

**BLOOD, SWEAT AND TEARS: BRITISH MOBILISATION FOR
WORLD WAR II**

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I. INTRODUCTION

In a total war, more than in any other type of conflict, victory is dependent on the scale of resources that can be mobilised. Here, we analyse the “blood, sweat and tears” behind British mobilisation for World War II.¹ A war economy is presumably one in which the overriding economic imperative is to achieve the war aims of the nation. A *total war* economy suggests an even greater intensity, in that all economic resources are mobilised to that end. However, this should not be taken to mean that all able-bodied people in the economy are in the armed forces or the munitions and related industries. An economy that produces guns but no butter will quickly collapse. The armed forces and the munitions workers need to be fed, clothed, housed, transported from home to work, industry needs to be provided with energy, etc. Nor can the pre-war standard of living of the populace be ignored, as they will expect to maintain some minimum level even during the wartime deprivations, and if the state is to be successful it will need to provide incentives. Therefore, the degree of war mobilisation (that is, the level of resources directly devoted to the prosecution of the war) that can be associated with a successful total war economy will differ across economies, reflecting their economic capacity.

Section II examines the level of mobilisation in the British economy during the war. It will be shown that, at the wartime peak, just over half of national expenditure was devoted directly to war and that the working population was divided roughly equally between on the one hand the armed forces, the munitions industries and other industries essential to the war effort, and on the other hand the less essential industries. Given the level of development and the structure of the British economy (and given the strategic imperatives) this represented a total war economy. The

mobilisation was achieved primarily through state direction and the economic scope and role of the state is the subject of section III. It broadly follows conventional accounts that emphasise the importance of Keynesian macroeconomic management and economic controls. However, the British economy was a market economy, a fact that had to be taken into account by those implementing state directives and which contributed to the success of the wartime economy. Thus, section IV begins by examining an alternative classical view of resource allocation during wartime before considering the benefits of capabilities developed in a pre-war market economy context. Of prime importance among these capabilities were the high level of productivity across all sectors of the economy and the degree of economic flexibility. It will also be argued that market-derived factor specialisation lay at the heart of the allied war effort.

II. THE SCALE OF MOBILISATION

1. Total war spending

The extent to which the term “total war” can be justified must depend on the scale of the commitment of resources to the war effort. On this criterion, there is little doubt that Britain during World War II was fighting a total war. Following the Combined Committee on Non-Food Consumption, the data in Table 1 divide national expenditure into consumption, war spending and non-war investment.² Whereas rearmament expenditure accounted for 7.4 per cent of national expenditure in 1938, by the peak year of the war effort in 1943, war spending accounted for as much as 55.3 per cent of national expenditure. A similar pattern emerges if expenditure is split between private consumption, government consumption, investment and net exports,

with government consumption rising from 13.5 per cent in 1938 to a peak of 49.7 per cent in 1943, before falling back to 42.2 per cent in 1945 and 23.3 per cent in 1946.³

2. Output of specific goods and services

Britain was a relatively large and rich country in 1938, so that devoting more than half of national expenditure to the war resulted in a formidable war effort.⁴ To see what this meant in more concrete terms, it is helpful to examine the output of selected items in Table 2, covering agriculture and services as well as industry, since fighting a total war requires more than producing munitions. First, however, note the time path taken by real GDP, the summary measure of domestic output of goods and services. Real GDP rose to a peak in 1943 that was 27 per cent above the 1938 level, before falling back during 1944 and 1945.

The main task facing British agriculture was the need to replace lost imports, which had accounted for 70 per cent of Britain's prewar food requirements.⁵ Between 1939 and 1942, for example, imports of animal feedstuffs fell by 94 per cent, imports of butter by 69 per cent, sugar by two-thirds and wheat by a third.⁶ Given the need to produce enough calories to sustain the population, resources were diverted from the livestock to the arable sector. The impact on output in the agricultural sector can be seen in Table 2, with grain and potato production increasing by 81 per cent and 96 per cent respectively between 1939 and 1943, while meat production fell by 36 per cent.

