

# The USSR and Total War: Why Didn't the Soviet Economy Collapse in 1942?\*

Mark Harrison\*\*

## *Abstract*

The economic dimensions of World War II are appraised both generally and with specific reference to the eastern front. When the Soviet war effort is examined more closely, it becomes surprising that the Soviet economy did not collapse in 1942. A rational-choice model is developed to illustrate the economic conditions under which a wartime collapse of the economy is rendered more and less likely. The possible effects of policy interventions by Stalin, Hitler, and Roosevelt on the stability of the Soviet war effort are defined.

---

\* This paper appeared as a chapter in *A World at Total War: Global Conflict and the Politics of Destruction, 1939-1945*, pp. 137-156. Edited by Roger Chickering, Stig Förster, and Bernd Greiner. Cambridge: Cambridge University Press, 2005.

\*\* Address for correspondence: Department of Economics, University of Warwick, Coventry CV4 7AL, UK. Email: [mark.harrison@warwick.ac.uk](mailto:mark.harrison@warwick.ac.uk).

# The USSR and Total War: Why Didn't the Soviet Economy Collapse in 1942?

The aim of this chapter is to reconsider the importance of economic factors in the outcome of World War II and especially on the eastern front.<sup>1</sup> In a recent essay on the war I asserted that “Ultimately, economics determined the outcome”.<sup>2</sup> Production was decisive: the Allies outgunned the Axis because they outproduced them. Economic factors carried more weight in the Allied victory than military or political factors. For example, the Allies did not make better soldiers or provide better weapons. Nor were they better led. It is true that some of the Allies were more democratic, but being a democracy did not save the Czechs, Poles, or French, and being a dictatorship did not defeat the Soviets. The Allies won the war because their economies supported a greater volume of war production and military personnel in larger numbers. The Allied preponderance in this dimension appears so decisive that, once one has grasped it, it seems hardly necessary to pay attention to anything else.

The historian Richard Overy has objected that this 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”.<sup>3</sup> I agree that it was very important for each country to solve its moral, political, technical, and organizational problems of the war, and that finding solutions was always costly, sometimes prohibitively so. But on my reading of the history of the war it was always easier to solve these problems if resources were favourable. On the other hand moral, political, technical, or

---

<sup>1</sup> I thank participants in the Total War V conference, Hamburg, 29 August to 1 September 2001, and in the Department of History & Civilization seminar “Inquiries into the Age of Extremes” at the European University Institute, Florence, 23 November 2001, and also John Barber, Louis Capdeboscq, Michael Ellman, Peter Howlett, Valery Lazarev, and Arfon Rees for advice and comments.

<sup>2</sup> Mark Harrison, “The Economics of World War II: an Overview”, in Mark Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge University Press: Cambridge (1998), 2. This view is directly descended from Raymond Goldsmith, “The Power of Victory: Munitions Output in World War II”, *Military Affairs*, 10 (1946), 69-80.

<sup>3</sup> R.J. Overy, “Who Really Won the Arms Race?” *The Times Literary Supplement*, 13 November 1998, 4-5.

organizational defects could prove fatal only if resources were also lacking.

For the sake of argument, however, I will accept Overy's criticism as valid in two senses. First, he is right that economic determinism makes bad history. In fact, determinism also makes bad economics for economics is about nothing if not choices. I agree that it is desirable to understand the role of economic factors in the war in a way that does not predetermine the role of the other factors. Second, I agree with Overy that if we pay no attention to moral, political, technical, and organizational factors we will not understand the eastern front. Specifically, we will fail to grasp the reasons why the Soviet economy, no larger than Germany's before the war, industrially less developed, and seriously weakened by invasion, did not collapse and instead succeeded in supplying more soldiers and weapons to the front than Germany.

This chapter proceeds as follows. Part 1 describes the global context of the Soviet war effort. Part 2 surveys the scale and purposes of Soviet war preparations and the wartime availability and uses of resources in the Soviet Union. It is suggested that the failure of the Soviet economy to collapse in 1942 is remarkable. Part 3 presents definitions of "economic collapse" and "the point of collapse", as when it is claimed that the Soviet Union in 1942 was at or near the point of collapse, and proposes a framework for understanding the choices behind the outcomes: how did individuals decide to work with or against the national war effort? Part 4 places the strategies of the players in the Soviet economy in 1942 within this framework. Part 5 concludes.

## 1. The Global Context

The Allied economic superiority was never less than overwhelming. A few figures illustrate this point. Table 1 shows that, when the GDPs of the great powers are compared in each year of the war, the superiority of the Allied coalition over the Axis powers was never less than 2:1. It is true that a focus on the great powers alone might mislead since one purpose of the building of empires and influence was to expand the extra-territorial resources available to each side. Therefore table 2 aims to show the balance of resources on each side including those of their respective colonial empires and trading blocs in 1942, the year most favourable to the Axis. Since the world was in turmoil in 1942 we do not know exactly how many people and dollars of GDP that meant, but the estimates for 1938 get us as close as we can. Table 2 shows that even in 1942 the Allied share of the global economy dominated that of the Axis by nearly 1.9:1 in population and 1.4:1 in GDP; in resource terms, the main Allied weakness lay in the British Empire's vast, low-income African and Asian colonies. Correspondingly France was the unexpected jewel in Germany's imperial crown.

Of course wars are fought with soldiers and weapons, not GDPs. The trail of Axis victories from 1937 to 1942 is to be explained only by the qualitative superiority of the Japanese and German armies and the strategic advantages of their leaders. Eventually, however, the Allies translated their economic superiority into overwhelming advantage on

the battlefield. Table 3 shows that after a temporary disadvantage in 1939 and 1941, occasioned by their own late start and the fall of France, the Allies continually maintained larger armed forces than the Axis powers and this advantage reached almost 2:1 in 1943 and 1944 before the final, desperate Japanese mobilization. But nothing conveys the crushing character of the Allied advantage better than table 4. This table shows the balance of weapons available to the two sides in 1942. It is true that in 1942 the war industries of both sides retained considerable untapped reserves. The indexes of British and Soviet war production were already close to their respective wartime peaks, but the rates of munitions output of the United States, Germany, and Japan were still accelerating. Still, 1942 was the decisive year of the war; if the Axis powers could not win in 1942 they would never get a better chance. Table 4 shows with dazzling clarity why the decision of that year was against them. In each category they were overwhelmed by Allied superiority measured at better than 2:1 (aircraft), 3:1 (rifles), 4:1 (warships), 5:1 (machine guns), 6:1 (tanks), 7:1 (guns), 13:1 (mortars), and 15:1 (machine pistols). Once we know this, what else is there to know?

