Economy and the Second World War: A Few Comparative Issues

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"We are as ignorant about war as the physicist is of the true nature of matter".[1] Is this statement really true? After more than thirty years of research, to what extent can it be said about the economy of the Second World War, which was dealt with comprehensively in the very valuable book by Alan Milward.

Obviously, the assertion is more an overstatement than a reality. Various aspects of the war economy have already been analyzed. Technology, war production, inflation and distribution, food and agriculture, prices and wages, economy and economic policy have all been given attention on both the national and international levels by a number of scholars. And yet, one cannot avoid the feeling that a number of issues can still be regarded as puzzles and, in spite of all the efforts made hitherto, the interest devoted to this subject is far from sufficient.

Clausewitz and Marx shared a common view that war "cannot be understood if abstracted from non-military developments which both affect and are affected by it". Relationships between war and economy can be approached from either of these directions: (1) by looking at economic factors in conducting wars, since "it cannot be denied that every age contructs its own war, its own types of war" [2] or, (2) by perceiving what a simplifica-

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[1] *War and Economic Development,* (Ed.) J.M. Winter, (Cambridge 1973), p. 5.

[2] F.C. Lane, Economic Consequences of Organized Violence. *Journal of Economic History*, 1958.

tion unfortunately results if we exclude from our analysis of economic development the role and contribution of warfare. Even if we regard our present task as one of focussing on the questions of the economy during the Second World War, we still have to face questions related to the role of the war in economic development as well.

E.H. Carr's book, *The Twenty Years Crisis*, after almost a half century can still be regarded as one of the main contributions toward understanding what really happened in the world between the two wars. Since its publication, enormous amounts of research have thrown up important revelations of diplomatic negotiations, events, data and motives, all of which are much better known today. But where the moving forces of the age are concerned his view can still be regarded as valid. "The most important lesson to be drawn... is the illusory character of the popular distinction between economic and military power. Power, which is an element of all political action, is one and indivisible. It uses military and economic weapons for the same end".[3]

That the economy plays a key role in all warfare was first properly understood during the First World War, when bitter experiences gave all participants an opportunity to learn how narrowly they had conceived war preparations. But what during the first war had been done in a hasty manner was much better prepared during or even before World War II. In the case of Britain, a kind of economic general staff was established only in 1937. But the war had not even started when, on 3 September, 1939, the establishment of the Ministry of Economic Warfare was made public. In the United States the Board of Economic Warfare and its three basic committees: shipping, munitions assignment and raw materials, was founded as early as January 1942. In Germany, besides other organizations and committees

[3] E.H. Carr, *The Twenty Years Crisis, 1919-1939*, (London 1964), p. 132.

in which Göring's famous office for carrying out the 4 Year Plan held sway, the General Staff also established a separate section dealing with economic matters long before the outbreak of the war (*Heereswaffenamt*). Since industry did not like the idea of being entirely controlled by the Army, a compromise was found in the establishment of *Reichsministerium für Bewaffnung und Munition.* In the Soviet Union military considerations were deliberately included as a key element in the programme of industrialization. By establishing full control and command over the economy, the different Five Years Plans were able to create sufficient organizations to prepare the Soviet Army and the economy against the eventuality of defeat such as Russia had faced on several occasions in the past, as a result of economic weakness and lack of preparation.

Even if everyone had learned the lesson that victory in a modern war depends as much on the economy as it does on the military forces, or, to put it more correctly, that military power is basically an economic force, the issue of how to prepare for a modern war raised a number of questions which might partly have been answered correctly based on past experience, but for others the answers could not have been divined as yet due to decisive changes in the economy and in technology.

A few issues were relatively clear. Besides the production of sufficient weapons, iron, coal and steel which were to be included in the list of war materials as well, particularly since tanks and airplanes – relatively insignificant weapons during the First World War – were regarded as decisive weapons for World War Two. The role of raw materials, production, stockpiles and supplies had been acknowledged early on, due to World War I experience where blockades made both sides vulnerable. However, in the early thirties more and more military and economic experts, joined by political prophets and science fiction writers, came to the conclusion that the next war would be far more than a delayed copy of the former. The next

war would be a total war which could not be won merely on the battlefields. To a greater extent, total war depends on the economic resources of the countries involved, where the successful mobilization and allocation of resources can be a decisive element in victory.[4] A memorandum submitted by the German General Staff to Hitler formulated the principles of total war in the following way:
"die rigorose Unterordnung der gesamten geselschaftlichen Lebens... unghehemmten and rücksicktlosen Einsatz aller Krafte".[5]
In this paper I would like to raise four issues connected with the four major belligerents.

A large amount of literature has been devoted to the puzzle of why Germany, which took the lead during the 1930's rearmament and devoted enormous efforts to military build up, seemingly slowed down or, more accurately, raised its military expenditure less rapidly.

"Had Germany's leaders decided to make an all-out war effort in 1939 instead of 1942, they would have had time to arm in depth, that is to lay the foundations of a war economy by expanding their basic industries and building up equipment for the mass production of munitions. Starting the armament program as late as 1942, they could only arm in width" [6] – so one reads in one of the basic books dealing with the German economy during the war. This confrontation of armament in width and depth, raised by General Thomas – and expressed clearly in his history of German rearmament – gained a number of followers

[4] According to Beck, "im Zukunftskrieg nichtmilitarischen Faktoren eine grossere Rolle spielen werden als früher", "im totalen Krieg das Handeln des Soldaten von wirtschaftlichen Momenten beeinflusst wird". Quoted by H. Bleyer Die Staats monopolitische Machtapparat und die. *Totale Mobilisierung im ersten Halbjahr* 1943, (Berlin 1970) p. 13.

[5] G. FÖRSTER *Totalerkrieg und Blitzkrieg*, (Berlin 1967), p. 64.

[6] *The Effects of Strategic Bombing on the German Economy*, (Washington 1945), p. 71.

in the literature. A number of authors are inclined to give too much credit to General Thomas's work,[7] mostly written in 1945 while he was a prisoner of war. In that he made a serious attempt to stress Hitler's mistakes and those of the Nazi party and political leadership and came up with his thesis of missed opportunities, and failures owing to politics, ignoring his own recommendations – namely the war economy in depth. The criticism of General Thomas consisted of two basic postulates: (1) the whole economy was supposed to have been converted totally to the war effort [8] and (2) only after the war economy had been built up in depth, should the war have started. His idea to orientate the economy, before the war started, to a complete war economy was obviously rejected by Hitler – for political reasons – and refuted by leaders of industry for economic considerations. Needless to say, an aim to convert the economy totally to war in time of peace might have emerged in the thought of a military bureaucrat, but neither a politician nor a financial expert or industrial entrepreneur would have regarded it as a viable policy.

If one analyses the concept that military operations are to coincide with economic war, and the war economy is to serve military operations, then one wonders whether this is not precisely what was done by the *blitzkrieg,* that is, to conquer and expand the economic basis. One may ask whether it is certain that Hitler, the more political animal, did not better understand the level of tolerance of Germany in the first years of the war, when he was reluctant to impose restrictions which might have been very unpopular, than General Thomas for whom everything was purely technical and subject to command. If his state-

[7] G. Thomas: *Aus Geschichte der deutschen Wehr und Rüstungswirtschaft, 1918-1943/45* (Boppard, 1966).

[8] *Anatomie des Krieges* (Berlin 1969), Hrs D. Eichholtzund W. Schumann Doc. 109.: Mit Radioaparaten, Staubsaugeir, und Küchengeraten werden wir England niemals besiegen konnen. Kriegswirtschaft bedautet die durch keninerlei Ruckschichtnahme auf entstehende Schäden".

ment: "politische Kriegsziele ur erreichbar sind vorher das militarische and wirtschaftliche sichergestellt werden ist" [9] – is accepted, then we come to the conclusion that Germany never had the chance to win the war.[10]

I think we can dismiss as irrelevant the second assumption of his thesis concerning the postponement of the war until 1944 or 1945 when, according to Thomas, Germany might have been better prepared.

Thomas might have been thinking about another war, but what type of war is not clear from Thomas's conception. Another war would not have been Hitler's. Nor would it have been Hitler's German war, at which point we are entering into counterfactual history. Neither the political circumstances, nor the economic strain – very much present in the German economy as early as 1938 [11] – would have allowed this postulate. Nor could things have gone on for ten more years as they had been between 1933 and 1938. Nor, again, may one overlook the question of whether Great Britain, the United States, or the Soviet Union would have been willing to allow the gap between themselves and Germany to remain as it was on ever widen.

Milward demonstrates that German war aims, which could not have been separated from politics, consisted of conquering large territories for economic reasons. The idea of Grosraumwirtschaft (economics of large areas) had an important part in formulating economic policy and war strategy. Hitler stated long before the war: "if we had at our disposal the Urals with their incalculable wealth of raw materials and the forests of

[9] Quoted by G. FÖRSTER, *Totalet Krieg und Blitzkrieg*. (Berlin 1967) p. 92.

[10] In a memo prepared by Thomas in the early fall of 1941, he assumed that economic difficulties could be overcome if they were able to conquer the Caucasus during this year. ROLF DIETER MULLER, *Das Scheiternder Wirtschaftlichen Blitzkriegstrategie Deutsche Reich under der Zweit*, Welkrieg (Stuttgart 1983), Band 4, p. 950.

