

THE HUMAN CAPITAL PEACE: DEVELOPMENT AND INTERNATIONAL CONFLICT

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This paper explores the relationship between human capital and international conflict. In theory, human capital may increase the opportunity cost of military service and the economic cost of injury and loss of life in combat; may decrease the benefits of conflict as human capital cannot be easily appropriated or transferred; may affect societal norms toward peace and war; and may alter military productivity through new technology and complementarities between military technology and personnel. Using a panel of politically relevant dyads, I find robust empirical evidence that human capital may significantly decrease the likelihood of militarized conflict between nations. In short, the findings suggest that promoting human capital-oriented development may help to increase peace in the world.

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INTRODUCTION

Many theoretical and empirical studies of international conflict focus almost exclusively on democracy (e.g. Bremer, 1992; Bueno de Mesquita and Lalman, 1992; Bueno de Mesquita et al., 1999; Dixon, 1994; Doyle, 1986; Fearon, 1994; Garfinkel, 1994; Hess and Orphanides, 1995, 2001; Maos and Russett, 1993; Schultz, 1998; Starr, 1992). Other studies have examined the role of economic development in promoting international peace (Barbieri, 1996; Bremer, 1992; Hegre, 2000; Miguel et al., 2004; Mousseau, Hegre, and Oneal, 2003; Oneal et al., 1996; Oneal and Russett, 1997, 1999a, 1999b; Oneal et al., 2003; Rosecrance, 1986).

However, perhaps curiously, the definition of development has been limited to GDP growth and international trade. The literature is missing a vital piece of the puzzle—human capital. Indeed, many scholars believe that human capital is one of the principal determinants of economic development (Becker, 1962; Becker, Murphy, and Tamura, 1990; Benhabib and Spiegel, 1994; Mankiw, Romer, and Weil, 1992; Schultz, 1961). Figure 1 illustrates the fraction of politically relevant dyads involved in a militarized dispute from 1950 to 2000. Figure 2 displays three development indicators. The figures provide prima facie evidence that human capital-oriented development and conflict may be negatively related.

While some studies discuss components of the theory connecting human capital and conflict (Brooks, 1999, 2005; Gartzke, 2007; Hegre, 2000; Rosecrance, 1996), this paper is the first to explore the relationship between human capital and international conflict. In what follows, I outline the mechanisms by which human capital may impact the likelihood of international conflict between nations. Human capital development may increase the costs of military engagement, decrease the benefits of conquest, promote norms favoring peace, and raise military productivity. To empirically test the theory, I analyze a panel of politically relevant

dyads from 1960 to 2000. I use four variables to serve as proxies for human capital: primary, secondary, and tertiary education as well as the fertility rate. Throughout the analysis, I utilize pooled logit and linear panel models with country fixed effects. Including fixed effects may be important, because they account for all potentially omitted country-specific, time invariant variables.

The empirical results provide evidence that fertility is positively associated with dyadic militarized disputes, while primary, secondary, and tertiary schooling and the human capital composite variable (generated through factor analysis) are negatively associated, which together suggest that human capital and international conflict may be inversely related. This relationship is robust to the inclusion of country fixed effects, year effects, and controls for temporal dependency. In addition, the results suggest that democracy may also have a pacifying effect, but it is significant with only one of the two dependent variables.

HUMAN CAPITAL AND INTERNATIONAL CONFLICT

In this section, I argue that human capital may potentially affect the likelihood of international conflict through four basic causal pathways. First, not only may human capital raise the value of opportunities in the labor market thus increasing the opportunity cost of military service, it may also raise the value of life and, thereby, the economic cost of injury and loss of life in combat. Second, to the extent that the incentive to obtain assets motivates military engagement, human capital may decrease the benefits of conflict, since human capital, unlike land and other natural resources, cannot be easily appropriated or transferred. Third, human capital may affect the preferences and norms of society, because education may cultivate, in addition to skills rewarded in the labor market, particular values about peace and war that may

influence foreign policy. Fourth, through the development of new military technology and positive complementarities between technology and educated military personnel, human capital may alter the relative and absolute military productivity of countries.

The first causal pathway is through the costs associated with international conflict. While a number of studies have examined the role of other variables related to economic development, e.g. GDP growth and trade (Hegre, 2000; Mousseau, Hegre, and Oneal, 2003; Oneal and Russett, 1997; Rosecrance, 1986; Russett, 1993), it appears that none have considered human capital in this respect. Education, training, and other human capital investments provide individuals with skills that are valued in the labor market. Hence, the opportunity cost associated with military service and, consequently, the amount that the state will have to explicitly or implicitly compensate those who choose to work in the military sector both rise with human capital. This effect holds true whether or not there is a chance of injury or death in military service. As long as the value of time rises, the cost of military personnel increases. Furthermore, the economic value of life increases in human capital (Murphy and Topel, 2005; Viscusi, 1993). This significantly amplifies the cost of injury and loss of life in combat (Kiker and Birkeli, 1972). Therefore, the possibility of injury or death pushes the compensation of military personnel upward.¹

The second causal pathway is through the benefits associated with international conflict. One of the principal factors that may motivate international conflict is the desire to acquire assets. Indeed, the spoils of war often include natural resources, physical capital, and unskilled labor. However, they rarely include human capital. This follows from an intrinsic attribute of

¹ The effect of human capital on the costs of conflict is quite general in that it also extends to the case of involuntary military service and dictatorship. The Coase Theorem, which maintains that, under certain assumptions, resource use will be efficient regardless of the assignment of property rights (Coase, 1960; Posner, 2007), implies that human resources will be utilized in an efficient manner, even when military service is involuntary or a dictator enjoys de facto ownership of citizens. Note that this logic contrasts with the Kantian view that a monarch or dictator, isolated from the direct burdens of battle, will heedlessly enter into war (Kant, 1991).

human capital—it cannot be easily seized or stolen. In part because it is highly mobile and sunk into individuals, it is considerably more difficult to appropriate human capital than natural and physical resources like land, petroleum, buildings, and machines. For example, it is more likely, *ceteris paribus*, that a country with one billion dollars worth of diamonds will be attacked than a country with one billion dollars worth of computer programming skills. This signifies that as economic resources shift from non-human assets to human capital, the gains to international conflict decrease (Brooks, 1999, 2005; Hegre, 2000; Rosecrance, 1996).

