

The Frequency of Wars

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# The Frequency of Wars\*

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## Abstract

Wars are increasingly frequent, and the trend has been steadily upward since 1870. The main tradition of Western political and philosophical thought suggests that extensive economic globalization and democratization over this period should have reduced appetites for war far below their current level. This view is clearly incomplete: at best, confounding factors are at work. Trade and democracy are traditionally thought of as goods, both in themselves, and because they reduce the willingness to go to war, conditional on the national capacity to do so. The same factors may also have been increasing the capacity to wage war, and so its frequency. We need better understanding of how to promote these goods without incurring adverse side-effects on world peace.

Keywords: wars, state capacity, democracy, trade.

JEL codes: H56, N40.

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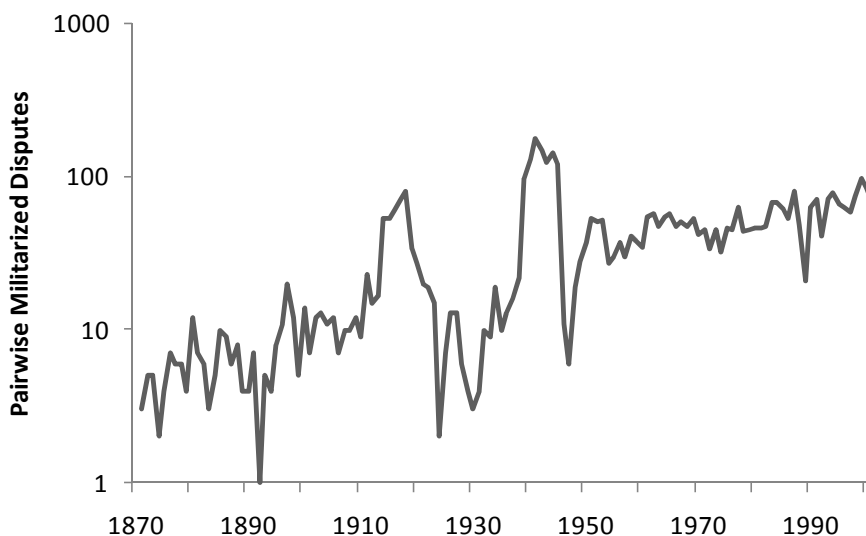
Wars are becoming more frequent. More precisely, the frequency of militarized conflicts among independent states has been rising steadily over 130 years. In this paper I suggest some reasons for this.

Part 1 of the paper reviews the data, and finds the trend to be of concern. Part 2 outlines some reasons why the trend is puzzling as well as worrying. The puzzle is that the world has become more globalized and more democratic; on both counts it should have got more peaceful, not less. In Part 3, I raise some issues about how the factors conducive to peace and war have been analyzed in the recent literature; in particular, underlying determinants of national capacity for war merit closer attention. Fiscal and commercial aspects of the capacity for war are defined in Parts 4 and 5; the issue here is that these capacities are promoted by the same forces of democratization and globalization that are supposed to discourage conflict. Part 6 concludes, suggesting lines of further investigation.

## 1. How Frequent?

Figure 1 charts the number of pairs of countries that have disputed with each other in each year from 1870 to 2001. This is a greater number than the number of wars for two reasons: first, it accounts for the number of countries involved in each conflict, rather than the number of conflicts; second, it has wider coverage than formal states of war, including displays as well as uses of military force. The chart measures the number of pairwise disputes on a logarithmic scale, partly to give a clear picture of what has happened at the lower frequencies.

*Chart 1. Militarized disputes between pairs of countries since 1870*



Source: Data from Martin, Mayer, and Thoenig (2008).

Viewed in this way, the chart demonstrates the existence of a clear log-linear trend; the frequency of bilateral conflicts has been rising for over a century at a

steady 2¼ percent per year.<sup>1</sup> To be sure, there was a good deal of disturbance in the period of the two world wars. But the surprising character of this disturbance is as follows: between 1914 and 1945, the conflicts that would normally have been distributed across the three decades were either brought forward (to World War I) or postponed (to World War II). After 1945, the frequency of conflict snapped back to the trend it had followed up to 1914.

