

Economics of the World Wars*

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Economics of the World Wars

INTRODUCTION

The two world wars of the twentieth century were events in a single process of reaction against globalisation that was prolonged and, from time to time, violent.

From 1815 to 1914 trade and capital flows increased alongside global productivity. Everywhere, economic development tended to reduce local risks. At the same time, falling trade and transport costs exposed farmers, firms, and labouring households to new instabilities and risks that originated faraway, in countries and markets across the world. Where governments and politicians embraced these long-range risks, liberalisation fostered engagement in the global economy. Where political entrepreneurs mobilised reaction against them, however, resistance gained ground.

By the end of the nineteenth century, leaders of several newly industrialising countries were seeking to insulate their economies from global risks through tariff protection. German leaders, for example, aimed at national security through trade within a closed region based on a colonial empire. To secure this empire they launched a naval arms race; the arms race precipitated the formation of two Eurasian alliances that confronted each other in World War I. By the end of the war, four great imperial regimes lay in ruins: the German empire of the Hohenzollerns, the Austro-Hungarian empire of the Habsburgs, the Romanovs' Russian empire, and the Ottoman empire in the Near East.

After World War I, the instabilities intrinsic to the global economic order increased. The weakness of the formerly dominant British economy and the isolation of Germany and Russia undermined global market integration. The slump of 1929 sent deflationary ripples around the world and accelerated the disintegration. As the world market shrank, the great powers struggled over national shares. In the 1930s the world economy broke up into several relatively closed trading blocs. The British, French, and Dutch reorganised their trade on colonial lines. With Hitler in power, Germany resumed the perspective of regulated trade within a colonial region in central and eastern Europe, and this led to rivalry with other interested regional powers. Italy established bilateral trade with the smaller states of the former Austro-Hungarian empire, and also set about winning an African empire. The Japanese competed with the Americans, the Dutch, the British, and the Soviet Union for influence in East Asia and the Pacific. The Soviet Union developed a closed economic space behind the frontiers of the former Russian Empire and defended it against the Japanese.

The worldwide trade disintegration contributed to the causes of World War II. The economies of the Axis powers, Germany, Italy, and Japan were

too small to prosper without specialisation and external sources of food, fuel, and other materials. A common thread in their course of external aggression was the attempt to secure these supplies by imposing a colonial regime upon trading partners. In this sense the national policies that led to World War II were a continuation of those that had led to World War I.

The second war continued some of the themes of the first, but it was not just a repeat. The object of the first war was regional – to control Europe, the Atlantic, and the Near East. The second war was a struggle for global domination in the full sense. The first war was certainly fuelled by racial identities, but no one aimed at genocide, as they did in the second. The first war ended inconclusively, with a ceasefire and a peace treaty that tried to punish the aggressors, but there was no unconditional surrender and in Germany, those who wanted to try again eventually took power. In 1945 the aggressors were crushed militarily and morally, their surviving leaders were put on trial, and what they stood for was excluded from public life.

In this chapter we pursue the similarities and differences of the two wars in terms of economic history. We have two main themes. First, what is the power of the economic factors compared with others in helping to explain the outcomes of the two wars? Second, of the possible economic factors that should be considered, which contribute most to the explanation of the results? These are not new questions, of course; here, we outline briefly some alternative views.

Historians of the two world wars tend to narrate their story as a complex interplay of forces that worked at many levels. They tell a story of warfare that was increasingly mechanised and waged for years on end by massed forces. Nonetheless, war was waged by people, not by numbers. Economists, in contrast, have tended to give the centre stage to the numbers, conceding less to aspects of warfare such as leadership, discipline, heroism, and villainy. Raymond Goldsmith (1946: 69), an economist who helped to manage the United States war economy in his youth, once observed that:

The cold figures of the output of airplanes, tanks, guns, naval ships, and ammunition, particularly when they are reduced to the still colder form of indices of aggregate munitions production of the major belligerents, probably tell the story of [World War II] as well as extended discussion or elaborate pictures ... They back to the full the thesis, dear to the economist's ear, that whatever may have saved the United Nations from defeat in the earlier phases of the conflict, what won the war for them in the end was their ability – and particularly that of the United States – to produce more, and vastly more, munitions than the Axis.

To many historians this view remains unappealing; Richard Overly (1998), for example, has objected that it leaves no room for “a whole series of contingent factors – moral, political, technical, and organizational – [that] worked to a greater or lesser degree on national war efforts.”

The opposition between cold figures and hot blood is false to some extent. Of course, leadership and psychology mattered. But they mattered less than in previous eras because they had become problems that both sides could solve. In both world wars, multi-million armies took the field and stayed there for months and years, giving and taking appalling losses, without disintegrating. Since the moral fabric of military life could withstand the pressure, numbers of men and the volume of supplies assumed the decisive role.

If economics did matter, exactly what was it about the economies of the Allies that gave them superiority? In Goldsmith's tradition, size mattered and only size. Niall Ferguson is a historian who gives economics the attention it deserves. Noting the overwhelming size advantage of the Allies in population and production on the eve of World War I, he remarks (1998: 248), "To the economic historian, the outcome of the First World War looks to have been inevitable from the moment [the British] opted for intervention." Given this advantage, he argues, the war should have been over quickly; the only explanation for the Allied failure to conclude the war much sooner is Allied mismanagement, so Ferguson concludes that the Allied economic preponderance was "an advantage squandered." As a result, economic advantage came into play only after much time had passed and the military advantage of the aggressors had almost won the day.

There is much truth in this, but we will take a more nuanced view of what it was about economic life that could be decisive in warfare. The belligerents' economies differed not only in the volume of national resources but also in their quality. The main factor in quality was the level of peacetime economic development, which we measure by average real incomes per head of the population. Richer countries could mobilise production, public finance, soldiers, and weapons out of proportion to their general economic capacities; in other words, the level of economic development acted as a multiplier of size. For Britain in both world wars, control of the vast but impoverished population and territory of India, for example, mattered little compared with access to the rich markets of the United States.

1. WORLD WAR I

From an economic viewpoint, World War I can be divided into two phases. In the late summer of 1914, both sides hoped for a quick victory with a limited commitment of resources to the war effort. This first phase is summed up in the memorable phrase "business as usual", which was common currency in Britain at the time (Lloyd, 1924). It was hoped that the war could be fought along similar lines to previous centuries, with a clear distinction between soldiers doing the fighting and civilians getting on with normal life. However, from late 1916 both Britain and Germany stepped up mobilisation in the direction of "total war". In total war, industry was mobilised to provide unprecedented amounts of munitions, and industrial workers became as vital to the war effort as soldiers. During this second phase, keeping up production and avoiding economic collapse became central to management of the war. The first economy to collapse was on the Allied side; the Bolshevik Revolution of 1917 took Russia out of the war and led to a Soviet Republic

(Gatrell, 2005). In 1918, falling output in Turkey, Austria and Germany, led to the collapse of the Central Powers and the break-up of their empires (Pamuk, 2005; Schulze, 2005; Ritschl, 2005). France also suffered a late collapse of output, but was shored up by the other Allies (Hautcoeur, 2005).

1.1. Size and Development

The Allies mobilised more soldiers and produced more of most weapons than the Central Powers, as can be seen in Table 1. Furthermore, the degree of Allied superiority increased with the complexity of the weapons. Only in guns did the Central Powers have numerical superiority, while the Allied superiority in tanks reached a factor of nearly 90:1.

Table 2 shows that the balance between the two sides varied over time, as the alliances' compositions changed. In 1914, the Triple Entente of the United Kingdom, France and Russia could also draw on their colonies and were joined by other countries including Serbia, the British Dominions, Liberia and Japan. By November 1916, the Allies had been joined by a second wave of countries, including Italy, Portugal and Rumania. By November 1918, although Russia had dropped out, the Allies had been strengthened by the United States and a further wave of countries. By this time, the Allied side included 70 per cent of the world's prewar population and 64 per cent of its prewar output. The scale of resources that could be mobilised by the Central Powers varied less over time. Austria-Hungary started the war, joined immediately by Germany and shortly after by the Ottoman Empire. By November 1915, Bulgaria had also joined, but Italy, defaulting on its treaty obligations, joined the Allies.