Turning to industry, there was a continuous and significant decline of coal output during the war years from 231 million tons in 1939 to 183 million tons in 1945. There were a number of reasons for this decline, including disruption to

transport facilities caused by German bombing, the loss of experienced workers to the armed forces, poor industrial relations, the curtailment in the supply of vital materials such as timber and steel, and shortages of mechanical cutting and conveying machinery.⁷

Annual steel making capacity had reached approximately 13 million tons during the 1930s, and this proved sufficient for war needs (apart from additional specialist steel capacity), with steel production fluctuating around this level throughout the war. In particular, this level of production struck a balance between the availability of local ores and the possibility of importing steel from the United States. As Burn notes, if the imported steel had been replaced by the same tonnage of imported iron ore, less steel would have been available in the crucial years.⁸ Aluminium was a vital metal for aircraft production, and annual ingot capacity was raised to 31,000 tons in 1939 and increased further to 54,000 tons by 1943.⁹ With scrap and imports, the total supply of aluminium reached nearly 300,000 tons by 1943.¹⁰

The huge expansion of munitions production that was to form the centrepiece of the war effort required also an increase in the production of machine tools, the output of which peaked in 1942 at nearly 100,000, compared with less than 20,000 in 1935.¹¹ The strain was eased by the import of machine tools from the United States, particularly during the early years of the war, with US imports peaking at more than 33,000 in 1940. The new tools were used to increase munitions output dramatically. To take one important example, whereas in 1938 a mere 2,828 aircraft were produced with an average structure weight of 3,472 lb., by 1941 more than 20,000 aircraft were

produced with an average structure weight of 4,342 lb., and by 1944 output had risen to 26,461 aircraft with average weight leaping to 7,880 lb., mainly as a result of heavy bomber production coming on line. Impressive gains in the production of warships, rifles and mortars can also be seen in Table 2.

In the absence of adequate or meaningful price data, the diversity of munitions production makes it difficult to derive a single consistent measure for munitions output. Fortunately, however, the British wartime planners designed an index of total munitions output for the United Kingdom, which has recently been revised by Harrison.¹² The Harrison index, rebased on the fourth quarter of 1939, is shown in Table 3. The index shows that munitions production peaked in the first quarter of 1944, when production was more than six-and-a-half times the level it had been in the last quarter of 1939. Furthermore, as many weapons (particularly aircraft) became heavier and more complex over time, the average quality of munitions almost certainly increased.

Returning to Table 2, we can see the collapse in the production of consumer industries such as cotton, footwear and construction. Although clothing and footwear were still needed for military purposes, civilian demand was severely curtailed through rationing and the introduction of utility specifications.¹³ Given the obvious need for the new construction of airfields, camps, training establishments, defence works, storage depots and other types of military installations, plus the need to make good bomb damage, it may seem surprising that the value of construction did not increase substantially, even in nominal terms, and even fell substantially later in the war.¹⁴ As in the coal industry, there was a loss of experienced labour to the armed

forces and a shortage of key materials. Nevertheless, again as in the coal industry, there have also been criticisms of the efforts of managers and workers in the industry.¹⁵ The amount of electricity generated grew rapidly during the early stages of the war as growing industrial demand more than offset any savings from the blackout and exhortations to economise on the domestic use of fuel.¹⁶ After industrial demand peaked in 1943, plans to extend capacity were given low priority, and output stagnated.¹⁷

Dealing finally with services, Table 2 provides a number of indicators of shipping and railway traffic, which also made an important contribution to the war effort. Shipping arrivals clearly fell sharply at the beginning of the war as the east coast ports were closed to larger vessels, congestion increased at west coast ports, and ships had to travel in convoy.¹⁸ Shipping arrivals continued to decline until the submarine menace was brought under control from March 1943.¹⁹ By contrast, the utilisation of the railways increased substantially during the war. Although the number of passenger journeys did not increase, the average distance travelled rose as service personnel were spread around the country, so that passenger miles increased substantially. Similarly, the increase in rail freight ton miles arose principally from an increase in the average distance of a freight journey rather than from an increase in the tonnage moved, despite zoning arrangements to reduce unnecessary mileage.²⁰

III. MACROECONOMIC MANAGEMENT AND MICROECONOMIC CONTROLS

We now turn from the scale of mobilisation to the issue of how the mobilisation of resources was achieved. This involves a consideration of both financial and real

aspects of the resource allocation process. It should be noted that the traditional literature, based on the multi-volume official history of the war, is very heavily imbued with a Keynesian view of the world and a strong belief in the superiority of controls over market forces.²¹ We shall consider the more recent literature that has begun to question these assumptions in section IV.

1. Fiscal and monetary policy

The traditional account usually places Keynes's contribution to the conduct of fiscal and monetary policy close to the centre of the story.²² Keynes developed the idea of an "inflationary gap" to analyse the problem of war finance.²³ He viewed the orthodox "Treasury View" of calculating how much tax revenue would be available on the principle of how much people would be willing to pay as a recipe for inflation. He argued, rather, that the government needed first to calculate national income, so as to assess the war potential of the economy, and then set taxes at the level needed to bring about the necessary transfers from the taxpayers to the government. The extra wartime taxes could be treated as forced savings or deferred pay to be repaid after the war. This had the additional advantage of building up potential purchasing power that could be released in the event of a postwar slump, as well as financing the war effort. To the extent that the government failed to achieve the required levels of taxation or forced savings, there would be an inflationary gap, since the excess of aggregate demand over aggregate supply would bid up prices.