In principle, the absolute number of pairwise conflicts per time period, or the *absolute frequency*, is the product of two underlying variables into which it can therefore be decomposed. One component is the number of country pairs, which has increased enormously since the nineteenth century. In 1870 the world contained fewer than 50 independent states. By the end of the twentieth century, there were more than 180. This was associated with the breakup of empires (Austro-Hungarian, German, Ottoman, Russian, French, British, Dutch, Belgian, Portuguese, and Soviet) and federations (Czechoslovak and Yugoslav). As a result the total number of possible country pairs in the world between whom relations of peace or war could exist grew from around one thousand to over 17,000.

After the increase in the number of possible pairs is stripped out of the data, we are left with the other component, the *relative frequency* of conflicts, that is, the absolute frequency of pairwise conflict normalized for the number of pairs. The number of countries since 1870 and the relative frequency of conflicts among them are shown together in Chart 2. As the chart shows, in the first 80 years the number of countries did not change much, but the relative frequency of disputes tended to rise. Then, over the next 40 or so years things changed; the relative frequency of disputes fell back to the level of the 1870s, but the number of countries increased dramatically, and it was this that took over as the main driver of the continued rise in the absolute frequency of conflicts.

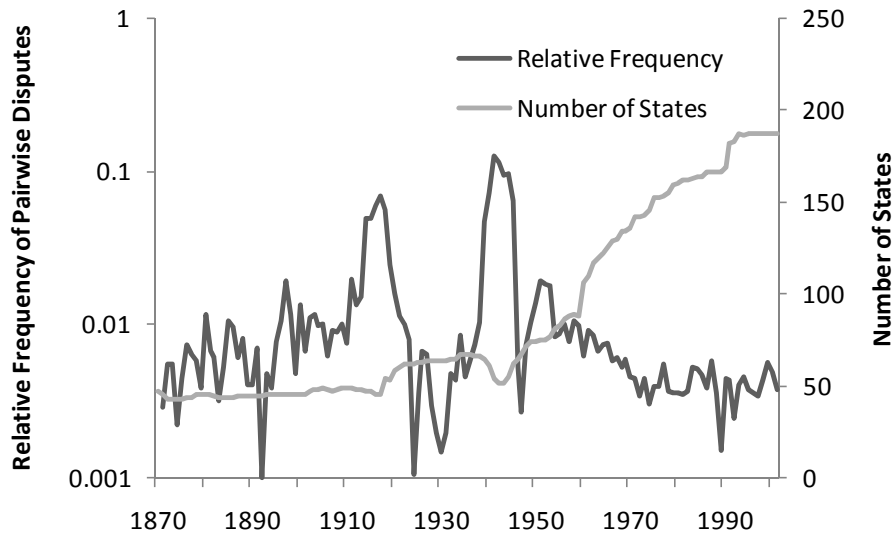
This gives us two possible angles on what has been going on. Normalized for the number of country pairs, the relative frequency of war does not show a trend and is no higher today than in the 1870s. This might seem to reassure, but should not do so. For, normalized for the number of planets that all countries must share – given as one, exactly – the absolute frequency of conflict today is similar to what it was during World War I. (The intensity of conflict is much lower, of course; it is simply the number of pairwise conflicts that is the same.) It is true that the number of conflicts has been driven up since 1945 by the number of states. But the number of states is not an exogenous or random variable. When new states come into being,

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<sup>1</sup> Statistical tests (not reported here) indicate that the data are described better as a first-order autoregressive process than a random walk. A rising trend is not evident in some other possible measures of the frequency of conflict, for example the absolute number of wars in each year (Poast 2006, p. 129). On my calculation the number of military fatalities in wars in each year since 1820 has risen on a trend similar to that of the world's population (whereas the upward trend in the frequency of bilateral disputes has risen faster by a full percentage point). One could infer that, while pairwise conflicts are becoming more frequent, they are not becoming more important. Whether that risks complacency is a matter for judgement.

what motivates them is the demand for sovereignty (Alesina and Spolaore 2003). And sovereignty includes decisions over peace – and war – with neighbors, including former compatriots. In fact it is not at all uncommon for new states to plunge into war, like Serbia, or be born out of war, like Kosovo.