It is important to consider the level of economic development of individual countries as well as the volume of output that the two alliances could draw upon. Britain, for example, with a prewar population of 46 million, had average incomes of nearly \$5,000 (at 1990 prices), but its colonies, excluding the Dominions, had a prewar population of 380 million, mostly in India, with average incomes of less than \$700. Thus the colonies, with nearly 8 times the population of Britain, produced only about the same volume of output. But the colonial output was less available for fighting the Germans because most of it was needed to meet the subsistence needs of the colonial population. Furthermore, this population was difficult to mobilise because of its distance from the theatre of war and the level of development of colonial administration. Even within the Triple Entente, the low level of development in Russia limited the Allied mobilisation. The Central Powers were similarly hampered by the low level of development of the Ottoman Empire and Bulgaria, and even the Hungarian half of the Habsburg Empire.

Comparing the information for the two alliances in Table 2, it is possible to calculate size and development ratios for three benchmark dates in Table 3. The ratios are calculated for each alliance as a whole, and also for the great powers only. The rationale for the latter is that if, as we argue, poor colonies did not count for much, it is helpful to see how the ratios look if we do not count them at all. The table establishes a striking result: judging by economic size, the Central Powers were doomed to defeat. In November 1914,

the Allies had access to 5 times the population, 11 times the territory and 3 times the output of the Central Powers. Looking only at great powers, the Allied advantages in population and output were smaller, but larger in territory, reflecting the fact that German and Turkish colonies tended to be in the sandy deserts of Africa and the Middle East. However, the Allied advantage was limited by relatively low average incomes in Russia and the British and French colonies. Allied incomes were less than two-thirds the average level of the Central Powers, or 80 per cent if attention is confined to the great powers, counting Russia as a great power.

By November 1916, the Allied advantage had grown moderately in terms of population, territory and output, but the Central Powers continued to have an advantage in average incomes. By November 1918, however, the situation had changed dramatically, largely as a result of the United States replacing Russia. The Allied advantages in population, territory and output all increased markedly and, for the first time the Allies enjoyed an average income advantage if attention is restricted to great powers. Although it took some time for the American presence to be felt on the battlefield, it sealed the Central Powers' fate.

1.2. Development and Mobilisation

The ratios in Table 3 are based on the assumption that during the war, the real output of a given country did not change. The reason for this assumption is statistical: it is difficult to track GDP changes in wartime in the poorer countries. What information we have suggests that Table 3 must understate the actual swing in favour of the Allies during the war, because output increased in the United States and Britain, but fell in the less developed economies of the Central Powers. This can be seen in Figure 1, which plots the change in GDP during 1913-1917 against the level of per capita income in 1913 for nine countries. The relationship is strongly positive, reflecting the fact that rich countries were better able to mobilise output than poor countries. The biggest decline was in Russia, which was also the poorest amongst these countries in 1913, and collapsed in the Bolshevik Revolution of 1917. There were also substantial falls in output in Austria-Hungary, France and Germany, which all started the war with lower average incomes than Canada, Britain, New Zealand and the United States.

Another measure of mobilisation which varied with the level of development is the change in government outlays as a share of GDP. This reflects the extent to which governments were able to convert output from peacetime uses to the war effort through taxation and spending. Figure 2 plots this measure of fiscal mobilisation during the first year of the war against prewar average incomes for eight countries. The relationship is positive, but not as clear cut as for production mobilisation. In particular, it is necessary to control for distance from the main theatre of war in Europe, with the New World countries of Canada, Australia and the United States mobilising less resources through taxation and public spending than the European countries.

Perhaps the most direct measure of mobilisation is the share of the prime-age male population recruited into the military. This measure, plotted in

Figure 3 against average incomes in 1913, is available for a relatively large sample of countries. Again, we find a relationship that increases with prewar prosperity and decreases with distance from the main theatre of war. The figure is plotted in three distance bands, comprising the frontline Eurasian states, peripheral European countries isolated from the frontline by land or sea (Britain and Portugal), and non-European states. Cumulative numbers mobilised are shown as a proportion of males aged 15 to 49. Controlling for distance (i.e. within each distance band), there is a positive relationship between military mobilisation and the level of development. But dropping a band also lowers the mobilisation rate substantially.

Figures 1 to 3 show us that the level of development acted as a multiplier of size. Rich countries were able to mobilise production, public finance and soldiers out of proportion to the size of their economies measured by GDP.

1.3. Mobilisation and Agriculture

Why did being poor matter for large countries like Russia, Austria-Hungary and Turkey? During World War I, the answer can be found in the performance of the agricultural sector, since these countries all ran short of food long before they ran out of guns and shells (Offer, 1989). Broadberry and Harrison (2005) attribute this to the negative impact of peasant agriculture on mobilisation.

One of the most striking attributes of relative poverty was the role of subsistence farming. Contemporary observers were aware of these differences and interpreted them as follows: when war broke out, a country such as Russia would have an immediate advantage in that most of the people could feed themselves; moreover, the diversion food supplies from export to the home market would actually increase Russia's advantage. In contrast Britain would quickly starve (Gatrell and Harrison, 1993). This diagnosis could not have been more wrong. In practice a large peasantry proved to be a great disadvantage in mobilising resources for war. Meyendorff (cited by Gatrell, 2005) described what happened in Russia as "the Russian peasant's secession from the economic fabric of the nation". And not only from Russia, for Italy, Austria-Hungary, the Ottoman Empire, and Germany all had large peasant populations that proved extremely difficult to mobilise for much the same reason. In wartime peasant agriculture behaved like a neutral trading partner. Why should the Netherlands trade with Germany at war, given the latter's reduced ability to pay, except under threat of invasion and confiscation? Peasant farmers, trading with their own governments, made the same calculation. Thus the Russian economy looked large, but if the observers of the time had first subtracted its peasant population and farming resources they would have seen how small and weak Russia really was.

The peasant's propensity to secede is clearly visible from a comparison of the richer and poorer countries' experience. When war broke out British and American farmers were offered higher prices, responded normally to incentives, and boosted production. The fact that British farming had already contracted to a small part of the economy made its expansion easier: there were plentiful reserves of land unused or little exploited, and the high

productivity of farm labour meant that large increases in farm output could be achieved with few additional resources (Olson, 1963; Broadberry and Howlett, 2005).

In the poorer countries, in contrast, wartime mobilisation took resources away from farming, particularly young men and horses for the army. Once in the army these young men and horses still needed to be fed, which required a diversion of food supplies from rural households to government purchasers. But the motivation for farmers in the countryside to sell food was reduced, not increased. These were subsistence farmers who grew food partly for their own consumption; what they sold, they took to the market primarily to buy manufactured commodities for their families. But war dried up the supply of manufactures to the countryside. The small industrial sectors of the poorer countries were soon wholly concentrated on supplying the army with weapons and kit. Little capacity was left to supply the countryside, which faced a steep decline in supplies.

Consequently, peasant farmers retreated into subsistence activities and the economy began to disintegrate. There might still be plenty of food, but it was locked in the countryside. The farmers preferred to eat it themselves than sell it for a low return. What food it could get, the government gave to the army for a simple reason: hungry soldiers will not fight. Between the army and the peasantry the urban workers were caught in a double squeeze. As the market supply of food dried up, urban food prices soared, and an urban famine set in. In terms of the economics of famines, the primary cause was not a failure of production but the urban society's loss of food entitlements (Sen, 1983; Offer, 1989).

Aware of this, public opinion might blame unpatriotic speculators or incompetent officials. But the truth was that a poor country had few genuine choices. The scope for policy to improve the situation was more apparent than real, and government action often made things worse: the Russian, Austrian, and German governments all began to ration food to the urban population, for example, while attempting to buy food from the farmers at purchasing prices that were fixed low for budgetary reasons. To repeat: in richer countries the government paid *more* to the farmers, and this worked, but in poorer countries the government tried to pay *less* and this had entirely predictable results: the farmers' willingness to participate in the market was further undermined.

