

# Industry and the Economy\*

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Mark Harrison\*\*

Department of Economics, University of Warwick  
Centre for Russian and East European Studies, University of Birmingham  
Hoover Institution on War, Revolution, and Peace, Stanford University.

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\* This is a draft chapter for *The Soviet Union in World War II*, edited by David R. Stone, to be published by Pen & Sword.

\*\* Mail: Department of Economics, University of Warwick, Coventry CV4 7AL, United Kingdom. Email: [mark.harrison@warwick.ac.uk](mailto:mark.harrison@warwick.ac.uk).

This version: 17 August 2009. First draft: 20 November 2008.

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At the heart of the Soviet war effort lay the economy. It is true that material supplies were not the only decisive factor. Red Army soldiers could not have won the war without leadership, organization, and the motivation to kill and die for their comrades. Even in the absence of material support, high morale and leadership could sometimes achieve wonderful results. In the battles of late 1941 the Red Army showed repeatedly that, although cold, hungry, sober, and running short of fuel and ammunition, many would still fight to the end. But this was a formula for glorious defeat, not for winning the war. Victory could not rely on morale alone. Ultimately it required mass and equipment.

In the first instance, this meant guns, shells, bullets, tanks, and aircraft. But these were just the start. Effective military operations also required winter and summer uniforms, food rations, maps, compasses, binoculars, field telephones, and radios, trucks, tractors and fuel. All these items were supplied by industrial establishment of various sizes and specializations, ranging from giant assembly plants for aircraft and tanks to workshops for electrical equipment and instruments, textile mills and clothing factories, bakeries, and distilleries. In turn, these plants required machinery, fuel, power, and raw materials. The workers in them needed to be fed, clothed, and housed. Everything had to be transported, men and women to work and to the battlefield, food to stores and canteen tables, materials to the factories, and equipment to the front line. A vast operation prioritized, rationed, and coordinated economic and military resources using minutes of meetings, reports and letters, telegraph cables, phone calls, and radio signals, formulated and dispatched by secretaries, couriers, cipher clerks, and switchboard and radio operators. Thus the Red Army depended on industry, but industry relied on the entire economy.

The war economy was managed by trial and error. There was plenty of miscalculation. Mistakes were dangerous because they were costly and at various times the Soviet economy had nothing in reserve. Mistakes cost lives; big mistakes could make the difference between victory and defeat. Nonetheless, as Stalin declared afterwards, the war had provided 'a great school of testing and verification of all the people's forces ... an examination for our Soviet system, our state, our government, our Communist Party.'<sup>1</sup> If World War II was a test, then the Soviet war economy passed it.

## The war in outline: rolling with the blow

The main dimensions of this successful war effort can be established by a few measures. Table 1 suggests how the Soviet and German forces may have measured up numerically on the eastern front in each year of the war to 1944. It indicates that the Soviet Union was able to field and supply an army that was consistently larger than that of its adversary in personnel. Moreover, in the critical years of 1942 and 1943, the Soviet Union was able to provision its soldiers more intensively, in terms

not only of the units of munitions and ordnance available, but also in the provision per soldier; this is suggested by the bold numbers in the lower rows of Table 1 that exceed the numbers in the first row. This was capital-intensive warfare.

The Soviet advantage in some lines of equipment showed a tendency to slip in 1943 and 1944, because the profiles of Soviet and German war production over time were quite different: when war broke out, the Soviet production of munitions rose within months to a high plateau and stayed there; in contrast, the German production of similar items accelerated more gradually, peaking only in 1944. 'If there was a true "armaments miracle" in 1942,' Adam Tooze concluded, 'it occurred, not in Germany, but in the armaments factories of the Urals.' In the summer of 1944, in a late frenzy of effort, German industry was producing at three times the level of the summer, three years earlier, when Hitler had launched Barbarossa. 'By then, however, it no longer mattered.'<sup>2</sup>

In fact, if all we knew about the war was the figures in Table 1, we would not be surprised at all that the Soviet Union won the war; we would be astonished to hear that they nearly lost it. The reason for the near defeat lay in Germany's qualitative advantages, surprise, momentum, experience, the self-confidence established by an unbroken trail of victories across Europe, and genuinely superior military organization. These were so great that they almost overcame Germany's shortfall in numbers:

The success of Soviet war production was both assisted and threatened by the sacrifices that accompanied it. Chart 1 shows the trend of output of the main production and service sectors of the economy. It is crystal clear from the chart that economically the war was a game of two halves. In the first half, which takes us through the second half of 1941 to the end of 1942, the rapid expansion of the armed forces and military supplies was achieved at the expense of the civilian economy. While the production of equipment and ordnance multiplied, everything else fell away, including the provision of the metals, fuels, power, transport services, and food on which the sustainability of the military mobilization relied. In short, whatever was happening on the battlefield, the Soviet economy was tilting over into an abyss.

In the second part of the war, the economy was pulled back from the edge of the precipice. In 1943 and 1944 there was stabilisation; the military mobilization slowed down, and all branches were allowed to grow together. The difficulties of postwar reconversion are signalled in 1945 by the fact that, while war production fell sharply, the recovery of the civilian sector remained sluggish.

Chart 1 considers only domestic production, and sheds no light on the other sources of resources. As Chart 2 suggests, foreign assistance contributed around 5 per cent of the real resources (at prewar factor costs) that were available to the Soviet economy in 1942, rising to 10 per cent in 1943 and 1944. As a result, in each of these years the terrifying pressure on nondefence outlays was slightly alleviated. Even so, public and private consumption and investment were squeezed in a vice. On one side the pressure came from the bloody amputation of vital territories, and, to the other side, from the all-out mobilization of efforts into war production and military service. As a result, in 1942 gross investment was zero and aggregate

consumption was halved in comparison to 1940. It is not clear what proportion of the prewar population remained under Soviet control in 1942 but through 1943 consumption per head on Soviet territory was down by around 40 per cent compared with the prewar level, already squeezed by peacetime rearmament.<sup>3</sup>

At the midpoint of the war, then, the situation was this. By 1942 the Soviet Union had mobilized more than 60 percent of its real GDP into the war effort. It had achieved this without collapsing; this in itself was a remarkable achievement. But, in spite of the resources being poured into combat, the Red Army was *not* winning the war. Men and women in uniform, in the prime of their lives, were dying at the rate of 9,000 on an average day. Behind the battlefield, the economy was near to collapse. This is shown by the fact that both the population and capital stock were shrinking, since not enough resources were available to maintain them. Fixed investment in 1942 did not cover capital depreciation; inventories also fell sharply. There was not enough food or fuel to keep everyone alive. While premature civilian deaths have never been accounted for in the same detail as military deaths, it seems likely that on that same 'average' day of 1942 at least 2,000 civilians (women more likely than men, and children and pensioners more likely than adults of working age) suffered death prematurely. While there were undoubtedly hunger deaths in the general population, civilian deaths were disproportionately selected from two categories: prisoners in labour camps, and those living under siege in Leningrad. (Later in the war ethnic minorities deported from the Caucasus on suspicion of collaboration with Germany formed a third category chosen for special treatment that led to disproportionate mortality.)<sup>4</sup>

At this middle point of the war, therefore, despite the external assistance that had arrived so far, the Soviet war effort was surely unsustainable beyond a few more months. The economy was stabilized, however, by the victories at Stalingrad in the winter of 1942, and at Kursk-Orel in the summer of 1943, and by the arrival of foreign aid in increasing quantities.

Some years would pass before the Soviet consumer experienced real relief. In 1944 and 1945 the economy began to recover but new burdens arose from the recapture of territories devastated by looting, enslavement, and extermination. The occupied territories required not only rebuilding but repopulating, since more than 13 million of their people had died prematurely. In 1946 there were fresh hardships to face across the country and one to 1.5 million famine deaths.<sup>5</sup> The tables and charts in this chapter do not show the agonizing personal histories of the war, but they show the overall setting within which each person found their fate.

## War preparations: (un-)intelligent design

To millions, the war that was imposed on them in June 1941 was no accident. Rather, it was an event for which all had been waiting for many years, although not at all in a unanimous spirit. Amir Weiner has written:

Some saw the war as the Bolshevik Armageddon, a final cleansing of elements that had intruded on the desired socialist harmony, ushering in the era of

communism. Others considered it a bloody sacrifice necessary to redeem the regime's past evils. Still others viewed the war as the long-awaited death blow to an evil enterprise. But to all the war signaled the climax in the unfolding socialist revolution ...<sup>6</sup>

The expectation of war profoundly influenced the direction of the interwar Soviet economy. This influence can be seen partly in the annual allocation of budgetary resources to defense, which chiefly decided the numbers of troops and their equipment at any given moment. More broadly, war expectations shaped the entire institutional design of the Soviet economy.