Income tax was the most important source of tax revenue for the state throughout the war, increasing both in terms of its level and its scope. The standard rate of income tax doubled from 25% in 1937/38 to 50% in 1941/42.²⁴ More

importantly, the proportion of the population paying tax was greatly widened through such measures as the introduction in 1943 of the Pay-As-You-Earn scheme.²⁵ An important new source of tax revenue was the Excess Profits Tax. This was an attempt to stop wartime profiteering by firms, taxing profits in excess of peacetime levels. Initially set at a rate of 60%, it was raised in 1940 to 100%.²⁶ Indirect taxes, especially those on the staples of alcohol and tobacco, were also increased.

A movement towards Keynes's forced savings or deferred pay proposal was made, but the scale of postwar credits was limited and applied only to special cases such as pensioners.²⁷ The principle of postwar credits was also applied in 1941 to the Excess Profits Tax, which was feared to be adversely affecting incentives. However, it should be noted that in general the Keynesian approach to fiscal policy pays more attention to the effects of taxation on aggregate demand than the effects on incentives, a theme to which we shall return in section IV. Wartime budgets dealt not only with measures to limit demand pull inflation, but also with measures to tackle cost push inflation through cost of living subsidies.²⁸

The conventional Keynesian view assigns only a subsidiary role to monetary policy. Although Bank Rate was raised from 2 per cent to 4 per cent on 24 August 1939, it was quickly lowered again to 3 per cent on 28 September, when it was felt that controls rendered the rate of interest redundant for regulating either domestic demand or the exchange rate. Interest rates then remained low for the duration of the war, which cheapened the cost of financing the large budget deficit and led to the memorable phrase of "A three per cent war", as *The Economist* put it in an article of 20 January 1940.²⁹ The government chose to finance the large budget deficit through

borrowing to avoid inflationary money finance. The aim was to persuade private sector agents to hold government debt, preferably long dated to keep them as illiquid as possible. This was achieved through restricting alternative investment opportunities as well as through expanding the range of government financial instruments.

Alternative investment opportunities were tightly controlled through a Capital Issues Committee and restrictions on bank advances.³⁰ This left the government free to act as a discriminating monopolist, offering different terms to different classes of investor, at the lowest rates necessary to attract each class of funds.³¹ This involved Defence Bonds and National Savings Certificates for small investors as well as War Bonds and Exchequer Bonds for institutional investors.³² In addition, from 1941, Tax Reserve Certificates were offered to firms setting aside funds to meet future tax liabilities.

Any funds not invested in these instruments normally ended up in banks, so it was important that the government developed ways of utilising banks' liquid reserves.³³ This was done through the introduction of the Treasury Deposit Receipt in addition to the Treasury Bill. The upshot of these changes was a transformation in the balance sheet position of the London clearing banks. On the asset side, commercial advances declined even in nominal terms, while holdings of government paper grew explosively. On the liabilities side, there was a dramatic rise in total deposits, much of it in the form of business deposits.³⁴

The monetary consequences of the central government deficit are summarised in Table 4. About two thirds of the deficit was financed by long term domestic

borrowing, with only about one third financed by short term floating debt, principally in the form of Treasury Bills and Treasury Deposit Receipts.³⁵ Only a small fraction of the deficit was financed through the expansion of the money base. Furthermore, the inflationary consequences of even this small expansion of the money base were muted by the extensive controls exercised over the banking sector, thus limiting the money multiplier effects.

The relationship between money and prices is considered in Table 5. Although broad money (M3) approximately doubled over the war period, the price level rose by only about 50 per cent, as reflected in Feinstein's GDP deflator at factor cost and retail price index.³⁶ It should be noted that the substantially smaller rise in the official Ministry of Labour cost of living index reflects the unrepresentativeness of the 1904 working class expenditure weights used in its construction. The excess of money growth over inflation, whichever index of the price level is used, suggests quite a significant role for controls in containing inflation. However, as Capie and Wood note, the role of controls is dwarfed by the role of bond finance.³⁷ Indeed, their counterfactual calculation indicates that if the war had been financed completely by printing money, the price level would have risen from 100 in 1939 to 1,023,824.3 by 1945. This is just the sort of catastrophic hyperinflation scenario that Keynes's scheme was designed to avoid.³⁸

2. Financing the external deficit

A central issue in most accounts of the mobilisation of resources for war in Britain is the external deficit. Although the Treasury initially hoped to meet the import requirements from gold reserves and exports, and to this end instituted an export

drive, by March 1941 it was clear that this was not feasible.³⁹ The introduction of lend-lease considerably relaxed the external constraint and allowed a much greater degree of specialisation by Britain on war work than would otherwise have been possible.⁴⁰

Despite the massive current account imbalance, the exchange rate was maintained at a fixed parity of £1 = \$4.03, about 20 per cent below the old gold standard parity, protected by a system of import controls and foreign exchange restrictions.⁴¹ As with so many aspects of the war economy, the price became artificial and attention switched to quantities.