In summary, in wartime poor countries suffered the consequences of peasant agriculture, which was essentially a deadweight on their mobilisation efforts. Economic mobilisation led to urban famine, revolutionary insurrection, and the downfall of emperors in Russia, Austria-Hungary, Germany and Turkey. The same process began in France, which still had a large peasant sector in 1914, but Allied support nipped it in the bud.

1.4. War Losses

After World War I, there were several attempts to calculate the costs of the war. However, these studies fell out of fashion, tainted by association with

inflated demands for reparations, and because later writers became interested in any positive developments that could be identified as arising out of the carnage and destruction. Thus in his popular survey of World War I Hardach (1987: 286) argues that Bogart's (1920) estimates of the costs of the war have not been revised in the light of later evidence because "the whole basis of calculation has been recognized as inappropriate".

There are good grounds to be sceptical, however, about the revisionist view that associates war with accelerated economic development. Milward (1984: 17-18), a leading revisionist, cites Bowley (1930) as a pioneer of revisionism, but Bowley (1930: 21-23) himself pointed out how difficult it is to show that any wider changes were actually the result of the war and would not have occurred anyway in its absence. Classifying developments as (a) mainly unconnected with the war, (b) accelerated or retarded by it or (c) apparently arising out of it, Bowley was himself reluctant to put anything other than the key elements of Bogart's "cost of war" calculations such as loss of life and destruction of capital into category (c). He did mention the new economic relations between Europe and the United States in this category, but with hindsight we can see that the process of U.S. overtaking was already under way well before 1914 (Abramovitz, 1986; Broadberry, 1998).

Table 4, accordingly, provides updated estimates of the destruction of human and physical capital as the costs of war within a national balance sheet framework provided by Broadberry and Howlett (1998). The first element, the destruction of human capital, is measured by war deaths relative to the population aged 15 to 49. This differs from the true proportion of human capital destroyed by the war to the extent that younger cohorts had more human capital investment, particularly through education. Although Germany suffered the most casualties in absolute numbers, the proportionate losses were higher in France, Serbia-Montenegro and Roumania among the Allies, and in Turkey and Bulgaria among the Central Powers.

The domestic physical capital losses in Table 4 build upon the work of Bogart (1920), who estimated property losses on land and shipping and cargo losses. These are expressed as a proportion of physical capital from modern historical national accounting sources. The French figures draw on estimates of losses from the Reparations Commission and capital stock data from Carré et al. (1976: 151). Although these probably overstate French losses, alternative estimates by Villa (1993) yield implausibly low ratios, given the concentration of fighting on French soil (Hautcoeur, 2005: 199). Russia's losses were proportionately high, more because of the small size of the prewar capital stock than a large absolute amount of wartime destruction.

For some countries in Table 4, we can estimate the change in overseas assets and national wealth. Nearly a quarter of British overseas investments were liquidated during the war, so that the reduction of national wealth was proportionally much greater than the loss of physical capital. The loss of French overseas assets was proportionally very high due to heavy exposure to Russian loans, so that, as in Britain, the share of national wealth lost in the war was proportionally greater than the share of physical capital lost.

Finally in Table 4, we have added in Germany's reparations bill as a proportion of prewar capital, since it represented an increase in overseas liabilities and hence a reduction in national wealth just as much as the liquidation of Britain's overseas assets meant a reduction in national wealth. Of course the extent to which Germany actually had to pay these reparations is much debated, but that does not alter the effect on the national balance sheet as it stood immediately after the Treaty of Versailles. These figures include the A+B+C Bonds, which added up to a total of 132 billion Gold Marks.

2. WORLD WAR II

Like its forebear, World War II may be divided into two periods. In the first period, economic considerations were less important than purely military factors. This was the phase of greatest success for the powers of the Axis, and it lasted from 1937 when the war began in the Pacific, or from 1939 in Europe, until the end of 1941 or 1942; the exact turning point differed by a few months among the different regional theatres. In this first period, Germany and Japan had advantages of strategy and fighting power on their side. As a result, they were able to inflict overwhelming defeats upon an economically superior combination of powers. In early 1942, Richard Overly writes (1995, p. 15), "no rational man ... would have guessed at the eventual outcome of the war."

This phase ended, however, without the decisive victory that previously appeared within the Axis powers' grasp. What ended it? On the surface it was the military failures, not economic weaknesses, of the Axis. Beneath the surface, however, economic fundamentals reasserted themselves: while the Allies had given ground everywhere, their morale had stiffened, their economies were not exhausted, their cooperation was taking effect, and their industries were supplying the front with a rising flood of munitions that would eventually overwhelm the adversary.

In the second period of the war, which began in 1942, the early advantages of the Axis evaporated. There was a brief stalemate. A war of attrition developed in which the opposing forces ground each other down, with rising force levels and losses. Superior military qualities came to count for less than superior size, wealth, and economic mobilisation. Economic superiority let the Allies take risks, absorb the cost of mistakes, replace losses, and accumulate overwhelming force. This turned the balance against the Axis and won the war.

This narrative does not support the claim that only economics mattered. Economic factors were decisive, however, in the context of a simple fact. The Axis leaders had the chance to use the other factors to decide the war, and they failed. Their failure gave the Allies the chance to bring economics decisively into the equation.

2.1. Size and Development

Table 5 shows the volumes of combat resources that each side delivered to the theatres of World War II. A comparison of the totals with those in Table 1

shows a staggering increase: a quarter of a million tanks and half a million aircraft, for example, compared with 170,000 aircraft and less than 10,000 tanks in World War I. One thing remained the same, however, across the two wars: the Allies supplied a greater volume of combat resources than their combined adversaries in almost every respect.

The Allied advantage did not hold at all points of time and place. As Goldsmith remarked, the prewar rearmament of the Axis powers gave them an early start and this, combined with their purely military advantages, accounts for their early success. A balance struck at the end of 1940, for example, when France had dropped out, the United States remained neutral, and the Soviet Union was still Germany's partner of convenience, would show a picture of Allied disadvantage. By 1942, however, reinforced by America and Russia, the Allies outnumbered and outgunned the powers that they faced in every major theatre. This was true even on the eastern front where Germany and the USSR confronted each other. These two powers were of similar economic size measured by GDP and industrial production, but the Soviet Union was substantially poorer in terms of the average incomes of its much larger population. Although this disadvantage was enlarged by devastating military and territorial losses in 1941 and 1942, the Soviet Union fielded a bigger army and supplied it more generously. We return to this anomaly below.

The relative economic sizes of the powers and their colonial possessions are shown in Tables 6 and 7. If we consider the world as it was on the eve of the war, then the populations available to the Allies – principally Britain and France with their colonies and dominions, but also including Poland and Czechoslovakia – amounted to nearly 690 million people occupying nearly 48 million square kilometres. The total output of this territory is estimated at one trillion dollars in 1990 prices. Against them stood the nearly 260 million people and more than 6 million square kilometres available to the Axis powers – Germany, Italy, and Japan, with the Italian and Japanese empires and annexations at the time such as Austria, Korea, and Manchuria. The people and their lands on the side of the Allies exceeded those available to the Axis power by several times.

The size of this advantage is more statistical than real, although a real advantage remains after the statistics are stripped out. Africa and South Asia, poor, undeveloped, and relatively sparsely settled, made up the greater part of the Allied advantage in size. When we turn to total output, it turns out that the Allied GDP exceeded that of the Axis territories by only one third; this is because average incomes across the Allied territories – less than \$1,500 in modern prices – stood at only one half the \$2,900 level of the Axis territories. Here is an ironic comment on the colonial aspirations of the Axis powers: what they wanted so much, and did not yet have, was access to millions of square kilometres of poorly integrated, low-yielding farmland and remote semi-desert.