This is something that historians have rediscovered. During the postwar period, economic historians on both sides of the Cold War tended to define the Soviet Union as a 'developmental state' that Chalmers Johnson later identified with the case of postwar Japan. They described a Soviet strategy or model for economic development that was motivated by impersonal goals of a predominantly civilian and welfare nature, perhaps distorted by an unduly long time horizon and willingness to impose present sacrifices for the sake of future generations.<sup>7</sup> Military considerations were rarely given much priority or examined in much depth, with few exceptions.<sup>8</sup>

In contrast, recent studies of Bolshevik politics and policies in the 1920s have advanced new evidence of the heavy weight of military interests and military security in Stalin's key decisions to accelerate industrialization, collectivize peasant farming, and squeeze consumption for the sake of accumulation and defense.<sup>9</sup>

Behind this lay the bitter experience of World War I.<sup>10</sup> In that war, the Russian economy had been destroyed by military mobilization. The government had taken young men and horses from the villages into the army. Russian industry had converted its facilities to war production, cutting back on the textiles and metal goods for which farm households were willing to trade their surplus food. Whether or not the remaining farmers still had surpluses of food to sell to the towns and the government, they had less incentive to sell it since they could no longer purchase fabricated goods in exchange. Food production declined gradually, and more of it was consumed within the countryside. Urban consumers were caught in a double squeeze between the peasants and the army. An urban famine developed that dispatched Russia towards economic and military collapse and revolution.

Russia was not special in this regard. The same processes could be seen at work in all the countries at war that retained a substantial sector of low-productivity peasant farmers from Germany to Austria, Hungary, and the Ottoman Empire. It is true that government initiatives, such as the introduction of food rationing and procurement at controlled prices, typically made matters somewhat worse, but the underlying problem was the structure of the economy.<sup>11</sup> With agriculture in the hands of peasant farmers, the government and the industrial workers were the residual claimants on food. In wartime, when the urban-rural market was disrupted, the peasants decided how much of it to eat, and the government and the industrial workers got what was left. If that was not enough to wage war, the war was lost and the government fell.

Stalin and his supporters understood this weakness. In the economy, Stalin's revolution was designed to overcome it. From 1929, a command system directed resources from the centre. One of the most important requirements of the command system was a reliable supply of food to the urban-rural market. How could the centre direct the market behavior of more than twenty million small farms? Temporarily it could use force alone, and in the late 1920s peasant farmers with significant food stocks felt the force of government repression and confiscation on an increasing scale. These measures were systematized through collectivization, which began in early 1930; the farms were amalgamated into larger units, and through them the government established centralized control over the disposition of the grain harvest.<sup>12</sup>

Huge losses accompanied this process. At first, the harsh campaign was a success, extracting millions of tons of grain from the countryside above what the market would have yielded to feed the cities and for export to purchase foreign equipment. Then there was not enough food left for the livestock, which had to be slaughtered. With the loss of horses, the agricultural production system was undermined, causing damage to the following harvests. There was also a measure of bad luck in poor weather. Eventually, rising exactions and falling harvests left insufficient food in the countryside to keep all the people there alive. By the time this was recognized, it was too late to prevent millions from dying of hunger.<sup>13</sup> More millions were sent into internal exile or imprisoned in labour camps. These losses made it impossible to continue the extraction of resources from the countryside on the scale that the government expected. In this sense, the rapid industrialization of the 1930s took place despite collectivization, not because of it.<sup>14</sup>

From another angle, collectivization tells a different story. It reveals the price that Stalin was prepared to pay in lives and capital resources in order to show that from now on the government, not the peasant, would define the amount of food that was surplus to rural consumption, and would take it. The peasant became the residual claimant on food.

There are different views on the pace of militarization of the prewar Soviet economy. Pointing to the strong influence of the military in plans and policies and the pervasive militarization of structures and organizations, David Stone argued that the Soviet economy was already highly militarized by the completion of the first five year plan in 1932.<sup>15</sup> At this time, however, the weights of the defense industry in the economy and of defense outlays in national and public expenditure remained at a low level, and for this reason R.W. Davies replied that full scale militarization was not apparent until the late 1930s when war was already imminent.<sup>16</sup> Both views have their place. What Stalin aimed to create through the first five year plan was a potential for speedy mobilization rather than immediate war capacities. In the early 1930s, military spending and investment in defense factories grew rapidly, but remained at modest levels in proportion to the economy. There was a steady escalation of strategic threats to the Soviet Union, however, from the Far East as well as from the West. As Chart 3 illustrates, these events gave rise to corresponding pressure to rearm, matched by ascending curves of military mobilization and production.

An important breakthrough accompanied the rearmament. This was the transfer of most Soviet defense factories to mass production and standardized, interchangeable parts. New production systems were imposed on the defense industry in the teeth of resistance from the old culture of craft engineering. The artisan tradition of incremental local 'improvement' on designs approved at the centre had two unwanted consequences: it continually halted production and so increased costs and lowered productivity; and it meant that military engineers in the field could never be sure that a mechanical ball or pin manufactured in one factory would fit a socket manufactured in another. The middle years of the decade saw a war of attrition between the government and industry that the government won – seemingly, just in time for the war.<sup>17</sup>

When war broke out, the policies of collectivization and rearmament paid off. Food and mass production were both critical elements in the success of the war economy. In food supply, the important step was to have turned the peasants into residual claimants on food. Chart 4 shows our best estimates of the wartime share of government procurements in the supply of grains and meat. Except for a dip in meat purchases in 1941, the share captured by the state exceeded the benchmark of 1940 in every subsequent year. As a result, there was no urban famine, except in Leningrad where the blockade made starvation unavoidable. Widespread hunger could not be prevented elsewhere, but supplies to the army, the defense industry, and the urban population were protected. This outcome was the opposite of the experience of World War I – and it was the intended result of collectivization.

When war broke out, prewar industrial policies turned out to have had both costs and benefits. The Soviet rearmament of the 1930s, including the mass production of weapons, required an immense consumption sacrifice; on a rough estimate, by 1940 defense outlays represented around one fifth of Soviet workers' wage earnings.<sup>18</sup> This sacrifice turned out to be of doubtful direct worth. Vast numbers of weapons were produced – from 1930 to 1940, nearly 30,000 tanks and more than 40,000 military aircraft – but a high proportion of the weapons in combat stocks at the outbreak of war was lost immediately or turned out to be unusable. There was a lot of contingency planning for the wartime mobilization of industry, but much of it was superficial or fanciful.<sup>19</sup> Many of the defense factories built in peacetime were located in regions exposed to immediate capture and were lost or had to be moved to the remote interior; the relocation process was immensely costly in itself, and precious time was lost while the production facilities in transit. Worst of all, the extensive war preparations did not even have a deterrent value; if they had, the war would not have happened.

There were two clear gains, however. One was the habituation of the workforce to the idea of a likely war. The prewar rearmament policies and contingency plans, whether they were sensible, or efficient, or neither, left no one in any doubt that war was possible; if war broke out, everyone was expected to do something at once, even if it was not completely clear what that should be; no one was to sit around waiting to see what would happen next.

Another clear gain lay in having won the battle for mass production before the war broke out. However costly it may have been to produce and deliver those

ultimately useless tens of thousands of airplanes and tanks in peacetime, it is hard to see any other way in which the experience of mass production could have been embedded in factories and work teams before the war broke out. This experience was critical to Soviet industry's wartime production miracle. Using the techniques of mass production and standardization embedded before the war, by 1943 Soviet industry was delivering weapons to the Red Army at three fifths of the average unit costs of 1940. That these were based on real resource savings is demonstrated in Chart 5, which shows the reduction in hours worked per unit of various items produced. It was because of this that, in the decisive years of the war, Soviet industry was able to produce larger numbers of tanks and airplanes in fewer models and longer runs than the German adversary.<sup>20</sup>

To summarize, the successful implementation of the Stalinist command system in wartime was the intentional result of prewar policies that Stalin designed for that very purpose. The policies that worked towards this goal were the mass collectivization of agriculture and the establishment of a modern defence industry based on mass production and standardization. This was design, not spontaneous evolution; the hand of the designer has left clear traces in official documents and memoirs. At the same time, the designer was not that intelligent. Stalin's war preparations, although purposeful, were hugely wasteful. Collectivization was a peacetime disaster. It decimated the human and social capital of the Soviet countryside and impoverished and alienated the majority of the population. Knowing that his policies were filling the country with dumb resentment and bitterness, Stalin launched a preventive war, not in 1941 against Germany as is sometimes alleged, but in 1937 against the 'enemy within.'<sup>21</sup> In the Great Terror, through show trials and secret mass operations, Stalin attempted to eliminate the potential traitors beforehand. Despite killing a million people, he failed to do so: there were still plenty of actual traitors when war broke out, and their number may even have been increased by the experience of surviving the Great Terror.