The third causal pathway is through preferences and norms. Several scholars cite strengthening international norms against war as a reason for why developed nations have had more resistance to conflict in the post-war period (Mueller, 1989; Ray, 1989). The evolution of norms may be intertwined with economic development in a number of ways. Perhaps most importantly, schools may teach peace. Investing in human capital, not only may individuals acquire skills rewarded in the labor market but also notions and norms that help to sustain peace in international relations. These views subsequently translate into foreign policy decisions through the process of civic participation. Human capital development may also alter the mix of citizens who vote and participate in politics, hence influencing foreign policy decisions. For instance, with significant investments in human capital, women have gained tremendous economic and political power during the past several decades. If women have a greater propensity for peace in international relations than men, then this might lead to less conflict (Caprioli, 2000).

The fourth causal pathway is through military productivity. Human capital expands the frontier of ideas and enhances the research and development capabilities of nations. Thus, countries with high levels of human capital may be better able to develop effective military

weapons through technological investments (Biddle and Long, 2004).² In addition to raising productivity purely through technology, the potential complementarity between human capital and existing military technology may also increase productivity in that soldiers with high human capital may utilize military capital more effectively. Hence, through the development of new technology and positive complementarities between technology and military personnel, human capital may alter the relative and absolute military productivity of countries. This might increase the likelihood that high human capital countries engage in a militarized dispute generally (Gartzke, 2007), but alternatively might decrease the likelihood that low human capital countries initiate a dispute with high human capital countries due to deterrence.

In short, I theorize that human capital may affect the likelihood of conflict through four distinct mechanisms. Three of the mechanisms unambiguously imply that human capital might decrease conflict, whereas the fourth implies that human capital may increase or decrease conflict. To test the theory, I examine the relationship between human capital and international conflict. In the next section, I introduce a set of variables to measure human capital and describe other key aspects of the empirical analysis.

DATA

Combining several sources of political and economic data, I examine the relationship between international conflict and human capital over the 1960-2000 period. In this section, I describe the dataset and empirical models.

Following a number of studies, the unit of analysis is the dyad-year, a pair of countries in a particular year (Bremer, 1992; Maos and Russett, 1993; Oneal et al., 1996; Oneal and Russett,

² Nonetheless, this is moderated by the extent to which an open market for military technology exists, i.e. the degree to which low human capital countries can freely purchase weapons that high human capital countries develop.

1997, 1999a, 1999b; Oneal et al., 2003). As justified by Lemke and Reed (2001), I focus specifically on politically relevant dyads—pairs of countries that share a border, are separated by less than 400 miles of water, or include a major power, as defined by the Correlates of War (COW) project (COW, 2008; Stinnett et al., 2002).³ All countries in the dataset satisfy three criteria: (a) they are members of the United Nations or receive diplomatic missions from at least two major powers; (b) they have a population of at least 500,000; and (c) they have obtained independence before 1998.⁴ I examine the years 1960-2000, a period throughout which political and economic variables vary dramatically and for which data are available.

Table 1 concisely defines the principal dependent and independent variables. The independent variables are standardized to have a mean of zero and a variance of one to help interpret the estimated regression coefficients. Contiguity and alliance, binary measures, are the only variables that are not standardized. Table 2 displays summary statistics prior to standardization.

International conflict is the dependent variable throughout the analysis. The COW dataset Militarized Interstate Disputes (MID version 3.10) contains information on international disputes that exhibit various levels of hostility, including threats to use force, displays of force, uses of force, and war (Ghosn and Palmer, 2003). To count as a dispute, the event must be explicit, overt, deliberate, and government authorized. The event must be directed against the government, government forces, property, or territory of another country (Jones, Bremer, and Singer, 1996). I examine two dependent variables. The first, conflict, equals one if the nations in a dyad are involved in a militarized dispute with one another characterized by a use of force or

³ The major powers are the US, UK, France, Russia, and China. During 1991-2000, Germany and Japan are major powers as well.

⁴ Because they are missing all economic and population data, Afghanistan and South Vietnam (which existed from 1954 to 1975) are the only two countries that meet the criteria but are excluded from the dataset.

war and equals zero otherwise. The second, fatal conflict, equals one if the nations in a dyad are involved in a militarized dispute with one another resulting in at least one fatality of a combatant and equals zero otherwise.

The World Bank's World Development Indicators (WDI, 2002) provides several potential variables with which to operationalize the concept of human capital. However, it turns out that to do so is a challenge. There are few, if any, direct measures available. Moreover, it is difficult to obtain data for most countries.⁵ I therefore rely on proxy variables.