As before, since poor colonies did not count for very much, we also count the resources on either side considering the great powers only. The Allied size advantage now disappears since Germany, Italy, and Japan

together had twice the population and one and a half times the territory of Britain and France – but it is replaced by a development advantage: the GDP per head of the Allied powers exceeded that of the Axis powers by one half.

Tables 6 and 7 also show how this balance evolved from 1938 to 1942, when the domains under control of the Axis powers had reached their maximal extent. As their forces swept across Europe and the Pacific region the population under Axis control tripled, while territory and peacetime output potential doubled; the addition of hundreds of millions of east European and east Asian farmers led the average development of the Axis empires to decline somewhat, from \$2,900 to less than \$2,500 in modern prices. Britain, in contrast, lost its allies France – with its empire – and Poland, but was joined by the Soviet Union and the United States. Between 1938 and 1942, therefore, the Allied population and territorial sway increased somewhat, but its peacetime output rose by three quarters (from one to 1.75 trillion dollars). This is *before* taking into the wartime doubling of United States output. Joining the richest and poorest of the great powers into a single coalition had a mixed effect, of course, but the net result was an increase in the measured average level of development across all the Allied territories from less than \$1,500 in modern prices to more than \$2,200.

Table 7 converts these figures into ratios of Allied advantage or disadvantage. We see that in 1942, when things were at their worst, the Allied powers alone had nearly twice the population, more than twice the output, and more than 20 times the territory of the Axis powers. All they had to do was not to lose; given enough time, this economic preponderance would surely bring victory. The weakest link in the Allied chain was poor Russia, with its hundred million low-productivity peasants and seven million square kilometres of permafrost. Germany had forced Russia out of World War I; could the same not happen again?

2.2. Development and Mobilisation

As with World War I we will consider three dimensions of mobilisation: production (the increase in total output that was achieved during the war), the government's fiscal leverage (the extent that output was mobilised through government spending and taxation out of peacetime uses into the war effort), and military mobilisation (the degree of mobilisation of the population into uniform). Each of these was powerfully influenced by the prewar level of development of the economy.

Figure 4 shows production mobilisation plotted against prewar average income. Under the pressure of war, rich countries expanded their economies; poor countries tended to collapse, and the collapse proceeded further, the poorer they were. Figure 5 shows the speed of fiscal mobilisation. The slope of the relationship with prewar economic development has the same positive sign: only rich countries achieved significant fiscal mobilisation, but there is an exception: the Soviet Union. Some underlying figures are provided in Table 8: these confirm that the Soviet Union achieved a level of mobilisation of GDP into the war effort – three fifths at its peak – that was typical of much richer countries. Germany and Japan achieved similar degrees of mobilisation

only in the last spasm of the struggle that preceded immediate collapse and defeat.

The Soviet anomaly demands explanation. A relatively poor country, Russia collapsed in World War I and the Soviet Union could have been expected to do so again in World War II, but did not. The course of inward-looking industrialisation that Stalin pursued between the wars does not appear to be a sufficient explanation. More important was Stalin's victory in the destructive struggle to collectivise farming, which ensured state control over wartime food supplies and prevented the peasants from seceding from the war effort (Gatrell and Harrison 1993). As a result the Soviet economy carried a disproportionately heavy economic burden in World War II without collapsing.

Finally, Figure 6 shows military mobilisation; again, the rich countries mobilised much higher proportions of their population into military uniform. The figure also shows the moderating effect of distance: controlling for prewar incomes, the countries separated from the fighting by oceanic distances put fewer men into the fighting forces. But the effect of distance was less in World War II than in World I, suggesting that the interwar decline of transport costs had brought about a more truly global struggle.

2.3. Inter-Ally Cooperation

In terms of cooperation within the opposing coalitions, World War II saw a repeat of World War I with some differences. In both wars the German-led coalition failed to achieve significant economic cooperation among the powers, each of which aimed primarily to exploit its own internal and colonial spaces. The Allies, in contrast, achieved fuller cooperation. During the first war, this involved pooling the industrial and commercial resources of Britain and America with the fighting strength of France, Italy, and Russia; the result was to permit the aggregate military power of the Allies to be produced more efficiently. The main instruments of pooling were war credits from America to Britain, France, and Italy, and from France and Britain to Italy and Russia. The amount was not enough to keep Russia in the war to the end, but enough that postwar repayments significantly complicated postwar international finance and trade.

The second time round, inter-Ally cooperation assumed a larger scale. The main form it took was the transfer of industrial goods – equipment (including vehicles), materials, fuels, and processed foodstuffs – from the United States to Britain and from both countries to the Soviet Union. Although the U.S. legislative framework called it “Lend-Lease,” the goods were actually supplied free of financial charges, the aim being to promote the Allied partnership. Pooling of the resources counted in Tables 6 and 7 augmented their value, increased the Allied advantage, saved lives and resources, helped to prevent Soviet defeat, and brought forward the Allied victory.

Allied cooperation was not problem-free. The main issue was that, while it saved lives and brought forward victory, it did so asymmetrically. By keeping the Russians in the war, it saved primarily American and British lives,

and the Russians felt this deeply. On the other hand, the victory that it brought forward was brought to Berlin by the Red Army, and was much more favourable to postwar Soviet power than would have been the case without western assistance – a source of wartime chagrin and postwar recriminations among the donors.

2.4. War Losses

World War II was fought on a global scale but half a dozen countries saw most losses of wealth and population. Nearly all the 55 million premature deaths, for example, are accounted for between the USSR (25 million), China (10 million), Germany (6.5 million), Poland (5 million), Japan (2.4 million), and Yugoslavia (1.7 million). Table 9 summarizes the data for the great powers as percentages of prewar populations and assets.

The figures show the heavy loss of life in the Soviet Union, followed by German and Japan, and also the widespread destruction of property in the same countries. Everywhere, it seems, human capital was destroyed at a higher rate than physical capital. The survivors were endowed, therefore, with a ratio of physical to human capital that was advantageous by prewar standards, provided that mismatches resulting from the wartime distribution of combat could be smoothed out. Table 9 takes no account of accelerated wartime investments in industry; in western Germany, for example, industrial capacity was added at a faster rate than bombing took it away, so that West German industry ended the war with a larger and newer stock of equipment than before (Abelshauser 1998: 168).

3. ECONOMIC GROWTH

Evidently, wartime economic mobilisation tended to make the rich richer and the poor poorer. Thus, both wars tended to polarize the global distribution of income. It is of some interest, therefore, to examine whether postwar recovery and long-term economic growth succeeded in reversing this pattern.

Figure 7 suggests that each war was followed by recovery and that those economies most damaged by the wartime experience recovered most rapidly. It takes 1929 as the benchmark date for measuring recovery from World War I, and 1973 as the benchmark for recovery from World War II. It shows that, the more a country's average income fell during each war, the more it tended subsequently to rise. Thus, at least some of each war's negative effects were transitory.

A more complex picture emerges when we turn to long term economic growth. To what extent did the postwar recovery return each country to a path of convergence on the global productivity frontier? Figure 8 suggests that after World War I there was little or no convergence. Some countries that were already rich did much better after the war than some countries that were already poor. In contrast, World War II was followed by convergent economic growth. This suggests that the Allies designed a much better international environment for genuine convergence after 1945 than after 1918.

4. CONCLUSIONS

In this essay we have shown that economics mattered, and we have shown how. Given time, resources won the two world wars. In mobilizing resources, the richer market economies had a significant advantage. It was more important to be rich than self-sufficient; probably, most prewar efforts to protect jobs or diminish national dependence on trade in the name of strategic self-sufficiency were counterproductive. Poor economies, especially those with a large peasant population, tended to collapse under the stress of total war, although they tended to be less reliant on external trade. The main exception is the Soviet economy in World War II; its exceptional resilience is best explained by its rulers' exceptional degree of control over the peasant farmers.