Do we really need nothing else to understand the outcome of the war? This question becomes sharper when we narrow our focus from the global balance of resources to that on the eastern front. Tables 3 and 4 show that Germany was numerically just as disadvantaged in the east by the Soviet armed forces and war production as were the Axis powers facing Britain and America in the west European and Pacific theatres. Yet table 1 showed that the Soviet Union was not superior to Germany in overall resources. Although Soviet GDP exceeded Germany's in 1940, German wartime mobilization and the deep invasion of Soviet territory shifted the balance strongly in Germany's favour. In the most critical years of the war overall Soviet resources were only 70 per cent of Germany's, and the increment arising from Allied aid compensated only to a small extent. It is true that Germany was engaged on two fronts. Taking this into account, the Soviet Union still maintained a bigger army in the field than Germany and outproduced German industry systematically in weapons other than warships.

The history of other wars and other countries suggests that the Soviet economy should have collapsed in 1942. In World War I, confronted by a small proportion of Germany's military might, Russia had struggled to mobilize itself and eventually disintegrated. The disintegration was just as much economic as military and political; indeed, it could be argued that Russia's economic disintegration had been the primary factor in both Russia's military defeat and the Russian revolution. Later in the same war the preponderance of the western Allies eventually brought about the economic collapse of both Austria-Hungary and Germany. Similarly, in World War II the weaker economies of Italy and Japan collapsed when these countries were

seriously attacked by stronger opponents.<sup>4</sup> Among the poorer countries that were invaded only the Soviet Union did not undergo a complete economic disintegration. Instead, the Soviet economy mobilized its resources and the German army was overwhelmed by the scale and scope of Soviet resistance.

## 2. Soviet Rearmament and Wartime Resources

When war broke out the Soviet Union had already engaged in substantial rearmament. In 1940, the last year of less than total war (the Soviet Union had used military force only in Finland and the Baltic region), the Red Army comprised between four and five million soldiers; the military budget consumed one third of government outlays and 15 per cent of the net material product at prevailing prices. One third of the military budget was allocated to procurement of weapons, and Soviet industry produced thousands of tanks and combat aircraft, tens of thousands of guns and mortars, and millions of infantry weapons.<sup>5</sup>

The strategic purposes of prewar rearmament have been much debated. According to Lennart Samuelson's archival study of chief of Red Army armament Marshal M.N. Tukhachevskii, Soviet plans to build a military-industrial complex were laid down before the so-called war scare of 1927.<sup>6</sup> These plans were not aimed at immediate armament to counter any particular military threat, since at the time none existed. They involved huge forward-looking investments in heavy and defence industry. Samuelson does not rule on their precise motivation. Nikolai Simonov has set these plans in the context of the Stalinist regime's basic insecurity: the Soviet leadership feared a

---

<sup>4</sup> On Russia in World War I see Peter Gatrell and Mark Harrison, "The Russian and Soviet Economy in Two World Wars", *Economic History Review*, 46(3) (1993), 425-452; on Italy and Japan in World War II see Vera Zamagni, "Italy: How to Lose the War and Win the Peace", and Akira Hara, "Japan: Guns Before Rice", both in Harrison, ed., *Economics of World War II*, 177-223 and 224-267.

<sup>5</sup> Mark Harrison, *Accounting for War: Soviet Production, Employment, and the Defence Burden, 1940-1945*, Cambridge University Press: Cambridge (1996), 68 and 284; 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), 372 and 394.

<sup>6</sup> Lennart Samuelson, *Soviet Defence Industry Planning: Tukhachevskii and Military-Industrial Mobilization*, Stockholm School of Economics: Stockholm (1996); Lennart Samuelson, *Plans for Stalin's War Machine: Tukhachevskii and Military-Economic Planning, 1925-1941*, Macmillan: London and Basingstoke (2000); Lennart Samuelson, "The Red Army's Economic Objectives and Involvement in Economic Planning, 1925-1940", in John Barber and Mark Harrison, eds, *The Soviet Defence-Industry Complex from Stalin to Khrushchev*, Macmillan: London and Basingstoke (2000), 47-69.

repetition of World War I when the industrial mobilization of a poorly integrated agrarian economy in the face of an external threat resulted in economic collapse and civil war. Simonov concludes that, although the 1927 war scare was just a scare, with no real threat of immediate war, it was also a trigger for change. It reminded Soviet leaders that the government of a poor country could be undermined by events at any moment; external difficulties would immediately give rise to internal tensions between the government and the peasantry that supplied both food and conscripts. The possibility of such an outcome could only be eliminated by countering internal and external threats simultaneously, in other words by executing the Stalin package of industrialization and farm collectivization as preconditions for sustained rearmament.<sup>7</sup> This has important implications for our understanding of Soviet history. It is often suggested that the Russian Civil War was an important learning experience for Bolsheviks. It is less often grasped that World War I also contributed something essential to the makeup of the communist economic development strategy.

Both Samuelson and Simonov confirm that in the mid-1930s Soviet military-economic planning was reoriented away from abstract threats to real ones emanating from Germany and Japan. As a result the pace of war production was accelerated far beyond that envisaged earlier in the decade while contingency plans for a war of the future became increasingly ambitious. In Samuelson's view the military archives leave open the question of whether these plans were designed to support an aggressive war against Germany, rather than to counter a German attack. However, the documentation assembled by Gabriel Gorodetsky in the central political, diplomatic, and military archives has surely settled this issue: Stalin was trying to head off Hitler's colonial ambitions and had no plans to conquer Europe, although it is true that his generals sometimes entertained the idea of a preemptive strike, and attack as the best means of defence was the official military doctrine of the time.<sup>8</sup>

It should not be forgotten that the Soviet Union remained relatively poor. The burden of prewar rearmament on Soviet resources and incomes was much greater than that of equivalent efforts in Germany, Britain, or the United States. Moreover, the cost of what was achieved by 1940 was only a small fraction of the fresh burdens encountered when war broke out.