The evolution of the British balance of payments is tracked in Table 6. The largest debit item on the current account was imports, accounting for £12.2 billion of the £16.9 billion, with government overseas expenditure (excluding munitions) accounting for the bulk of the rest. With export volumes falling to less than one third of their prewar level by 1943, current account credits lagged seriously behind debits, creating an accumulated current account deficit of £10.0 billion over the war period as a whole. The single most important method of finance was grants from the United States under lend-lease, although the deficit was also covered by the sale of investments and the accumulation of substantial liabilities.

3. Microeconomic controls

Even if the inflationary gap could be closed at the macroeconomic level, there was no guarantee that the consumption of individual goods would be brought smoothly into line with supply.⁴² Hence the government also used a barrage of microeconomic

measures to ensure that this balance was achieved, including (1) overall central planning to set priorities (2) rationing to curtail consumer demand (3) production quotas and the concentration of production in large units in civilian industries (4) central manpower budgeting to allocate labour across sectors (5) central allocation of scarce resources such as steel and capital.⁴³

Although there were mechanisms of control and planning during World War I and during rearmament, Wiles argues that rational overall planning only really began with World War II.⁴⁴ The War Cabinet discussed strategic issues, and overall priorities were fed through a production committee to the supply departments, although the details of the structure changed during the course of the war.⁴⁵ At the departmental level, new Ministries of Supply, Home Security, Shipping, Food, Economic Warfare and Information quickly appeared at the outbreak of war, reflecting the changed priorities of the war economy.⁴⁶ In the formulation and co-ordination of economy policy, the newly established Economic Section of the War Cabinet secretariat and the Central Statistical Office came to play an increasingly important role.⁴⁷

A number of items were rationed from the outbreak of war and rationing gradually spread to more consumer goods and services.⁴⁸ By the spring of 1945, rationing covered about one half of consumer spending on goods at prewar values and about one third of consumer spending on goods and services.⁴⁹ Initially, rationing operated on a coupon basis, with consumers entitled to fixed amounts of rationed items.⁵⁰ From 1941, however, a more flexible points system was introduced, whereby coupon points could be spent on a limited number of goods, thus allowing consumers

some scope for substitution in line with preferences.⁵¹ It has been argued that the rationing system operated more effectively in Britain than in other countries.

Although some writers see this as reflecting a greater spirit of voluntary compliance in Britain, Mills and Rockoff attribute it mainly to the greater scale of resources devoted to the issue, with a fuller array of controls backed up by both financial and legal resources, ensuring a strict supervision of both production and distribution.⁵²

Much civilian production was cut back severely at the beginning of the war, particularly through Limitation of Supplies Orders.⁵³ In many consumer industries, the state also implemented a temporary wartime concentration of production drive to gain economies of scale and standardisation. Figures from the Federation of British Industries suggest that this drive released 255,900 workers and 61.2 million square feet of capacity for munitions and related industries.⁵⁴

One aspect of the mobilisation of labour for the war effort was the need to bring about an overall increase in labour supply by securing increased female participation to replace males recruited into the armed forces. An additional boost to labour input came from the elimination of the mass unemployment of the 1930s. However, in addition to increasing the labour input, it was necessary to reorient civilian labour supply away from group III industries producing inessential civilian items and into the essential group I industries producing war supplies, while maintaining employment and output in essential group II non-war industries such as fuel and power. Although during the early stages of the war labour problems appeared mainly in the form of bottlenecks with skilled labour, as time went on the general supply of labour was seen as a constraint. From December 1942, with the first

Manpower Budget, the problem of the allocation of labour between the production programmes of the different government departments was tackled directly.⁵⁵

“Manpower” was the term coined in that bygone age, less gender-conscious than our own, but in wartime the most rapidly growing element was womanpower, as Table 7 reveals. The government had wide powers of labour compulsion which it used to control the supply of labour to both the armed forces and industry, although where possible it relied on voluntarism and co-operation.⁵⁶