In wartime as in peacetime, the Stalinist pattern of war preparations through industrialization turned out to have important gaps. The goals of the five-year plans were heavily biased towards things fabricated from steel and cement and the electric power required to produce them. Because the rival powers made large quantities of these, Stalin and his associates may well have supposed that there was a causal connection: make lots of steel and cement and become rich like them! But steel and cement were not as critical as they thought. Other processes were at work; in particular, the costs of copying and transmitting information were collapsing with modern printing and cable and wireless telecommunications. The productivity of information was rising as incomes rose. Across market economies in the 1930s average incomes were correlated with the consumption of newsprint and access to telephone networks just as strongly as with ingots of steel or kilowatts of electric power.<sup>22</sup>

In this respect the Bolshevik development model, if it existed, was seriously incomplete. At best, it failed to reckon with the falling cost and rising value of information. More realistically, the Bolsheviks' tradition of secrecy and monopolisation of information led them intentionally to suppress the opportunities

associated with the age of information. In peacetime, information flowed sluggishly through distorting channels, or was locked away altogether in the deep freeze of Stalinist secrecy. In wartime, the Soviet Army paid a heavy price in poor communications among the frontline units and with the command staff. They made this good by importing large quantities of radios and field telephones from the United States, including a million miles of telephone cable.

The final weakness of Soviet war preparations lay in foresight. Although they had spent years planning and preparing for war, when it came Stalin and his colleagues were still taken by surprise. In the words of the aircraft minister:

Knowing that war was inevitable, anticipating it, each [of us] in the depth of his soul had put off the outbreak of war to some future moment of his own choosing.<sup>23</sup>

## Economic policy: from chaos to order via near-disaster

The outbreak of war presented the Soviet administration with an immediate requirement: to recruit millions of soldiers and equip them for war. Within a few months this requirement was replaced by another: how to prevent the excessive strain on the economy from precipitating a collapse.

The speed of mobilization was accelerated by three factors, summed up as preparation, nationalism, and coercion. Prewar preparations ensured that systems were in place for military conscription; a defence industry existed that was already largely based on standardized mass production; most communities and workplaces had some sort of formal plan for war that they knew they should now put into action without waiting for further instructions. As a result the war, although a devastating psychological shock, was not a paralysing one.

National feeling was a powerful motivator. For some the instinct for resistance was immediate. These were the ones who quickly found something to identify with a society under attack: family, village, the desire to return home, solidarity with the victims of war, support for a political idea. For others, the will to resist was released more gradually, and in some cases not at all. One reason was that it took time for the genocidal character of German war plans to become clear.<sup>24</sup> Initially, more than a few thought that Hitler's framework for the east might offer national liberation for the ethnic borderlands, or the return of property to dispossessed farmers, or at least a more civilized dictatorship than Stalin's. The reality eventually disabused them of these illusions.

To the extent that spontaneous national feeling was lacking, the immediate gap was filled by the initiatives and actions of Stalin and his subordinates, backed by an active political police and a terrifying reputation for coercion and terror. Stalin's decrees called up millions of soldiers, issued new plans for hugely increased quantities of munitions and equipment from industry, and organized the evacuation of people and industrial facilities from the war zones. He also ordered the execution of officers who could not hold the line, and civilian 'defeatists' (including those who

were simply reporting the truth about military setbacks), stigmatized Soviet soldiers that surrendered as traitors, and ordered social and financial penalties on their families. The result was to simplify the choices faced by those for whom national feeling on its own was not enough: fight or die.<sup>25</sup>

The evacuation of industry exemplifies the improvisation of wartime economic management. The Soviet industrial capacities established in peacetime were highly vulnerable to attack from the west. The Ukraine, for example, was hugely valuable to the Soviet economy. Hitler wanted it for its agricultural resources, from which he intended to feed Germany. To Stalin, the mines, mills, and equipment factories of the Donbass and the Black Sea region were also a major source of defense supplies. The Soviet Union's war plans were oriented exclusively on frontier defense, however, and did not contemplate giving ground in the face of massive attack. As a result, no thought had been given to saving vital facilities immediately behind the front line.<sup>26</sup>

Much was lost with the German invasion. Stalin soon ordered the destruction of all installations and stocks that could not be moved, intending that if the Germans could not be stopped they would at best occupy a wasteland. But not all was lost, and this was the result of initiatives that considerably undercut the image of Stalin in the grip of disbelief or shocked into inaction by the outbreak of war. On Day 2 of the war, Stalin ordered the leaders of the Kirov tank factory in Leningrad to investigate relocation to the Urals. On Day 3, he ordered the Soviet Union's main rolling mill for tank armour to be evacuated from Mariupol' on the Black Sea; the same day he established a committee to organize the wholesale evacuation of industrial plant and equipment from the war zone.<sup>27</sup> These actions make no sense unless they were designed to insure against a war of deep penetration that might last for many months and even for years.

There were two waves of evacuation. The first wave, involving more than 1,500 enterprises, began immediately and continued through the end of 1941. The German advance on Stalingrad in 1942 sent a second, smaller wave rolling east. Nearly half the evacuated factories went to the Urals, and most of the rest to the Volga region, western Siberia, Kazakhstan and central Asia. There were a million evacuation truckloads. On a rough estimate the process may have involved up to one eighth of the entire assets of Soviet industry.<sup>28</sup>

Nothing in this process went smoothly. Timing was a problem. Evacuating too soon, they lost production and morale. Evacuating too late, they lost everything. Evacuate to where? Too far to the east, and the trucks could not be turned around for the next trainload; not far enough, and the fast moving front soon caught up on them. The railways were shuttling combat supplies one way to a front that was never in the last place they looked, and evacuation stocks the other way to interior destinations that were either unknown or completely unprepared to receive them, and had their own crisis to resolve. Increasingly the evacuation was frustrated by shortages of rolling stock and labour to dismantle, load, and unload. It is sometimes asked whether the evacuation could have been managed more efficiently. It is doubtful whether the question has a meaning, let alone an answer. It mattered that it was done, not because it was done well. As Marshal Georgii Zhukov wrote later:

The heroic feat of evacuation and restoration of industrial capacities during the war ... meant as much for the country's destiny as the greatest battles of the war.<sup>29</sup>

The success of the evacuation made the Soviet Union's military survival possible, but worsened the imbalances in the economy of the remote interior. The relocation and reassembly of huge factories in the Urals, western Siberia and central Asia, placed new demands on local transport and power facilities, and labour, accommodation, and consumer goods, for which these regions were largely or entirely unprepared. Because of these shortages there was wide variation in the recommissioning of evacuated plant. The Khar'kov tractor factory, evacuated in October 1941, was delivering tanks again after seven weeks. But some factories evacuated in 1941 were still idle at the end of 1942 because there were no workers to operate them.<sup>30</sup>

If rapid mobilization was the first requirement posed by the war, the second requirement was not to mobilize too much. The Soviet economy in 1942 showed clear signs of excessive mobilization, threatening it with immediate collapse. The danger was that represented above in Chart 1: while the army's ranks were filled and the defence industry's factories were relocated and open for work, the civilian economy was stripped of resources of all kinds. The output of steel, fuel, power, and foodstuffs plunged. As a result, during the first eighteen months of the war, the Soviet economy limped from crisis to crisis. The population was starving while the capital stock depreciated. There was a continual threat that defence factories would become idle because their production lines could not be supplied with metals, components, or power, and their workers could not be fed or clothed. Beyond that lay the prospect of an army that would lay down its arms because its soldiers could not be fed, clothed, armed, or moved.

While the Red Army continued to give ground and retreat to the East, it was impossible for Soviet economic policy to give serious priority to restoring civilian industry, transport, and agriculture. All that could be achieved was a series of ad hoc measures to stave off immediate disaster in the production of heavy industry and the harvest. In 1943 the Soviet economy gradually became more 'planned,' but this was a consequence of military recovery and the increased flow of Allied aid, not a cause of military success.

Public finance played an important part in the management of the market economies at war. This was also true of the Soviet economy. There exists an unhelpful stereotype of public finance in the Soviet-type economy as passive, in contrast to an active role for finance in market economies. According to this stereotype, Soviet central plans directed resources physically, leaving the financial instruments and indicators to register and control the consequences after the event. In fact, the operation of public finance in the Soviet context was not as different from that of the UK or US war economies as might be thought.