---

<sup>7</sup> N.S. Simonov, *Voenno-promyshlennyy kompleks SSSR v 1920-1950-e gody: tempy ekonomicheskogo rosta, struktura, organizatsiia proizvodstva i upravlenie*, ROSSPEN: Moscow (1996); N.S. Simonov, "Strengthen the Defence of the Land of the Soviets: the 1927 'War Alarm' and its Consequences", *Europe-Asia Studies*, 48(8) (1996), 1355-64; N.S. Simonov, "The 'War Scare' of 1927 and the Birth of the Soviet Defence-Industry Complex", in Barber and Harrison, eds, *The Soviet Defence-Industry Complex*, 33-46.

<sup>8</sup> Gabriel Gorodetsky, (1999), *Grand Delusion: Stalin and the German Invasion of Russia*, Yale University Press: New Haven, CT (1999).

The outlines of the Soviet wartime mobilization of resources can be depicted briefly. Under the pressure of a deep invasion, Soviet GNP fell by one third, while the resources allocated to defence increased both relatively and absolutely. The pressure on resources was somewhat alleviated by foreign aid, which added approximately 5 per cent to Soviet resources in 1942 and 10 per cent in 1943 and 1944. Figure 1 compares Soviet military and civilian uses of resources with production possibilities through the war years. The bold line that wanders to the southeast before turning north marks the actual combinations of military and civilian uses of resources, or total final demand, in each year. In each year the Soviet Union's real gross national product is used to mark a boundary with a minus-45-degree slope that shows the alternative uses that were possible within the limits of its own production. The net import of Allied resources allowed the Soviet Union to use more resources than it produced in 1942, 1943, and 1944. The distance from the GNP line to the point representing total final demand in each year shows the difference that Allied resources made.

Wartime changes in the uses of output were accompanied by changes in both employment and productivity. Total employment fell by more than one third, while numbers engaged in military service and war production rose. The biggest shift was out of agriculture; there were smaller movements out of civilian industry, transport, construction, and services. A considerable efficiency gain in defence industry pushed output per worker far above peacetime levels. A similar process was noted in Germany and accounts for much of the belated surge of German war production between 1941 and 1944.<sup>9</sup> There was no efficiency gain in other sectors, and labour productivity in the civilian economy declined. This raised the resource requirements of civilian output and made it more difficult to divert resources to military use.

When the war was at its most intense, the resources available to civilian producers and consumers were reduced below the minimum required to replace stocks of physical and human capital. Household consumption was already being squeezed a little by rearmament in 1940; it was squeezed ferociously in 1941-2 by the cut in overall resources and the ballooning defence budget, and squeezed even further in 1943 by the recovery of capital formation. At the low point living standards were roughly 40 per cent below the prewar level. Millions were overworked and malnourished, and there was substantial excess mortality amongst the civilian population.

Figure 2 illustrates a conjecture concerning the position of the Soviet economy in 1942. Again the figure compares Soviet military and civilian uses of resources with production possibilities. Think of the vertical dashed line as showing the military replacement minimum, the minimum level of defence outlays that would maintain the Soviet

---

<sup>9</sup> R.J. Overy, *War and Economy in the Third Reich*, Oxford University Press: Oxford (1994), 346; Werner Abelshauser, "Germany: Guns, Butter, and Economic Miracles", in Harrison, ed., *The Economics of World War II*, 155.

armed forces and combat stocks of 1942 at a constant level while replacing their losses on and off the battlefield. The horizontal dashed line shows the civilian replacement minimum, the minimum level of civilian outlays that would maintain the Soviet population and capital stock of 1942 at a constant level while meeting subsistence and replacing wartime losses and depreciation. It is plausible that Soviet production possibilities in that year were insufficient to meet both minima at the same time, so the minus-45-degree GNP boundary falls inside the point where the dashed lines intersect. Soviet production possibilities were augmented by Allied aid, so total final demand is shown outside the GNP boundary. In 1942 the Soviet armed forces and combat stocks were rising while the population and capital stock were shrinking, so the TFD point fell to the right of the military replacement minimum although below the civilian replacement minimum.<sup>10</sup>

What is remarkable about the Soviet economy is that the tendency of shrinkage did *not* end in economic collapse. Despite negative net investment and millions of hunger deaths, the war effort was maintained and economic recovery followed.

### 3. Where is the Point of Collapse?

War production was a decisive element of the Soviet war effort. But in 1941 and 1942 its foundations were crumbling. Soviet factories could not operate without metals, machinery, power, and transportation. Their workers needed to be fed and clothed, and competed for the same means of subsistence as the soldiers on the front line and the farmers in the rear. As war production climbed, this civilian infrastructure fell away. While Soviet factories turned out columns of combat-ready vehicles and aircraft, guns and shells, civilians were starving and freezing to death. The tribulations of the other Allied economies, even Britain under submarine blockade and aerial bombardment, seem almost frivolous in comparison. Why the Soviet economy stopped short of outright collapse is therefore a proper and serious question.

How might such economies collapse? A country's war effort will collapse when citizens choose to invest effort elsewhere. In wartime the citizen may choose to allocate effort to patriotic service of the country's interest and to service of self-interest. I define self-interest broadly: it includes service of anything to the exclusion of the interest of the country. Between the country and the self are many layers of association, for example the family, the village, or ethnic group. If the latter are served in ways that conduce to the country's interest I define it as patriotic service. Otherwise self-interest is being served.

A patriotic citizen serves in whatever capacity the state directs, does his or her duty, obeys orders, accepts rations, and respects state property; call this person a mouse. Specifically, mice serve their

---

<sup>10</sup> It should not be concluded that Allied aid was used only to augment Soviet defence outlays. In its absence both defence and civilian uses of resources would probably have been reduced but it is possible that civilian uses would have been cut by more. For discussion see Harrison, *Accounting for War*, 128-54.



country to prevent it from being defeated and in the hope of victory. A self-serving citizen behaves opportunistically and ignores orders or gets around regulations, goes absent without leave, jumps queues, and steals government property and the property of others; call this person a rat. Specifically, rats allocate effort between two kinds of theft. They steal nondurable goods, for example food or civilian or military materials, in the hope of surviving until victory. They also steal capital assets, for example durable goods, productive equipment, and even land titles, in anticipation of defeat and in the hope of being permitted by the enemy to establish postwar ownership rights. Thus where mice have a strategy only for victory, rats have strategies for both victory and defeat.