*Chart 2. The relative frequency of pairwise militarized disputes and the number of independent states since 1870*



Source: Data from Martin, Mayer, and Thoenig (2008).

In sum, should we be reassured by the lack of trend in the relative frequency of conflict, or alarmed by the rising trend in absolute numbers? In my view the trend in the absolute frequency should arouse our concern. It is also a puzzle.

## 2. Too Frequent?

The data are a surprise, given the longstanding traditions of western political and philosophical thinking on the future of war. According to these traditions, the global trends towards democracy and globalization should make war increasingly a minority sport. In fact, war *is* a minority sport. The problem is that the minority is growing, and this should not be happening.

The expected relationship between war and globalization is, on the face of it, clear cut. For many reasons, modern states ought to prefer trade to war. On the eve of World War I, Norman Angell (1910, pp. 76-77) wrote:

Men are fundamentally just as disposed as they were at any time to take wealth that does not belong to them. But their relative interest in the matter has changed. In very primitive conditions robbery is a moderately profitable enterprise ... But to the man whose wealth so largely depends upon his credit, dishonesty has become as precarious and profitless as honest toil was in more primitive times.

In more contemporary terms, trade is a positive-sum interaction; war is negative-sum. Trade costs have fallen (Jacks, Meissner, and Novy 2008); war costs are high and rising (Stiglitz and Bilmes 2008; Glick and Taylor forthcoming). Victory in

war can bring one-sided gains but the gains are reversible if conflict is renewed. And, in wars of choice, victory is not only uncertain but unlikely. On the record of all wars since 1700, to start one attracts a 60 percent probability of defeat (Eckhardt 1989).

More or less the same tradition affirms that the spread of democracy should crowd war out of the global community. It is widely held that “Liberal or democratic states do not fight each other” (Levy 1988). The reasons for it have been debated. It is not hard to identify democratic political structures that impose restraint on leaders; leaders that lose wars, for example, are found to be more likely to lose office in democracies than in autocracies (Bueno de Mesquita and Siverson 1995). Plausibly, democratic norms also make leaders more likely to exercise self-restraint. Autocrats, in contrast, can steal the benefits of war while shifting the costs onto their subjects (Jackson and Morelli 2007); if defeated, they can retain supporters’ loyalty at lower cost than in a democracy (Bueno de Mesquita and Siverson 1995).

A compelling illustration of the so-called democratic peace is shown in Table 1. Whether the definition of conflict is narrow or broad, democracies have been systematically less likely to engage in it with each other.

*Table 1. Russett on dispute behavior, 1946-1986*

	<i>War</i>	<i>No war</i>	<i>Percent with war</i>
Democracy	0	169	0.0
Not Democracy	37	1045	3.4
	<i>Use of force</i>	<i>No use of force</i>	<i>Percent using force</i>
Democracy	8	161	4.7
Not Democracy	229	853	21.2
	<i>Any dispute</i>	<i>No dispute</i>	<i>Percent with dispute</i>
Democracy	12	157	7.1
Not Democracy	257	825	23.8

Note: The unit of analysis is the “regime-dyad.” The unit is counted as a democracy in all years when both countries in the dyad (or pair) are democratic, and not otherwise. All years in which the regime of the dyad is unchanged are taken as a single unit, so as to eliminate any bias arising from persistent pairwise behavior.

