

Saving lives in armed conflicts: what factors matter?

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Contrary to popular opinion, the number of armed conflicts has been in decline in recent years: about 30 ongoing conflicts per year nowadays compared to about 50 conflicts per year during the Cold War era. The probability of being killed in war is also at its lowest since World War II.¹ However, these trends hide the dramatic variations of war-related deaths across countries and conflict types. This article seeks to explain cross-country variations in conflict casualties by examining how battlefield deaths are related to military expenditure per soldier, political regime type, conscription, economic freedom, human capital, per capita GDP, and various geographic variables. The empirical estimates presented here provide an intuitive insight into how democracy, conscription, economic freedom, and other factors affect battlefield deaths and the value of life in military conflicts. The article departs from previous studies on this topic by proposing a more rigorous specification of the endogenous channel through which political regimes, conscription, and other factors may affect conflict casualties. This channel is military capital intensity (measured as military expenditure per soldier), and it can be used to estimate the value of a statistical life that can be saved by providing soldiers with more military capital. The findings indicate that more politically and economically free societies place a higher value on life, manifested in better equipped military forces. As a result, such societies suffer fewer casualties in military conflicts. In addition, it is found that societies with higher levels of education, per capita GDP, and volunteer armies suffer fewer casualties. The estimates are consistent with some of the previous findings in the literature and emphasize the importance of controlling for endogeneity bias in the empirical models of conflict.

On the determinants of conflict casualties

There exists a fascinating and growing empirical literature on conflict casualties and their determinants. Some of the most interesting recent papers explore the effects of political, institutional, economic, and geographic factors on conflict casualties. The influence of these variables on conflict casualties is the focus of this article.

Political and economic forces have long been considered intertwined, but a consensus on whether democracies and dictatorships choose identical policies has not yet emerged. This debate could have significant ramifications for understanding cross-country variations in conflict casualties. The new and growing body of literature indicates that political regimes diverge only in certain kinds of policies. Some

researchers argue that democracies and nondemocracies should have identical policies except for cases when these policies influence the threat of entry from political challengers.² Not surprisingly, it is found that democracies and dictatorships differ significantly in policies pertaining to military spending, torture, death penalty, censorship, religious regulation, and perhaps even in fiscal policy, welfare, and corruption.³

As for military expenditure in particular, several scholars find that democracies spend less on defense as a percentage of GDP than do nondemocracies, holding everything else constant.⁴ But lower defense burdens as a share of GDP in more democratic nations do not necessarily make democracies weaker military opponents. Factors like superior human capital, harmonious civil-military relations, and Western cultural background seem to be responsible for democracy's apparent military effectiveness.⁵ Others attribute the striking military success of democracies to superior leadership and initiative on the battlefield, supposedly arising from the political culture of democracies and the social value systems that encourage individualism and decentralized decisionmaking.⁶ Compared to dictatorships, democracies also appear to have higher military expenditure per soldier, which allows them to protect their soldiers with more capital. This military capital view holds that countries that value their soldiers more should equip their troops with more or better capital.⁷ For instance, one study that looked at World War II battlefield data for the Western front finds that each additional \$1.3 million spent on military capital could have saved one American life.⁸ These findings suggest that democracies suffer fewer conflict casualties because they shield or protect their troops with more military capital.

Another hypothesis as to why democracies suffer fewer casualties holds that democratic institutions are better designed to constrain military aggression. According to this audience cost view, democracies are more sensitive to wartime casualties than dictatorships because democratic leaders require popular consent in order to remain in office, which forces them to use troops sparingly so as to avoid high casualties. The audience cost view suggests that democratic leaders choose wars and conflict strategies with low casualties in order to minimize the loss of public support.⁹ In other words, casualty aversion entices democratic regimes to accept negotiated settlements over wars and choose to fight only low cost and short wars that they can win. Another study arrives at a similar conclusion by showing that political party competition associated with electoral uncertainty can reduce military expenditure and the severity of conflict between nations.¹⁰ However, other scholars argue that public support for war in democracies may depend less on casualties and more on clear movement

This article seeks to explain variations in conflict casualties in relation to military expenditure, regime type, conscription, income levels, and other factors. It finds that more politically and economically free societies place a higher value on soldiers' lives and, as a consequence, suffer fewer casualties.

toward victory.¹¹ They contend that democratically elected leaders and their constituents will accept higher casualties if they are victorious. Conversely, politicians may lose office if their wars go poorly despite low casualties. The popular notion that democracies tend to engage in fewer wars does not go unchallenged, however. One pair of scholars show in two studies how a president's desire for reelection can instigate an otherwise avoidable war in order to show off the president's competence in military leadership.¹² There is also some evidence that income inequality and pervasive rent-seeking by ruling elites may lead to war and state violence.¹³ These findings indicate that democracies might be just as eager to fight wars as their autocratic counterparts, but perhaps with fewer casualties.