To begin with, the budget in the hands of the defence ministry rose from 57 billion rubles in 1940 to a wartime peak of 138 billion rubles in 1944, when it amounted to three fifths of overall government spending (at current prices). These

sums were laid out to pay and provide for the troops and to compensate firms and government agencies for the provision of equipment, rations, and services. The problem of public finance was to ensure that this cash represented effective purchasing power and was not devalued by inflation in the defence sector. In the market economies, the control of inflation involved balancing the budget by cutting public spending on non-defence items and increasing revenues from taxes and borrowing; administrative pressure to cut costs in the defence sector, and neutralizing the purchasing power left in the hand of the civilian agents by rationing consumer and investment goods. This description of wartime public finance would apply perfectly well to the Soviet economy. Of course, there were also differences. The differences stemmed mainly from the context of a harsh political dictatorship that was not afraid to rule by terror.

Budgetary economy was pursued vigorously during the war years. Weapon prices were pushed down, keeping pace with rapidly falling unit costs. Subsidies to industry were largely avoided, increasing as the war drew to a close only because reconversion to peacetime production turned out to be unexpectedly costly. Weapons, equipment, materials, and provisions imported free of charge under the Allied aid programmes were transferred to domestic military and industrial users at prices calibrated roughly to the domestic price level through levies and taxes. Even the charges that the Gulag invoiced to industrial users of forced labour were regulated to keep them in line with the maintenance costs that the labour camps actually incurred.<sup>31</sup>

Despite such measures, domestic tax revenues supported only about half of the ballooning total of government outlays (Harrison 1998b). This resulted inevitably from the peacetime reliance on taxing retail sales, which collapsed in real terms; by 1943 the real volume of supplies to consumer via the combined official and unofficial sectors stood at little more than one third of the prewar level. The deficit of taxes was covered from three sources. The growth of domestic savings bank deposits made a small contribution, as did sales of war loans, never attractive to potential lenders given low fixed interest rates and the lack of a legal secondary market. Much larger sums flowed in from counterpart revenues created to represent the budgetary value of British and American aid.

Finally, the government printed money. The stock of rubles in circulation tripled during the war years. Since there were far fewer consumer goods to soak up this purchasing power, two things happened. First, there was inflation. Even the controlled prices in state and cooperative outlets nearly doubled between 1940 and 1945, mainly on account of the rising price of alcohol and tobacco. The urban markets where collective farmers took their individual produce to sell at unregulated prices saw a more dramatic rise; at the peak of scarcity in 1943, prices there were ten times the prewar level. Second, some inflation was deferred. This happened when the sellers stored up the money they received and did not try to spend it immediately. Since the sellers were primarily peasants, the war saw a gradual transfer of cash stocks from town to village. After the war, rather than honour these liabilities, Stalin confiscated them by means of a monetary conversion held at the

end of 1947. Thus the inflation that had previously been deferred was now cancelled, but at the cost of destroying the credibility of monetary institutions.

## The war effort: mobilizing versus free riding

The central problem for the individual in war is: Why fight? Regardless of personal hopes for victory or defeat, there is a prisoner's dilemma. Each person's contribution is most likely too small to affect the outcome. The outcome will be decided by others. If others choose to fight, why should I risk my life as well? If the others run away, why should I be a hero?

It may be objected that this individualist calculus leaves out of the balance issues such as love and hate, loyalty, and national feeling. In a social-science framework we see these emotions not just as spontaneous feelings but in the way that war leaders have understood them throughout the history of conflict: as powerful instruments for solving the problem of free-riding in battle.<sup>32</sup> It was with this awareness that Pericles said to the Athenians in 431BC:

I could tell you a long story (and you know it as well as I do) about what is to be gained by beating the enemy back. What I would prefer is that you should fix your eyes every day on the greatness of Athens as she really is, and should fall in love with her.<sup>33</sup>

In other words, when collective action is necessary and cannot otherwise be guaranteed, appeals to individual and collective identity including heroism and personal courage, and love of family, home, and motherland are the solution. Combined with strict punishment of shirking and defection, these have enabled modern states to field multi-million armies, incur huge costs, and suffer devastating losses for years on end without collapsing.

The patterns of economic mobilization that have been described were made possible by the fact that Stalin solved the problem of free riding in the economy as in the armed forces. The solutions that he found were sufficient rather than optimal. They did not eliminate disloyal behavior, or even control it efficiently. They were just enough to prevent defeat and eventually secure victory.<sup>34</sup>

The overall outcome is found by adding up the personal choices made in wartime by millions of people acting as individuals. In short, while the story of wars can be summarized by statistics and aggregates, it really begins with individuals. This is because war is also the struggle of each person to resolve individual commitments and determine personal actions.

At the moment that war broke out the Soviet economy numbered more than 80 million individual producers (not counting 5 million serving in the armed forces) and more than 190 million consumers. Each of these would have a different personal story to tell, but first they needed to survive to tell it. (Of the 40 million dead by the autumn of 1945, on a rough count, 15 million would have died anyway under normal, peacetime conditions, leaving 25 million 'excess' or premature wartime deaths.)<sup>35</sup> Here is a tiny and far from representative handful of the many roles that

individual survivors played in the Soviet Union's war effort in industry and the economy.

## Forcing the pace

In the autumn of 1941 Stalin ordered Vasilii Emel'ianov, a defense industry manager, to Cheliabinsk to oversee the urgent restoration of tank building using heavy equipment evacuated from the western regions now occupied by the enemy. There he told a colleague, Nikonov:

You don't need me to explain about the situation in the country ... The Germans are at Moscow. We need tanks. Some of the turret parts are fabricated by stamping them, and we can't make them without a press. We've already concreted the foundations, but we haven't yet begun to set it up. We have to know, and know exactly, when our plant will be able to start up the delivery of tank bodies to the factory that fits them for combat. In other words, we have to know exactly when the press can be set up.<sup>36</sup>

Emel'ianov pointed out that in peacetime this would take four to six months. They held a meeting with the plant managers. Nikonov proposed: put up camp beds and a supply of food so that efforts could proceed continuously without the usual breaks. They agreed a target of 17 days. 'I couldn't believe my ears,' Emel'ianov commented. 'This went outside all engineering calculations and accumulated experience.' The next day work began.

It seemed to me that a single human organism was at work, so much in accord were all the actions of the brigade members. They worked silently, without words; by some instinct each understood his role. From time to time there was heard only the clang of iron or the clatter of some falling part or instrument.

The press was operational within a fortnight.

## Taking the strain

The war effort stripped Soviet agriculture of men of working age, horses, and machinery. Farm work was carried out mainly by women and pensioners. Vera Ul'ianova, a member of the 'New Life' collective farm, just 40 kilometres north of Moscow, recalled:

During the war we had to do the ploughing ourselves. Eight or ten women harnessed themselves to each other up close and side by side and dragged it. The tackle had to be wider than for horses. From the tackle they stretched rods out and fixed the plough to them. A woman or a chap walked behind.<sup>37</sup>

## Supplying the army

In 1942 a Polish refugee, Włodzimerz Brus, was employed in a Saratov clothing factory making gloves for soldiers on the front line. You couldn't kill Germans without a gun, but without gloves in 20 degrees of frost you couldn't fire the gun. In

fact, gloves were just as essential to the war effort as guns. So, although he was not in a gun, tank, or aircraft factory, Brus was clearly doing war work. In a conversation before his death he told the author:

In January 1943 the factory's orders suddenly changed: Stop making gloves! Start making epaulettes! Stalin had decided to restore the signs of rank and status of the Tsarist army before the Bolshevik revolution. Until 1917, the Tsarist army had been the instrument for oppressing Poland as a Russian colony. As a Pole, I was shocked. My Russian co-workers thought it was an excellent thing and fell to work with renewed enthusiasm.

### Selling tickets in the lottery of life

Another Polish refugee, Karol Kewes was taken into the Soviet army in the autumn of 1941 and stationed in Rostov on Don. His landlady, 'Moussia,' lived mainly off the illegal sale of ration coupons that she was given each week by a former boy friend. When challenged, she defended the morality of her behavior:

In Russia, the people have been used to rationing since time immemorial. With the exception of newcomers like [her listener], people know very well from experience that a ticket represents the hope of a food ration, but that it doesn't in any way guarantee it. Thus the food-ration cards represent a kind of supplementary currency that one uses at will. Citizens short of roubles have never hesitated to sell their monthly card knowing they are perfectly at liberty, some days later, to buy another. Sometimes they make a small profit from it since the price of cards is subject to fluctuation. Now, Moussia argues, the surplus cards that she puts on the market tend to lower the prices. And when her supplier – who might be pressed for money – brings her a larger packet than usual, she even goes as far as flooding the market with cards at giveaway prices, thereby provoking a temporary collapse in the price, from which all buyers gain a profit. She performs a genuine service therefore.<sup>38</sup>

### Guarding the fascists

Karlo Štajner, an Austrian communist, was imprisoned before the war, accused of being an agent of Hitler's Gestapo. In the winter of 1942 he was in a work brigade digging gravel under guard in a labour camp of the far northern Noril'sk complex. In that year there was not enough food in the country to keep everyone alive, and one in five of the prisoners in the Gulag died of hunger, cold, and overwork. Labour incentives were regressive in the sense that the ratio of reward to punishment rose with position in the hierarchy. If the brigade met or exceeded the daily quota, the guards got a bonus. If not, the guards would punish the labourers:

If we failed to meet the quota, the soldiers would vent their rage on us on the way home. A favorite technique was to drive us into the deep snow, requiring us to stay in strict formation. This would be repeated every five minutes, and the commander would shout: 'Well, how do you like that? I'll teach you to work!'<sup>39</sup>

The gravel pit manager was the prisoners' savior; often he would sign that they had met the quota whether or not this was the case.