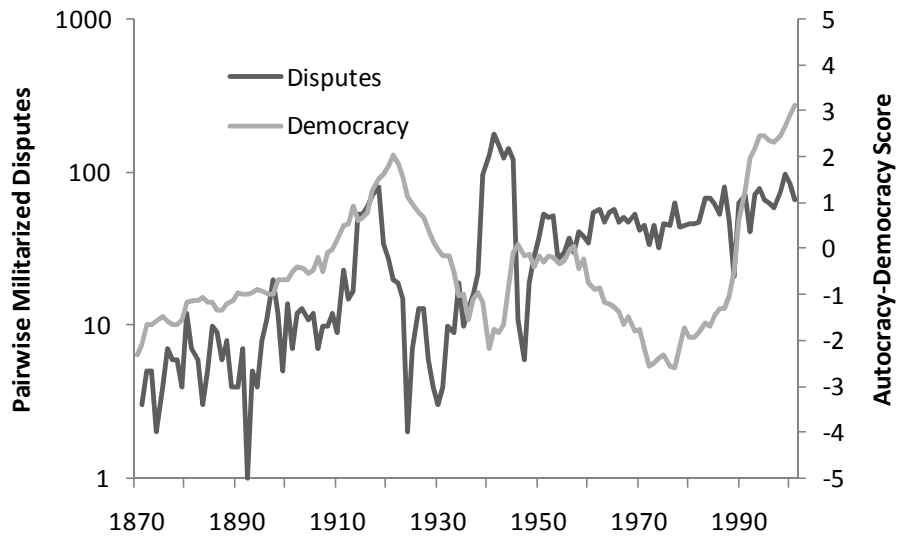
Source: Russett (1995, p. 167).

The recent literature on the democratic peace is not unequivocal in support of it, however. Here are three recent qualifications. Downs and Rocke (1994) have noted that elected leaders that face punishment by the electorate because their policies are failing have an incentive to gamble for resurrection, either by starting wars or by persisting with them, in the hope that something will turn up. This argument has been applied to Iraq by Stiglitz and Bilmes (2008), as well as generalized by Majumdar and Mukand (2004). Observing the record of the former Soviet and Yugoslav states Mansfield and Snyder (1995, 2002) have proposed that new or incompletely established democracies are particularly vulnerable to risky adventures in nation-building. Georgia seems to have supplied recent out-of-sample confirmation. Finally Conconi, Sahuguet, and Zanardi (2008) have found in the data that democracies where leaders are subject to term limits are as likely to make war as autocratic states – and term limits are increasingly widespread. It is the

democracies without term limits, where established leaders retain the option of continuing to compete for office, that account for the democratic peace.

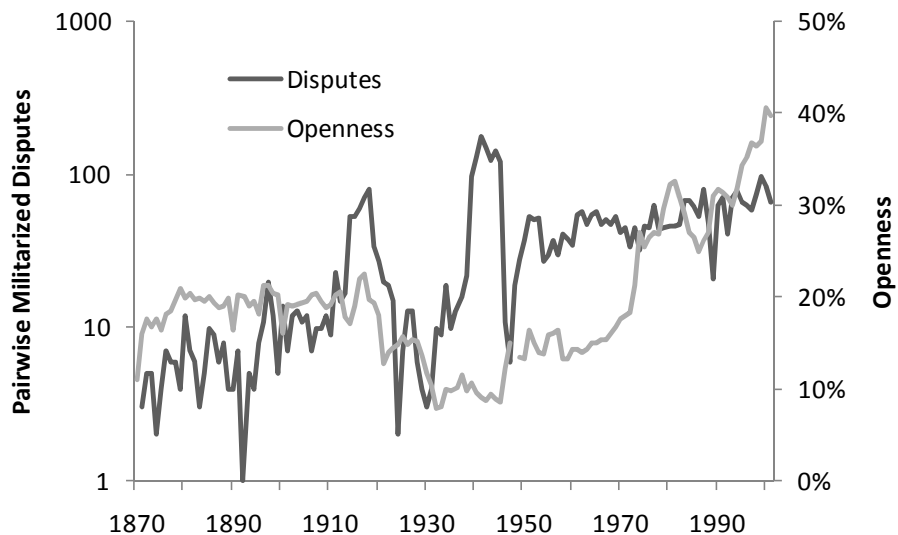
In short, the idea that democratization necessarily spreads peace has been qualified in various ways. Whether taken separately or together, however, the qualifications do not seem fully up to the task of explaining a trend towards the rising frequency of war that has persisted for 130 years. The full difficulty that we face is illustrated in Charts 3 and 4 which deal, respectively, with the spread of democracy and trade.