Citizens may choose to be rats or mice, their choice depending on the relative payoffs. In other words mice are not better people than rats; it is not a moral choice, just a choice between payoffs. This choice is forward-looking, being based on the probability of defeat. Within the framework that I propose, the probability of defeat depends exclusively on the balance of production available to the war effort on each side. But the probability of defeat is endogenous since the level of production available to the war effort depends on people's choices.

Some possible implications are illustrated in figure 3. Being a mouse brings a payoff. The expected return to patriotic behaviour is the citizen's share in the utility that results from defending one's country (including one's community, one's family, and oneself). This return, labeled  $m$ , will fall as the number choosing to be mice falls. At the vertical axis there are only mice, and the payoff to mice has the value  $m$ . To the right, the proportion of rats to mice increases and with the community's impoverishment the payoff to mice falls away. First, with fewer mice less output is produced. Second, the growing population of rats diverts a rising share of output away from the war effort. Both raise the probability of defeat and cut the payoff to patriotism. Third, as the probability of defeat increases rats steal a rising share of productive assets, which additionally cuts output. Eventually the payoff to mice falls to zero at a point labeled  $n'$  where defeat is certain because everyone has become a rat and output is zero.

Being a rat also brings returns. Consider panel (A). The return from stealing output is labeled  $r$ . When everyone else is being patriotic the payoff to the first rat will be substantial. The first to steal supplies will always be able to pick something of a value higher than the payoff to patriotic activity: why else do governments find it necessary to enforce wartime controls? So at the vertical axis  $r > m$ . But this return will fall as the number choosing to be rats increases. First, there are fewer mice producing less output for the rising population of rats to share. Second, as rats crowd in the risk of confiscation rises at first. Wartime controls are enforced by threats: crime incurs a certain probability of punishment, which confiscates the rat's payoff and reduces it to zero. Let the probability of punishment depend on the proportion of rats to mice, so that it is low when rats are few and there is little threat for mice to guard against; it rises as rats multiply, then peaks and falls

again as mice become few and are overwhelmed by rats.<sup>11</sup> These considerations make the rats' payoff decline more rapidly at first than the returns to mice. As rats begins to outnumber mice the rats' risk of confiscation falls again, but the few remaining mice provide little output for rats to steal, so the two payoffs converge on zero at  $n'$ , the point of certain defeat.

In addition to output rats also steal durable assets. The return from stealing assets is labeled  $r'$  in panel (A). Under home rule illegally held assets are always at risk of confiscation. However, rats may calculate that under enemy rule, the previous legal owner being unrepresented, possession of stolen assets will be nine points of the law.<sup>12</sup> As an extension, the enemy may encourage rats by offering to protect their stolen assets after victory. Then the probability that property rights over grabbed assets will become enforceable, and the incentive to grab, will rise with the probability of defeat. And the probability of defeat will rise, the more output and assets are grabbed. Of course while the country is undefeated rats still face the threat of confiscation, and this rises at first when mice are still many, but eventually the danger of confiscation will fade as rats multiply and defeat becomes more likely.

Combine the rats' expected payoff under home rule with their payoff from the enemy. In figure 3 these give panel (B). The rats' combined payoff  $r + r'$  is U-shaped; it has one maximum when rats are few and pickings are rich, and another when rats are so many that the country's defeat is ensured. In between there is a zone of disputed territory and unresolved conflict where the incentive to grab is weakened by impoverishment and the risks of punishment: there is less to grab, and what is grabbed cannot be held securely. But as defeat becomes more predictable the incentive to grab what's left rises again while the rats anticipate the enemy's arrival.

A result is a stable equilibrium at  $e_1$ . A few rats have invaded the community but, with the return to self-serving activity dropping away, grabbing stops at the point where the payoffs to rats and mice are equalized. Thus in any society at war a degree of rule-breaking and self-serving activity might be normal without necessarily threatening the state's survival. Further to the right, there is an unstable equilibrium at  $e_2$  that I define as the "point of collapse". At the point of collapse the

---

<sup>11</sup> In this respect the position of rats is different from that usually attributed to rent-seekers: up to a point at least, for rats there is no safety in numbers. On rent-seeking see, Kevin M. Murphy, Andrei Shleifer, and Robert W. Vyshny, "Why is Rent-Seeking so Costly to Growth?", *American Economic Review Papers & Proceedings*, 83(2) (1993), 409-14.

<sup>12</sup> In English law possession implies ownership unless someone with a better claim comes forward. Recently the appeal court ruled that someone who had bought a car knowing it to be stolen was entitled to keep it since the previous owner was no longer identifiable: there could be no one with a better claim. In short, "even a thief is entitled to the protection of the criminal law against the theft from him of that which he has stolen" (*The Guardian*, London, 23 March 2001).

payoffs to rats and mice are equal again. To the right of this point the higher reward goes to rats and the war effort collapses unstoppably, taking the country straight to the other stable equilibrium at  $e_3$  where the war is lost. But the existence of the “bad” equilibrium at  $e_3$  is not a problem as long as the “good” equilibrium at  $e_1$  is self-sustaining.

The problem presented by the point of collapse can be translated into the terms of a dictatorship of the stationary-bandit type.<sup>13</sup> The dictator administers his assets through agents. Each agent will remain loyal to the dictator’s interests as long as his share in the dictator’s expected rents from the assets he administers exceeds the expected value of the asset if the agent stole it. If the agent were allowed to gain by stealing from the dictator he would become a roving bandit. This would reduce the expected value to all agents of serving the dictator loyally and increase the others’ incentives to rove too. However, unregulated or roving banditry would also reduce the value of assets to all agents, so a rational dictator like Stalin could be expected to enforce cooperation and self-interested agents could be expected to comply. However, their incentives would change if a neighbouring bandit such as Hitler were to offer to settle on the territory, expropriate the dictator, and share the rents on his new assets with the first few agents to defect, threatening the rest with wholesale destruction.