The pattern should not be over-generalized. Broadberry and Harrison (2005) have suggested that the power of the relationship between economic and military performance is confined to a relatively short historical period. The era of "total war" from 1914 to 1945 seems to have been unique. In both world wars the main combatants were able to devote more than half of their national income to the war effort. This is likely to have been impossible before 1914 because until then most people were too poor to be taxed at such rates; most economies had the bulk of their resources locked up in forms of subsistence agriculture that were resistant to mobilization; before mass literacy and the telegraph, typewriter, and duplicator, commercial and government services were too inefficient to do much about it. In short, in earlier stages of global development total war could not be staged because too many people were required to labour in the fields and workshops just to feed and clothe the population, and it cost too much for government officials to count, tax, and direct them into mass combat.

Since 1945 the economic factors in warfare may have lost significance again. This is because nuclear weapons can give devastating military force to any rich country however small, or any large country however poor, for a few billion dollars. Hence the marshalling of economic resources played a much more vital role in the outcome of the two world wars than was likely in any period before or after.

Table 1 Allies vs Central Powers: Soldiers and Equipment in World War I

| | Allies (1) | Central Powers (2) | Ratio, 1:2 (3) |
|-----------------------------|---------------|--------------------------|-------------------|
| Soldiers Mobilized, million | 41.0 | 25.6 | 1.6 |
| Weapons Produced: | | | |
| Guns, thousand | 59.9 | 82.4 | 0.7 |
| Rifles, million | 13.3 | 12.1 | 1.1 |
| Machine Guns, thousand | 656 | 319 | 2.1 |
| Aircraft, thousand | 124.5 | 47.3 | 2.6 |
| Tanks | 8919 | 100 | 89.2 |

Source: Broadberry and Harrison (2005).

Table 2. The Alliances in World War I: Resources of 1913

| | Population, million | <u>Territory,</u> million sq. km | ha. per head | <u>GDP in 1990</u> prices \$ per billion head, \$ | |
|--------------------------------------|------------------------|--|-----------------|--|------|
| Allies | | | | | |
| <i>November 1914</i> | | | | | |
| Allies, total | 793.3 | 67.5 | 8.5 | 1093.6 | 1379 |
| UK, France, and Russia only | 259.0 | 22.6 | 8.7 | 622.8 | 2405 |
| <i>November 1916</i> | | | | | |
| Allies, total | 853.3 | 72.5 | 8.5 | 1210.5 | 1419 |
| UK, France, and Russia only | 259.0 | 22.6 | 8.7 | 622.8 | 2405 |
| <i>November 1918</i> | | | | | |
| Allies, total | 1271.7 | 80.9 | 6.4 | 1760.6 | 1384 |
| UK, France, and USA only | 182.3 | 8.7 | 4.8 | 876.6 | 4809 |
| Central Powers | | | | | |
| <i>November 1914</i> | | | | | |
| Central Powers, total | 151.3 | 5.9 | 3.9 | 376.6 | 2489 |
| Germany and Austria- Hungary only | 117.6 | 1.2 | 1.0 | 344.8 | 2933 |
| <i>November 1915</i> | | | | | |
| Central Powers, total | 156.1 | 6.0 | 3.8 | 383.9 | 2459 |

Source: Broadberry and Harrison (2005).

Table 3. *Allies Versus Central Powers: Size and Development Ratios*

| | Population | Territory | Territory per head | Gross Domestic Product | GDP per head |
|----------------------|------------|-----------|--------------------|------------------------|--------------|
| <i>November 1914</i> | | | | | |
| Total | 5.2 | 11.5 | 2.2 | 2.9 | 0.6 |
| Great Powers only | 2.2 | 19.4 | 8.8 | 1.8 | 0.8 |
| <i>November 1916</i> | | | | | |
| Total | 5.5 | 12.1 | 2.2 | 3.2 | 0.6 |
| Great Powers only | 2.2 | 19.4 | 8.8 | 1.8 | 0.8 |
| <i>November 1918</i> | | | | | |
| Total | 8.2 | 13.5 | 1.7 | 4.6 | 0.6 |
| Great Powers only | 1.6 | 7.5 | 4.8 | 2.5 | 1.6 |

Source: Calculated from Table 1.

Table 4. *Destruction of Human and Physical Capital (% of prewar assets)*

| | Human capital | Physical capital | | | National wealth |
|-----------------------|---------------|------------------|-----------------|------------------|-----------------|
| | | Domestic assets | Overseas assets | Reparations bill | |
| <i>Allies</i> | | | | | |
| Britain | 3.6 | 9.9 | 23.9 | ... | 14.9 |
| France | 7.2 | 24.6 | 49.0 | ... | 31.0 |
| Russia | 2.3 | 14.3 | ... | ... | ... |
| Italy | 3.8 | 15.9 | ... | ... | ... |
| United States | 0.3 | ... | ... | ... | ... |
| <i>Central Powers</i> | | | | | |
| Germany | 6.3 | 3.1 | ... | 51.6 | 54.7 |
| Austria-Hungary | 4.5 | 6.5 | ... | ... | ... |
| Turkey and Bulgaria | 6.8 | ... | ... | ... | ... |

Source: Derived from Broadberry and Harrison (2005: 28).

Table 5. *Allies vs Axis: Soldiers and Equipment in World War II*

| | Allies (1) | Axis (2) | Ratio, 1:2 (3) |
|------------------------------|---------------|-------------|-------------------|
| Combatant-years, million | 106.4 | 76.9 | 1.4 |
| <i>Weapons Produced:</i> | | | |
| Rifles and carbines, million | 25.3 | 13.0 | 1.9 |
| Combat aircraft, thousand | 370 | 144 | 2.6 |
| Machine Guns, thousand | 4827 | 1646 | 2.9 |
| Guns, thousand | 1357 | 462 | 2.9 |
| Armoured vehicles, thousand | 216 | 51 | 4.3 |
| Mortars, thousand | 516 | 100 | 5.1 |
| Major naval vessels | 8999 | 1734 | 5.2 |
| Machine pistols, thousand | 11604 | 1185 | 9.8 |
| Ballistic missiles | 0 | 6000 | ... |
| Atomic weapons | 4 | 0 | ... |

Source: Harrison (1998: 14-16; 2005); Ordway and Sharpe (1979: 405-7).

Table 6. *The Alliances in World War II: Resources of 1938*

| | Population, million | Territory, | | GDP in 1990 prices | |
|--|------------------------|-------------------|-----------------|-----------------------|-----------------|
| | | million sq. km | ha. per head | \$ billion | per head, \$ |
| Allies | | | | | |
| <i>1938</i> | | | | | |
| Allies, total | 689.7 | 47.6 | 6.9 | 1024 | 1485 |
| UK and France only | 89.5 | 0.8 | 0.9 | 470 | 5252 |
| <i>1942</i> | | | | | |
| Allies, total | 783.5 | 68.0 | 8.7 | 1749 | 2232 |
| UK, USA, and USSR only | 345.0 | 29.3 | 8.5 | 1444 | 4184 |
| Axis | | | | | |
| <i>1938</i> | | | | | |
| Axis, total | 258.9 | 6.3 | 2.4 | 751 | 2902 |
| Germany, Austria, Italy, and Japan only | 190.6 | 1.2 | 0.7 | 686 | 3598 |
| <i>1942</i> | | | | | |
| Axis, total | 634.6 | 11.2 | 1.8 | 1552 | 2446 |
| Germany, Austria, Italy, and Japan only | 190.6 | 1.2 | 0.7 | 686 | 3598 |

Source: Harrison (1998: 3-9).

Table 7. Allies Versus Axis: Size and Development Ratios

| | Population | Territory | Territory per head | Gross Domestic Product | GDP per head |
|-------------------|------------|-----------|-----------------------|------------------------------|-----------------|
| <i>1938</i> | | | | | |
| Total | 2.7 | 7.5 | 2.8 | 1.4 | 0.5 |
| Great Powers only | 0.5 | 0.6 | 1.4 | 0.7 | 1.5 |
| <i>1942</i> | | | | | |
| Total | 1.2 | 6.1 | 4.9 | 1.1 | 0.9 |
| Great Powers only | 1.8 | 23.5 | 13.0 | 2.1 | 1.2 |

Source: Calculated from Table 6.