A different debate persists regarding the relationship between conscription and conflict casualties. A literature review indicates that the implication of military recruitment strategies for conflict casualties is an under-researched area because many economists regard recruitment policies as the phenomenon to be explained, instead of recognizing that the policies might serve as an explanatory factor for wartime casualties.¹⁴ In other words, economists typically examine whether a military draft is the most efficient means for recruiting appropriate numbers of military forces.¹⁵ It is often argued that democracies attempt to shelter their citizens and soldiers with more military capital compared to dictatorships, but capital-for-labor substitution is likely to be reversed by conscription, which lowers the relative price of military recruits. A nonmarket method of recruiting military forces such as conscription is a form of enslavement or servitude that causes less regard for the lives of soldiers and results in greater casualties. In a comprehensive analysis of military draft policies around the world, Poutvaara and Wagener dispel many if not all economic, civic, and moral benefits commonly attributed to conscription by its proponents.¹⁶ Unless subject to politically unpopular tax increases, volunteer armies are perfectly capable of maintaining a sufficient quantity of qualified soldiers by compensating individuals with risk-adjusted market wages and adopting technologies that could save more lives.¹⁷

The importance of property rights and the institutions that enforce them is beginning to be widely recognized by economists. Combined, the two can create incentives for investment by preventing arbitrary confiscation of property by the state. With property rights guaranteed over a long-time frame, individuals can be assured of profiting from their investments, which encourages more economic activity or wealth creation. Conversely, an economic system that allows for arbitrary seizures not only reduces time-horizons but also creates markets characterized by inefficient or wasteful use of resources that thwart economic growth. Douglass North and other institutional economists argue that state property seizures lead to a wasteful use of property, but in the case of conscription the stakes might be higher because people pay for these policies with their lives.¹⁸ In other words, when conscripts come cheap and plenty, they are likely to become cannon fodder. An empirical analysis of interstate disputes by Choi and James reveals that countries with military draft

systems engage in more militarized disputes than countries with volunteer armies.¹⁹ Thus, one might expect volunteer armies (or free market policies in general) to be consistent with a higher value of life and lower casualties in military conflicts. Several scholars find that democratic countries with volunteer armies tend to have substantially lower casualty rates as compared to other combinations of recruitment methods and regime types.²⁰ Their findings suggest that all forms of governments tend to use conscription armies inefficiently and suffer higher battlefield casualties. However, democratic institutions can mitigate some if not all of the conscription-induced casualties and are able to sustain high levels of casualties when targeted by authoritarian states.

Not everyone agrees with the view that volunteer armies are superior to conscription armies in terms of minimizing war costs and casualties. Some scholars claim that countries with a broader constituency face different resource mobilization challenges than do countries with narrower constituencies when conflict payoffs or costs have public-good like characteristics.²¹ In the case of nonrival conflict costs, the war burden would be diluted by the large size of the electorate or conscripts in a democracy, making conscription armies more likely to minimize conflict costs to the public. A study by Vasquez finds that democracies with conscription armies experience fewer combat casualties compared to democracies with volunteer armies because, supposedly, conscript casualties place high political costs on policymakers.²²

These findings show a lack of consensus on the true effect of democracy and conscription on conflict casualties. In an attempt to reconcile these findings, this article studies both direct and indirect effects of economic, geographic, political, and institutional arrangements on conflict casualties, using an endogenous specification of military capital intensity.²³ Military capital intensity can be viewed as the channel through which various factors may exert their influence on conflict casualties. Using individual conflict data and aggregate country data, it is found that democracy, volunteer recruitment system, economic freedom, human capital (that is, schooling), per capita GDP, and the percentage of the total population living in urban areas all have a significant positive effect on military capital intensity, which in turn has a significant effect on lowering battlefield deaths. Additionally, it appears that conflict duration and civil war increase battlefield deaths directly, bypassing the military capital intensity channel.

To account for geographic determinants of battlefield deaths that do not vary over time, my latest paper uses cross-country averages instead of individual conflict data.²⁴

The “audience cost” view suggests that democracies direct lower battlefield casualties because they avoid fighting relatively bloody wars in the first place; in contrast, the “military capital” view holds that democratic governments and volunteer armies reduce combat casualties indirectly by shielding soldiers with more military capital.