[11] TIM MASON, *Innere Krise und Angriffskrieg 1938/39* in F. FORSTMEIER - H.E. VOLKMAN, *Wirtschaft und Rüstung am Vorabend des zweiten Welkrieges* (Dusseldorf 1975).

Siberia, and if the unending wheatfields of the Ukraine lay within Germany our country would swim in plenty". In 1940 everybody was convinced that without Russian resources Germany would not be able to counterbalance the British blockade. And again, Milward explains very clearly why Hitler was forced to accept the *blitzkrieg* as an economic strategy as well.[12] Let us take one of his six points and try to explain it and put it in a wider perspective. Milward underlines rightly that the strategy applied "corresponded to the economic realities of Germany's position".

I regard this as the most decisive point in the discussion. By this statement I do not intend to call into question all the other factors, such as the social and political substance of the national socialist system or even some human errors.[13] It is rightly stressed that after the tremendous victories in the West, Hitler tried to ease the economic strains involved in the system, and tried to demonstrate that war is a business which reaps its own rewards, and bring its benefits to the whole German population. However, it is certainly true that the conquest of Western Europe brought basic changes in German economic potentialities. As early as 1936, before the introduction of the 4-year plan, the German economy preparing for war demonstrated a couple of weaknesses which could be overcome. These weaknesses or bottlenecks first made their appearance in the raw material sector (or in the deficiency of sufficient foreign exchange to substitute scarce domestic sources by imported ones). In 1936, since the extension of the raw material base by conquest was not yet possible, the strategy adapted by the 4-year plan was to use all domestic resources – disregarding the high cost of production so relevant in a market economy, establish substitute industries,

[12] A. MILWARD, *War Economy and Society 1939-1945*, (Berkeley 1977), pp. 12-26.

[13] Among other authors, Milward stressed these factors (probably overstressed it) in *Der Einfluss ökonomischen Faktoren* in FORSTMEIER-VOLKMANN, *Wirtschaft und Rüstung* (Dusseldorf 1975).

and create large reserve stocks.[14] The continuation of these efforts, which had been partly successful in increasing the production of low grade ores, synthetic oil, rubber and stable fibre, was not regarded as quite so necessary after 1940, when some of the output of French, Luxemburg or Belgian mines became available together with confiscated supplies which were on the whole more substantial than those Germany had originally possessed.[15] By those conquests Germany had obtained a new stimulus for its *blitzkrieg* strategy in two aspects: first, it was confirmed by success; second, it gave Germany the possibility not only to anticipate new *blitzkriegs*, but also to accept even a relatively long *blitzkrieg*. The success of the *blitzkrieg* strategy in this sense extended the options of changing this strategy, and trying to face a long war. The economic resources of Germany in 1939 were far smaller than they were in 1941, even though the use of domestic sources was probably less intensive at this stage than might have been expected.

Eichholtz gave an impressive summary of the extent to which the basic resources of the German war economy were changed by military success.

According to Table A, the allied and occupied territories gave Germany an enormous advantage: in almost every raw material, except oil, the conquered territories doubled or tripled German production. In some cases, where German stocks were very limited, the contribution of the conquered territories was even more important. Such items included 1) iron ore, with occupied territories producing seven times more than Germany; 2) copper ore, 200 percent more; and 3), grain and meat 200 percent more. Besides this production capacity, the stocks found in France, Belgium and elsewhere extended the possibility of covering needs by using stocks. If German stocks were able to

[14] Anthony Basch, *The New Economic Warfare*, New York, 1941, p. 5.

[15] See Mathias Riedel, *Eisen und Kohle Für das Dritte Reich* (Gottingen 1973) p. 267.

Table A

	Germany and Austria	European Allies and satellites: Italy Hungary Rumania Bulgaria	Total	Occupied countries (France, Belgium, Netherlands Luxemburg, Denmark, Norway, Poland, Czechoslovakia, Greece, Albania	Grand Total
Territory km²	554	801	1355	1922	3277
Population (million)	76	78	154	129	283
Electroenergy (kwh)	52	15	67	43	110
Coal (mill. T.)	185	2	187	161	348
Iron ore (mill. T.)	3.4	0.5	3.9	22.4	26.3
Copper ore (1000)	31	1	32	67	99
Bauxite (1000 T.)	93	848	941	1176	2117
Petroleum (mill. T.)	0.5	8.7	9.2	0.8	10.0
Iron (mill. T.)	16.3	1.4	17.7	20.2	37.9
Steel (mill. T.)	20.0	3.2	23.2	20.4	43.6
Aluminium (1000 T.)	131	23	154	64	218
Vehicles (1000)	333	75	408	268	676
Grain (mill. T.)	136	148	284	264	548
Wool (1000 T.)	19.6	59.7	79.3	59.4	138.7
Cattle (million)	22.9	16.3	38.2	45.4	83.6
Pigs (million)	26.7	9.9	36.6	27.8	(1)64.4

D. Eichholtz, *Die Geschichte der deutschen Kriegswirtschaft 1939-1941*, Vol. I, (Berlin 1969), p. 31.

cover 12 to 18 months' consumption in 1939 (by 1941 at least 2 years), consumption might have been covered entirely by stocks – in some cases more than covered.[16] In some cases, Soviet deliveries to Germany in 1940 also strengthened German reserves significantly, as in oil, manganese and chrome ore, cotton and cereals.[17] But even if Soviet deliveries were flowing into Germany in sufficient quantity in 1940, the basic difference – that those were stocks not under direct German control – could not have been dismissed. In several plans prepared during the summer of 1939, it was made perfectly clear that in the case of a lon-

[16] D. Eichholtz, *Die Geschichte*, op. cit., p. 228.
[17] W.N. Medlicott, *The Economics of Blockade*, (London 1952), p. 658.

ger war, Germany had only a limited chance of success without the oil of the Caucasus when it would not be possible to "Ukraine wirtschaftlich auszunutzen".[18] A report presented by the *Weltwirtschaftliches Institute* attributed decisive significance for German war efforts to the economic resources of Russia. Even more stimulated by the success of the German army in 1940, the dream of more than a half a century of being able to build up a European continental economy under German leadership as a chance to compete with the British or the American economy seemingly became close to reality. Funk felt that Germany now had "politish die Machteine Neuordnung der Wirtschaft entsprechend seinen Bedurfnisse durchzusetzen": the aim was to create "Kontinental europaische Grossraumwirtschaft unter deutscher Führung". In this European continental economy, all people from Gibraltar to the Urals, and from the North Pole to Cyprus were to be included. If Russia could be conquered and its resources properly used then Germany "Damit verfuge es über alle Möglichkeiten in Zukunft auch des Kampf gegen Kontinente zu führen es konne dann von niemand geschlagen werden".[19]

When the Germans were at the height of their campaign in Russia, the bulk of Russian grain, coal, iron, nickel and manganese became their property. The conquest of the Caucasian oil fields seemed to be only a question of time. The German war economy seemed to be in a position from which not only a *blitzkrieg,* but also a longer war might have been fought. There were still some raw materials in short supply, but for a number of others, supply seemed to be more than sufficient and it seemed that procurement was only a matter of organization. The old dream that the great economic potential of USA and the

[18] See Rolf Dieter Müller, *Von der Wirtschaftsallianz zum Koloniallien Ausbeutung in Das Deutsche Reich und der Zweite Weltkrieg*. Band 4, (Stuttgart 1983).

[19] See Rolf Dieter Müller, *Von der Wirtschaftsallianz zum Kolonialen Ausbeutung in Das Deutsche Reich und der Zweite Weltkrieg*, Band 4, (Stuttgart 1983).

British Empire would be matched by the great European economic potential under German leadership became a reality, and even more, it was expected that with the defeat of the Soviet Union, Russian economic resources would also be at Germany's disposal, which might have created an adequate economic force to face even American and British economic capacity.

However, in spite of the tremendous military success, the economic benefits from the war were far less than had been expected. The assumption that "Wegnahme die westliche Randgebiete das Sovietunion zu einen volligen Zusammenbruch des Sovietischen Kriegswirtschaft führen wurde" was proved erroneous.[20] Even the conquered territories did not deliver what was expected. Some over-optimists counted on 400,000 tons of Russian oil for month as early as October but not a drop arrived. Before its withdrawal, the Soviet army destroyed almost everything, and the most important factories were successfully evacuated. Krivoj Rog, the centre of Soviet iron ore production, plus Nikopol, the centre of nickel production, were totally destroyed. The economic impact of the Russian campaign on the positive side was close to zero. But, on the negative side, the tremendous losses of the army (for instance, 3524 German tanks were destroyed during the period when replacements totalled only 1153), and the fact that the war was not yet over, caused the economy to face a growing shortage of manpower. Finally, Hitler did not yet feel obliged to mobilize all domestic resources which created more and more difficulty in the German economy.[21] The collapse of the *blitzkrieg* in a military sense meant the collapse of the economic *blitzkrieg* as well. The moment of truth was approaching.

While the German economy was able to use resources drawn

[20] Rolf Dieter Müller, *Von der Wirtschaftsallianz in Das Deutsche Reich*, Band 4.