The first measure of human capital is the fertility rate. This is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with average national age-specific fertility rates. For a number of reasons, including the opportunity cost of time, people with high human capital tend to exhibit a lower fertility rate. In nations that have scarce human capital, parents have large families and invest relatively little in each child. In nations that have abundant human capital, parents have small families and invest much in each child (Becker et al., 1990). This variable is available from 1960 to 2000. The second, third, and fourth measures of human capital are primary, secondary, and tertiary educational enrollment. Primary education is the ratio of total national enrollment in primary education, regardless of age, to the population of the age group that officially corresponds to primary education. Secondary education, i.e. high school, and tertiary education, i.e. college, are defined analogously. These measures illustrate the degree to which individuals participate in education. School enrollment not only relates to the incentives to invest in knowledge and skills but also to the levels of human capital that a nation ultimately produces. The education variables are available from 1970 to 2000.

⁵ To counter this problem, I linearly interpolate missing WDI data when necessary.

Since they are interrelated, I performed factor analysis on fertility, primary, secondary, and tertiary education and estimated the associated score vector. This composite variable, "human capital," is hence the common factor among the four human capital proxies. In the regressions which follow, I include "human capital" as well as each of the proxies one at a time.

Other variables included as controls in the regressions are log real GDP per capita, bilateral trade, and geography (Barbieri, 1996; Bremer, 1992; Hegre, 2000, 2004, 2008; Miguel et al., 2004; Oneal et al., 1996; Oneal and Russett, 1997, 1999a, 1999b; Oneal et al., 2003; Rosecrance, 1986). Log real GDP per capita is calculated as the natural logarithm of chain-indexed real per capita GDP from the Penn World Tables (PWT) 6.1 (Heston et al., 2002).⁶ To construct an index of the intensity of bilateral trade, I use the comprehensive data assembled by Kristian Gleditsch (2002). Bilateral trade is the total value of dyadic trade divided by the larger GDP in a dyad, a measure which is comparable to that developed by Oneal and Russett (1997) and Oneal et al. (2003). It is also important to control for key geographic variables. I follow Oneal and Russett (2005) and include both contiguity (COW, 2008) and distance between capital cities (Gleditsch and Ward, 2001) in every regression.

Democracy and political alliance are critical controls. I rely on a well-known measure of democracy, the polity score, from the Polity IV dataset (Marshall and Jaggers, 2002). It is a composite index derived from several political characteristics: regulation, competitiveness, and openness of executive recruitment; constraints on the executive authority; and regulation and competitiveness of political participation. Small values denote low democracy, while large

⁶ For the small number of countries that do not appear in PWT 6.1, I use PWT 5.6 and adjust the base year accordingly. I use information in PWT 6.1 Data Appendix Table B to estimate GDP and population data for North Korea and Libya.

values denote high democracy.⁷ It may also be important to account for formal political alliances. The COW dataset Formal Alliances (v3.03) provides information on treaties and other formal agreements (Gibler and Sarkees, 2004). The dummy variable, *alliance*, equals one if the nations in a dyad have a formal alliance with one another or if both have a formal alliance with the US and equals zero otherwise.

To test whether human capital impacts international conflict through military capabilities, some regressions include a set of military controls. I adopt a widely-utilized measure of military capabilities (Singer et al., 1972). The COW dataset National Material Capabilities (v3.02) contains six variables: military personnel, military expenditures, energy consumption, iron and steel production, urban population, and total population. The military capability index is the average of a nation's global share of each of the variables. The variable used in the empirical analysis, the military capability ratio, is the logarithm of the ratio of military capability indexes in a dyad, the larger value divided by the smaller. Other controls include the ratio of military expenditures in a dyad and the number of military personnel.

I regress international conflict on human capital and controls using a logit model. I also use a linear panel model (see Tables 6 and 8) to verify the robustness of the pooled logit. Nearly all of the specifications include country fixed effects, because fixed effects estimators are robust to any omitted country-specific time invariant effects. While there may be a case for dyad-level fixed effects (Green et al., 2001), the consensus is that country fixed effects are more appropriate, in part, because variation in the key dependent and independent variables is relatively limited (King, 2001; Oneal and Russett, 2001). Additionally, I introduce a set of annual dummy variables to control for general worldwide trends, i.e. time effects, and a set of

⁷ I drop the small number of dyad-years during which a country experiences a political "interruption period," occupation by another country.

dummy variables indicating the length of prior spells of peace to control for temporal dependency (Beck, Katz, and Tucker, 1998). Furthermore, the independent variables are lagged by one year in order to ensure that the dependent variable does not influence the independent variables, i.e. reverse causality. For example, it is possible that a conflict in a particular year may affect the fertility rate in that year and, as a result, estimates of the effect of the fertility rate on the likelihood of conflict may be biased. Lagging the independent variables helps to minimize this potential endogeneity problem.

To summarize, the estimating equation for dyad ij in year t is:

$Conflict_{ij,t} = \beta_1 HC_{ij,t-1}^L + \beta_2 HC_{ij,t-1}^H + \beta_3 X_{ij,t-1} + \delta_i + \delta_j + \lambda_t + \kappa_{ij,t} + \varepsilon_{ij,t}$, where $HC_{ij,t-1}^L$ and $HC_{ij,t-1}^H$ are the low and high values of human capital, respectively; $X_{ij,t-1}$ represents other economic and political variables; δ is a country fixed effect; λ is a year fixed effect, and κ is the set of controls for temporal dependency. To illustrate what *low* and *high* signify, let Z_i and Z_j be the values of Z that correspond to countries i and j in a particular dyad. Hence, $Z_{ij}^L = \min[Z_i, Z_j]$, and $Z_{ij}^H = \max[Z_i, Z_j]$.

RESULTS AND DISCUSSION

In this section, I present and discuss the empirical findings. I report robust standard errors. The dependent variable in Tables 3-6 is whether the nations in a dyad were involved in a militarized dispute characterized by a use of force or war, and in Tables 7-8, it is whether the nations in a dyad were involved in a militarized dispute resulting in at least one fatality. As mentioned earlier, each independent variable is standardized, so that its mean and variance are zero and one, respectively.