### Catching a traitor

In the besieged city of Leningrad, the security police investigated a series of leaflets found in public places.<sup>40</sup> The author, 'Buntovshchik' (Rebel), called on his fellow citizens to end their patriotic resistance, storm the warehouses where food was stored, and open to the city to the German army. The Rebel also wrote a number of anonymous letters to city leaders objecting to their policies and decisions. Attempting to profile the author's education, employment, and residence from the growing evidence of the leaflets and letters, the NKVD began to check the population of the city by factory and neighbourhood. All too many presented a possible fit.

Around them raged a three-year battle in which a million residents and soldiers on the Leningrad front were killed or died of wounds, hunger, and cold. Patiently, over 21 months, the police eliminated more than one hundred thousand people. Finally, they got their man –Sergei Luzhkov, a steel worker, who had acted on his own initiative. Telling the story Bellamy remarks that despite the extreme circumstances the police did their work without mass terror, relying on patient and unremitting detective work.

### Being there

In October 1941 Moscow was in imminent danger of encirclement and capture. Stalin ordered the evacuation of the civil administration and foreign embassies to the east. Across the city, workers were laid off. There was a fine ash in the air from the burning of government documents. The city's factories and transportation links were mined for demolition. Moscow was swept by rumour, panic, and disorder. (One persistent story, false as it happened, was that Stalin himself had abandoned the city.) A deputy prime minister with the lead responsibility for evacuation, Aleksei Kosygin walked into the offices of the central government:

The ... building was empty - the doors of offices swung open, papers blew around and rustled underfoot, everywhere telephones rang. Kosygin ran from room to room, answering the phone. No-one spoke at the other end. Silence. He understood: they were checking whether there was anyone in the Kremlin ... One of those who rang identified himself. It was a well-known person. In a businesslike way, he enquired, 'Well, then, are we going to surrender Moscow?'<sup>41</sup>

At that moment, the single most important thing Kosygin could do for the war effort on the home front was to let it be known that the government had not left the city.

### The Alliance: sharing the burden or passing it on

Victory in 1945 depended on global cooperation. Just as persons could free ride, so could countries. The founding partners in the wartime alliance of the United Nations

had a common goal: the unconditional surrender of Nazi Germany and its allies. But they were very different in their constitutions, political norms, sizes, and resources. The governments of the United States and United Kingdom were elected; the Soviet Union was governed by a dictator. The free-enterprise economies of the United States and United Kingdom were of a similar level of development but the US economy was three times the size of the British. The state-dominated Soviet economy was of a similar size to the British economy but, with three times the population, lagged far behind in development level and average incomes.

Within the alliance, there was scope for each partner to play to its strengths. Since the United States was far from the European theatre, had efficient industries and productive workers, and the US Army was inexperienced in mechanized warfare on land, it made sense for the United States economy to gear up production and supply Soviet industry and the Red Army with the equipment to defeat the Wehrmacht. The productive potential and fighting power of the British were between the two extremes; the British gave aid to the Soviet Union for a while, before becoming recipients of aid from the United States.

The flows of aid became very substantial, amounting to a tenth of Soviet national income in 1943 and 1944. A stream of metals, fuels, processed foods, and industrial and military equipment, flowed along shipping lines to the Soviet ports of the Arctic and the Far East and overland through Central Asia. Throughout the war the Red Army fought with weapons made very largely at home, but became significantly dependent on imported means of transport and communication, fuels, and food rations. Despite initial discussion of loans and deferred payment, US President Franklyn D Roosevelt took an early decision to provide aid through the Lend-Lease programme without any financial consideration in return; in fact, the aid was neither lent nor leased but given. What FDR expected of Stalin in return was the sharing of information in wartime and continued cooperation after the war, but Stalin never shared wartime intelligence and the victory celebrations of 1945 were followed all too quickly by the Cold War.<sup>42</sup>

Even without the expected return, the aid program was very much worthwhile to the chief donor. By paying the Soviets to do the killing and dying in 1942 and 1943, the US administration clearly saved British and American lives; less obviously, it also saved Soviet military and civilian casualties, since the alternative for the Red Army was a higher probability of defeat. Finally, by letting the Soviet Union play to its strength, it maximized the killing of Germans. In this way, the long-distance cooperation of the Alliance multiplied the military value of Allied resources and hastened the end of the war.

Two qualifications to this happy picture are necessary. One is that aid could not be decisive on its own. In recent years, for example, western aid to sub-Saharan Africa has run at around 5 per cent of that region's GDP – as much as the Soviet Union received in 1942. It is widely recognized, however, that the impact of aid on the economies of different countries in the region is highly variable and depends critically on local resources, infrastructure, and institutions that decide whether or not the aid can be utilized effectively, dissipated in corruption, or just wasted.<sup>43</sup> The

same was true of Allied aid in World War II; it would have been useless if the Soviet Union had not had the means or the time at its disposal to use it well.

A second qualification is that wartime cooperation was continually fraught with tension and mutual suspicion. The economic theory of coalitions emphasizes the incentives for each country to hold back and wait for its partners to do the job at hand.<sup>44</sup> Since the Soviet Union already had a large army in the field with no choice but to fight, the Soviet side feared the Americans would give them just enough to keep the Red Army fighting and its young men dying on the eastern front, holding back in the west while the US Army built up its invasion forces on the safe side of the English channel. On the other hand, since the United States was the dominant power economically, and had a vital national interest in the eventual defeat of Germany, the American side feared that the Soviets would seize every opportunity to divert American aid from the war effort – for example, to build Soviet postwar power.

Neither fear was entirely idle, and each can be illustrated by the same figures. Table 2 enumerates the GDPs and military personnel of the three allies in 1941 and 1943. The Soviet perspective is reflected in the figures for 1943 when the Soviet Union, with just 15 percent of Allied economic resources, was providing almost half of Allied military power (measured by troops). The disparity would be even wider if we took into account the intensity with which Allied troops were fighting, much higher on the eastern front than in the west.

The changes in these figures compared with 1941, plotted in Chart 6, tell the American side of the story. Between the two years, the balance of economic power among the Allies shifted substantially. As the US economy mobilized, its share in Allied economic resources rose by around 7 percentage points; the British and Soviet shares fell correspondingly, mostly because of the absolute shrinkage of the Soviet economy. But the associated change in relative contributions to military power was disproportionate: the US share of Allied military resources (measured by personnel) rose by more than 20 percentage points; while the Soviet share in economic resources declined by just 5 per cent, its share in military resources fell by 12 percent. Here we see how the addition of American resources enabled Britain and especially the Soviet Union to hold back somewhat on their military commitments.

## Conclusions

The Soviet economy eventually collapsed in 1991, at a time of growing international relaxation, when the burden of military outlays was shrinking, when the only threat to the country's borders came from within. It did *not* collapse in 1941, with its territory deeply penetrated by the mightiest military machine of the time for the purposes of a genocidal onslaught.

The reasons include prewar Soviet preparations for war, Stalin's successful exploitation of national feeling and repression to hold the war effort together, the provision of Allied assistance in large quantities, and its effective utilization.

In 1946 Stalin claimed that the Soviet economy had been proven more effective than capitalism at the tasks of both peace and war. Stalin was half right: despite the

costs and weaknesses that we have reviewed, the Soviet economy was able to mobilize its resources effectively under the colossal pressures of wholesale attack. It was able to commit a proportion of its resources to the battlefield that matched those achieved by market economies at a much higher development level. The fact that it was assisted by substantial Allied aid is significant, but does not detract from the remarkable resilience that was in evidence.

Stalin was wrong to claim an advantage in peaceful uses of resources as well. The measures that helped prepare the Soviet economy for war were bloody and disastrous by the standards of peacetime. The Soviet advantage was confined to its ability to drive up the share of resources for national priorities at the expense of the personal lives of its citizens. They could accept this more readily when faced with enslavement or extermination as the alternative.