[21] Rolf Dieter Müller, *Das Scheitern der Wirtschaftlichen Blitzkriegstrategie Das Deutsche Reich*, Band 4, pp. 946-1027.

largely from outside its territory, including occupied Soviet territory – even if its production remained far below expectations – the Soviet economy, despite being able to survive the terrible blow suffered in 1941, had to face the fact that a substantial part of its economy came under German occupation and could not be used for winning the war. While the German economy was working with extended capacity – according to different calculations the occupied territories contributed as much as 25 percent to German war efforts – the Soviet Union had to temporarily adjust its production to accommodate a significant decline in its economic base. Even if a part of the industrial capacity of the territory conquered by the German army was successfully evacuated to the Urals or Siberia and reestablished for production from the spring of 1942, the loss of raw material sources was enormous and not easily compensated. As some sign of improvement and reorganization began to be seen, the successful new German campaign in the summer of 1942 forced a new wave of evacuation although its magnitude was far less than the previous one.[22]

The significance of the territorial losses for raw material supply can be understood from the fact that 71% of iron, 58% of steel and 63% of coal was produced in this area. The loss of Nikopolszkoje meant for the Soviet economy the loss of 35% of its manganese production.[23] The coordinated effort to replace as much as possible of the lost raw material sources started in late 1941 when the Soviet leadership proposed the development of metallurgy in the Urals and in Siberia, as well as the increase of coal production in the Eastern territories of the Soviet Union.[24]

[22] A. Samsonov, Vklad Sovietskovo tula v sawoevanie pobedy pod Stalingradom. *Voproszi Isztorii*, 1983. According to Chadajev the productive capacity of Soviet industry decreased by 28 percent in 1941 and by another 4 percent in 1942. Ja. Chadajev, *Economika SSSR v period Velikoi-Otecestvennoi Voins* (Moscow 1961).

[23] A. Volodarskij, *Vozrozsgenei rajonov SSSR postpoduvtus ot nemeckoj okkupacii* (Moscow 1946), p. 2.

[24] Ju. Poljakov, O ponvatvi Tüll, *Voproszi Istori*, Mai. 1982, pp. 171-175.

During the following years different directives by the government and the Communist Party planned for the collateral production of necessary raw material in the Urals, in Siberia, and in Central Asia. Among other things, the resolution of September 1942 to increase the oil production in Central Asia, in Baskhiria and in the Kujbisev territory had particular significance. Since this was the time when the German troops were driving into the territory of the Caucasus with some of the major oil production areas failing temporarily under German occupation the rapid replacement of lost oil supplies was decisive for the continuation of the war.[25]

In the process of replacing losses and keeping pace with the raw material demands of the war economy, the Soviet government had decisive advantages in comparison with Germany. Although priorities in the economy as well as in working methods were to change due to the new circumstances, the prewar achievements – namely the total state control by nationalization and the introduction of planning, eased the task of overcoming the difficulties. The Soviet system of planning introduced in the 1930s was a type of command economy. Targets to be achieved in the output of some of the standard raw materials and products were based on mainly physical balances calculating output versus demand. The effectiveness of planning was much more successful in the case of homogeneous products, because it was easier to put the necessary resources at their disposal, in manpower as well as in technology. The second advantage of the Soviet Union lay in the fact that, in spite of the process of industrialization started by the 5-year Plans, enormous amounts of raw materials were either newly discovered or unused. Since most of Soviet heavy industry before the war was located in the Ukraine, in the Donetz basin, neither the Urals region – important in Russian economic history before 1861 – nor Siberia were actually used as much they might have been. The

[25] *Direktivi KPSS i Sovietskogo pravitelstva po khoziaistvennym Voprosam* (Moscow 1957), 1942, September, 22, 726-727.

difficulty for the Soviet government existed much less in the fact that its raw material wealth was limited, or that a number of important ores and metals were not available, than in the fact that to try to use these resources required a large amount of manpower and investment: investment not only to open up the mines or establish factories, but also – what was even more cost intensive – to establish the infrastructure necessary for drawing them into the war economy by building railway connections and other facilities.

Since most of the eastern territories were not well provided with the necessary industrial infrastructure, any effective exploitation of their enormous wealth required much more investment than would have been necessary to open up a mine or to start a factory in the Ukraine. During 1942 more than 3000 km. of railroad was built.[26] The goal was to establish the necessary connections between the mines, new factories and the front, where the Soviet troops badly needed the extra output. Obviously, at the end of 1942 and the beginning of 1943, critical shortages of almost all types of raw materials appeared (steel, coal, iron, aluminum, copper, tin, nickel, etc.). However, new deposits and raw material reserves, in manganese ore and molybodinium among other things, soon started to open up in the Urals, Kazakhstan, Kuzhasan and Kuragandee. Wartime plans elaborated by the State Defence Committee and the GOS plan (Planning Office) expected 100,000 tons of pig iron, 77,000 tons of steel and 326,000 tons of rolled metal from the Urals and Siberian plants. Making allowances for these efforts, in some of the basic raw materials Soviet production started to increase as early as 1942. For example, coal and oil production in February 1942 reached a low point of 32% and 56% of the June 1941 level, respectively, but by June of the same year had climbed to 45 and 72%.[27]

At this time iron production was merely 35 percent of the 1941 production level, steel 45, rolled metal 43, manganese ore 33

[26] A. Samsonov, *Vklad sovietskogo tüla Voprosi Istorii*, 1983, p. 122.
[27] G. S. Kravchenko, *Vojennaja Ekonomika SSSR 1941-45*, (Moscow 1963), p. 1.

percent.[28] But by the middle of 1942, 1200 of the factories transferred to the east started to produce. If the Soviet Union was able to recover its level of armament production despite decreased raw material supply, this could have been because from 1943 the involvement of new territories helped compensate for a large part of the losses, and because the planned economy was better able to mobilize all sources of the economy to the needs of armaments, while civilian production was limited much more than in any of the other countries, including Germany. The German occupation of the Donetz basin meant that c. 100 million tons of coal was lost for Soviet industrial production. To substitute for these losses the production of the Urals – particularly around Tcheljabinsk – tripled to 25 million tons, the Kuznyetck basin provided about 30 million and Karagunda about 11 million tons earlier in 1944.[29] Since earlier geological research had already indicated where the most important coal reserves were to be found in the country, and some of them had begun to be exploited even earlier, a large number of mines were opened in Siberia around Lake Baikal, Usbekiztan, and other areas of the Far East. In the North, around Petschova and Vorkonta, coal production managed to increase to about 5 million tons. It is unbelievable how much human, economic, and technological difficulty had to be overcome in order to increase production in these territories. Production in the Kuznyetszk basin – the share of which in overall coal production increased from 13.8% to 20.3% between 1940 and 1945, and whose importance was surely larger before the reconquest and reconstruction of the mines in the Donetz area – actually declined during the first period of the war.[30]

The main reason was to be found partly in the decrease of labour, since a large number of the miners were drafted into the

[28] G. S. Kravchenko, *idem.*, p. 118.

[29] I. Zelkin, *Kuznyeckij ugalnyij basszein v godii Velikoi Otechestvennoi Vojny*, (Moscow 1969), pp. 166-168.

[30] J. Chardonnet, *Les conséquences économiques de la guèrre*, (Paris 1942), pp. 50-51.

army. Women and children were unable to replace those losses, either in skill or in physical strength. Ever increasing difficulties occurred in transportation since the tremendous losses of the Soviet railway system and the need for wagons for evacuation made it difficult to deliver coal from the mines where finally replacement parts for equipment became scarce as well. The Soviet government, in August 1941, initiated directives to open up six new mines in Kuznyetzk and in 1942 a goal was set for six more. Even these directives were not entirely fulfilled, since only four new mines were opened during the first years and only four remained in production from the beginning to the end of the war.[31] Despite the increases in coal production in the newly developed territories, the Soviet Union suffered from a coal shortage during the whole period of the war. Civilian consumption was reduced almost to the minimum, and total priority was given to armament production. Metallurgy consumed twice as much coal as before the war, while consumption was restricted for power stations, textiles, food, and the construction industries. The use of coal for heating was even more limited. Part of normal coal consumption was replaced by the use of timber – necessarily, since in 1944 the country's coal production was 10% less than in 1940. Timber as a fuel contributed only 20% to consumption before the war; its share increased to more than half by 1944.[32] In the consumption of electrical energy, the share of industry was 66% and transport 12%, while that of private consumption and agriculture was insignificant.

Siberia played a significant role in the provision of raw material supplies for the war economy. Its role substantially increased during the war in iron, steel, coal, manganese and oil production. In 1942, the worst year for the Soviet economy, Siberia and the Urals produced more than 90% of almost all of the important raw

[31] Zelkin, *Kuznyeickij, op. cit.*, pp. 82, 93-95.
[32] A. Chadajev, *Ekonimika*, pp. 153-254.

materials.[33] Siberia's share was about the same in 1943, and began to decline again only in 1944 even though the volume of production was still on the rise. Electrical energy production more than doubled during the war years. Even in oil production, besides the Kuibisev area, Siberia and Central Asia had important roles in compensating for losses from the traditional areas, where from the summer of 1942, production completely stopped in Maikop and Groznij and decreased in Baku.[34]

It is true the increase in output achieved in 1943 was significant. Iron production rose by 31%, steel by 28 and coal by 31%. In that sense 1943 may rightly be regarded as a turning point. But still the output of none of the most important raw materials reached the prewar level in this year. One might conclude, therefore, that one of the major achievements of the planned economy was its ability to provide the necessary supply of larger quantities of armament from much less raw material than the Germans.