Other inputs of vital materials and capital were also controlled by the government. For vital materials such as steel, each government order or licensed private order for a product requiring steel carried with it a right to the required amount of steel. This right, known as an “M form” could be cashed at a steelworks. This was administratively complex and led on occasions to “coupon inflation” when too many M forms were chasing too little steel.⁵⁷ The Capital Issues Committee controlled all new issues on the capital market, but this is not the same as control over physical investment. Although building, and at times machine tools, were subject to close control, most investment was controlled only indirectly through the controls on labour and materials.⁵⁸

IV. A ROLE FOR MARKET FORCES?

1. An alternative classical view

The analysis so far has reflected the strong Keynesian bias of the literature, with an emphasis on quantities and a belief in the efficacy of government intervention and controls. Although an alternative classical model of the war economy is available, its empirical implementation in the British case has been limited to a general analysis of

the twentieth century, rather than a detailed analysis of World War II. Nevertheless, from a classical perspective this may be a strength rather than a weakness, with the stark differences between a war economy and a peacetime economy being over-drawn in the traditional analysis. After all, it is unlikely that the declaration of war suddenly makes a government all-knowing and all-powerful, or leads to the suspension of all pursuit of selfish interests. There may be some virtue, then, in analysing how we would expect a perfectly competitive market economy to react to war. This can then be used as a benchmark against which to assess the impact of the special measures and controls, rather than simply attributing all change to such measures. This is important because Britain's postwar problems are sometimes seen as stemming from too ready an acceptance of the beneficial effects of government intervention and controls.⁵⁹

Ahmed adapts Barro's model of government spending in a closed economy model to the open economy case and provides an econometric application to the United Kingdom in the twentieth century.⁶⁰ There are four key aspects to the model. First, there is a temporary increase in government spending to fight a war. Although this displaces some private spending, the "direct crowding out" effect is less than proportional, since "guns" are not a good substitute for "butter" and people want to go on consuming butter. Hence the level of aggregate demand increases. Second, there is an increase in aggregate supply, as real wages increase to bring forth the required extra labour. In a way, a war acts a bit like a "gold rush", creating a temporary boom. Third, if the increase in aggregate demand exceeds the increase in aggregate supply, there is excess demand, and this can be met by a deterioration in the balance of trade deficit. Fourth, it makes no difference to the level of economic activity whether the

increased government spending is financed by taxation or borrowing. Under this “Ricardian equivalence” of taxation and bond finance, private spending decisions are unaffected by the form of finance of government spending, since bond finance represents a future tax liability, the present value of which is the same as the taxes which would otherwise have to be raised now.

The model seems to capture the crude features of the British war economy. Overall activity rises, consumption falls but by less than the increase in government spending, and excess demand spills over into a balance of payments deficit. Furthermore, the issue of taxes versus bonds in a Ricardian framework becomes simply one of intergenerational transfers and tax smoothing, with a greater reliance on bond financing spreading the burden onto future generations of taxpayers. Doubtless many of the strong assumptions of the model do not hold, particularly with regard to the ubiquity of perfect competition. Nevertheless, it suggests that we should not be too quick to attribute all changes during wartime to the efficacy of regulations and controls.

Few historians are likely to be persuaded that the achievements of the British war economy can be put down to the smooth operation of market forces during the war itself. However, the classical view does remind us that before the outbreak of war in 1939, Britain had a long history as a market economy. Clearly, this had to be taken into account by those implementing state controls during wartime. Also, it meant that Britain had the benefit of capabilities developed in a market economy context before the war, including high levels of productivity across all sectors and a high degree of

flexibility. We now explore these issues in more detail by comparing Britain with Germany and by considering relations with the United States.

2. Britain and Germany

One important feature of the British economy was its early commercialisation and commitment to open markets. In contrast to Germany and much of the rest of western Europe, Britain remained committed to free trade during the period of the “US grain invasion” from the mid-nineteenth century, and this led to a further decline in the share of the British labour force in agriculture, from an already unusually low level.⁶¹ Taking a strategic view of food supplies during war, it would be natural to think of Britain as particularly vulnerable to economic blockade, and Germany as more secure. And yet, as Olson notes, it was Germany rather than Britain that succumbed to economic blockade during the two world wars.⁶²

Olson’s explanation for Britain’s ability to survive and Germany’s tendency to collapse is instructive. He points to the ability of the British agricultural sector to expand output on the stored-up fertility of grasslands brought back into arable use compared with the inability of German agriculture to maintain output at full stretch in the face of wartime disruption. He also stresses the flexibility of the British service sector through administration as well as distribution as the decisive factor.