Table 8. The Military Burden, 1939-44 (military outlays, per cent of national income)

| | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 |
|---------------------|------|------|------|------|------|------|
| At current prices: | | | | | | |
| Allied powers | | | | | | |
| USA | 1 | 2 | 11 | 31 | 42 | 42 |
| UK | 15 | 44 | 53 | 52 | 55 | 53 |
| USSR | ... | ... | ... | ... | ... | ... |
| Axis powers | | | | | | |
| Germany | 23 | 40 | 52 | 64 | 70 | ... |
| Italy | 8 | 12 | 23 | 22 | 21 | ... |
| Japan | 22 | 22 | 27 | 33 | 43 | 76 |
| At constant prices: | | | | | | |
| Allied powers | | | | | | |
| USA | 1 | 2 | 11 | 32 | 43 | 45 |
| UK | .. | ... | ... | ... | ... | ... |
| USSR | .. | 17 | 28 | 61 | 61 | 53 |
| Axis powers | | | | | | |
| Germany | 23 | 40 | 52 | 63 | 70 | ... |
| Italy | ... | ... | ... | ... | ... | ... |
| Japan | ... | ... | ... | ... | ... | ... |

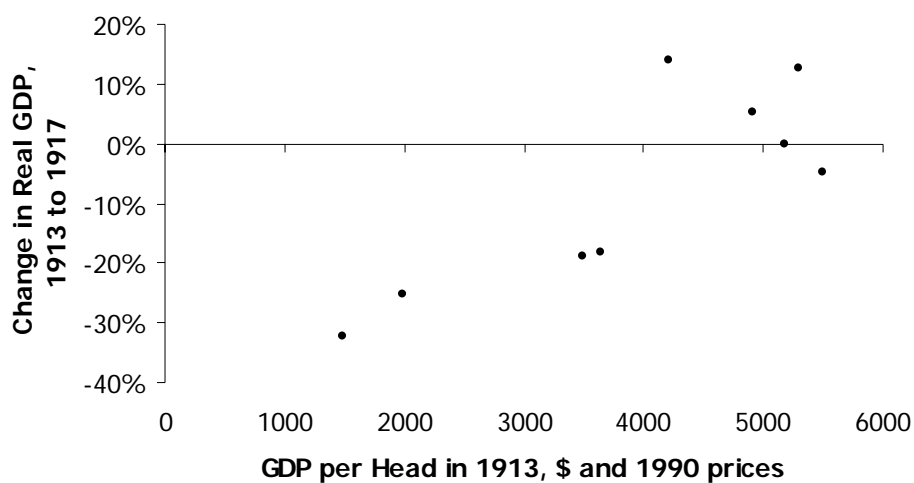
Source: Harrison (1998: 21).

Table 9. War Losses Attributable to Physical Destruction (per cent of assets)

| | Human assets | Physical assets | |
|---------------|--------------|-----------------|-----------------------|
| | | national wealth | industry fixed assets |
| Allied powers | | | |
| USA | 1 | 0 | ... |
| UK | 1 | 5 | ... |
| USSR | 18-19 | 25 | ... |
| Axis powers | | | |
| Germany | 9 | ... | 17 |
| Italy | 1 | ... | 10 |
| Japan | 6 | 25 | 34 |

Source: Harrison (1998: 37).

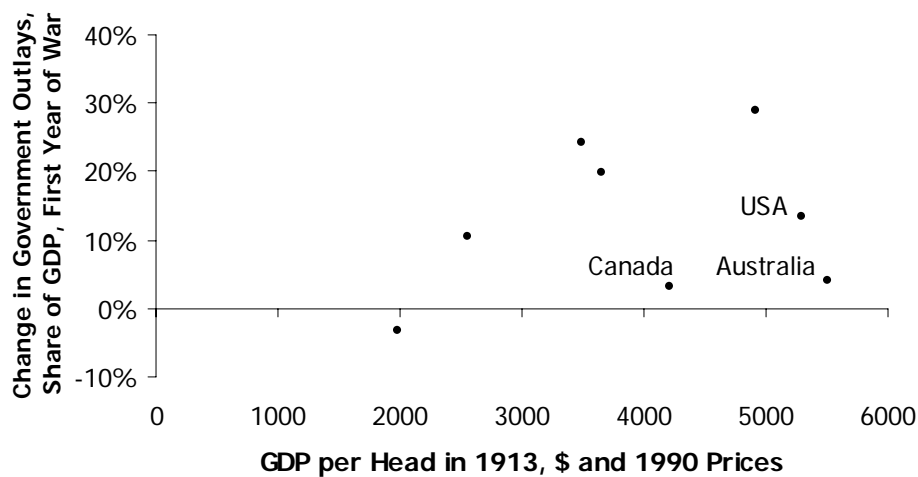
Figure 1. Production Mobilization: Nine Countries, 1913 to 1917



Source: Broadberry and Harrison (2005).

Notes: Observations are, from left to right, Russia, Austria-Hungary, France, Germany, Canada, UK, New Zealand, USA, and Australia.

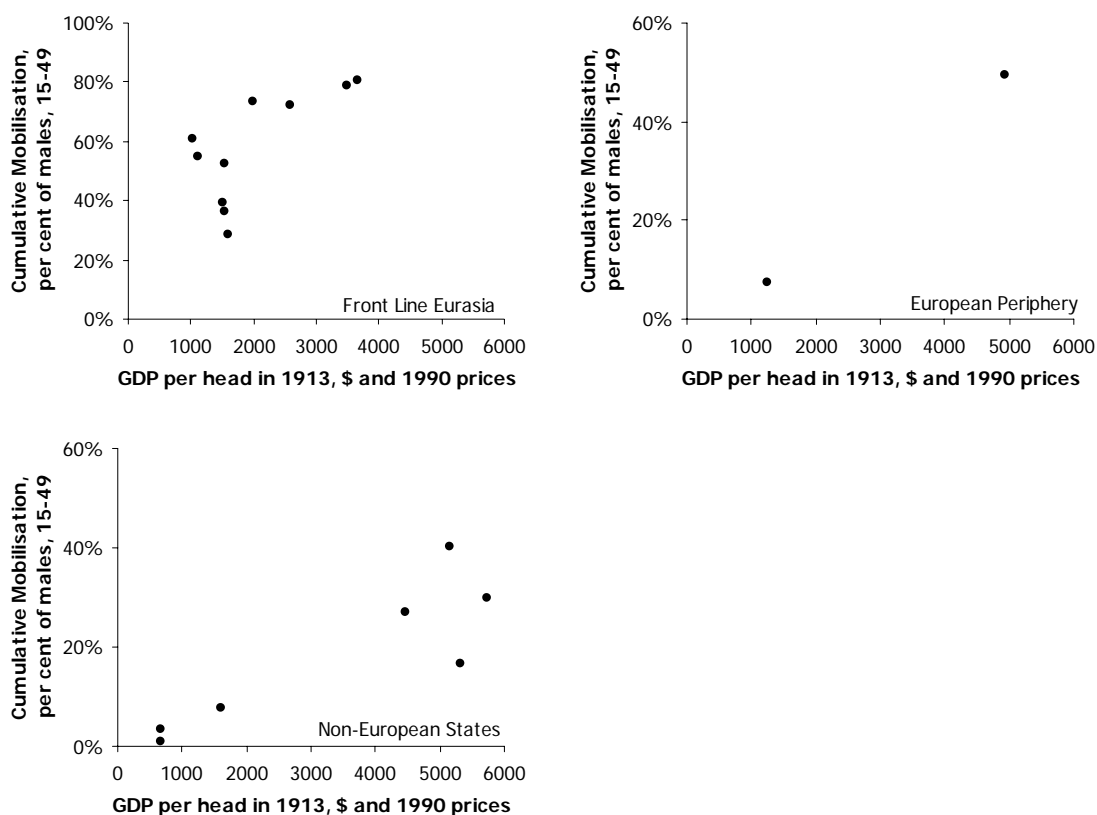
Figure 2. Fiscal Mobilization in World War I: Eight Countries



Source: Broadberry and Harrison (2005), supplemented by Austria-Hungary from Schulze (2005).