Priorities established (in this case) were actually carried out.[35] Since the large area of the Soviet Union was able to provide almost every sort of raw material, the difficulty created by the war was much more a matter of raising the necessary investments (production expenses were too high to be able to make large scale production possible) and of acquiring the necessary labour. Obviously, before the war the Soviet Union had a very large reservoir of labour, in spite of the fact that there was no unemployment due to its planned economy, and during the 1930s substantial labour had been shifted from agriculture to industry. But with more than 50% of its population still in agriculture, underemployment of the labour force was very much present, and in peace time this might have offered good opportunities for redeployment. However,

[33] *Sibirii v gody Velikoi Oteshestvennoi Voiny*. Ed. M. Aktyrov, (Moscow 1970), pp. 43-47.

[34] A. CHADAJEV, *Ekonomika*, pp. 248-250.

[35] B.G. GRIGORJEV, *Ekonomicheskije v moralnij potenchiali v Sovremennoj Voine*, (Moscow 1970), p. 32.

things were quickly changed due to the German attack. The size of the Soviet army was 4.2 million in January 1941, and about 5 million in June. During the second half of 1941, according to available data, the number of casualties was as much as the size of the entire army before the war, and had to be replaced by new soldiers. German sources claimed to have captured as many as 4.5 to 5 million prisoners of war – almost all of whom perished under inhuman circumstances in the German camps. If we add the casualties in those killed or severely wounded, we might add another 1.5 to 2 million. Since the Soviet army in early 1942 had more than 5 million men (actually reaching the level of 11 million in May 1943),[36] according to the lowest estimates 12 million men of working age must have been taken from the economy. (If we take into account the lost territories, where in spite of successful evacuation a certain amount of labour did remain and the fact that some time was needed for the evacuated labour force to get back to normal work, the losses might have been larger). According to Soviet sources male labour in 1940 totalled 31.2 million, in 1942 only 18.4 million; the 13 million difference is approximately equal to the estimate given above. The Kuznetz basin was in the process of emerging as one of the most important industrial regions of the Soviet war economy. However, it had to struggle constantly with a shortage of labour. In June 1942, 34,000 workers were missing from the production process. During the next month, through organizations set up in the major communication centres to re-direct the evacuated labour forces, 15,000 new workers were obtained.

But it was still far from enough. On August 24, 1942, the State Defence Committee dealt with the issue, and had accepted the measures necessary to speed up production in the Kuznetz. During the next 4 months a large amount of investment as well as

[36] B.G. Grigorjev, *Ekonomicheszkije i moralnij potenchiali v Sovjemennoi Voine*, (Moscow 1970); p. 22.

31,000 new workers were directed to this area.[37] Nevertheless during the summer of 1943 the State Defence Committee was compelled to discuss the situation in the Kuznetz again, and to come up with new measures, among them sending even more labour to this area. Occasionally the problem was not that the actual labour force working in the area was insufficient, but that its composition was inappropriate, due to the increased number of female workers or teenagers. Since investment capacity was limited and the vast majority of the engineering industry was totally involved in the production of armaments, the mechanisation of production was extremely low, tools were scarce, and all production was extremely labour intensive.[38]

The Soviet government was well aware of the fact that labour would be their major concern during the war. To overcome the difficulty with proper organization, a special commission of the government was established as early as 30 June, 1941, to deal with the distribution of labour. In the very beginning the mobilization of the army had received top priority. In early July men born between 1905 and 1918 were drafted; in August, this was extended to those who were born between 1890 and 1904; also in August the Defence Committee made military training mandatory for all Soviet citizens. The first critical labour shortages were felt around the end of the year. The European territory of the Soviet Union was the most densely populated area (74 million), and a large part of it had been lost. Even if a large and more qualified labour force had succesfully been evacuated, without drastic State intervention in the distribution of labour, matters would have run out of control.

An the end of 1941 the Supreme Soviet had decided that during the war all workers in armament factories were to be regarded as mobilized, and military rules were extended to them. At the same

[37] A. Zelkin, *Kuznyeckij*, pp. 93-95.
[38] A. Chadajev, *Ekonomika*, pp. 114-119.

time the government and local authorities received full power to redirect labour elsewhere from different branches of industry, even from different factories and different areas. The next step in the total mobilization of manpower was introduced in February 1942, when wartime mobilization was extended to all urban citizens in the Soviet Union, for men aged 16 to 55, and women from 16 to 45 years of age.[39] Railway and other forms of communication were also declared war factories. Official working stints were increased but actual working hours, partly thanks to voluntary labour, were far more than the formal level. We have no reliable figures concerning existing working hours, or the observation of the 6-day week. The decree of 26 June, 1941 authorized enterprise directors to increase the work day by one to three hours; vacations were suspended and replaced by financial compensation.[40]

Decrees accepted by the government in early 1943 indicate that working hours were increased too much. The first decree provided workers in the armament factories with two days of rest per month; the other declared that underaged workers, who were allowed to be taken to the factories over 14, were not to work more than six hours per day, and overtime work for them was prohibited.[41]

Four major sources were available to replace the manpower lost during the first year of the war, and to obtain the necessary labour in the industries having priority. First of all, as many women as possible were put into factories; second, sub-adults were made eligible by lowering the working age; third, working hours were increased and the time for skilled training lessened; and fourth, labour was redirected from agriculture administration and consumption industries.

[39] A.V. Mitrofonovna, *Rabochij klass Sovetskogo Sojuzi v periodi Velikoi Otechestvennoi Voiny*, (Moscow 1960), p. 116.

[40] J. Chadajev, *Ekonomika*, pp. 100-108 and Kluev, *Mufi i pravda* (Leningrad 1969), p. 89.

[41] S.G. Strumilin, *Ekonomicheskoi zhizn SSSR*, (Moscow 1967), p. 331.

The most successful wartime progress was probably the mobilization of women. It started with the mobilization of 500,000 housewives, and 500,000 school girls (in grades 8 to 10), who were included in the production process. The ratio of women to the total number of workers and employees in the economy rose from 38% in 1940 to 53% in 1942.[42] These figures might have been even higher if collective farms had been worked. In industry the ratio of women rose from 41 to 52%, and in railway transportation from 21 to 40%. In the electrical industry this figure was 54%, and in the aircraft industry 40%. Voznessenskij gives the following increase in the percentages of women among different types of skilled worker:

	1940	1942
Steam engine operators	6	33
Compressor operators	27	44
Steam boiler stokers	6	27
Metal lathe operators	16	33
Welders	17	31
Manual moulders	12	32
Machine moulders	29	39
Locksmiths	4	12
Blacksmiths and stamping machine operators	11	50
Electricians	32	50
Automobile drivers	4	19
Truckdrivers	17	40

Even before the war, the proportion of female labour in agriculture went up to 52%, reaching 71% in 1943. Before the war, only around 9% of the women were tractor drivers, but in 1944 the ratio had risen to 60%.

In the Gorki auto factory, where production was converted to tanks, tank-engines, and armaments by the end of 1941, more than 4000 former housewives were introduced to factory work.[43] In the

[42] G.I. Shigulin, *Narodnoe khoziastvo SSSR v period Velikoi Otechestvennoi Voiny* (Moscow 1960), p. 233.

[43] V. Kiselev, *Gorkovskii avtozavod v godii Velikoi Otechestvennoi Voiny Voprosi* (Istorii, 1981), p. 15.

very first year of the war the factory was able to procure 11,000 new workers who had been trained during a very short period in which 7 to 14 days were devoted to this task.

The number of women workers was even more important in the educational institutions (58% in 1940 and 73% in 1943), which included medical institutions at 83% and state and local administration at 55%.

The age composition of workers had also changed greatly during the war. Workers under 18 years of age comprised 6% of the labour force in 1939, and 15% in 1943. Many of these teenagers were actually under 16 when they entered the factories, and occasionally performed very heavy work in armament industries. In one of the centres of the Soviet war industry, in the Kuznyetz Basin, the share of teenagers in the working force went up to as much as 10 percent.[44]

Because of the labour shortage, there was constant pressure on the Soviet economy. Due to the German occupation, enormous human losses and conscription into the army, the number of workers and employees actually decreased by 38% in 1942 and although it started to rise slowly afterwards, during the war it never regained the prewar peak. One new mobilization campaign after another was started, bringing a large number of people into the production process. During 1943, for example, 7.6 million new workers were mobilized, of whom 1.3 million went to industry, 3.8 million to agriculture and 1.3 million to forestry. In Siberia, where manpower losses were obviously smaller between 1941 and 1944, more than 67% of the working age male population was drafted into the army.[45]

An important element in the attempt to overcome constant labour shortages was the programme for training the necessary work force. Although it was centrally organized, the major bulk of work was still done by local factories. Short-term schools and

[44] I. Zelkin, *Kuzneczkij, op. cit.* p. 78.
[45] *Istorija Sibirii*, p. 92

systems of courses were used in addition to individual institutions – which were rewarded by special bonuses. Certainly training was facilitated by the fact that a large number of workers were employed in the mass production of armaments, which did not require particular skills. The number of women, teenagers and older people trained to be skilled workers was 2.7 million in 1941, 3.7 million in 1942 and 5.1 million in 1943.[46]

Special training was given to invalids who suffered injuries in the war and were unable to return to the army after their recovery, but who might be included in the productive process. Rough estimates put their number at one million by the end of 1944.