Table 3 displays logit regressions without country fixed effects. The regressions provide preliminary evidence that human capital may be related to international conflict. The coefficients on low primary education and high tertiary education are both positive and significant, whereas high primary education and high secondary education are both negative and significant. Moreover, the coefficient on high human capital, the common factor among the four proxy variables, is negative and significant. Perhaps these results suggest that increasing development from either very low or very high levels tends to raise the likelihood of dyadic conflict, while increasing development from intermediate levels tends to lower the likelihood. However, they probably only imply that the effect of human capital is existent, though ambiguous, in regressions without fixed effects.

The regressions also contain evidence on the effects of democracy and other variables. The coefficient on low democracy is negative and significant in every regression. This replicates many previous studies on the democratic peace (e.g. Oneal and Russett, 1997; Oneal et al., 2003). In addition, high democracy is positive and significant, contiguity is positive and significant, distance is negative and significant, and the log military capability ratio is negative and significant.

However, concern remains that omitted country-specific time invariant variables may bias the results. Thus, country fixed effects are introduced into the empirical analysis to assess the robustness of the relationship between human capital and conflict. Table 4 displays logit regressions with fixed effects. The unambiguous result that emerges is that human capital and international conflict are negatively associated. The coefficient on high fertility (indicating low levels of human capital) is positive and significant. The coefficients on high primary education, low and high secondary education, and low tertiary education are all negative and significant.

Furthermore, in column (E), both low and high human capital are negative and significant implying that the common factor among fertility, primary, secondary, and tertiary education is negatively associated with conflict.

It is important to verify that the main results survive the addition of military controls and to see whether the effect, in part, may operate through military capabilities. Table 5 displays the regressions. Confirming the previous findings, high primary education, low and high secondary education, low tertiary education, and low and high human capital are all significant while controlling for the military capability ratio, military spending ratio, and military personnel. This may suggest that the principle causal mechanisms through which human capital affects international conflict are unrelated to military capabilities. The table highlights other interesting implications. The coefficients on the military spending ratio and high soldier are negative, which provides support for deterrence theories of conflict.

To explore the robustness of the pooled logit model, I utilize a linear panel model with country fixed effects, year dummies, and controls for temporal dependency. As an additional benefit, the sample size increases, and the resulting coefficients are easier to interpret. Table 6 displays the regressions. The coefficient on high fertility is positive and significant, and the coefficients on high primary education, low and high secondary education, and low and high human capital are all negative and significant. Taken together, the results suggest that human capital may be negatively related to international conflict, hence reinforcing the previous findings.

Based on the estimated coefficients, it is straightforward to obtain the effect of a one standard-deviation change in a variable on the probability of dyadic conflict. Interpreting column (A), the probability of conflict declines by about 0.8 percentage points with a one standard-

deviation decline in high fertility, which corresponds to a drop of about two births per woman. A one standard-deviation increase in low secondary education decreases the probability of conflict by about 0.8 percentage points, while a one standard-deviation increase in high secondary education decreases conflict by 0.9 percentage points. These represent relatively sizable marginal effects considering that the average likelihood of dyadic conflict is about 3.0% (see Table 2). In fact, the effect of a one standard-deviation change in the human capital composite variable, low or high, is about twice as large as the effect of a one standard-deviation change in low democracy, a fact which further underscores the potential role of human capital-oriented economic development in lowering the likelihood of conflict between nations.

To test the robustness of the findings with respect to the dependent variable, I examined a more restrictive definition of international conflict. Indeed, fatal militarized conflict might better identify significant disputes between nations, although using this dependent variable lowers the sample size by about 50% in logit regressions that include country, time, and dependency effects, since fatal conflict is prevalent in only 1.2% of dyad-years. Table 7 displays the regressions. Akin to the previous results, the coefficients on high fertility, high primary education, low and high secondary education, and low and high human capital are significantly different from zero. Table 8 displays linear panel regressions of fatal conflict on human capital and controls. These regressions paint a similar picture. While the significance of low secondary education and low human capital is lost (as well as that of low democracy), high fertility, primary education, secondary education, and human capital remain significant along with low fertility. Therefore, in light of all the previous empirical findings, the negative effect of human capital on international conflict appears to be robust, as it persists across pooled logit and linear panel models, across

different dependent variables, and with the addition of country fixed effects, year effects, controls for temporal dependency, military controls.

CONCLUSION

I have presented evidence that human capital may reduce the likelihood of conflict between nations perhaps by raising the costs and/or reducing the benefits associated with military engagement. The findings suggest that promoting human capital-oriented development may help to increase peace in the world. Future research may be able to identify the exact causal mechanisms potentially underlying the empirical relationship between human capital and conflict.