Because many institutional, political, and especially geographical variables do not change significantly over time, cross-country regressions might be better suited for illuminating the underlying long-run relationships. The findings reveal that democracy and volunteer armies have significant casualties-reducing effects via the military capital intensity channel, but their magnitudes are substantially below those for economic freedom, human capital, and per capita GDP. In fact, economic freedom is five times stronger than democracy in terms of its effect on military capital intensity. Also, it is found that a country's land area increases and elevation decreases military capital intensity, while tropical area increases battlefield deaths. Perhaps defending a larger geographic area entails a higher number of military bases and other fixed costs that increase military capital intensity. A higher elevation can be thought of as a natural military obstacle and a substitute for military capital. Tropics, in contrast, can contribute to conflict casualties directly due to the presence of infectious diseases, heat, and humidity.

Military capital intensity and democracy

Despite a plethora of studies on the determinants of military expenditure, the nexus between political regime and military capital intensity remains largely unexplored. Although some studies argue that democratic and volunteer armed forces shield their soldiers with more military capital, they do not model this indirect or endogenous specification thoroughly. Many empirical studies on the regime-casualty relationship utilize ad hoc, single-equation regressions that produce inaccurate estimates due to the endogeneity bias. This endogeneity bias is central to understanding the difference between the audience cost and the military capital views discussed previously. The audience cost view suggests that democracies have a direct effect on battlefield casualties because democracies avoid fighting relatively bloody wars. In contrast, the military capital view holds that democratic governments and volunteer armies reduce combat casualties indirectly by shielding soldiers with more military capital. The direct audience cost effect has been typically estimated via single-equation regressions that are likely to produce biased estimates if democracy enters the regression equation alongside military expenditure, which has been found to be dependent on political regime type. However, the views are not mutually exclusive and would ultimately need to be tested empirically.

This section reports on an attempt to statistically separate the direct audience cost effect from the indirect democratic effect, which affects casualties via the military capital intensity channel. An equation is estimated where democracy is allowed to have the direct effect on battlefield deaths (second-stage regression) as well as the indirect effect on battlefield deaths through military capital intensity (first-stage regression). If the audience cost view is correct, then democracy should have a statistically significant effect on lowering battlefield casualties in the second-stage regression, even after controlling for its effect on military capital intensity in the

Table 1: Selected determinants of battlefield deaths

<i>First-stage regression</i> (dep. var.: military capital intensity)		<i>Second-stage regression</i> (dep. var.: battlefield deaths)	
Democracy	0.49***	Military capital intensity	-0.89**
Conscription	-0.25***	Coalition member	-3.70***
Economic freedom	2.23***	Coastal country	1.07*
Human capital (educ.)	0.65***	Democracy	-0.36
GDP per capita	0.88***		
Coalition member	0.53**		
Land area	0.13**		
Elevation	-0.15*		
Observations	64	Observations	64
F-statistic	36.26***	F-statistic	30.99***
R-squared	0.84	R-squared	0.72
	Hansen J test for instruments (p-value) =>		0.83
	Ramsey omitted variable test (p-value) =>		0.35

Notes: Statistical significance levels: *** at 1%, ** at 5%, and * at 10%. Variables are in logarithms and coefficients serve as elasticities. Instrumental variables are: conscription, economic freedom, human capital, per capita GDP. Residuals are used in place of human capital and per capita GDP to factor out their correlations with democracy and economic freedom. The model satisfies both Hansen J and Ramsey tests. Military capital intensity (stock variable) is proxied with military expenditure divided by military personnel (flow variable), which reflects annual investment in military capital per soldier. Variable sources and descriptions are provided in endnote 25.

first-stage regression. In estimating this two-stage least squares (2SLS) regression equation, average country battlefield deaths and their determinants are used.²⁵ The results are summarized in Table 1.

The table shows that although democracy appears to have a negative (lowering) effect on battlefield deaths in the second-stage regression, the estimated effect is not significantly different from zero. Nevertheless, democracy has a significant positive effect on military capital intensity in the first-stage regression, which confirms the indirect effect argument and my earlier findings.²⁶ Other variables with significant effects on military capital intensity are shown in Table 1 and include conscription, economic freedom, human capital, per capita GDP, military campaign or coalition membership, land area, and elevation. Variables with significant direct effects on

The evidence presented here does not support the audience cost view that democracies choose to fight low-casualty conflicts.

average country battlefield deaths are shown on the right hand-side of Table 1 and include military capital intensity, coalition membership, and seacoast.²⁷ This evidence suggests that the audience cost view found in other studies might be capturing the

indirect casualty-reducing effect of democracy working its way through the military capital intensity channel.