*Chart 3. Democratization and militarized disputes since 1870*



Source: Data from Marshall and Jagers (2007); Martin, Mayer, and Thoenig (2008).

*Chart 4. Trade openness and militarized disputes since 1870*



Source: Data from Martin, Mayer, and Thoenig (2008).

As these charts illustrate, the general tendency has been for trade and democratization to grow together. From study of the endogenous relationship between trade and democratization since 1870, López Córdova and Meissner (2008)

confirm that more open countries have been consistently more democratic; most likely trade has tended to drive democracy but with long lags and through uncertain and varying channels. But on our own figures, as trade and democracy have spread, so have wars. Over significant sub-periods, for example from 1870 to 1913 and from the mid-1970s to 2001, the positive associations of openness and democratization with the absolute frequency of wars have been particularly close. Thus, if we have not got the general relationship between economic and political progress and war completely and utterly wrong, then, to say the least, we have missed some important confounding factors.

### 3. How Much Do We Really Know?

We know less than we should, apparently. There is a vast and long-standing international relations literature on war and peace. The literature was once based on intuitive inference from narratives and comparisons, but has been transformed over the last thirty years by new data and the application of quantitative methods. Large-scale open-access cross-country panel datasets have been created that deal with war and peace, political regimes, and historical macroeconomic and trade variables.<sup>2</sup> We should know more than ever before about the correlates of war and peace. Yet, what do we know?

As might be expected, the literature that has resulted, being voluminous, is of variable quality. Not all of the data now available have been well used; among thousands of regressions that have been reported are many with potentially biased or otherwise dubious estimates, for example because of the neglect of fixed effects in pooled regressions (Green, Kim, and Yoon 2001).

In some ways the present state of the field is reminiscent of the literature on global economic growth and divergence a decade or more ago. Banerjee (2007) has described how economists strayed into thinking of global development as a machine that produced growth using levers labeled “investment,” “education,” and “trade.” In much the same way, estimation strategies now typically model global relations as a machine with big push-buttons marked “democracy” and “trade.” Economists have learned, however, that, while the big buttons have some power as statistical drivers of global development in the aggregate, their power has intrinsic limits. The buttons become particularly unreliable when applied in the context of any given country. One likely reason (Rodrik 2007) is that their operation is likely to be at least partly confounded by unobserved cross-country variation in institutions.

Where next for the study of peace and war? Experience suggests three possible correctives. One is to look inside the regressors: democracy and trade are complex phenomena that may have multiple or non-linear effects. An example of work in this spirit would be the investigation of term limits in democracies cited previously, but other aspects are also likely to be deserving of closer study. Collier (2007) has

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<sup>2</sup> See the Correlates of War project at <http://www.correlatesofwar.org>, the Polity IV project at <http://www.systemicpeace.org>, the Penn World Tables at <http://pwt.econ.upenn.edu>, and the work of Angus Maddison at <http://www.ggdc.net/maddison>.



argued that electoral competition may impede effective governance for development unless accompanied by checks on executive power. Intuitively, electoral competition without executive restraint might be as damaging for international relations as it can be for domestic development.