In fact, careful quantitative examination suggests that Britain’s survival owed more to the flexibility of the service sector than the expansion of agricultural output, which was actually quite modest overall in both world wars.⁶³ Given recent research on international comparisons of labour productivity by sector, we can now see in Table 8 that on the eve of World War I, Germany had caught up with Britain in

industry, but remained a long way behind in agriculture and services. By protecting agriculture, Germany had retained a relatively “backward” structure with 29.9 per cent of the labour force in agriculture in 1935, compared with just 6.8 per cent in the United Kingdom. Accordingly, Germany also had a much smaller service sector, which failed to reap economies of specialisation, and hence achieved lower productivity than its British counterpart.

We must be careful, then, not to be mesmerised by the success of Germany’s rapid industrialisation from the mid-nineteenth century on the basis of protectionism, state intervention and universal banks.⁶⁴ Britain’s slower, more market-oriented development made for a more flexible economy which was better able to stand the strains of total war.

3. Comparative advantage and the allied war effort

From the perspective of neoclassical economics, development and growth are dependent on free and integrated factor and product markets both nationally and internationally. Indeed, the period before World War I was characterised by economic growth and income convergence underpinned by global factor and product market integration.⁶⁵ This gave way in the interwar period to rising autarky, which helped to contribute to the economic, political and social tensions that would lead to World War II. The war itself, through the disruption it caused to international trade and to the national economies, further weakened the forces of globalisation and convergence. Paradoxically, however, at the heart of the allied war effort (and possibly a defining factor in its success) was a remarkable form of economic integration.

The Heckscher-Ohlin theory of international trade says that economies should trade those goods in which they have an international comparative advantage. Comparative advantage arises from the differences in factor prices across economies and those differences, in turn, reflect their relative supplies of factors of production such as labour and capital. During the war Britain and the United States applied a variation to Heckscher-Ohlin which also took account of their relative closeness to the theatres of war. Allen has argued that the greater size and productivity of the US economy led it (and Canada) to provide a greater share of munitions whereas Britain compensated by having a greater mobilisation of troops (and of its economy generally).⁶⁶ Thus, for example whereas by D-Day 55 per cent of the UK labour force was in the armed forces or in war-related employment the comparable figure for the United States was 40 per cent.⁶⁷

Indeed, the size of the UK armed forces (and those of Australia, New Zealand and India) exceeded its capacity to equip them and the gap could only be, and indeed was, made up by munitions supplies from North America. The strain of full-scale mobilisation on the British economy was such that necessary imports from the United States and Canada also extended to food, consumer goods and raw materials.⁶⁸ It could be argued that because mobilisation exceeded capacity, in economic terms the characterisation of the British economy as a total war economy is an understatement.

The mechanism by which the United States provided its aid was lend-lease (which began in March 1941). There was also reciprocal aid from Britain to the United States, which again recognised a war restricted international comparative advantage. To equip American troops in the European and Pacific theatres from the

United States would not only have been costly (especially in terms of scarce shipping capacity) but also dangerous and thus they were supplied with many goods and services locally. Reciprocal aid also extended to the provision of raw materials and foodstuffs to the American economy itself, especially from 1943 and primarily supplied by British colonies.⁶⁹

In monetary terms the value of lend-lease aid (\$27 billion) greatly exceeded that of reciprocal aid (\$6 billion). However, relative to the size of the economies the gap was much smaller: reciprocal aid accounted for 4.6% of UK national income (3.0% of GDP) whereas lend-lease aid accounted for 4.1% of US national income (3.4% of GDP).⁷⁰ In the settlement of this mutual aid at the end of the war, the Americans recognised this fact and acknowledged the international division of labour that characterised the allied war effort by effectively cancelling the notional \$21 billion that stood to their credit.⁷¹

V. CONCLUDING COMMENTS

The British war economy was a success, at least in terms of the overriding objective of achieving victory. Britain overcame early strategic setbacks to mobilise economically without causing internal unrest, managing to raise, equip and maintain armed forces that would fight on three major fronts: in Asia, in Africa (and later Southern Europe), and finally Western Europe. We have analysed the "blood, sweat and tears" behind this British mobilisation, showing how conventional accounts emphasise the importance of Keynesian macroeconomic management and the microeconomic tools associated with wartime administrative planning. However, we have also argued that attention needs to be given to the market context and market

forces. Thus, we have examined an alternative classical view of resource allocation during the war, demonstrated the benefits of capabilities developed in the market context before the war, and shown how comparative advantage lay behind allied wartime co-operation. The scale of mobilisation is probably sufficient to justify the use of the term “total war economy” to describe Britain during World War II. However, the claim is strengthened by the importance of overseas financial aid, dominated by the United States but supplemented by the British dominions and colonies. In a sense, this aid allowed Britain to become “over-mobilised”, so that we need to think in terms of a Western Allied Economic Market, particularly after the American entry into the war in December 1941. During these years, the war economy was “total” in the additional sense that it eclipsed national boundaries.