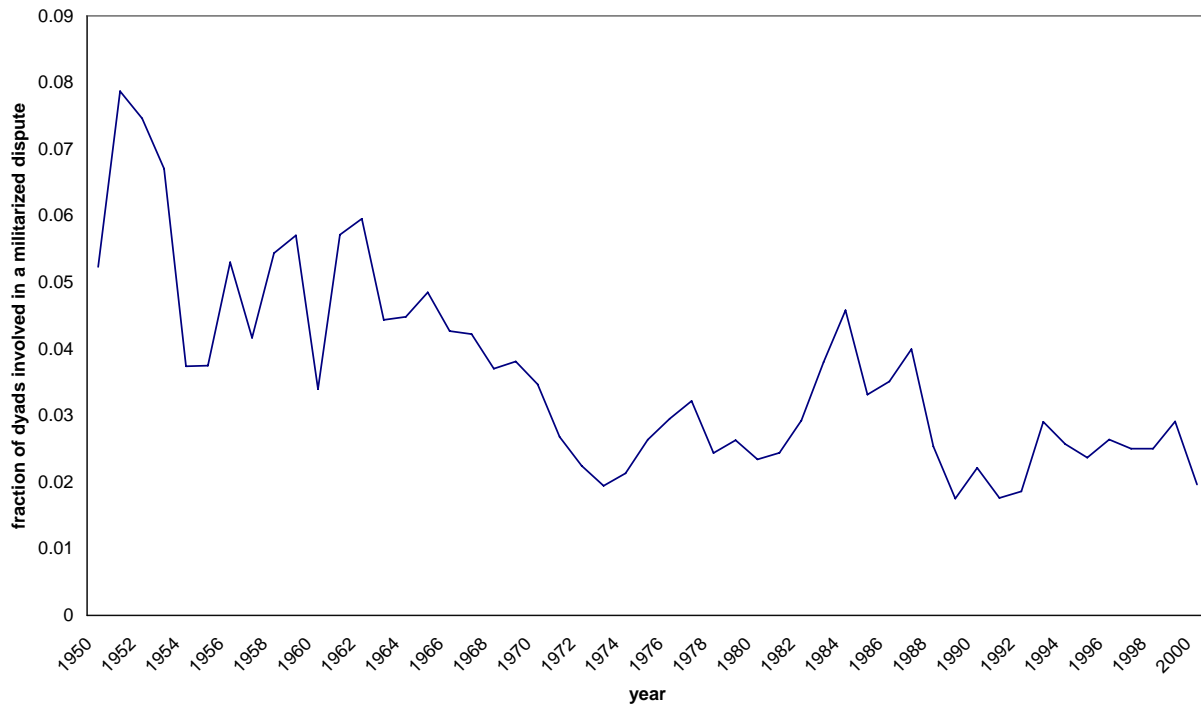
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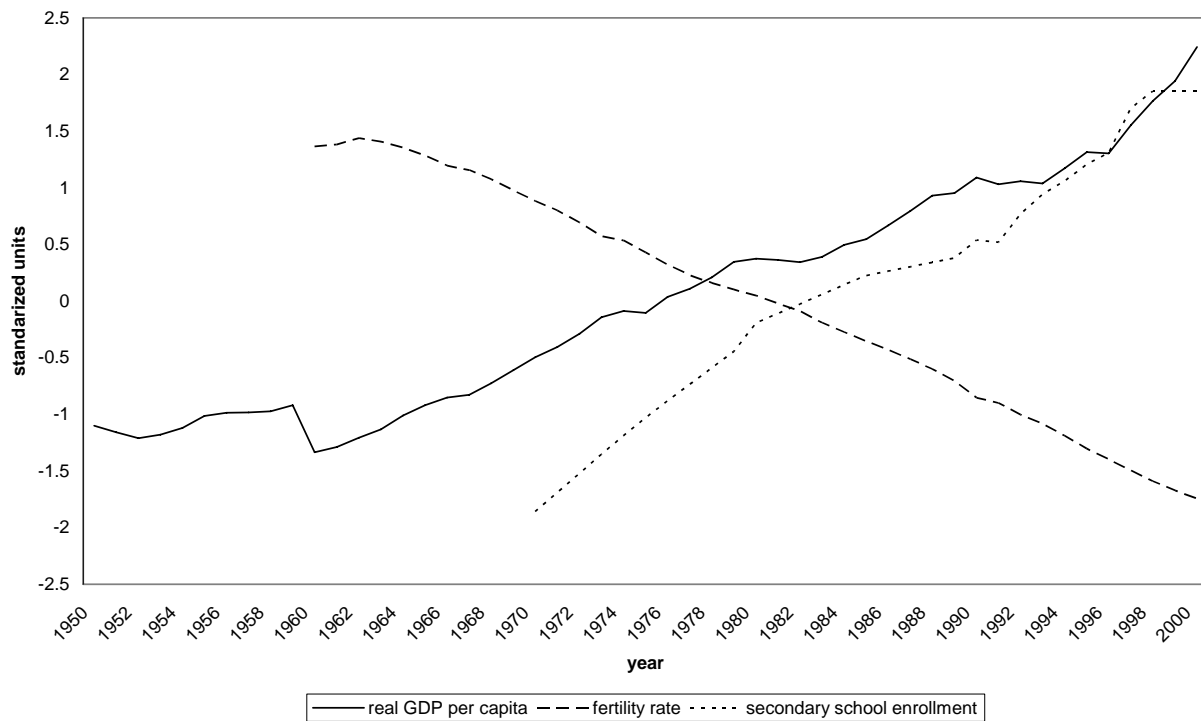
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Figure 1
Dyadic involvement in militarized disputes, 1950-2000



NOTE. The figure displays the annual fraction of dyads that are involved in a militarized dispute with one another characterized by a use of force or war.

Figure 2
Three global development indicators, 1950-2000



NOTE. The figure displays the average annual real GDP per capita, fertility rate, and secondary school enrollment for those nations that existed prior to 1960. Units are standardized in order to represent all three variables in same figure.