#### 4. The Risks of Soviet Collapse in 1942

When citizens chose between serving their country and serving themselves, their calculations were driven by the probability of defeat. In the framework that I propose, the probability of defeat depended exclusively on production. Thus, controlling for rats, greater initial wealth always raised the payoff per mouse relative to the payoff per rat and reduced the likelihood of a wartime collapse. A wealthier community would offer a greater private return to its defence. A poorer enemy was less likely to win and less likely in the event of victory to honour postwar claims to assets laid by rats. When Japan attacked the United States, the rewards to American mice from defending American prosperity were obviously substantial, and the Japanese ability to offer significant rewards to American rats was self-evidently limited. The size disparity of the US and Japanese GDPs ensured that the zone of stability for the US war effort was very large: even if the good equilibrium allowed for significant numbers of cheats and thieves, it remained far to the left of the point of collapse.<sup>14</sup> There was not the slightest chance that the US war effort would collapse into a bad equilibrium, even if a more faint-hearted or more isolationist administration might have willfully chosen a less belligerent response

---

<sup>13</sup> Mancur Olson, “Dictatorship, Democracy, and Development”, *American Political Science Review*, 87(3) (1993), 567-76.

<sup>14</sup> On food rationing violations in the United States in World War II see Geoffrey Mills and Hugh Rockoff, “Compliance with Price Controls in the United States and the United Kingdom During World War II”, *Journal of Economic History*, 47(1) (1987), 191-213.

to attack in the first place. This suggests that initial resource disparities can be decisive

Think of two economies closer to each other in size, for example Germany and the USSR, engaged in a military struggle that had become too close to call. Consider the Soviet war effort in the winter of 1942. Huge Soviet wealth had already been destroyed or lost to the invader. In figure 4 panel (A) illustrates this case. Controlling for rats, the payoff per mouse had been depressed by capital losses. Controlling for mice, the anarchy in the civilian economy and the dangers of outright defeat had raised the payoff per rat. The net effect was to shift the good equilibrium dangerously close to the point of collapse. Stalin could rationally fear that with only a small additional capital loss the good equilibrium and the point of collapse would converge and then disappear, making a disintegration of the Soviet war effort inevitable. This case is illustrated in panel (B): there is only one equilibrium where collapse has already occurred.

Under the circumstances shown in panel (A) of figure 4, the exact positions and slopes of the various schedules became critically important, and the contingent “moral, political, technical, and organizational” factors came fully into play. Fearing destabilization, and with few means available to raise the payoff to mice, the Soviet regime did everything it could to depress the payoff to rats. It is true that the latter was fixed in part by the expected policies of a victorious enemy, and Stalin was helped by the fact that Hitler promised little or nothing to ethnic Russians. The Soviet authorities also downshifted the expected payoff from German occupation by threatening potential collaboration with death: even if the enemy prevailed, collaborators would not live to receive any benefit.

Various experiences of 1941-2 testify both to the risks of destabilization and the importance of the Soviet countermeasures taken to strengthen the stable equilibrium.<sup>15</sup> For example, in 1941 expectations were widespread that Soviet resistance to German invasion would follow the same course of unraveling and collapse as that already followed by Poland, Netherlands, Belgium, France, Norway, Greece, and Yugoslavia. These forecasts were reinforced by the ease with which the Wehrmacht moved into the Baltic and the western Ukraine and the warmth of its reception there. Such expectations raised the expected value to individuals of pursuing a strategy for defeat and threatened the existence of the “good” equilibrium. No single episode illustrates this more clearly than the Moscow “panic” of mid-October 1941: with the enemy a few kilometres distant, wrongly believing Stalin had left the city, crowds rioted and looted public property. The authorities took determined steps to counter such perceptions of likely defeat. Stalin suppressed information about Red Army setbacks and casualties. Many were executed for spreading defeatist rumours about events on the front line that might simply have been the truth. Moscow and Leningrad were closed to refugees from the occupied areas in the

---

<sup>15</sup> Unless otherwise noted all cases are taken from Barber and Harrison, *The Soviet Home Front*.

autumn of 1941 to prevent the spread of information about Soviet defeats. Evacuation of civilians from both Leningrad and Stalingrad was delayed by the authorities' desire to conceal the real military situation.

Despite this millions implemented or contemplated strategies for defeat. Huge numbers of Red Army soldiers rejected orders that prohibited surrender or retreat. Against orders, millions of encircled soldiers surrendered to the invader in the autumn and winter of 1941 and the spring of 1942. Some prisoners who survived the winter of 1942 subsequently went over to the German side and fought alongside the Wehrmacht, for example General A.A. Vlasov's "Russian Liberation Army", and the Germans also recruited national "legions" from ethnic groups in the occupied areas. At the end of July 1942 when the Germans' summer offensive reached Rostov on Don, significant numbers of Red Army troops ran away from the front line. The risks arising from such behaviours led Stalin to impose the most severe penalties. His Order no. 270 of 16 August 1941 stigmatized the behaviour of Soviet soldiers who allowed themselves to fall into captivity as "betrayal of the Motherland" and inflicted social and financial penalties on the families of the prisoners of war. His Order no. 227 of 28 July 1942 ("Not a step back") combated defeatism in the retreating Red Army by deploying military police behind the lines to shoot stragglers and men retreating without orders and officers who allowed their units to disintegrate. While the war continued Stalin singled out several national minorities suspected of collaboration, for example the Chechens, for mass deportation to Siberia. After the war the *Vlasovtsy* were mercilessly pursued, and Vlasov himself was horribly executed.

Against the same background civilians made similar calculations; this led them to withdraw their human capital from the war effort and steal or conspire to steal productive assets including land titles. In the countryside in the summer of 1941 defeatism stimulated speculative talk about sharing out state grain stocks and collective livestock. In 1941-2 there were widespread reports of collective farmers secretly agreeing the redivision of the collective-farm fields into private property in anticipation of the arrival of German troops. They did not know that Hitler was determined to offer no concessions to Russian peasants, but the Germans permitted some decollectivization in the north Caucasus and this stimulated local collaborationism. Some of the trains evacuating the plant and equipment of the Soviet defence industries from the southern and western regions to the remote interior in the autumn and winter of 1941 were looted as they moved eastward. In the urban economy, although labour discipline became highly militarized, lateness, absenteeism, and illegal quitting remained widespread. Wartime "deserters" from war work on the industrial front

were doggedly pursued and hundreds of thousands were sentenced to terms in prisons and labour camps while the war continued.<sup>16</sup>

Regardless of the prospects of defeat or victory food crimes became widespread. People stole food from the state and stole from each other. Military and civilian food administrators stole rations for own consumption and for sideline trade. Civilians forged and traded ration cards. In the winter of 1942 Red Army units in the Caucasus began helping themselves to local food supplies.<sup>17</sup> Food crimes reached the extreme of cannibalism in Leningrad in the winter of 1941.<sup>18</sup> But when millions lived on the edge even quite trivial violations of food regulations could have lethal consequences for individuals who suffered losses as a result, and food crimes in general were harshly punished, not infrequently by shooting.