Another desirable corrective is to demand that cross-section results ought to be reconciled with what time series and narratives tell us. The virtue of cross sections is that they enlarge the data; but the fact is that we live our lives through time. When we ask what may happen next year, it is not always helpful to be told what would happen if Argentina became Britain in a timeless way, since countries (and country pairs) are likely to be otherwise different in ways that we cannot control. Narratives of democratization in particular countries, for example, have shed light on the hypothesis of democratic peace where pooled cross-section studies have failed to do so or may even have misled. In principle fixed effects should exclude the across-unit variation from the variation that is exploited for estimation, leaving only the within-unit variation over time, but it is not always clear what is the unit: the country or the pair, for example (or even the “regime-pair,” as in Table 1). Under these circumstances, narratives should provide a further check on robustness.

Finally, a focus on the appetite or “demand” for war is reasonable and justifiable, but may have led us to neglect “supply-side” or capacity-for-war factors that are also relevant. The nature of “state and legal capacity” generally, and its relationship to propensities for peace and war, are the subject of recent work by Besley and Persson (2008 and forthcoming). I will consider aspects of this at greater length, using two examples: the fiscal capacity for war and what I will term the “commercial” capacity for war. Globalization and democratization both ought to have diminished the appetite for war – and may well do so in cross section. But they may also have promoted the capacity for war over long periods, and this may explain some of what we see in the historical time series.

#### 4. The Fiscal Capacity for War

In the middle ages citizens were poor. Tax compliance was low and sovereign debt was unattractive to lenders. Often, rulers raised military forces in kind: local overlords supplied the king with armed men and food. As a result, the ruler could wage external war only by consensus. Or the king raised taxes to pay the army; conditional on having done so, he gained freedom of military action, but he could raise the taxes in the first place only through the overlords, and this again required their consent. Nor could rulers borrow to any great extent because, at this stage, there was no real distinction between public finance and the personal finance of the king; lenders were reluctant, not knowing if the king would be bound by his word, or if his debts would die with him.

Comparative historical research of Karaman and Pamuk (2008) on the Ottoman Empire, reported in Table 2, is suggestive that no sixteenth-century ruler could extract more than 2 or 3 per cent of GNP in central revenues from the territory of the kingdom. The burden on peasants might well be higher, but much of what could be levied was dissipated locally in paying off overlords or tax farmers. Only adding to

the size of the kingdom could add to central revenues, but this risked diminishing returns to the delegation of tax-raising authority across a larger territory.

The seventeenth century saw a fiscal revolution in northwestern Europe. Afterwards, English and Dutch fiscal ratios climbed to 10 and then 20 percent of national income. Chart 5 portrays the progress of this revolution in England between 1500 and 1800. In the middle of these three centuries fall the English Civil War of 1642 to 1651 and the Glorious Revolution of 1688. Before 1642 English revenues were only once, briefly, more than 5 per cent of national income; after 1688, they were never less than that, and increasingly much more.

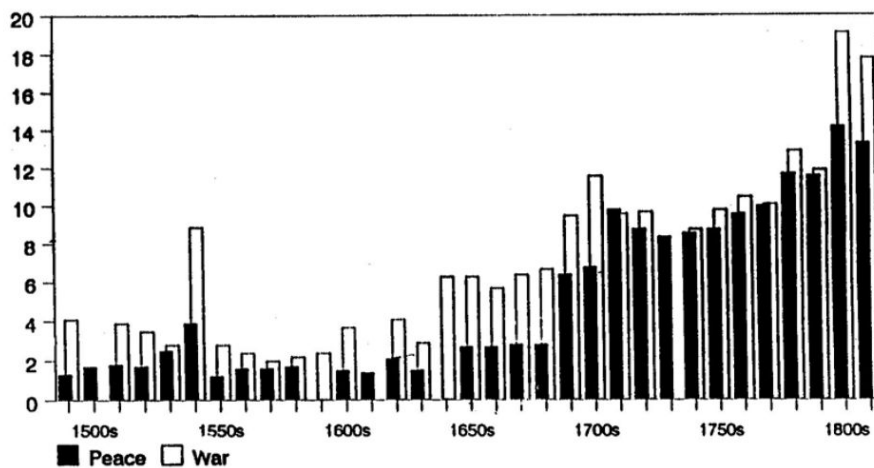
*Table 2. Central tax revenues, per head (number of daily wages of unskilled construction workers in the capital city)*