Finally, an important labour source for the armament industries was the reorganization of the working force, partly from administrative to manual jobs,[47] partly in the industrial production of those factories which had been specifically constructed to supply the front.

If we compare the structure of industrial production, with the armament industries producing two and a half times more in 1944 than before the war, and consumption goods industries producing not even half of the prewar level, it is quite clear that a large number of people previously working in these branches were shifted to the armament industries. Since the number of industrial workers in the Soviet Union was 9.1 million in 1941 and 5.5 in 1942, the proportion of the newly trained workers or new workers may have ranged from 40 to 70%.[48] We have no comprehensive figures concerning the productivity of the new labour force. Data published in the literature are usually comparative indexes where 1941 is used as a starting point. Thus, in 1942, 19%; 1943, 7%, and in 1944, 2% increases were found.[49] However, since 1941 must have

[46] N. Voznesensky, *The Economy*, p. 68.

[47] Belikov, *Sovietskii Tül Vo Vremja Velikoi Otechnestvennoi Voiny* speaks about a decrease of one million in the number of employees in trade, cultural institutions and other local organizations.

[48] See Kravchenko, *Voennaia ekonomika*, pp. 98 and 218.

[49] A. Chadaev, *Ekonomika*, pp. 114-119.

been below the prewar productivity, those data give us no more information than the fact that the Soviet economy was recovering from the blow suffered in 1941. More reliable and revealing are the figures which estimate the increase of labour productivity in the armaments industry between 1942 and 1944 at 40%. The better skill, better organization, improved raw material supply, improved living conditions and the introduction of standardization would have contributed to this productivity increase. Most of the indicators in the use of productivity are connected with the aircraft industry, where working hours needed for producing a Pe 2 aircraft for example, fell from 25,300 hours in 1941, to 13,200 hours in 1943, or tank production, where 8000 hours were required in 1941 to produce the T 34, while less than the half, 3,700 hours, was enough to do the same job in 1943.[50]

Voznesensky in his account on the economy of the USSR during the war provides us with a number of other examples connected to the production of Sl. 4 planes, VV tanks, artillery pieces, cannon, machine guns, rifles and small arms ammunition.[51] In summary, the Russian economy was able to mobilize the necessary resources for the war. Since the economy was based on directive plans – even if a number of plan directives never got off the ground [52] – the maximum war effort was sustained effectively on a given organizational level, as the Soviets were able to make use of their vast natural resources. This was achieved on a much smaller industrial base than there had been before the war and on a national income which never reached the prewar level. It is true that almost all production indexes started to rise from 1942, but they were so far down at this point that it took years, even after the war, to reach the prewar level. Of course the same question may be posed differently. If we look at those territories which were unin-

[50] A.N. Lagovski, *Strategia i ekonomika*, (Moscow 1961), p. 25

[51] N. Voznesenskij, *The Economy*, *op. cit.*, p. 68.

[52] See Eugene Zaleski, *Stalinist Planning for Economic Growth* (Chapel Hill 1980). Statistical Appendixes.

terruptedly under Soviet control during the war, then we may come to the conclusion that all major economic indicators were constantly increasing. Labour in the Urals was 34% more than in 1940, in Western Siberia 22% more, and in Central Asia 15% more. Siberia produced almost 3 times more industrial goods than it had done before the war. Among others, the State aircraft factory recently established was able to produce 97,000 Klirov aeroengines during four years, which meant an enormous concentration of the production process. Almost the same percentage increase was observed in the Urals as well, and growth in Central Asia and Kazakhztan was also remarkable. The Ukraine and Bielorussia were lost to production for two to three years, and even central areas of Russia were only partly included in production, if we wish to compare the mere success of efforts for mobilization it is probably better to exclude these territories when measuring the success of Soviet efforts.

SOME BASIC INDICATORS
OF THE SOVIET ECONOMY DURING THE WAR.[53]
1940 = 100

	1941	1942	1943	1944
National income	92	66	74	88
Gross industrial production	98	77	90	104
Armaments industry	140	186	224	251
Gross agricultural production	62	38	37	54
Number of workers employed	88	59	62	72
Retail trade turnover	84	37	32	37

We get a very similar picture if we extend the indexes to other goods, including basic raw materials, different products of heavy industries, and some other industrial goods for which we have quantitative data. Unfortunately in a number of cases we do not have reliable data at all or, if we do, they seem to be given more as

[53] *Sovetskaja Ekonomika*, p. 34. The aggregate indexes used are not always consistent with partial indexes on which we may obtain information. See *Isztorija Velikaja Otechestvannaja Voiny*, Vol. 6, p. 45.

an index where the composition of the index is not clearly explained.

CHADAJEV INDEX OF INDUSTRIAL PRODUCTION [54]
1940 = 100

	1941	1942	1943
Total production	98	77	90
Metallurgy	109	69	76
Fuel	93	50	56
Power output	97	62	67
Chemical industry	112	76	100
Engineering	112	119	142
Naval industry	88	48	51
Building materials	80	27	31
Glass, stone	83	33	52
Printing industry	72	35	37

It is clearly indicated that only two branches largely connected with armaments produced more goods in the Soviet Union during the war then before. In such basic production goods as coal, steel, iron, and electricity Soviet industry did not achieve its prewar level until 1945.[55]

	1940	1941	1942	1943	1944	1945
Coal	166	151	75.2	92	118	149.7
Oil	31	28.5	15.2	15.8	17	19.4
Steel	18.3	17.8	8	8.4	10.7	12.2
Electricity	48.3	46.5	23	32.8	35	43.3
Iron	14.9	13.8	4.8	5.6	7.3	—

In other words, German iron, steel and coal production was far above Soviet production during the war, even without the occupied territories, and still the Soviet armament industries were able

[54] CHADAJEV, *Ekonomika*, p. 67.
[55] N. VOZNESENSKY, *Economy*, p. 46, with small differences from this, *Sovietskaja ekonomika*, pp. 259-267.

to produce more guns and rifles, tanks and self propelled guns, and aircraft.[56] Soviet tank production reached 77,000 during the war, when Germany was not able to produce more than 56,000. Soviet aircraft industries produced 100,000 planes and the Germans 78,000. (Even if we take into account the fact that the Germans were producing relatively more heavy bombers, their production was at best only equal to Russia's). The strength of the Soviet war economy is clearly indicated by the fact that, in spite of terrible losses, they were able to produce more weapons as early as the second half of 1941 than they had done in the first half of the year. Instead of 1800 tanks they produced 4740, and instead of 950 airplanes they produced 8,000 and, in almost all kinds of weapons, similiar increases were achieved.[57]

From 1942 Soviet designers were able to come up either with a number of modifications on old weapons or quite new models. New rocket launchers, machine pistols, the new LA-5 and Yak-7 airplanes were much better quality fighters than the Soviets had ever had before, and in a few months they were able to produce an even better version of the Yak-9 long-range bomber. The TU-2 was a better bomber, and the IL-2 was excellent for ground attack rôles.

The Soviet tank factories modernized the T-34 and produced a new heavy tank named after Stalin. New powerful guns and self propelled guns were produced in enormous quantities. After improving the 45 mm and 57 mm guns, 76 mm antitank guns started to be produced, and the new T-34 tanks were equipped with 85 mm guns. The IS-2 (Stalin) heavy tanks with 122 mm guns (in 1943 only 103 of these heavy tanks were produced; in 1944 over 2,000).

[56] Kluev, *Mŭfi i pravda*, pp. 191-195.

	Soviet tank production	airplane production
1941	6542	12516
1942	24795	21343
1943	29000	34900

[57] *50 let vooruzenij sili*, (Moscow 1967), p. 405.

Of the T-34's 11,000 were produced in 1944, and another 2,500 of the new ISU-122 and 152.

The numerical increase in tank production of 24,000 in 1943 and 29,000 in 1944 was probably not so impressive, but the quantitative comparison is misleading because of the modernization, better equipment, and much heavier weight of the new tanks. It is partly true in the aircraft industry where the increase in production from 1943 (34,900 planes) to 1944 (40,300 planes) was about 20%, but where improvements in quality were far more important. At the peak level of output Soviet industry produced 122,500 guns of all types and calibre, 184 millions shells, mines, and 7.5 million rounds of small arms ammunition.[58]

If under certain conditions the situation can be seen in terms of wages, some estimates put real wages at 40-50% of the prewar level. If we take into account the fact that the index of output in the consumer goods industries was 77 in 1941, 41 in 1942, 45 in 1953, 54 in 1944, and 59 in 1945, and that agricultural production, as we can see, was around 38% in 1942 and 1943, and 54% in 1944, the fall in consumption might have been around this figure. Textile production dropped to one-third of the prewar level, and even in 1944 and 1945 was not more than half.[59] Even correcting the index

[58] J. Erikson, *The Road to Berlin*.
[59] Chadajev, *Ekonomika*, pp. 284-285.