In short it is apparent that the stability of the Soviet war effort was seriously at risk in 1941 and 1942. Millions of Soviet citizens faced desperately hard choices between serving the state and serving their own interests and the interests of those around them with whom they identified. Strategies for victory and defeat diverged. However, beyond a certain point the danger that citizens might choose defeat in ever increasing numbers was not realized. Both Stalin and Hitler played their part in stabilizing the Soviet war effort by closing off the options of honourable surrender and the restoration of private property under German occupation.

Roosevelt also contributed to Soviet stabilization. The first installment of wartime Allied aid that reached the Soviet Union in 1942, although small by later standards, amounted to some 5 per cent of Soviet GNP in that year. Although Allied aid was used directly to supply the armed forces with both durable goods and consumables, indirectly it probably released resources to households. By improving the balance of overall resources it brought about a *ceteris paribus* increase in the payoff to patriotic citizens. In other words, Lend-Lease was stabilizing. We cannot measure the distance of the Soviet economy from the point of collapse in 1942, but it seems beyond doubt that collapse was near. Without Lend-Lease it would have been nearer.

---

<sup>16</sup> Don Filtzer, "Labour Discipline and Criminal Law in Soviet Industry, 1945-1953", PERSA Working Papers no. 8, University of Warwick, Department of Economics (2000).

<sup>17</sup> V.A. Zolotarev, ed. (1998), "Velikaia Otechestvennaia. Tyl Krasnoi Armii v Velikoi Otechestvennoi voiny 1941-1945 gg.. Dokumenty i materialy", *Russkii Arkhiv*, 25(14) (1998), 304-5.

<sup>18</sup> In addition to Barber and Harrison, *The Soviet Home Front*, see William Moskoff, *The Bread of Affliction: the Food Supply in the USSR During World War II*, Cambridge University Press: Cambridge (1990) and, on Leningrad, A.R. Dzeniskevich, "Banditizm (osobaia kategoriia) v blokirovannom Leningrade", *Istoriia Peterburga*, no. 1 (2001), 47-51 and John Barber, ed., *Zhizn' i smert' v blokadnom Leningrade. Istoriko-meditsinskii aspekt*, Dmitrii Bulanin: St Petersburg (2001).

Stalin himself recognized this, although he expressed himself more directly. He told Khrushchev several times that the Soviet Union had suffered such heavy losses that without Allied aid it would have lost the war.<sup>19</sup>

## 5. Conclusion

The outcome of the war was decided by production, and production rested on overall resources and their mobilization into the war effort. Taking a global view we can see that Allied superiority measured by overall resources was never in question. Moreover, once the Axis powers had exhausted their purely military advantages, it was not particularly difficult for the Allies to translate economic superiority into overwhelming superiority on the battlefield.

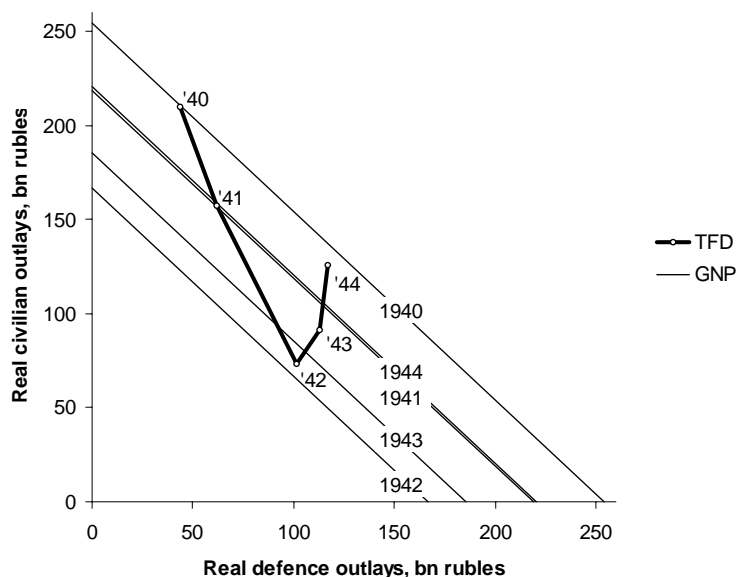
But every generalization has its limits. The limits of this one are to be found on the eastern front, where the war was most bitterly contested. On the eastern front the Red Army soon outnumbered and outgunned the Wehrmacht. Yet the Soviet Union did not have an overall economic advantage over Germany. It should be considered surprising that, under the pressure of deep invasion and devastating military setbacks the Soviet war effort did not completely unravel in 1942.

The failure of the Soviet economy to collapse in 1942 demands explanation. In that year the Soviet war effort rested on a knife-edge. A battle of motivations took place in which a hundred million people made individual choices based on the information and incentives available. The decisions that individuals made were aimed either at victory or at defeat. The battle of motivations took place in the context of a balance of resources between the two sides that was indecisive. Within this context policy interventions by Stalin, Hitler, and Roosevelt could make a difference. Thus, where the balance of overall resources was indecisive, “moral, political, technical, and organizational factors” decided the outcome.

---

<sup>19</sup> N.S. Khrushchev, *Vremia, liudi, vlast'*, Moskovskie novosti: Moscow (1999), vol. 1, 598-9 and 638. I thank Michael Ellman for this reference.