Did the Soviet victory in 1945 justify Stalin's rule, pragmatically or morally? From a pragmatic standpoint the answer "Yes" may be superficially tempting, but becomes more difficult on closer inspection. Stalin used a wide range of policies, from the forced collectivization of peasant farming and rapid industrialization to the Great Terror, to condition the Soviet economy for war. Viewed pragmatically these measures had complex effects. Collective farming, for example, was part of the glue that held the Soviet economy together in wartime. Yet the indiscriminate violence that established it was a powerful factor in the minds of millions when they wavered between Stalin and Hitler. The Great Terror may have created more real enemies than it destroyed.

From a moral standpoint we may think about the victims of wars, the sacrifices they were willing to make for the sake of the next generation, and the importance of commemorating them. In contrast to this, millions of Stalin's victims were killed by his policies whether they liked it or not. There was no benefit to their children, who often died with them. After death, they were slandered and their memory was suppressed. There was no morality in this, only the expediency of a dictator determined to hold power against external and internal enemies at any price.

## Tables

*Table 1. The balance of supply on the eastern front, 1941 to 1944 (USSR to Germany, ratio)*

	1941	1942	1943	1944
Average number:				
Soldiers	1.1	1.5	1.4	1.9
Units produced:				
Rifles and carbines	<b>2.0</b>	<b>3.3</b>	<b>1.7</b>	1.3
Machine pistols	0.3	<b>2.7</b>	<b>3.1</b>	<b>3.6</b>
Machine guns	<b>1.7</b>	<b>3.4</b>	<b>1.9</b>	1.3
Guns	<b>2.0</b>	<b>3.5</b>	<b>2.0</b>	1.2
Mortars	<b>11.2</b>	<b>26.1</b>	<b>3.4</b>	0.3
Tanks and self-propelled guns	0.8	1.2	<b>2.6</b>	<b>2.0</b>
Combat aircraft	<b>2.1</b>	<b>2.4</b>	<b>2.0</b>	1.8

Note: Each number in the table is the ratio of a Soviet figure to a German figure for the eastern front. Since Germany fought on two fronts, the German figures involve some guesswork; they are assumed to be 90 percent of the German total in 1941 to 1943 and two thirds in 1944. The first row in the table compares annual average numbers of personnel in the armed forces of each country. Subsequent rows compare annual totals of units available from domestic production. Bold figures in these rows are those that exceed the figure in the first row for the same year.

Sources: Generally as Mark Harrison, 'The Economics of World War II' (pp. 14-16), in Mark Harrison, ed., *The Economics of World War II: six great powers in international comparison* (Cambridge, 1998), pp. 1-42. For 1941 underlying Soviet data, except mortars, are full-year figures from RTsKhIDNI (now RGASPI), f. 71, op. 25, d. 7882, ll. 4-20.

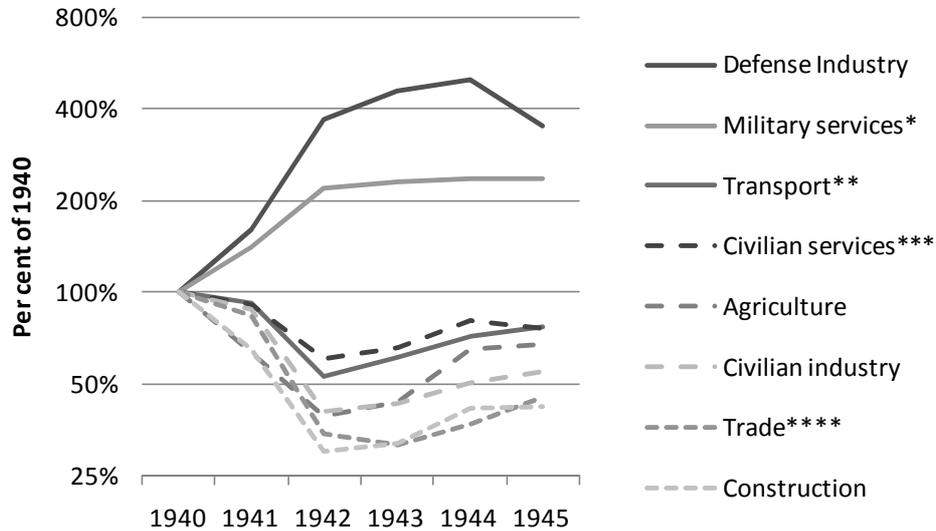
*Table 2. Production and combat: The Allies, 1941 to 1943*

	<i>GDP, billions of dollars and 1990 prices</i>		<i>Military Personnel, thousands</i>	
	<i>1941</i>	<i>1943</i>	<i>1941</i>	<i>1943</i>
USA	1,094	1,399	1,620	9,020
UK	344	361	3,383	4,761
USSR	359	305	7,100	11,858
Total	1,798	2,064	12,103	25,639

Source: Mark Harrison, 'Why Didn't the Soviet Economy Collapse in 1942?' (pp. 138 and 140), in Roger Chickering, Stig Förster, and Bernd Greiner, eds, *A World at Total War: Global Conflict and the Politics of Destruction, 1939-1945* (Cambridge, 2005), pp. 137-156.

## Charts

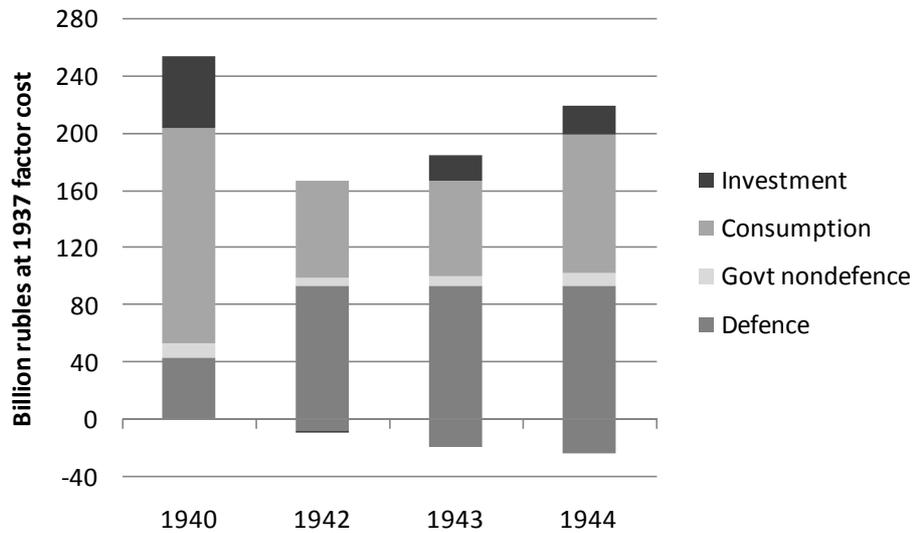
Chart 1. Net national product of the Soviet Union by sector of origin, 1940 to 1945 (per cent of 1940, at factor costs of 1937)



Notes: \* Army, Navy, and NKVD troops. \*\* Including communications. \*\*\* Housing, health, education, finance, government, and other services. \*\*\*\* Including catering.

Source: Based on figures from Mark Harrison, *Accounting for War: Soviet production, employment, and the defence burden, 1940-1945* (Cambridge, 1996), p. 92.

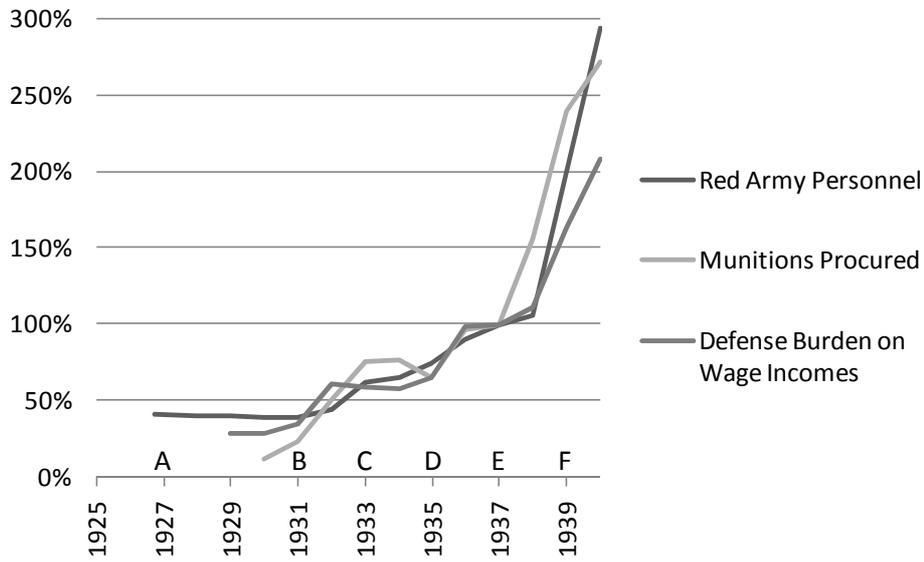
Chart 2. Gross national product of the Soviet Union, by final use, 1940 and 1942 to 1944 (billion rubles at 1937 factor cost)



Note: Investment is fixed capital formation plus inventory investment. Consumption is the sum of outlays on household consumption and communal services. The Soviet gross national product is the sum of the items shown above the horizontal axis, while the sum of all items, both above and below the line, equals the total of resources available to the Soviet Union. The excess of total resources available over GNP was made up by net imports (chiefly, British mutual aid and United States Lend-Lease). Thus, the area below the horizontal axis shows the contribution to total Soviet resources from foreign military-economic assistance; in the chart foreign assistance is set against domestic defence outlays but this is arbitrary to the extent that domestic resources were transferable between uses.