Table 1
Definition of variables

Conflict	equals one if the nations in a dyad are involved in a militarized dispute with one another characterized by a use of force or war; equals zero otherwise
Fatal conflict	equals one if the nations in a dyad are involved in a militarized dispute with one another resulting in at least one fatality; equals zero otherwise
Contiguity	equals one if the nations in a dyad share a border or are separated by less than 400 miles of water; equals zero otherwise
Distance	number of kilometers between the capital cities of the nations in a dyad
Democracy	measure of democracy that incorporates the regulation, competitiveness, and openness of executive recruitment; executive constraints; and the regulation and competitiveness of political participation
Alliance	equals one if the nations in a dyad have a formal alliance with one another or if both have a formal alliance with the US; zero otherwise
Bilateral trade	total value of bilateral trade divided by the larger GDP in a dyad
Military capability ratio	log of the ratio of national military capabilities in a dyad (high/low)
Military spending ratio	ratio of national military expenditures in a dyad (high/low)
Soldier	number of military personnel in thousands
GDP per capita	log of chain-indexed real per capita GDP
Fertility	number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with average national age-specific fertility rates
Primary education	ratio of national enrollment in primary education, regardless of age, to the population of the age group that corresponds to primary education
Secondary education	ratio of national enrollment in secondary education, regardless of age, to the population of the age group that corresponds to secondary education
Tertiary education	ratio of national enrollment in tertiary education, regardless of age, to the population of the age group that corresponds to tertiary education
Human capital	the score associated with the factor analysis of fertility, primary, secondary, and tertiary education

Table 2
Summary statistics

Dyad variables	N	Mean	Std Dev
Conflict	44445	0.030	0.171
Fatal conflict	44445	0.012	0.111
Contiguity	44445	0.353	0.478
Distance	44445	5422.108	4388.923
Democracy L	43499	-2.951	6.814
Democracy H	43166	4.819	6.880
Alliance	43499	0.280	0.449
Bilateral trade	34893	0.002	0.007
Military capability ratio	43499	3.248	2.005
GDP per capita L	34717	7.875	1.000
GDP per capita H	34717	9.104	0.936
Fertility H	42164	4.810	2.004
Fertility L	42811	2.752	1.608
Primary education L	32272	85.635	24.580
Primary education H	28196	105.711	14.937
Secondary education L	32242	45.843	30.790
Secondary education H	27941	79.048	29.259
Tertiary education L	32152	11.728	13.787
Tertiary education H	27737	31.717	21.542

NOTE. L and H indicate the low and high value for each dyad-year.

Table 3
Logit regressions of conflict on measures of human capital

Conflict	(A)	(B)	(C)	(D)	(E)
Contiguity	1.152 (0.193)***	1.063 (0.241)***	1.030 (0.240)***	1.210 (0.242)***	1.054 (0.242)***
Distance	0.013 (0.089)	-0.333 (0.131)**	-0.322 (0.129)**	-0.399 (0.136)***	-0.309 (0.131)**
Democracy L	-0.303 (0.069)***	-0.267 (0.087)***	-0.271 (0.087)***	-0.280 (0.088)***	-0.285 (0.089)***
Democracy H	0.303 (0.063)***	0.320 (0.082)***	0.341 (0.081)***	0.324 (0.084)***	0.318 (0.083)***
Alliance	0.029 (0.116)	0.106 (0.138)	0.111 (0.144)	0.143 (0.140)	0.158 (0.147)
Bilateral trade	-0.118 (0.099)	-0.133 (0.126)	-0.132 (0.122)	-0.147 (0.154)	-0.127 (0.127)
Military capability ratio	-0.406 (0.070)***	-0.229 (0.092)**	-0.240 (0.095)**	-0.256 (0.096)***	-0.202 (0.098)**
GDP per capita L	-0.033 (0.093)	-0.016 (0.112)	0.032 (0.139)	0.020 (0.129)	0.017 (0.143)
GDP per capita H	-0.041 (0.090)	-0.112 (0.100)	0.081 (0.134)	-0.317 (0.122)***	0.098 (0.137)
Fertility H	0.088 (0.086)				
Fertility L	-0.073 (0.085)				
Primary education L		0.204 (0.098)**			
Primary education H		-0.118 (0.067)*			
Secondary education L			0.030 (0.138)		
Secondary education H			-0.255 (0.140)*		
Tertiary education L				-0.106 (0.137)	
Tertiary education H				0.509 (0.142)***	
Human capital L					0.029 (0.141)
Human capital H					-0.262 (0.143)*
N	30828	20633	20462	20204	19532
R-squared	0.377	0.382	0.384	0.389	0.382

NOTE. Numbers in parentheses are robust standard errors. A triple, double, and single asterisk indicate significance at the 1%, 5%, and 10% levels, respectively. All regressions include year dummies as well as dummies to control for temporal dependence. Independent variables are lagged by one year. Non-dummy variables are standardized to have a mean of zero and a variance of one. L and H indicate the low and high value for each dyad-year.

Table 4
Logit regressions of conflict on measures of human capital with fixed effects