Soviet agricultural production during the war. Land planted in million hectares.

All units in million	1940	1941	1942	1943	1944
Hectares	150.6	84.7	87.5	93.9	109.7
Grain (tons)	95.6	56.4	29.6	29.6	48.8
Sugarbeet (tons)	18.0	2.0	2.2	1.3	4.1
Seedflower (tons)	2.64	0.9	0.29	9.79	1.0
Potatoes (tons)	76.1	26.6	23.6	35.0	54.8
Meat and production (tons)	1.3	9.95	9.78	9.77	0.7
Milk and products (tons)	6.5	5.3	2.9	2.4	2.7

Source: Sovietskaja Ekonomika, pp. 259-264.

by taking into account the fringe benefits enjoyed by Soviet workers – which had been decreased as well – shows that real wages may have been well below the prewar level, taking into consideration the terrible food shortages of consumption goods. In that sense we may say that, apart from the fact that the Soviet economy was able to surpass the Germans in armament production, we may find that the planned economy had equally great advantages in selecting priorities and allocating scarce resources inaccordance with those priorities as in the enormous sacrifices of the Soviet people, who suffered in factories and fields as well as on the fronts.

Was the British economy able to overcome the difficulties in raw material supply? If an affirmative answer is to be given, we must add three remarks in order to understand the process. The success is to be found not so much in efficient allocation as in the achievement of British agriculture, which was able to double its calorie production during the war years,[60] and through this to make shipping allocations easier for the import of raw materials. Second, the success is to be explained by British technology which was able to increase the production of synthetic materials and by these achievement to reduce the dependancy on imports. Raw cotton consumption, for example, declined in the United Kingdom from 600,000 tons to 365,000 tons during the war years; a growing share of textile production came from the rising output of artificial and synthetic fibres. Last, but not least, since an important part of British armaments was supplied by American factories – particularly tank production, and shipbuilding – raw materials needed for the British economy were actually supplied by the United States. The raw material supply position during the whole period was a bottleneck in British war production. Nevertheless, this must be viewed in close connection with manpower since a shortage there might have also created basic obstacles to the con-

[60] A. Milward, *War, Economy and Society 1939-1945*, (Berkeley 1977), p. 253.

version of the economy to a complete war footing and in the augmentation of armament production at the necessary speed to a level high enough to compete with German production. The situation of labour was entirely different in Britain to that in Germany or in the Soviet Union. The main supply of manpower for German war industries was the forced labour of foreigners, almost 10 million workers. In the case of the Soviet Union, the country was able to put millions of women and children to work from a large reservoir of agricultural population, which served as the main source of supply to the army as well. Britain, the most industrialized and urbanized country, where the agricultural population was around 5% of the national total, did not have this type of reserve strength. It is true that there was a high level of unemployment before the war, which might have been drawn into production, but unemployment was far below its magnitude in the United States. In this sense, the mobilization of labour became one of the central issues for successfully converting the economy to wartime needs. What made things even more complicated was that (as has already been indicated), in the late 1930s, when unemployment generally was still a major problem in the engineering industry, which was the basic source of armaments productions, skilled labour had already started to be scarce.

But as early as this stage, the British authorities began to think of a device which later on would prove rather successful in overcoming labour difficulties, namely the so-called subcontracting system. In this, smaller firms were involved in fulfilling military orders, which eased the necessity of concentrating and reallocating workers in a few giant factories.[61]

These were still more plans than reality. Mobilization in the British economy proceeded relatively slowly. It is hard to say whether this was because of the phony war, or because of inherent difficulties facing the economy and a conservative government.

[61] M.M. Postan, *British War Production*, (London 1952), pp. 10-21.

Old schemes applied during the First World War offered little experience. The demand for a prompt increase in mobilisation for the army had obviously created a number of difficulties, even though a special committee was to have prevented the loss of skilled labour by haphazard recruiting. Shortages started to become common in industries having top priorities for armaments, such as aircraft and shipbuilding. However, until mid-1940 no serious attempt to enforce the transfer of labour was made since the government was afraid of opposition from the trade unions, with whom relations had been strained. With some reserves probably still available from the ranks of the unemployed, government did not try to push the issue, as in other fields where war activities similarly had not yet been carried out with the necessary forcefulness. The retraining or upgrading of labour was also still in just the beginning stages, comprising plans and discussions rather than action.

In some ways the problem of labour was to be solved by individual companies. Since almost 2 million persons had been called up for military service or into civil defence, the number of persons mobilized for the war economy lagged behind. On the whole 625,000 unemployed were returned to an active role in the economy, and about 900,000, half of them women who had not previously belonged to the active working force, were brought in. One of the basic incentives for redeployment remained the use of market forces, through the offer of better opportunities or higher wages rather than using compulsory sanctions.

The first efforts of mobilization between June 1939 and June 1940 meant that the number of workers employed in building, retail trade, food, and textiles declined by 900,000 and in shipping, transport, agriculture, and public services by 65,000, while employment in chemicals and engineering went up by half a million.[62] This mobilization cannot be regarded as significant, particularly if

[62] M.M. Postan, *British War Production*, p. 100.

we take into account the fact that in all fields of armament except aircraft, the United Kingdom was further behind Germany than it had been before the outbreak of the war. Mobilization started to become more effective after Churchill became Prime Minister, particularly since he could enjoy the support and cooperation of the Labour Party, whose second most powerful individual, Bevin, took over the post of Minister of Labour in the new government. Many of the unemployed did not have the necessary skills, and most were located in the depressed industrial areas of the 1930s rather than in the regions where the new armament factories were located. Mobilization of women was still very slow. When the Beveridge Report on labour supply was published at the end of 1940, it gave a rather gloomy picture of the labour situation.[63] According to its estimates, during the next year almost one million more workers would be needed in the munition industries. Since not even half of these newly created jobs were expected to be filled by the transfer of male workers from other industries, it was obvious that the only possible solution was the mobilization of women. The Labour Party, being close to the Trade Unions, tried to avoid a repetition of the compulsory measures taken during the First World War, when the interests of labour were entirely disregarded. Even at this stage therefore only tentative measures were taken and those very reluctantly like the Employment Order for the registration of those who had previously been in industry, and the registration of women in different age groups. This made it possible for 200,000 to be transferred into the munitions industries between April and November of 1941. The next step was the Employment of Women Order in early 1942, according to which women between twenty and thirty years of age could obtain jobs only through employment agencies. Of course these very cautious policies had their drawbacks, namely a permanent shortage of labour particularly in certain skills. New factories, hastily built, were unable to reach full rates of production, because many work-

[63] P. INMAN, *Labour in the Munitions Industries*, (London 1957).

ers left the vital industrial areas, due to constant German air attacks.

If prior to 1941 the labour shortage, serious as it often was, was mostly local or related to particular skills, from 1942 it slowly became general as manpower resources were seemingly exhausted. Once the war was extended to the Far East, demand for the armed forces increased and prospects for the future were gloomy as more than 2 million people were ordered to enter the army and related industries. The only way to solve the problem was to put more pressure on the employment of women and to enforce legislation about this. Exemptions from work on different grounds were limited in October 1942, and the age of registration was extended from 18 to 45 years, then on up to 50. During one year employment in the country rose by 1 million, and reached a record peak of 4 million more than it had been in 1918. Mobilization thus allowed 32 percent of the population to be sent to the armed forces and the munitions industries. Sixteen percent of the population was working in the so-called Group II, i.e., the major war industries. Altogether half of the British population was directly working for the war effort. All this happened under conditions when working hours for men were extended from 48 to 54.1 hours per week, and those for women from 44.2 to 46.9 hours.[64] The increase in the number of workers in the major industries connected with armament and munitions were extremely impressive. In engineering and allied branches the labour force increased by more than 75 percent; in shipbuilding and explosives and chemicals it almost doubled. Forty percent of the increase in employment actually occurred in factories which either directly belonged to the state (Royal Ordnance Factories) or were under strong state influence (the so-called Agency Factories working for either aircraft production or for the Ministry of Supply and the Admiralty).[65]

[64] W.K. Hancock and M.M. Gowing, *British War Economy*, (London 1949), p. 454.

[65] William Hornby, *Factories and Plants*, (London 1958), p. 382.