Source: Based on figures from Mark Harrison, *Accounting for War: Soviet production, employment, and the defence burden, 1940-1945* (Cambridge, 1996), p. 104.

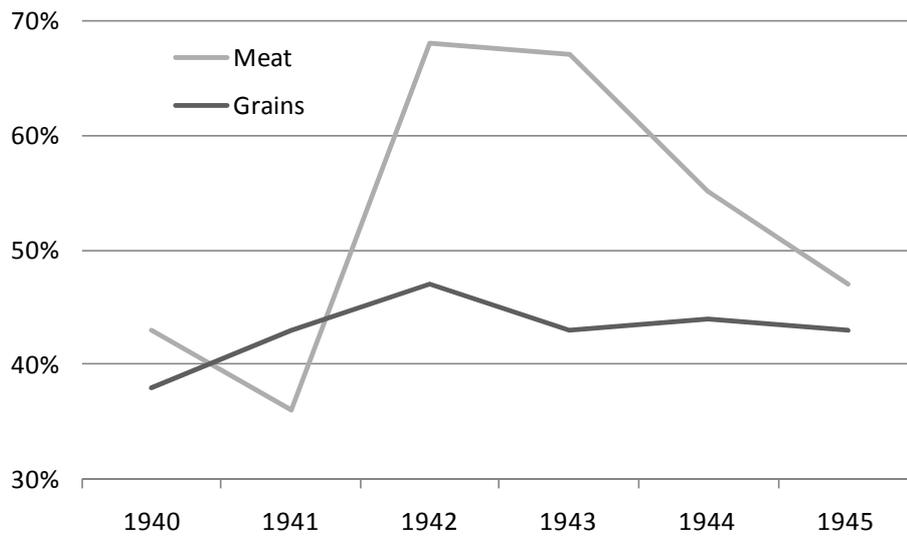
Chart 3. Soviet defense outlays, 1926/27 to 1940: Selected Measures (percent of 1937)



Key: A. The 1927 'war scare.' B. Japan invades Manchuria. C. Hitler takes power in Germany. D. Stalin recognizes Hitler as a threat. E. Japan invades China: World War II begins in the Far East. F. Germany invades Poland: World War II spreads to Europe.

Source: Mark Harrison, 'The Dictator and Defense' (p. 12), in Mark Harrison, ed., *Guns and Rubles: the defense industry in the Stalinist state* (New Haven, 2008), pp. 1-30.

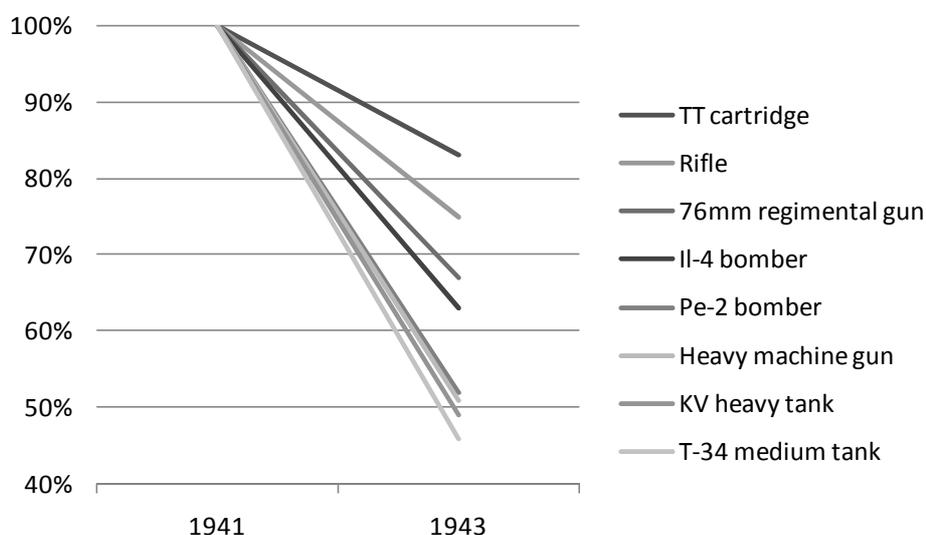
Chart 4. Government food procurements, 1940 to 1945 (per cent of output)



Note: Liveweight meat procurements are measured against deadweight output; this must bias the level of the series upward without affecting the sign of the large changes from year to year.

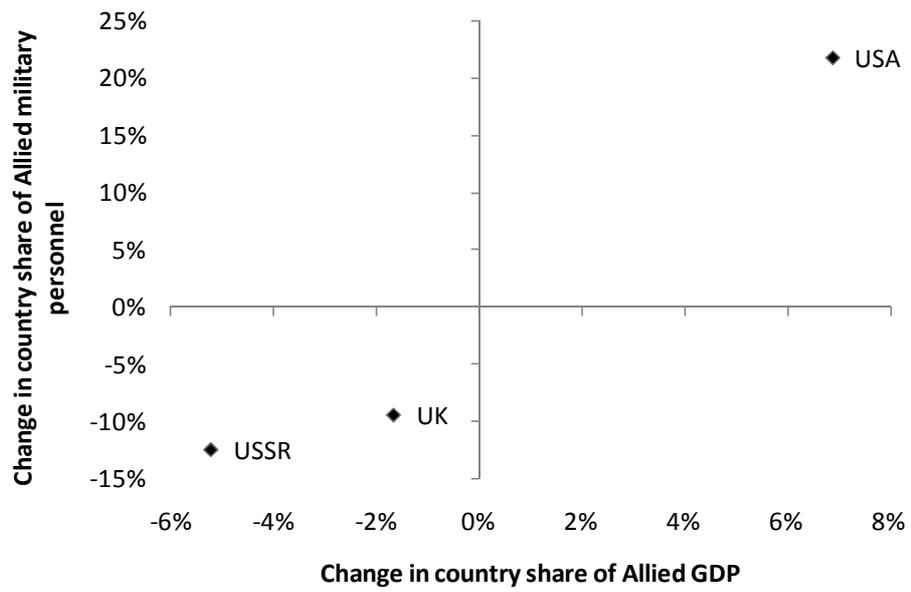
Source: Based on figures from Mark Harrison, 'Soviet Industrialisation and the Test of War' (p. 84), *History Workshop Journal* #29 (1990), pp. 65-84.

Chart 5. Ground and air munitions: hours worked per unit produced in 1941 and 1943 (per cent of 1941)



Source: Based on figures from N A Voznesensky, *The War Economy of the USSR in the Period of the Patriotic War* (Moscow, 1948), p. 92. These published figures were not unrepresentative, as copious evidence from the formerly secret archives has demonstrated (Mark Harrison, *Accounting for War: Soviet production, employment, and the defence burden, 1940-1945* (Cambridge, 1996), pp. 223, 226).

Chart 6. Burden sharing, 1941 to 1943: USA, UK, and USSR



Source: Based on figures from Table 2.

## Endnotes

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<sup>1</sup> *Pravda*, February 10, 1946.

<sup>2</sup> Adam Tooze, *The Wages of Destruction: the Making and Breaking of the Nazi Economy* (London, 2006), pp. 588-589.

<sup>3</sup> Mark Harrison, *Accounting for War: Soviet Production, Employment, and the Defence Burden, 1940-1945* (Cambridge, 1996), p. 104.

<sup>4</sup> John Barber and Mark Harrison, 'Patriotic War, 1941 to 1945,' in Ronald Grigor Suny, ed., *The Cambridge History of Russia*, Vol. 3, *The Twentieth Century* (Cambridge, 2006), pp. 217-242.

<sup>5</sup> Michael Ellman, 'The 1947 Soviet Famine and the Entitlement Approach to Famines,' *Cambridge Journal of Economics* 24:5 (2000), pp. 603-630.