Conflict	(A)	(B)	(C)	(D)	(E)
Contiguity	1.063 (0.197)***	1.638 (0.301)***	1.591 (0.295)***	1.734 (0.294)***	1.637 (0.298)***
Distance	-0.629 (0.110)***	-0.650 (0.161)***	-0.627 (0.159)***	-0.654 (0.163)***	-0.602 (0.162)***
Democracy L	-0.314 (0.090)***	-0.280 (0.120)**	-0.268 (0.123)**	-0.263 (0.121)**	-0.260 (0.126)**
Democracy H	0.159 (0.087)*	0.308 (0.129)**	0.297 (0.125)**	0.258 (0.127)**	0.275 (0.126)**
Alliance	-0.061 (0.148)	0.218 (0.208)	0.102 (0.205)	0.148 (0.215)	0.219 (0.216)
Bilateral trade	-0.023 (0.115)	-0.103 (0.207)	-0.078 (0.172)	-0.123 (0.211)	-0.090 (0.167)
Military capability ratio	-0.516 (0.091)***	-0.250 (0.132)*	-0.254 (0.138)*	-0.272 (0.133)**	-0.266 (0.139)*
GDP per capita L	-0.367 (0.152)**	-0.143 (0.216)	0.141 (0.235)	-0.008 (0.232)	0.021 (0.252)
GDP per capita H	-0.602 (0.153)***	-0.454 (0.221)**	-0.205 (0.233)	-0.457 (0.243)*	-0.357 (0.245)
Fertility H	0.225 (0.128)*				
Fertility L	0.054 (0.102)				
Primary education L		0.035 (0.165)			
Primary education H		-0.232 (0.113)**			
Secondary education L			-0.849 (0.279)***		
Secondary education H			-0.886 (0.253)***		
Tertiary education L				-0.338 (0.195)*	
Tertiary education H				-0.312 (0.250)	
Human capital L					-0.962 (0.293)***
Human capital H					-0.894 (0.262)***
N	24221	14915	14548	14268	13653
R-squared	0.420	0.427	0.432	0.429	0.430

NOTE. Numbers in parentheses are robust standard errors. A triple, double, and single asterisk indicate significance at the 1%, 5%, and 10% levels, respectively. All regressions include country fixed effects and year dummies as well as dummies to control for temporal dependence. Independent variables are lagged by one year. Non-dummy variables are standardized to have a mean of zero and a variance of one. L and H indicate the low and high value for each dyad-year.

Table 5
Logit regressions of conflict on human capital with fixed effects and military controls

Conflict	(A)	(B)	(C)	(D)	(E)
Contiguity	0.985 (0.204)***	1.585 (0.312)***	1.514 (0.311)***	1.709 (0.303)***	1.564 (0.310)***
Distance	-0.680 (0.123)***	-0.751 (0.182)***	-0.729 (0.183)***	-0.740 (0.185)***	-0.701 (0.182)***
Democracy L	-0.342 (0.092)***	-0.296 (0.124)**	-0.237 (0.130)*	-0.278 (0.125)**	-0.241 (0.131)*
Democracy H	0.142 (0.090)	0.296 (0.133)**	0.301 (0.129)**	0.251 (0.131)*	0.290 (0.129)**
Alliance	-0.080 (0.150)	0.230 (0.214)	0.149 (0.214)	0.138 (0.218)	0.204 (0.219)
Bilateral trade	0.030 (0.103)	-0.063 (0.179)	-0.050 (0.156)	-0.092 (0.183)	-0.067 (0.152)
Military capability ratio	-0.189 (0.132)	-0.010 (0.191)	-0.094 (0.193)	-0.037 (0.188)	-0.086 (0.192)
Military spending ratio	-7.072 (2.145)***	-6.815 (2.737)**	-5.965 (2.852)**	-6.572 (2.880)**	-5.963 (2.845)**
Soldier H	-0.488 (0.168)***	-0.495 (0.249)**	-0.199 (0.257)	-0.511 (0.247)**	-0.221 (0.257)
Soldier L	0.000 (0.040)	-0.017 (0.075)	0.008 (0.077)	-0.018 (0.074)	0.007 (0.076)
GDP per capita L	-0.486 (0.159)***	-0.285 (0.222)	0.026 (0.246)	-0.147 (0.237)	-0.080 (0.255)
GDP per capita H	-0.641 (0.164)***	-0.495 (0.229)**	-0.176 (0.246)	-0.522 (0.257)**	-0.344 (0.254)
Fertility H	0.070 (0.135)				
Fertility L	-0.020 (0.109)				
Primary education L		-0.008 (0.176)			
Primary education H		-0.212 (0.119)*			
Secondary education L			-0.885 (0.299)***		
Secondary education H			-0.999 (0.277)***		
Tertiary education L				-0.340 (0.200)*	
Tertiary education H				-0.280 (0.275)	
Human capital L					-0.997 (0.312)***
Human capital H					-0.979 (0.285)***
N	22638	13826	13495	13356	12822
Adj R-squared	0.428	0.435	0.440	0.436	0.437

NOTE. Numbers in parentheses are robust standard errors. A triple, double, and single asterisk indicate significance at the 1%, 5%, and 10% levels, respectively. All regressions include country fixed effects and year dummies as well as dummies to control for temporal dependence. Independent variables are lagged by one year. Non-dummy variables are standardized to have a mean of zero and a variance of one. L and H indicate the low and high value for each dyad-year.

Table 6
Linear panel regressions of conflict on human capital with fixed effects

Conflict	(A)	(B)	(C)	(D)	(E)
Contiguity	0.035 (0.005) ^{***}	0.029 (0.006) ^{***}	0.028 (0.006) ^{***}	0.030 (0.006) ^{***}	0.028 (0.006) ^{***}
Distance	-0.003 (0.001) ^{**}	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Democracy L	-0.005 (0.001) ^{***}	-0.003 (0.002) ^{**}	-0.004 (0.002) ^{**}	-0.004 (0.002) ^{**}	-0.004 (0.002) ^{**}
Democracy H	0.002 (0.002)	0.003 (0.002) [*]	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)
Alliance	-0.005 (0.003) [*]	-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.001 (0.003)
Bilateral trade	-0.002 (0.001) [*]	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Military capability ratio	-0.007 (0.002) ^{***}	0.001 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)
GDP per capita L	-0.010 (0.003) ^{***}	-0.003 (0.004)	-0.000 (0.004)	-0.002 (0.004)	-0.002 (0.005)
GDP per capita H	-0.013 (0.003) ^{***}	-0.009 (0.005) [*]	-0.006 (0.005)	-0.009 (0.005) [*]	-0.008 (0.005)
Fertility H	0.008 (0.003) ^{***}				
Fertility L	0.003 (0.002)				
Primary education L		0.001 (0.003)			
Primary education H		-0.004 (0.002) ^{**}			
Secondary education L			-0.008 (0.003) ^{**}		
Secondary education H			-0.009 (0.002) ^{***}		
Tertiary education L				-0.002 (0.003)	
Tertiary education H				-0.003 (0.003)	
Human capital L					-0.008 (0.004) ^{**}
Human capital H					-0.009 (0.002) ^{***}
N	33747	22912	22704	22476	21675
R-squared	0.268	0.256	0.261	0.262	0.258

