves statistically insignificant, and has no effect on the key results. The threshold size of a dyad’s overall trade openness (Oneal 2003) is negative but insignificant. Oil exporting nations can have high per capita GDP without possessing other attributes of development. Fearon & Laitin (2003) offer a dummy variable indicating whether more than a third of a country’s exports involve fossil fuels. Dyads containing petroleum exporters are more dispute prone ($p = 0.017$), but other results are unchanged.

Growing populations or “lateral pressure” in some countries could increase conflict. We examine three demographic variables, *population*, *population density*, and *arable population* (acres of arable

land per adult). Data are from the *CIA World Factbook*. Much of the variation in these variables is cross-sectional, so using data from a single year is probably adequate for simple tests of robustness. *Population*, and *arable population* are not statistically significant. *Population density* significantly increases the probability of a MID (z score 2.71). Results for the key variables are unaltered.

A final set of controls involves geography. *Area* reports the total square kilometers within the borders of the smaller of two states in a dyad. *Coast* and *Boundary* measure, respectively, linear kilometers of shoreline and land border length. *Area (low)*, *Coast (low)*, *Coast (high)*, and *Boundary (low)* are all statistically insignificant while key results are unchanged. Only *Boundary (high)* is statistically significant (5% threshold). *Dyad Bndry.* measures the portion of land border that is shared by dyad members. It is not statistically significant. Finally, a count variable for the number of states with contiguous borders with a given country (*neighbors*) is also statistically insignificant.

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