Notes: Observations not labelled within the figure are, from left to right, Austria-Hungary, Italy, France, Germany, and UK.

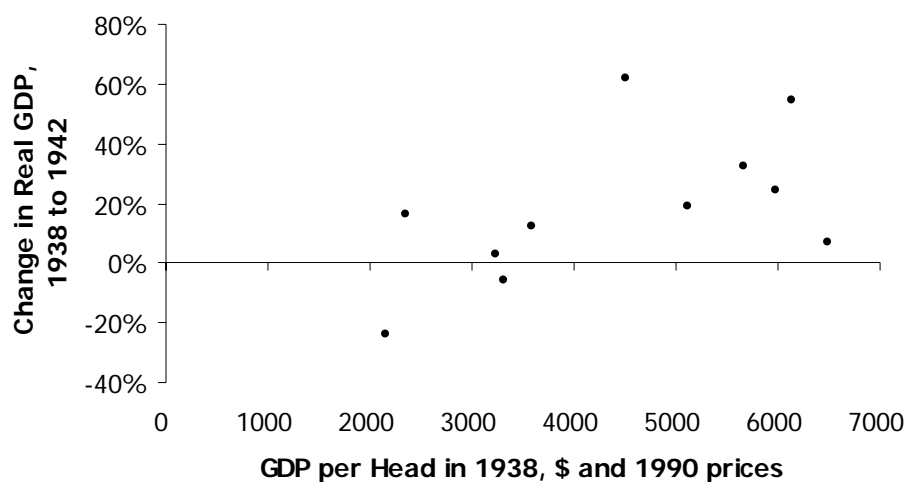
Figure 3. Military Mobilization in World War I: Eighteen Countries and the French Colonies



Sources: GDPs per head in 1913 from Tables 1 and 2 or, if not listed there, from Maddison (2001: 185); cumulative mobilization rates, 1914-1918, from Uralnis (1971: 209).

Note: Observations are, from left to right: Front line Eurasia: Serbia, Turkey, Russia, Bulgaria, Roumania, Greece, Austria-Hungary, Italy, France, and Germany. European periphery: Portugal and UK. Non-European States: French colonies, India, South Africa, Canada, New Zealand, USA, Australia.

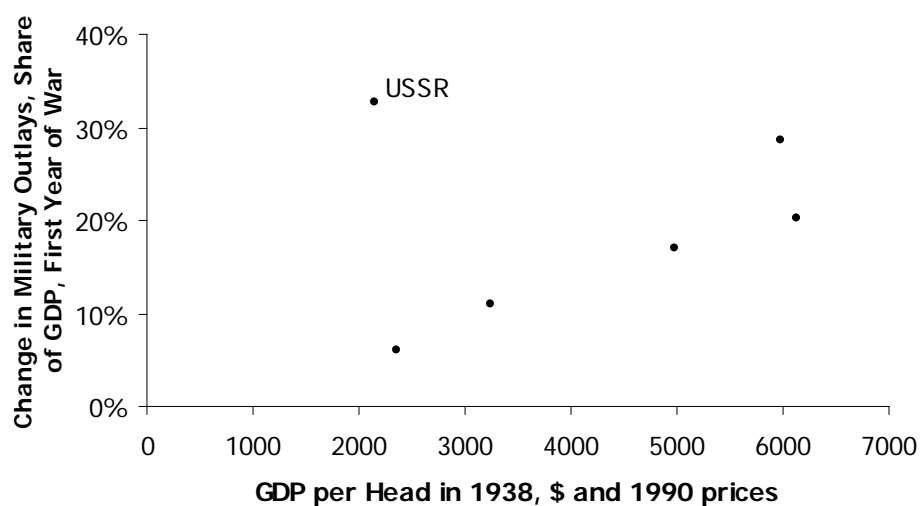
Figure 4. Production Mobilization: Eleven Countries, 1938 to 1942



Source: Harrison (1998: 10; 2005); Maddison (1995).

Note: Observations are, from left to right, the Soviet Union, Japan, Italy, Finland, Austria, Canada, Germany (excluding Austria), Australia, UK, USA, and New Zealand.

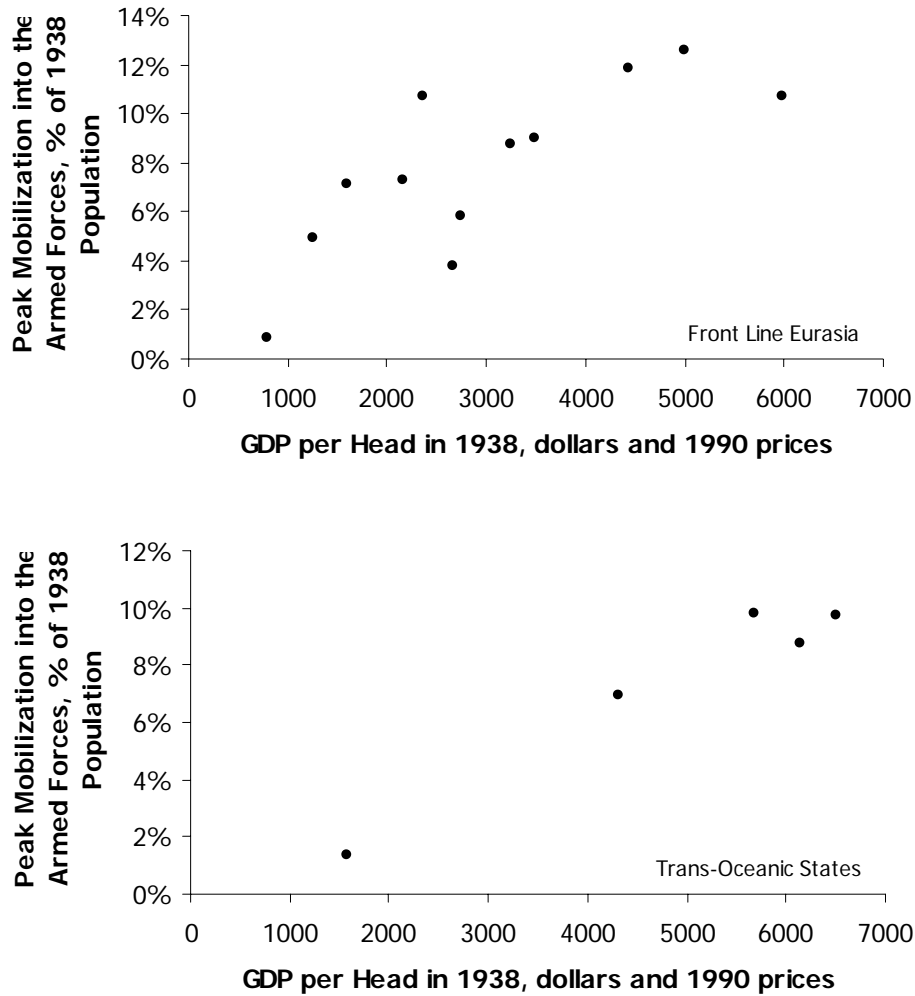
Figure 5. Fiscal Mobilization in World War II: Six Countries



Source: Harrison (1998: 21).

Notes: Observations are, from left to right, the Soviet Union, Japan, Italy, Germany, the UK, and the USA.