<sup>6</sup> Amir Weiner, *Making Sense of War: The Second World War and the Fate of the Bolshevik Revolution* (Princeton, 2001), p. 7.

<sup>7</sup> M H Dobb, *Soviet Economic Development since 1917* (London, 1948); Nicolas Spulber, *Soviet Strategy for Economic Growth*, and *Foundations of Soviet Strategy for Economic Growth: selected Soviet essays, 1924-1930* (Bloomington, Indiana, 1964); Charles K Wilber, *The Soviet Model and Underdeveloped Countries* (Chapel Hill, North Carolina, 1969); Alec Nove, *An Economic History of the USSR* (London, 1969); Holland Hunter and Janusz M Szyrmer, *Faulty Foundations: Soviet economic policies, 1928-1940* (Princeton, N.J., 1992); Robert C Allen, *Farm to Factory: a reinterpretation of the Soviet industrial revolution* (Princeton, N.J., 2003). On Japan see Chalmers A Johnson, *Japan, Who Governs? The rise of the developmental state* (New York, 1995).

<sup>8</sup> For example E H Carr and R W Davies, *Foundations of a Planned Economy, 1926-1929*, vol. 1 (London, 1969), pp. 454-60.

<sup>9</sup> N S Simonov, *Voенно-promyshlennyi kompleks SSSR v 1920-1950-e gody: tempy ekonomicheskogo rosta, struktura, organizatsiia proizvodstva i upravlenie* (Moscow, 1996); Lennart Samuelson, *Plans for Stalin's War Machine: Tukhachevskii and military-economic planning, 1925-41* (London and Basingstoke, 2000); David R Stone, *Hammer and Rifle: The militarization of the Soviet Union, 1926-1933* (Lawrence, KS, 2000); Andrei Sokolov, 'Before Stalinism: the early 1920s,' in Mark Harrison, ed., *Guns and Rubles: the defense industry in the Stalinist state* (New Haven, 2008), pp. 31-49.

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<sup>10</sup> Peter Gatrell, 'Poor Russia, Poor Show: mobilising a backward economy for war, 1914-1917,' in Stephen Broadberry and Mark Harrison, eds., *The Economics of World War I* (Cambridge, 2005), pp. 235-275.

<sup>11</sup> Stephen Broadberry and Mark Harrison, 'Economics of the World Wars,' in Stephen Durlauf and Lawrence Blume, eds, *The New Palgrave Dictionary of Economics*, second edn (Basingstoke, 2008).

<sup>12</sup> See R W Davies, *The Industrialisation of Soviet Russia*, vol. 1, *The Socialist Offensive: the Collectivisation of Soviet Agriculture, 1929-1930*, and vol. 2, *The Soviet Collective Farm, 1929-1930* (Basingstoke, 1980).

<sup>13</sup> R W Davies and S G Wheatcroft, *The Industrialisation of Soviet Russia*, vol. 5, *The Years of Hunger: Soviet Agriculture, 1931-1933* (Basingstoke, 2003).

<sup>14</sup> James R Millar, 'Mass Collectivization and the Contribution of Soviet Agriculture to the First Five-Year Plan: A Review Article,' *Slavic Review* 33:4 (1974), pp. 750-766; Michael Ellman, 'Did the Agricultural Surplus Provide the Resources for the Increase in Investment in the USSR During the First Five Year Plan?' *Economic Journal* 85:340 (1975), pp. 844-863.

<sup>15</sup> Stone, *Hammer and Rifle*.

<sup>16</sup> R W Davies, 'Planning for Mobilization: the 1930s,' in Mark Harrison, ed., *Guns and Rubles: the defense industry in the Stalinist state* (New Haven, 2008), pp. 118-155.

<sup>17</sup> R W Davies and Mark Harrison, 'The Soviet Military-Economic Effort under the Second Five-Year Plan 1933-1937,' *Europe-Asia Studies* 49:3 (1997), pp. 369-406; Mark Harrison, 'Industrial Mobilisation for World War II: a German Comparison,' in John Barber and Mark Harrison, eds, *The Soviet Defence Industry Complex from Stalin to Khrushchev* (Basingstoke and London, 2000), pp. 99-117.

<sup>18</sup> Davies and Harrison, 'The Soviet Military-Economic Effort.'

<sup>19</sup> Davies, 'Planning for Mobilization.'

<sup>20</sup> Harrison, 'Industrial Mobilization.'

<sup>21</sup> Oleg Khlevniuk, 'The Objectives of the Great Terror, 1937-38,' in J M Cooper, Maureen Perrie, and E A Rees, eds, *Soviet History, 1917-1953: essays in honour of R. W. Davies* (New York, 1995), pp. 158-76.

<sup>22</sup> Mark Harrison, 'GDPs of the USSR and Eastern Europe: towards an interwar comparison,' *Europe-Asia Studies* 46:2 (1994), pp. 243-59.

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<sup>23</sup> A I Shakhurin, *Krylia pobedy* (Moscow, 1975), p. 134.

<sup>24</sup> On plans see Alex J Kay, *Exploitation, Resettlement, Mass Murder: Political and Economic Planning for German Occupation Policy in the Soviet Union, 1940-1941* (New York, 2006); Tooze, *Wages of Destruction*. On policies, see Alexander Dallin, *German rule in Russia, 1941-1945: a study of occupation policies* (London, 1957).

<sup>25</sup> Mark Harrison, 'Why Didn't the Soviet Economy Collapse in 1942?' in Roger Chickering, Stig Förster, and Bernd Greiner, eds, *A World at Total War: Global Conflict and the Politics of Destruction, 1939-1945* (Cambridge, 2005), pp. 137-156.

<sup>26</sup> Mark Harrison, *Soviet Planning in Peace and War, 1938-1945* (Cambridge, 1985), pp. 61-62.

<sup>27</sup> John Barber and Mark Harrison, *The Soviet Home Front, 1941-5: a social and economic history of the USSR in World War II* (London, 1991), p.128.

<sup>28</sup> Barber and Harrison, *Soviet Home Front*, p. 130.

<sup>29</sup> G K Zhukov, *Vospominaniia i razhmyshleniia* (Moscow, 1971), p. 266.

<sup>30</sup> Barber and Harrison, *Soviet Home Front*, p. 139.

<sup>31</sup> This and the following discussion of wartime finance is based on Harrison, *Accounting for War*, pp. 173-174, and Mark Harrison, 'The Soviet Union: the defeated victor,' in Harrison, ed., *Economics of World War II*, pp. 268-301.

<sup>32</sup> Geoffrey Brennan and Gordon Tullock, 'An Economic Theory of Military Tactics: Methodological individualism at war,' *Journal of Economic Behavior and Organization* 3:2-3 (1982), pp. 225-42

<sup>33</sup> Thucydides, Book 2:43.

<sup>34</sup> Harrison, 'Why Didn't the Soviet Economy Collapse?'

<sup>35</sup> Mark Harrison, 'Counting Soviet Deaths in the Great Patriotic War: Comment,' *Europe-Asia Studies* 55:6 (2003), pp. 939-44.

<sup>36</sup> V S Emel'ianov, 'Tam, gde izgotovlialis' tanki' (pp. 250-251), in *Kuznitsa pobedy. Podvig tyla v gody Velikoi Otechestvennoi voiny. Ocherki i vospominaniia*, second edn (Moscow, 1980), pp. 244-256.

<sup>37</sup> Iu V Arutiunian, *Sovetskoe krest'ianstvo v gody Velikoi Otechestvennoi voiny*, second edn (Moscow, 1970), p. 156.

<sup>38</sup> K S Karol (Kewes), *Solik: life in the Soviet Union, 1939-1946* (London, 1986), pp. 94-95.

<sup>39</sup> Karlo Štajner, *Seven Thousand Days in Siberia* (Edinburgh, 1988), p. 155.

<sup>40</sup> Chris Bellamy, *Absolute War: Soviet Russia in the Second World War* (Basingstoke, 2007), pp. 380-381 and 399-401.

<sup>41</sup> Daniil Granin, 'Zapretnaia glava' (p. 122), *Znamia* #2 (1988), pp. 117-132.

<sup>42</sup> Mark Harrison, 'The Soviet Economy and Relations with the USA and Britain' (pp. 72-74), in Howard Temperley and Ann Lane, eds, *The Rise and Fall of the Grand Alliance, 1941-1945* (London and Basingstoke, 1995), pp. 69-89.

<sup>43</sup> See for example Paul Collier, *The Bottom Billion: Why the poorest countries are failing and what can be done about it* (Oxford, 2007).

<sup>44</sup> Mancur Olson and Richard Zeckhauser, 'An Economic Theory of Alliances,' *Review of Economics and Statistics* 48:3 (1966), pp. 266-279.