NOTE. Numbers in parentheses are robust standard errors. A triple, double, and single asterisk indicate significance at the 1%, 5%, and 10% levels, respectively. All regressions include country fixed effects and year dummies as well as dummies to control for temporal dependence. Independent variables are lagged by one year. Non-dummy variables are standardized to have a mean of zero and a variance of one. L and H indicate the low and high value for each dyad-year.

Table 7
Logit regressions of fatal conflict on human capital with fixed effects

Fatal conflict	(A)	(B)	(C)	(D)	(E)
Contiguity	0.925 (0.326)***	1.216 (0.576)**	1.211 (0.557)**	1.231 (0.561)**	1.236 (0.571)**
Distance	-0.966 (0.236)***	-1.529 (0.392)***	-1.419 (0.387)***	-1.498 (0.389)***	-1.498 (0.428)***
Democracy L	-0.109 (0.157)	-0.155 (0.221)	-0.147 (0.229)	-0.153 (0.231)	-0.078 (0.235)
Democracy H	0.284 (0.139)**	0.492 (0.198)**	0.413 (0.198)**	0.403 (0.201)**	0.339 (0.198)*
Alliance	-0.095 (0.242)	0.159 (0.370)	0.103 (0.377)	0.197 (0.374)	0.124 (0.386)
Bilateral trade	-0.636 (0.431)	-0.748 (0.503)	-0.673 (0.484)	-0.919 (0.587)	-0.818 (0.537)
Military capability ratio	-0.615 (0.156)***	-0.357 (0.259)	-0.352 (0.292)	-0.419 (0.267)	-0.472 (0.298)
GDP per capita L	-0.385 (0.266)	-0.022 (0.363)	0.211 (0.411)	-0.200 (0.417)	-0.015 (0.443)
GDP per capita H	-0.435 (0.268)	-0.188 (0.362)	-0.049 (0.394)	-0.493 (0.415)	-0.135 (0.407)
Fertility H	0.459 (0.216)**				
Fertility L	0.169 (0.162)				
Primary education L		0.046 (0.251)			
Primary education H		-0.248 (0.141)*			
Secondary education L			-0.839 (0.476)*		
Secondary education H			-0.813 (0.417)*		
Tertiary education L				0.169 (0.369)	
Tertiary education H				0.366 (0.433)	
Human capital L					-0.891 (0.521)*
Human capital H					-0.846 (0.417)**
N	14075	7281	7005	6729	6645
R-squared	0.451	0.461	0.462	0.462	0.464

NOTE. Numbers in parentheses are robust standard errors. A triple, double, and single asterisk indicate significance at the 1%, 5%, and 10% levels, respectively. All regressions include country fixed effects and year dummies as well as dummies to control for temporal dependence. Independent variables are lagged by one year. Non-dummy variables are standardized to have a mean of zero and a variance of one. L and H indicate the low and high value for each dyad-year.

Table 8
Linear panel regressions of fatal conflict on human capital with fixed effects

Fatal conflict	(A)	(B)	(C)	(D)	(E)
Contiguity	0.010 (0.003) ^{***}	0.006 (0.003) ^{**}	0.006 (0.003) ^{**}	0.007 (0.003) ^{***}	0.007 (0.003) ^{**}
Distance	-0.002 (0.001) ^{**}	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Democracy L	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Democracy H	0.003 (0.001) ^{**}	0.002 (0.001) [*]	0.002 (0.001) [*]	0.003 (0.001) [*]	0.002 (0.001)
Alliance	-0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.002)
Bilateral trade	-0.001 (0.000) ^{**}	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Military capability ratio	-0.002 (0.001)	0.002 (0.001) [*]	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)
GDP per capita L	-0.003 (0.002) [*]	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)
GDP per capita H	-0.004 (0.002) [*]	-0.002 (0.003)	-0.002 (0.003)	-0.004 (0.003)	-0.002 (0.003)
Fertility H	0.005 (0.002) ^{***}				
Fertility L	0.004 (0.001) ^{***}				
Primary education L		0.002 (0.002)			
Primary education H		-0.003 (0.001) ^{**}			
Secondary education L			-0.000 (0.002)		
Secondary education H			-0.003 (0.001) ^{**}		
Tertiary education L				0.000 (0.001)	
Tertiary education H				0.003 (0.002)	
Human capital L					-0.001 (0.002)
Human capital H					-0.004 (0.002) ^{**}
N	33747	22912	22704	22476	21675
R-squared	0.265	0.241	0.243	0.248	0.242

NOTE. Numbers in parentheses are robust standard errors. A triple, double, and single asterisk indicate significance at the 1%, 5%, and 10% levels, respectively. All regressions include country fixed effects and year dummies as well as dummies to control for temporal dependence. Independent variables are lagged by one year. Non-dummy variables are standardized to have a mean of zero and a variance of one. L and H indicate the low and high value for each dyad-year.