*Figure 1. Soviet Production Possibilities and Uses of Resources, 1940 to 1944 (billion rubles at 1937 factor costs)*



Source: Mark Harrison, *Accounting for War: Soviet Production, Employment, and the Defence Burden, 1940-1945*, Cambridge University Press: Cambridge (1996), 104. Total final demand (TFD) is the sum of civilian and defence outlays on domestically produced and imported goods and services available for household and government consumption and investment and equals the gross national product (GNP) plus net imports.

*Figure 2. Soviet Production Possibilities and Uses of Resources in 1942: a Conjecture*

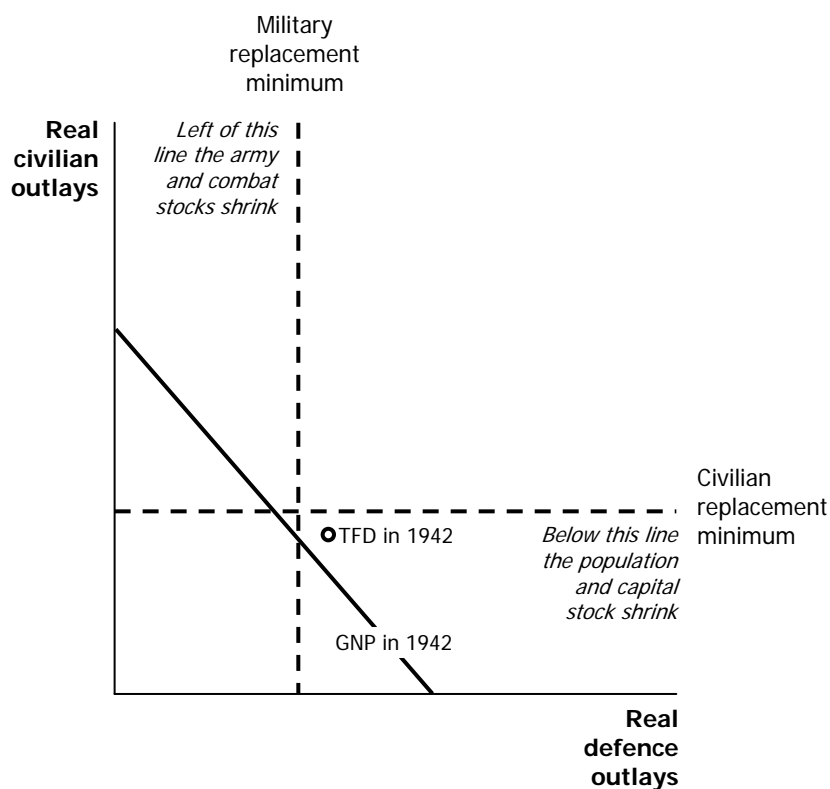




Figure 3. The Wartime Payoffs to Serving One's Country and Serving Oneself

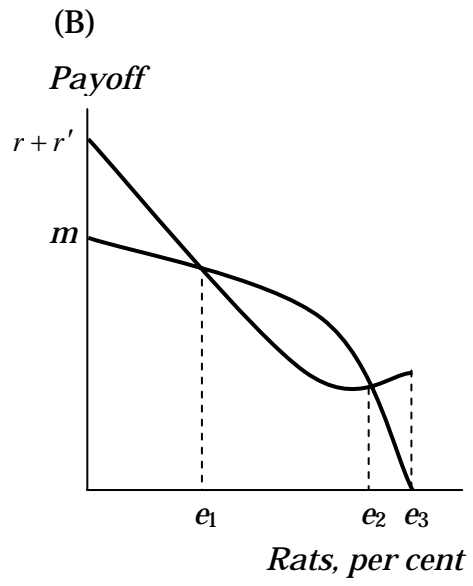
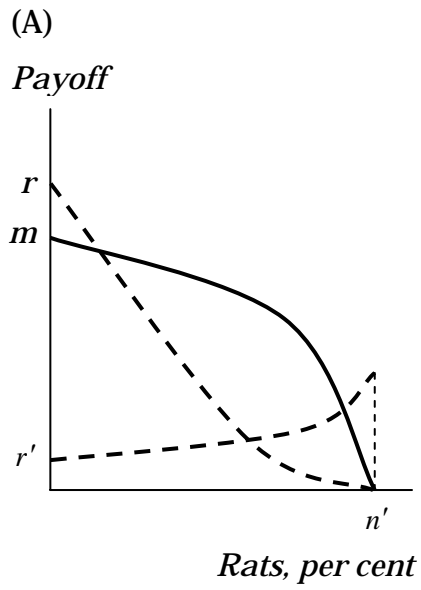
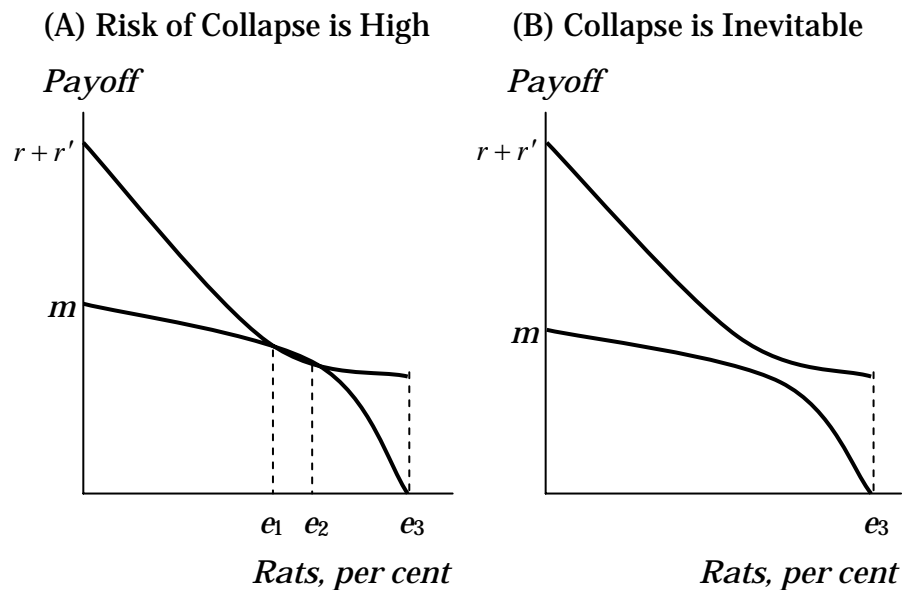