	1550/59	1780/89
Holland/Dutch republic	5	19
Spain	4	18
England	3	17
Austria	...	14
France	3	12
Ottoman Empire	2 to 4	2 to 3

Note: I have omitted figures for Venice from the table (9 in 1550/59 and 13 in 1780/89). Venice was a special case: a city state, the Singapore of early modern Europe, a pioneer of commerce and public finance, but not a contender for military hegemony in a world increasingly dominated by nations.

Source: Karaman and Pamuk (2008).

*Chart 5. English revenues, 1500 to 1800 (per cent of conjectured national income)*



**Notes:** The ratios, measured in current prices, refer to the lowest percentage for a given peace time year and the highest percentage for a war year within each decade. In the 1490's the king collected a low of 1.3% in peacetime and a high of 4.1% in wartime.

Source: O'Brien (2005).

What drove the transformation of public finance? The Civil War and the Glorious Revolution destroyed absolutism and set new restraints on the executive – at least, the executive was now restrained in everything but the making of war (Açemoglu, Johnson and Robinson 2005). Abroad, the government aggressively promoted the

Atlantic trade by extending naval power, a policy that won taxpayers' support and built tax compliance. At home, credible guarantees against default widened the market for sovereign debt. The result was to build public finance (Tilly 1990, Ferguson 2001, O'Brien 2005).

Since other regions of Europe and the Near East did not follow, there was fiscal divergence. As Table 2 showed, at the end of the eighteenth century the fiscal ratio of the Ottoman Empire remained where it had been. Through the nineteenth and early twentieth centuries, the fiscal gap widened. In fact, by the era of the two world wars, the liberal democracies could put half or more of national income into both world wars. In World War I, Germany exhausted its economy in the attempt to compete; the agrarian empires of the Ottomans, Romanovs, and Habsburgs struggled to mobilize their resources at all (Broadberry and Harrison 2005).

*Table 3. Public spending in two world wars (per cent of national income in peak year)*

	<i>Government outlays, 1914 to 1918</i>	<i>Military outlays, 1939 to 1945</i>
USA	*17	42
UK	37	55
France	54	...
Germany	59	70
Japan	**	70
Russia/USSR	***	61

Note: \* The United States was in World War I for a year and a half compared with more than four years for the UK, France, and Germany. \*\* Japan was not in World War I. \*\*\* There are no data for Russia at this time.

Source: Harrison (1998), Broadberry and Harrison (2005).

Later in the century, the non-democracies caught up and narrowed or even eliminated the gap. The extraordinary fiscal ratios of Nazi Germany, militarist Japan, and the Soviet Union stand out in Table 3. Behind this lay the fact that, by World War II, dictators of varying hues had learned to exploit modern repression to match the fiscal capacities of the capitalist democracies (Harrison 1998). What the dictators could not do, however, was match their commercial capacities for war.

## 5. The Commercial Capacity for War

The commercial capacity for war is illustrated by a twentieth-century paradox. Since the Napoleonic era, European governments have worried about food security. Britain has relied overwhelmingly on imported calories. Despite this, in two world wars Britain had little difficulty in feeding its people (Olson 1963). In contrast, those countries that believed themselves secure were the first to run short of food. In the last quarter of the nineteenth century its leaders worked hard to limit Germany's exposure to international trade and to protect agriculture. In 1914 Russia went to war congratulating itself on the availability of a large peacetime surplus of exportable food. Yet it was Russian and German cities that were stalked by hunger (Offer 1989; Broadberry and Harrison 2005).