By the middle of 1943, the limit of British mobilization was near. Bomber programmes and naval construction had top priority. Expenditure on shipbuilding was one of the major sectors of war investment totalling £ 870 million during the war including armour plate, guns, ammunition, torpedoes and mines. Actual government capital expenditure in the aircraft industry rose to £ 350 million, but this included just the investment for building the air-frames.[66]

After 1943 further increases in output were regarded as getting close to possible limits, or attainable only by reallocation and further reduction of manpower in industries and services not closely related to armaments. This was the point when coordination with the American war effort received top priority for raw material supply since it was clear that without far reaching American assistance in taking over a large amount of production to supply Britain, British manpower would not be able to meet the dual demands of increasing the size of the armed forces and the munitions industry simultaneously.[67] Actually, the process which became increasingly prevalent was that a certain division of labour began to be established, which allowed the British to concentrate on their two major commitments, the naval programme and the bomber programme, which meant building as many aircraft as possible. However, in some of the other programmes, deliberate cuts had to be made, on the assumption that these needs would be met by American production. From the second half of 1943 the labour force actually started to decline, even in the munitions industry. Employment reached its peak in January 1943 at 1.7 million; in June it was 1.64 million and in December of the same year 1.47 million. The output of guns, small arms, shells and bombs also declined. For every 100 guns produced in December 1939, in February 1943, 793 were produced but only about 500 in

[66] Ibid., pp. 66, 212.
[67] M. Postan, *British War Production*, (London, 1952), p. 293.

the last quarter of the year. May 1943 was the peak of small arms' production, with 1114 percent of the December 1939 output. In the last quarter of the year, output of shells and bombs was about 880 percent; the decline being almost fifty percent.[68]

American war production supplied to U.K.[69]

	production UK	US supply	US supply as % of UK production
Figures in thousands			
Tanks	24.8	25.6	104
Artillery	132.1	10.3	8
Small arms	7598	2454	36
Military Vehicles	682	264	39
Combat Aircraft	96.1	23	24
Landing craft, ships	4.3	26	600

The impressive contribution of American industry certainly eased the labour problem in Britain. This does not deny the impressive achievement of British mobilization, particularly in introducing women into the economy. Eighty percent of the new labour force employed in the economy between 1939 and 1943 consisted of women who had not previously been employed. Two and a half million workers transfered from the "non-industrial classes" (housewives, domestic servants) into industrial employment.[70] The number of women between the ages of 14 and 64 was 17.2 million, and 6.5 million were actually working before the outbreak of the war. Of the remaining 11 million, only 2.5 million were single or widowed; the others had children or elderly relatives. The two and a half million spinsters and widows had

[68] *op. cit.*, p. 355.
[69] *op. cit.*, p. 247.
[70] A. MILWARD, *War, Economy and Society 1939-1945*, (Berkeley 1977), p. 219.

been largely moved into production, not to mention the three quarters of a million women who worked part-time, and another million who were doing some kind of voluntary work. The proportion of women over the age of fourteen employed in Britain rose from 27 percent in 1939 to 37 percent in 1943.

Training was important as well, but the number of people who received training in comparison to the Soviet Union was relatively minuscule: 300,000. More effective was the dilution of skills i.e., formerly very highly qualified jobs were broken down into their constituent parts, which made it possible to perform them with semi or unskilled labour and by doing so to upgrade workers after a short training to do the work which formerly was reserved for skilled workers.

Last but not least, since the United Kingdom agricultural labour force increased slightly during the war – the peculiarity of British economic development that stands in sharp contrast to all other states is that British agriculture did not have hidden reserves in manpower, and the need to substitute for foreign supply made it necessary to increse workers in agriculture – the only possibility of reallocation was the textile industry (about half a million) or retail trade (about 1 million).

The British economy was able to maintain its level of employment, 17.9 million in 1939 and 17.1 million in 1943, during a period when the number of people in the army grew from 470,000 to 4,284,000 and when women in the auxiliary services, rose from zero to 461,000. Obviously, the composition of the labour force changed, insofar that the ratio of men to women was 73.27 in 1939, and 62.38 in 1943.[71]

One of the major achievements of the mobilization of the American economy was that, even after the entrance of the USA into the war, a substantial part of its production could be sent to help Great Britain mainly, but also the Soviet Union, with diffe-

[71] *Studies in War Economics*, (Oxford 1945), p. 204. J.L. Nicholson, *Employment and National Income During the War.*

DISTRIBUTION OF POPULATION OF GREAT BRITAIN

Figures in 000s	1939	1941	1942	1943	1944
Total population	46,466	46,875	47,039	47,300	47,627
0-13	9,231	9,101	9,091	9,150	9,239
M. 14-64 - F. 14-59	31,923	32,245	32,259	32,285	32,386
F. 60	5,312	5,529	5,688	5,865	6,002
M. 65	22,332	22,600	22,656	22,770	22,975
Males					
0-13 and over	4,672	4,615	4,614	4,648	4,698
14-64	15,887	16,140	16,140	16,155	16,261
65 and over	1,773	1,845	1,901	1,967	2,016
Females	24,134	24,275	24,383	24,530	24,652
0-13	4,559	4,486	4,477	4,502	4,541
14-59	16,036	16,105	16,119	16,130	16,125
60 and over	3,539	3,684	3,787	3,898	3,986

Source: Central Statistical Office, Quoted by W.K. HANCOK and M.M. GROWING, *British War Economy*, (London 1949), p. 351.

rent goods and raw materials. It is well-known how the famous Lend Lease Act was initiated after Great Britain ran out of gold and foreign exchange reserves with which to effect an increasing amount of purchases.[72] Roosevelt, who initiated the assistance was able to obtain congressional approval for the Lend Lease Act in March 1941 appropriating some $7 billion for military and defence aid to nations at war with the Axis. After the attack against the Soviet Union by Hitler, Roosevelt was willing to include the Soviet Union in the Lend Lease Act, with more definite discussion in October. At this time the modified Victory Program attempted to promote goods which also conformed to the Lend Lease Act requirements.[73]

Milward rightly underlines that it was "the American contribution that ensured a 3:1 superiority in munitions for the Allied powers [74] in 1944". Of course this calculation is valid on a world scale; on the European front the American armament was not so

[72] W. CHURCHILL, *Their Finest Hour*, (London), pp. 494-501.
[73] E. SMITH, *The Army and Economic Mobilization*, (Washington 1954), p. 136.
[74] A. MILWARD, War *etc. op. cit.*, p. 70.

unilaterally dominant. However, we have already referred to the fact that Britain had received as many tanks from the USA as it had produced itself and that 24 percent of British combat aircraft were produced in American factories, and that the American contribution rose to almost a quarter of total British armament consumption in 1944.[75]

The total value of US Lend Lease Aid to Great Britain (together with the Commonwealth) is put at about $30 billion. Since a large amount of service work in Great Britain was done for the US, we may deduct the value of this work, as we may also deduct the value of some British deliveries. In that case the net value is close to 23 billion dollars.

The composition of Lend Lease Aid was made up of four major items: ships, munitions, other goods and services.

Lend Lease Aid to Britain and the Commonwealth (Billion $).[76]

	1941 (March-Dec.)	1942	1943	1944	1945 (Jan.-Aug.)
Ships	65	195	1078	540	229
Munitions	186	2145	928	6101	2174
Other goods	586	1631	2218	2988	1665
Services	245	786	807	1137	369
Total	1082	4757	736	9998	44

The total sum was distributed as follows: 21 percent aircraft, 12 percent in ships, 13.8 vehicles and equipment, 13.5 ammunition, 12.2 percent foodstuffs. Petroleum, metals and machinery were the other major items. It is worthwhile taking a look at the share of the Lend Lease Aid within total United States Production.[77]

[75] D. Hall, *North American Supply*, (London 1958), p. 428.

[76] W.K. Hancock and M.M. Gowing, *British War Economy*, (London 1949), p. 353.

[77] Quoted from R.G.D. Allen, *Mutual Aid between the U.S. and the British Empire, 1941-1945*, by Milward, *op. cit.*, p. 72.

Figures in percentages	1942	1943	1944	1945 (first half)
Aircraft	12.4	11.9	13.5	11.8
Ships (equipment + repairs)	5.5	11.8	6.7	5.4
Ammunition	10.4	10.0	8.8	4.6
Vehicles	9.8	26.7	29.4	12.1
Total munitions	7.6	11.2	11.7	7.6
Foodstuffs	4.3	4.4	5.4	3.9
Other agriculture	4.3	5.6	4.4	5.0
Metals	3.9	4.2	3.4	3.5
Machinery	2.6	5.7	7.1	4.2
Other manufactures	0.7	0.6	1.1	0.3

U.S. aid made up almost 5 percent of the national income of the United States, and in some industrial sectors, particularly in aircraft and vehicles, quite a substantial proportion of steel production was actually used by the British army. Lend Lease Aid came to about 10 percent of the total U.S. war expenditure. Lend Lease Aid for the Soviet Union had considerably less significance. Starting much later, and staying at the low level of $26 million during the critical period of 1941, it slowly gathered momentum. The formal protocol signed by representatives of the three powers on October 2, 1941, promised among other things 400 planes, 500 tanks, etc. each month.[78] The unconditional aid for the Soviet Union met with very strong resistance on the part of the army and the State Department. While the first was worried about the impact of this aid or their own armament programme, since even the British Lend Lease deliveries created some difficulties in prevailing circumstances; the State Department opposed unconditional aid more for political reasons referring to a number of things, among others that the Russian were not willing to provide the necessary information concerning their real priorities.