TABLE 1: The distribution of UK net national expenditure, 1938-1944 (per cent of total)

	Consumption	War	Non-war investment
1938	87.2	7.4	5.4
1939	82.6	15.3	2.1
1940	71.1	43.8	-14.9
1941	62.4	52.7	-15.1
1942	59.0	51.8	-10.8
1943	55.5	55.3	-10.8
1944	56.5	53.4	-9.9

Source: Combined Committee on Non-Food Consumption, *The Impact of the War on Civilian Consumption in the United Kingdom, the United States and Canada*, (London: HMSO, 1945), 144.

TABLE 2: UK output of selected items, 1939-1945

	1939	1940	1941	1942	1943	1944	1945
Real GDP, 1938=100	101.1	111.1	121.2	124.2	127.0	121.9	116.6
<i>Agriculture</i>							
Grains, 000 tons	4,264	5,231	5,942	7,113	7,737	7,445	7,132
Potatoes, 000 tons	4,354	5,375	6,783	8,162	8,537	8,026	8,702
Meat, 000 tons	1,180	1,072	902	772	754	783	812
<i>Industry</i>							
Coal, m tons	231	224	206	205	199	193	183
Iron ore, m tons	14.5	17.7	19.0	19.9	18.5	15.5	14.2
Steel, m tons	13.2	13.0	12.3	12.9	13.0	12.1	11.8
Aluminium, 000 tons	25.0	19.0	22.7	46.8	55.7	35.5	31.9
Machine tools, 000	37.0	62.0	80.9	95.8	76.2	59.1	47.5
Aircraft, units	7,940	15,049	20,094	23,672	26,263	26,461	
Aircraft, m lb	29	59	87	133	185	209	
Warships, 000 tons	76	170	226	234	174	171	
.303 rifles, 000	34	81	79	595	910	547	
Mortars, units	2,822	7,559	21,725	29,162	17,121	19,046	
Cotton yarn, m lb	1,092	1,191	821	733	712	665	597
Footwear, m pairs	132.5			108.2	102.7	99.7	99.8
Construction, £m	442	425	470	425	350	290	290
Electricity, GWh	27,733	29,976	33,577	36,903	38,217	39,649	38,611
<i>Services</i>							
Ship arrivals, units	13,833	8,126	6,362	6,296	6,778	9,297	8,541
Rail passengers, m	1,226	967	1,023	1,218	1,335	1,345	1,372
Rail passengers, m miles	18,993				32,273	32,052	35,248
Rail freight, m tons	288	294	287	295	301	293	266
Rail freight, m ton miles	16,266			23,822	24,358	24,444	22,023

Sources: Central Statistical Office, *Statistical Digest of the War*, (London: HMSO and Longmans, 1951), with page references given in parentheses in notes, except where stated otherwise. Notes: Real GDP (Feinstein, C.H., *National Income, Expenditure and Output of the United Kingdom, 1855-1965*, Cambridge: Cambridge University

Press, 1972: Table 6); grains are the sum of wheat, barley and oats harvested (59); potatoes (59); meat is home killed meat (68); coal (Supple, B.E., *The History of the British Coal Industry, Vol. IV, 1913-1946: The Political Economy of Decline*, Oxford: Oxford University Press, 1987: 9); iron ore (101); steel (British Iron and Steel Federation, *Statistical Year Book for 1946, Part 2: Overseas Countries*, London: BISF: 328-329); aluminium, virgin (110); machine tools (158; Postan, M.M., *British War Production*, London: HMSO and Longmans, 1952: 207); aircraft (152-153); warships include battleships, aircraft carriers, monitors, cruisers, destroyers and submarines, measured by displacement tonnage (133); .303 rifles (144); mortars (133); cotton yarn (126); footwear (160); construction, value of gross output (Kohan, C.M., *Works and Buildings*, London: HMSO and Longmans, 1952: 426, 488; electricity generated (86); shipping arrivals at UK ports (183); railway passenger journeys (189); railway freight traffic (189).

TABLE 3: Quarterly index of total munitions output of the UK, 1940-1944 (per cent of 1939.IV)

	I	II	III	IV
1939				100
1940			233	249
1941	269	292	307	381
1942	418	535	542	567
1943	591	616	586	628
1944	652	633	547	537

Source: Harrison, M., "A Volume Index of the Total Munitions Output of the United Kingdom, 1939-1944", *Economic History Review*, 43 (1990), 665.