It was easier for Britain to feed itself from the other side of the world than for Berlin, Vienna, St Petersburg, or Constantinople to induce farmers thirty miles distant from the capital to feed their own people. Why was this? Britain had invested not in agriculture but in something more important: the gains from international trade. These were not only direct gains in the Ricardian sense of returns to specialization, but also indirect gains from the establishment of an overseas trading network that would robustly survive the disruptions of continental war. The Russian, German, Austro-Hungarian, and Ottoman Empires had inferior external networks, although Russia was helped by peripheral membership of the Anglo-French network. But there was more: these countries, with their large peasant populations, could not maintain the integration of their own domestic markets under the pressure of wartime mobilization. Unable to trade with the cities on peacetime terms, their peasant farmers seceded from the war effort, retreating into subsistence activities, leaving the soldiers and war workers without food.

To varying degrees, these countries had a commercial capacity for war that was greatly inferior to Britain's. They thought they were safe; they perceived the British to be at risk. When war broke out, they expected Britain to starve. Using commerce rather than agriculture, however, the British fed themselves to standards little short of peacetime through two world wars. In both world wars, moreover, the Allies were able to multiply the military value of coalition resources through long-distance economic cooperation that the Central and Axis Powers could not match.

The lesson of this narrative is straightforward: war and trade are not exclusive. The same conclusion can be reached in other ways, however. Using panel data from 1950, Martin, Mayer, and Thoenig (2008) have shown that trade had a double effect on the relative frequency of pairwise conflict. More bilateral trade reduced this frequency, but more multilateral trade raised it. Over time both multilateral and bilateral openness increased on average, but the net effect was positive. For any country pair separated by less than 1,000 kilometers, globalization from 1970 to 2000 raised the probability of conflict by one fifth (from 3.7 to 4.5 percent). On the interpretation of Martin and his co-authors, the same forces that widened the scope of multilateral trade made bilateral war less costly. As long-distance trade costs fell, open economies could increasingly wage war against some (most likely close by), while continuing to reap the gains from trade with others (at a distance).

From various angles, therefore, it is possible to identify something that it is convenient to call the commercial capacity for war; this capacity is increasing in trade liberalization, and also in the information, communication, transportation, and transaction technologies that account for much of modern economic growth.

## 6. Conclusions

The evidence suggests that, normalized by the number of countries (or people) in the world, the risk of war is no higher today than in the 1870s. Normalized by the number of planets we have to share, however, it is of the same frequency (if not intensity) as during World War I. There has been a steady upward trend in the number of bilateral conflicts over 130 years – and this should arouse our concern.

The rising trend may turn out to be driven by things we would otherwise welcome as global improvements. For example, the hunger for self-determination has been satisfied in many troubled regions, leading to the formation of new states – each providing a new focus for potential conflict. Democracy is becoming more typical – and, with democracy comes improved fiscal capacity; as a result, countries that adopt democracy are likely to be able to raise taxes or borrow more in order to promote national adventures without recourse to domestic repression.

Falling trade costs are another modern boon that has allowed many countries to benefit from specialization and increased economic interdependence. Wider markets have also increased the scope for smaller countries to self-insure against asymmetric shocks. A moral hazard that we associate with insurance, however, is that the insured can then engage in risky behavior at lower cost. In the same way, small states that reduce risks through multilateral exchange may become more inclined to risky action in bilateral relations.

We could stop here, noting that the news is mixed-to-bad; by implication, there is nothing much to be done except build defenses against an increasingly dangerous world. This seems to me to be unduly pessimistic. But more positive action must await answers to two questions.

Democracy is good, but without nation there is no democracy, and nation-building is a double-edged process. Similarly, falling trade costs and wider multilateral exchange are powerful promoters of economic growth and development, but may also cheapen war. How can we encourage democracy to spread in ways that don't offer gains to nation-building adventurers? How can we lock countries into regional or global trade without freeing their hands for confrontational foreign adventures? Together, these questions may hold one of the keys to a peaceful twenty-first century.

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