Neither American industry nor shipping capacity available was able to fulfill this commitment, quite apart from the bureaucratic

[78] Leon Martell, *Lend Lease Loans and the Coming of Cold War*, (Boulder 1979), p. 32.

and even political obstacles which emerged. In the first three months only 750 aircraft, 501 tanks, and anti-aircraft guns actually arrived, so that they did not play significant roles in the repulse of the German attack before Moscow. Even later, in 1942 and 1943, transportation difficulties – shipments were constantly attacked by German U-boats on their way to the port of Murmansk – were regarded as a major problem, and created some strong words in the correspondence of Roosevelt and Churchill with Stalin. From the deliveries sent in the first round two thirds actually reached the Soviet port. The second protocol, signed in 1942, increased the pledge and actual deliveries, also increased, even though they remained far behind the schedules. The third protocol – signed in 1943 – and the fourth in 1944 – significantly increased commitments, and fulfillment was getting closer to the pledges.[79]

The $10,670 million of American aid sent to Russia was supplemented by some British aid as well of which the value can be estimated at 1.5 billion. What was the real significance of this $12 billion, besides its symbolic value? Soviet sources stress that American and British supply was rather insignificant compared to the efforts and achievements of the Soviet economy. No more than 10.5 percent of all tanks, and just over 11 percent of all aircraft used by the Soviet Union were from the USA or Great Britain,[80] and the whole contribution of Lend Lease Aid is put at no more than four percent of all war production of the Soviet Union. Even if we accept this figure, we still must face a number of questions to be examined. We do not have reliable information about the exact composition and timing of the aid. Certainly a few thousand tanks and aircrafts had a different meaning in early 1942, when Soviet production, due to terrible losses, was at its low point, than in 1944, when production was at its height. The strength of the Soviet economy, due to the industrialization drive in the 1930s, lay in

[79] Department of State, *Soviet Supply Protocols*, (Washington 1947).

[80] *Istorija Velikoj Otechestvennoi Vojny Sovietskogo Sojuza, 1941-45*, (Moscow 1969).

heavy industry and in spite of losses they were able to recover this strength in the most important area of mass production of standardized weapons. Here foreign aid proved to be less important from 1943 on. However, as is well known, the weakness of the Soviet economy was in transportation [81] – where a not very modern sector underwent terrible losses – in agriculture – where again a large part of its most productive areas were temporarily under German control – and in some consumer goods industries. In these sectors and in some raw materials, lend lease aid might have had more significance. The first protocol signed by the three powers, aircraft and tanks were regarded as priorities, but aluminum, foodstuffs and medical supplies were also at the top of the list. Later on tin and rubber were also regarded as significant. Copper shipments equalled three quarters of Soviet production; steel only one seventeenth.[82] Eighteen million pairs of shoes and $300 millions worth of machine tools might also have had important significance and yet it seems that the two sectors where lend lease aid helped the Soviet economy most were, first, transportation, where more than 600,000 American trucks and jeeps contributed significantly to overcome transportation and logistical difficulties, particularly since a large part of railway track and locomotives were destroyed, and the second, food. Flour, sugar and canned meat went to the Soviet Union in large quantities and, according to some sources, while 5 percent of American agricultural production went to Britain during 1944, another 2 percent went to the Soviet Union.[83]

If we try to compare the level and growth rate of Soviet munitions production to lend lease aid then we may come still

[81] G. HERRING, *Aid to Russia Strategy Diplomacy*, (New York 1973), 1177. "Contemporary observers and military historians agree that vehicles and automotive equipment presented the most important armament contributing to the Russian victory".

[82] A. MILWARD, *op. cit.*, p. 73

[83] R.H. JONES, *The Roads to Russia*, (Oklahoma 1964), p. 268.

closer to its real significance. American estimates prepared in 1946 put the value of Soviet production as follows (in $ billion)

1941	1942	1943	1944 [84]
8.5	11.5	14	16

If we assume that lend lease was nothing more than munitions, which was certainly not the case, then its share was 12 percent in 1942, 17 percent in 1943, and almost 25 percent in 1944. However, we may doubt whether the estimates made in 1946 are correct and whether this procedure is correct, since about half of lend lease aid was not in combat munitions.[85] We may not be very far from the reality if we put the share of American aid between 6 to 10 percent of Soviet production between 1942 and 1944. Soviet sources put Soviet war expenditures at 550 billion roubles, whereas the value of lend lease was 53 billion i.e., about 10 percent.[86] But since about 40-45 percent of lend lease aid was not munitions, we may put its total contribution at about 6 to 7 percent of Russian war expenditure.

Our survey of how the four major belligerents tackled some of the issues facing them in the process of converting their economies to wartime needs does not have the purpose of giving a detailed account of the economic history of World War II. We tried to limit our answer – though it goes far beyond the boundaries of a single lecture – to a few questions upon which this colloquium was to focus its interest. Issues such as raw material and labour supply and the financial aspects of the war, stand at the focus of our investigation, all in the framework of economic, social and institutional changes taking place after the outbreak of World War II. The picture which we have presented is based on extended research, trying to use existing, literature on this subject as much as possible,

[84] R. GOLDSMITH, calculations published in *Military Affairs, Journal of the American Military Institute*, Vol. X (1946), Spring.

[85] Proportion in British Lend-Lease was about 55 to 45 percent.

[86] Defence outlays were estimated up to 58.2 billion rubles in 1960 values.

which has been written in a national framework or going beyond national boundaries to deal with particular issues. In this discussion we have tried to use as wide a range of statistical material and literature as possible, with a clearly defined aim of not going too far into details, trying to select the main issues that can be approached on a comparative basis. Obviously, our aim in some way defined our methods: a number of books and articles were not used – although they might have been read. These we felt did not serve our purpose, either by going into too much detail, or by concentrating on matters which were not our main concern for this research. What we wanted to show was that, among the four states included in this research, only Germany regarded war as a major aim of its policy. Once the war began, all the others were able to find more or less successful answers to the problem of transforming their economy to wartime needs. The size, scope and success of those answers were usually dependent on a number of factors: whether the country involved was well provided with resources usable for modern war; whether the political and institutional systems were effective in mobilizing these sources, and whether the implementation of a policy to convert the economy to a war footing could produce the necessary means and levers to carry out this job successfully.

All of the four belligerents, in spite of the fact that they faced more or less the same issues, tackled these problems in different ways. Their success or failure was ultimately tested on the fields of battle, where armies – never seen before in such size and scale of armament – confronted each other. But clear insight into the facts of how the real world went about its business at this time demonstrates the relationship between politics and economics, the links between economic and human factors, between plans and reality, between hopes and disillusionment. We tried to look upon the transformations of the economies in terms of their connections, to trace all the similarities in these parallel processes, as well as the distinguishing features.

In the literature of the Second World War a great deal of effort has been devoted to the institutional contexts and political history, the military events, and obviously the phenomenon of resistance and partisan warfare. Considerably less attention has been given until now to the economic aspects of the war, in spite of the fact that nobody would deny its crucial importance in the victory of the Allies.

It will soon be a decade since the publication of the first comprehensive study on the economic history of World War II by Alan Milward, and still his words are valid concerning "the seemingly countless works on military history in which armies and navies come and go, commanded by greater or lesser figures deciding momentous historical issues, and nothing is said of the real productive forces which alone give such events meaning or indeed make them possible".[87]

One generally has to accept as a fact the basically destructive impact of war, not only on humanity in general, but also on economic development in particular. One must also accept as basically true the concept that a war economy is nothing else than the misdirection of inventive genius and organizational skill towards the arts of war instead of the arts of peace. Still, as we have seen, one must also accept as a fact the concept that "War stimulates, sometimes produces an invention that may be also serviceable in peace".[88]

One may refer to the enormous investment carried out by the Soviet Union in establishing a new strong industrial base behind the Urals, which actually gave a new starting point for Soviet economic development in general and for Soviet Asia in particular. One may mention that in a number of countries, particularly in the U.S.A., instead of disinvestment and shrinkage of national wealth, war demands gave a previously unheard of stimulus to economic development. One can mention that scientific research, technical

[87] A. Milward, *op. cit.*, p. XII.
[88] H. Barbara, *Rich Nations and Poor in Peace and War*, (Lexington 1973), p. 8.

inventions, and innovations were accelerated and reached a point which actually formed a new starting point for modern economic development carried out in a depth and with a growth rate after the war unequalled in the history of economic development.[89]

Diligence and intelligence are able to overcome difficulties and contribute to the victory. Evidence is clear that in modern war intelligence does not express itself only on the battlefield – perhaps not even primarily – but in quiet studios or laboratories far removed from the front, where the growth of science played a crucial role in the processing of winning the war; in the workshops and factories where management, organization, skill and heavy manual work were preparing the tools without which the job would never have been finished. But in addition the growth of science must not add to the growing concern about the sources of a new war. We must hope that the words which Cervantes gave to *Don Quixote* will never become true:

> "Blessed be those happy ages, that were stranger to the dreadful fury of these devilish intruments..."

The study of the economic history of the Second World War thus has a perpetual relevance. The more we know about its achievement and limitation, the better equipped we are to deal with similar questions. The warning of Wright Mills has – unfortunately – a large amount of truth:

> "The immediate cause of World War III is the military preparation for it".[90]

[89] H. Van der Wee: *Der gebremste Wohlstand. Wiederaufbau, Wachstum, Strukturwandel*, 1945-1980 (München 1984), p. 23.

[90] C. Wright Mills, *The Causes of World War Three*, (London 1958), p. 85.