Figure 4. Two More Cases



*Table 1. Wartime GDP of the Great Powers, 1938 to 1945, in International Dollars and 1990 Prices (billions)*

	1938	1939	1940	1941	1942	1943	1944	1945
<i>Allied Powers</i>								
USA	800	869	943	1094	1235	1399	1499	1474
UK	284	287	316	344	353	361	346	331
France	186	199	82	..	..	..	..	101
Italy	..	..	..	..	..	..	117	92
USSR	359	366	417	359	274	305	362	343
Allied subtotal	1 629	1 721	1 757	1 798	1 862	2 064	2 325	2 342
<i>Axis Powers</i>								
Germany	351	384	387	412	417	426	437	310
France	..	..	82	130	116	110	93	..
Austria	24	27	27	29	27	28	29	12
Italy	141	151	147	144	145	137	..	..
Japan	169	184	192	196	197	194	189	144
Axis subtotal	686	747	835	911	903	895	748	466
<i>Allies-to-Axis</i>								
Overall	2.4	2.3	2.1	2.0	2.1	2.3	3.1	5.0
USSR to Germany	1.0	1.0	1.1	0.9	0.7	0.7	0.8	1.1

Source: Mark Harrison, "The Economics of World War II: an Overview", in Mark Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge University Press: Cambridge (1998), 10. French GDP in 1940 is allocated half to the Allies, half to the Axis. This table corrects a spreadsheet error in the source that affected figures for Soviet GDP.

*Table 2. World Population and GDP within 1942 Frontiers (figures for 1938)*

	Allies	Axis	Allies-to-Axis
<i>Population (millions)</i>			
Great Powers	345	191	1.8
Colonies	850	444	1.9
Neutral trading blocs	130	71	1.8
World	1 325	705	1.9
<i>GDP (\$ billion and 1990 prices)</i>			
Great Powers	1 444	686	2.1
Colonies	626	866	0.7
Neutral trading blocs	259	151	1.7
World	2 329	1 703	1.4

Source: calculated from Mark Harrison, "The Economics of World War II: an Overview", in Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge University Press: Cambridge (1998), 7, 8, and 13. Allied powers are UK, USA, and USSR; Axis powers are Germany, Italy, and Japan. Allied colonies are mainly British dominions and colonies not occupied by the enemy, plus unoccupied China; Axis colonies are occupied Europe, Africa, and Asia (including occupied China). The Allied trading bloc is Ireland plus Central and South America; the Axis trading bloc is neutral Europe and its colonies

*Table 3. Armed Forces of the Great Powers, 1939 to 1945 (thousands)*

	1939	1940	1941	1942	1943	1944	1945
<i>Allied Powers</i>							
USA	..	..	1 620	3 970	9 020	11 410	11 430
UK	480	2 273	3 383	4 091	4 761	4 967	5 090
France	5 000	5 000	..	..	..	..	..
USSR	..	5 000	7 100	11 340	11 858	12 225	12 100
Allied subtotal	5 480	12 273	12 103	19 401	25 639	28 602	28 620
<i>Axis Powers</i>							
Germany	4 522	5 762	7 309	8 410	9 480	9 420	7 830
Italy	1 740	2 340	3 227	3 810	3 815	..	..
Japan	..	1 630	2 420	2 840	3 700	5 380	7 730
Axis subtotal	6 262	9 732	12 956	15 060	16 995	14 800	15 560
<i>Allies-to-Axis</i>							
Eastern front	..	..	1.1	1.5	1.4	1.9	2.3
Western and Pacific fronts	1.2	0.7	0.9	1.1	1.9	1.9	1.6

Source: Mark Harrison, "The Economics of World War II: an Overview", in Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge University Press: Cambridge (1998), 14, except that numbers in the French armed forces in 1940 are shown as held at 5 million rather than rising to 7 million on the advice of Louis Capdeboscq (personal communication, 7 January 2002) and based on figures from Jean-Louis Crémieux-Brilhac, *Les Français de l'an 40*, vol. 2, *Ouvriers et soldats*, Gallimard: Paris (1990). The Allied-to-Axis ratio on the western and Pacific fronts for 1939 takes UK and France versus Germany; for 1940, the French and Italian forces are included, each with a 50 percent weight since Italy joined the war in mid-year at the same time as the French surrendered; for 1942-3, USA and UK versus one tenth of the German armed forces, plus Italy, plus Japan, but in 1943 the Italian forces are given a weight of two-thirds corresponding to the eight months of fighting before the Italian surrender; for 1944-5, USA and UK versus one third of the German armed forces, plus Japan. On the eastern front, USSR versus 90 percent of the German armed forces in 1941-3, but only two-thirds in 1944-5.

Table 4. War Production of the Great Powers, 1942

	Rifles and carbines (thou.)	Machine pistols (thou.)	Machine guns (thou.)	Guns (thou.)	Mortars (thou.)	Tanks (thou.)	Combat aircraft (thou.)	Major naval vessels
<i>Allied Powers</i>								
USA	1 542	651	662	188	11.0	27.0	24.9	1 854
UK	595	1 438	284	106	29.2	8.6	17.7	239
USSR	4 049	1 506	356	127	230.0	24.4	21.7	19
Allied subtotal	6 186	3 596	1 302	421	270.2	60.0	64.3	2 112
<i>Axis Powers</i>								
Germany	1 370	232	117	41	9.8	6.2	11.6	244
Italy	..	..	63	5	8.5	1.5	6.7	164
Japan	440	0	71	13	1.5	1.2	6.3	68
Axis subtotal	1810	232	251	59	19.8	8.9	24.6	476
<i>Allies-to-Axis</i>								
Overall	3.4	15.5	5.2	7.1	13.6	6.7	2.6	4.4
Eastern front	4.4	9.7	4.6	4.7	35.2	5.9	2.8	..
Western and Pacific fronts	2.4	27.0	5.5	9.2	3.0	7.5	2.5	..

Source: calculated from Mark Harrison, "The Economics of World War II: an Overview", in Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge University Press: Cambridge (1998), 15-16. Half of Italian production between mid-1940 and mid-1943 is assumed to have taken place within 1942. Two thirds of German army and air munitions produced in 1942 are assigned to the eastern front. No account is taken of the contribution of the western Allies or of Italy to the munitions supply of the eastern front.