Military capital intensity and the value of a statistical life

In addition to providing more accurate regression estimates, the endogenous treatment of military capital intensity allows estimating the value of a statistical life by calculating how much one would have to increase military expenditure per soldier in order to save one more life in a military conflict. Economist Chris Rohlfs uses a similar approach, which relies on capital-for-labor substitution, in order to show how more spending on capital equipment can save lives.²⁸ He examines how many American lives would have been saved if relatively more capital inputs like tanks or airplanes had been used in World War II battles in Western Europe. Using detailed battlefield data, he estimates the value of a statistical life for an American soldier in World War II to be about 1.3 million (present day) dollars. In contrast to Chris Rohlfs, my study uses international or country level data and finds that the average value of a statistical life (VSL) in military conflicts ranges between 4.5 and 7.3 million inflation-adjusted dollars, depending on the econometric techniques and variables used. My value of life estimates fall within the typical range of \$4 to \$9 million per life found in other VSL studies.²⁹ These numbers place additional confidence in the endogenous empirical specification, which treats military capital intensity as the endogenous channel through which many factors may influence conflict casualties.

Conclusion

This study identifies a number of political, economic, institutional, and geographic factors that have a significant direct or indirect effect on conflict casualties. Various findings in the literature are surveyed and a different empirical model is proposed that treats military capital intensity as the channel through which various factors may affect conflict casualties. The findings suggest that policies or institutions that promote democratic and economic freedoms, volunteer armies, education, and higher incomes per capita are likely to save more lives in interstate or civil wars. The proposed modeling approach also allows estimating how much military expenditure per soldier it would take, on average, to save one life in military conflicts. The estimates suggest that it may take between 4.5 and 7.3 million dollars of additional

military spending per soldier in order to save one more life.

Notes

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1. For both assertions, see Harbom, *et al.* (2005, 2006).
2. Mulligan and Tsui (2006).
3. See Mulligan, *et al.* (2004) for specific policy differences, and Persson (2002) for regime differences in fiscal policy, welfare, and corruption.
4. Goldsmith (2003); Yakovlev (2007).
5. Biddle and Long (2004).
6. Reiter and Stam (2002).
7. Horowitz, *et al.* (2006); Yakovlev (2006).
8. Rohlfs (2006).
9. Siverson (1995); Mueller (1973; 2005).
10. Garfinkel (1994).
11. Feaver and Gelpi (2004); Chiozza and Goemans (2003; 2004); Bueno de Mesquita, *et al.* (1992).
12. Hess and Orphanides (1995; 2001).
13. Nafziger and Auvinen (2002).
14. Horowitz, *et al.* (2006).

15. For an analysis of costs and benefits of conscription see, e.g., Altman and Fechter (1967); Hansen and Weisbrod (1967); Lee and McKenzie (1992); Fisher (1969); Warner and Asch (1995); Poutvaara and Wagener (2007).

16. Poutvaara and Wagener (2007).

17. See Miles (2006) for a report on recent army recruitment programs.

18. See, e.g., North (1990).

19. Choi and James (2003).

20. See, e.g., Horowitz, *et al.* (2006).

21. See, e.g., Bueno de Mesquita, *et al.* (1992).

22. Vasquez (2005).

23. Also see Yakovlev (2006).

24. See Yakovlev (2008).

25. See Yakovlev (2008). The military capital intensity variable is proxied by using military expenditure (real dollars) divided by military personnel. Although this proxy is a flow rather than a stock variable, it captures the effect of investment in military capital per worker allowing the regression coefficient to be interpreted as the effect of a change in the stock variable. Military spending and military personnel come from the Correlates of War data set (Singer, *et al.*, 1972). Battlefield casualties come from Gleditsch, *et al.* (2002). The democracy index is computed from democracy and autocracy measures taken from the Polity IV Project (2000). Conscription and economic freedom indices (interval or continuous measures) come from Gwartney and Lawson (2004). Conscription is factored out from the economic freedom index (courtesy of Bob Lawson). Human capital figures in the form of average years of schooling are from Barro and Lee (2000). The cross-country data set amounts to a maximum of 84 country averages over the 1950-2002 period.

26. Yakovlev (2006; 2008). Furthermore, the Wu-Hausman and Durbin-Wu-Hausman endogeneity tests support the model with only the indirect effect of democracy on battlefield deaths.

27. The regression model in Table 1 also satisfies Hansen's instrumental variable test and Ramsey's omitted variable (specification) test.

28. Rohlfs (2005; 2006).

29. Viscusi and Aldy (2003).

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