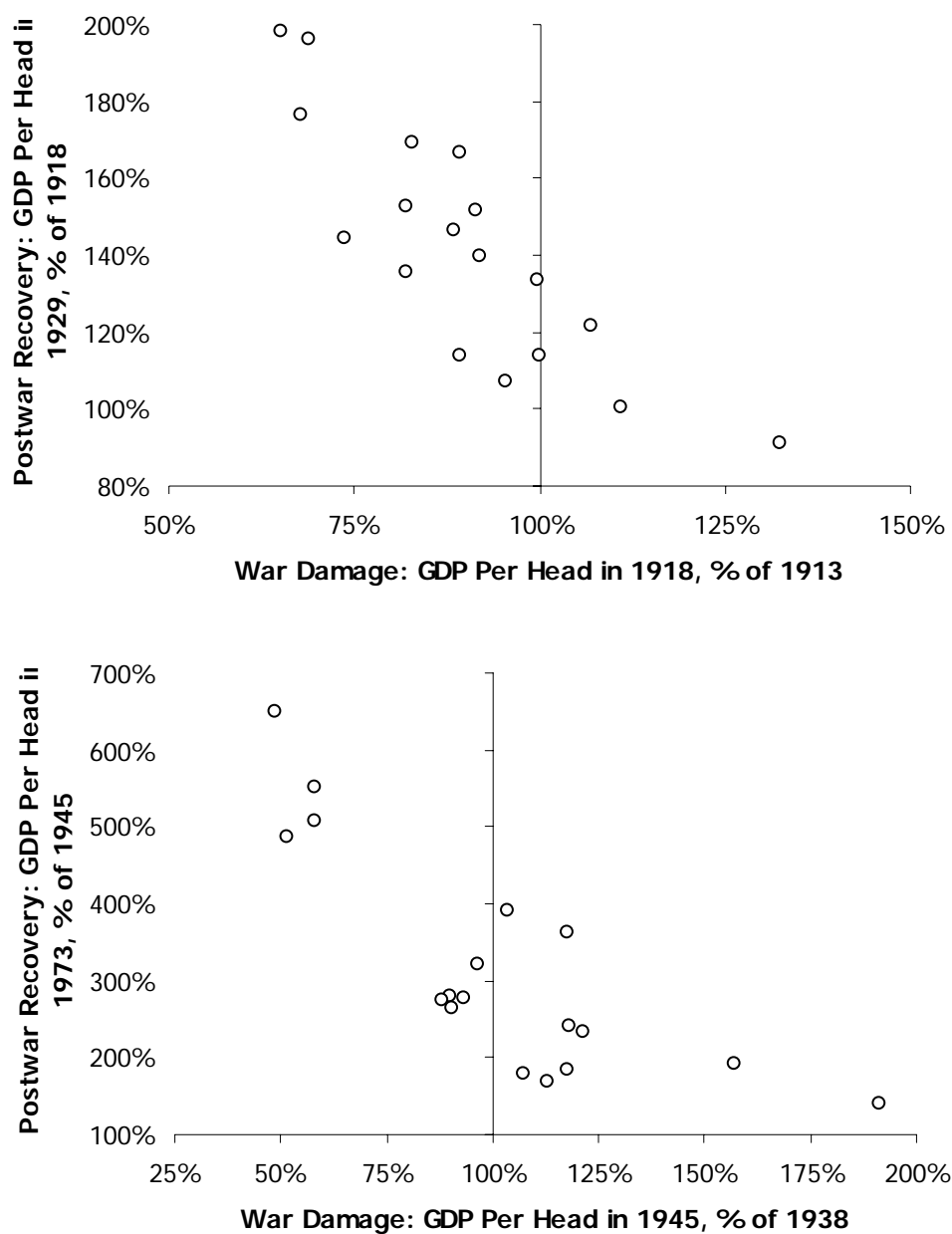
Figure 6. Military Mobilization in World War II: Seventeen Countries



Sources: Harrison (1998:3-9, 14); Correlates of War dataset, version 2.1, at <http://www.umich.edu/~cowproj>; Singer (1979, 1980).

Note: Observations are, from left to right: Front line Eurasia: China, Roumania, Bulgaria, USSR, Japan, Hungary, Greece, Italy, Finland, France, Germany, and UK. Trans-Oceanic States: South Africa, Canada, Australia, USA, and New Zealand.

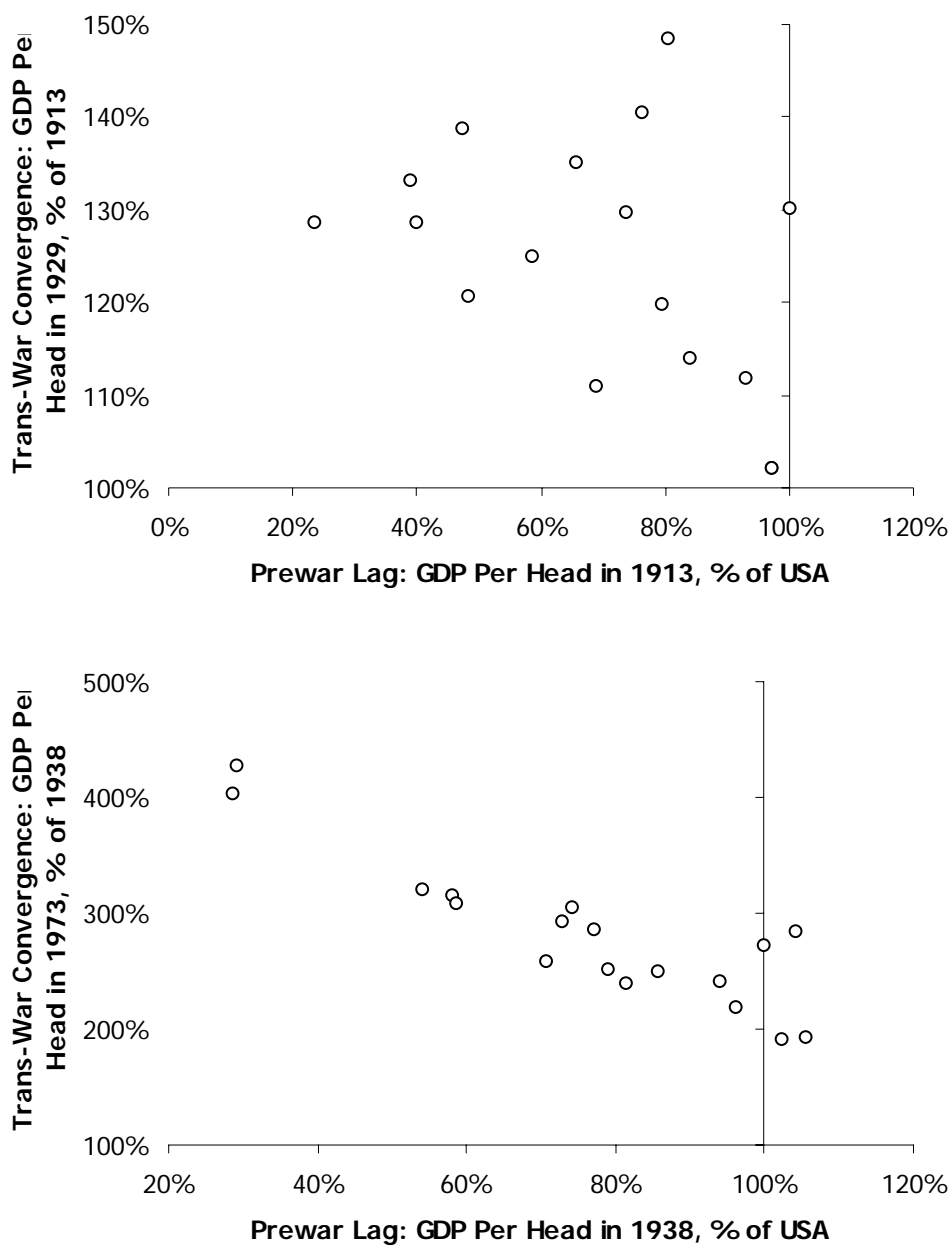
Figure 7. Economic Recovery Following Two World Wars



Source: Maddison (2001).

Note. Observations are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

Figure 8. Economic Convergence Through Two World Wars



Notes and Sources: as Figure 7.

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