TABLE 4: Financing the UK central government deficit, 1938-1945 (£m)

	Total revenue	Total spending	Current deficit	Increase in			
				domestic long debt	domestic short debt	money base	other finance
1938	673	781	108	77	-179	18	192
1939	771	1,261	490	72	280	18	120
1940	1,158	3,273	2,115	1,033	517	70	495
1941	1,905	4,727	2,822	1,650	903	109	160
1942	2,314	5,223	2,909	2,100	476	191	142
1943	2,759	5,585	2,826	1,955	1,017	200	-346
1944	2,897	5,569	2,672	1,711	1,081	190	-310
1945	2,806	4,937	2,131	1,885	557	184	-495

Source: Central Statistical Office, *Statistical Digest of the War*, (London: HMSO and Longmans, 1951), 202; Capie, F. and Webber, A. (1985), *A Monetary History of the United Kingdom, 1870-1982, Vol. 1: Data, Sources and Methods*, (London: Allen & Unwin, 1985), Table 1.1.

TABLE 5: Money and prices in the UK, 1939-1945 (per cent of 1938)

	M3	GDP deflator (Feinstein)	Retail price index (Feinstein)	Cost of living (Ministry of Labour)
1939	99.3	104.4	103.3	101.0
1940	109.2	113.4	117.0	117.8
1941	125.9	123.6	128.8	126.7
1942	142.0	132.5	137.3	127.7
1943	162.4	138.6	141.8	126.7
1944	184.4	146.9	145.1	128.7
1945	208.5	151.3	147.7	129.7

Source: Capie, F. and Webber, A. (1985), *A Monetary History of the United Kingdom, 1870-1982, Vol. 1: Data, Sources and Methods*, (London: Allen & Unwin, 1985), Table 1.3; Feinstein, C.H., *National Income, Expenditure and Output of the United Kingdom, 1855-1965*, Cambridge: (Cambridge University Press, 1972), Tables 61, 65); Central Statistical Office, *Statistical Digest of the War*, (London: HMSO and Longmans, 1951), 205.

TABLE 6: UK balance of payments, 1939-1945 (£ billion)

	Current account			Means of financing			
	debits	credits	deficit	net grants from US	sale of investments	rise in liabilities	other finance
1939	0.3	0.1	0.2	0.0	0.0	0.1	0.1
IX-XII							
1940	1.5	0.7	0.8	0.0	0.2	0.2	0.4
1941	1.9	0.8	1.1	0.3	0.3	0.6	-0.1
1942	2.6	0.9	1.7	0.9	0.2	0.5	0.1
1943	3.6	1.5	2.1	1.6	0.2	0.7	-0.4
1944	4.2	1.7	2.5	1.9	0.1	0.7	-0.2
1945	2.8	1.2	1.6	0.7	0.1	0.7	0.1
Total	16.9	6.9	10.0	5.4	1.1	3.5	0.0

Source: Sayers, R.S., *Financial Policy, 1939-45*, (London: HMSO and Longmans, 1956), 499.

TABLE 7: Distribution of the UK working population, 1939-45 (mid-June)

	1939	1940	1941	1942	1943	1944	1945
<i>A. Thousands</i>							
Total	19,750	20,676	21,332	22,056	22,285	22,008	21649
Male	14,656	15,104	15,222	15,141	15,032	14,901	14,881
Female	5,094	5,572	6,110	6,915	7,253	7,107	6,768
<i>B. Per cent of total</i>							
Unemployed	6	3	1	--	--	--	1
Armed forces	2	11	16	19	21	23	24
Civil defence	--	2	2	2	1	1	1
Group I	16	17	20	23	23	23	20
Group II	27	25	26	25	25	25	26
Group III	49	41	36	32	28	28	29

Source: Central Statistical Office, *Statistical Digest of the War*, (London: HMSO and Longmans, 1951), 8.

Notes: Group I industries: metals, engineering, vehicles and shipbuilding; chemicals, explosives, paints, oils etc.

Group II industries: agriculture and fishing; mining and quarrying; national and local government; gas, water and electricity supply; transport and shipping.

Group III industries: food, drink and tobacco; textiles; clothing, boots and shoes; cement, bricks, pottery, glass etc.; leather, wood, paper etc.; other manufactures; building and civil engineering; distributive trades; commerce, banking, insurance and finance; miscellaneous services.

TABLE 8: Comparative Germany/UK labour productivity levels by sector, 1911-1935 (UK=100)

	1911	1935
Agriculture	67.3	57.2
Industry	122.0	99.1
Services	81.3	85.7
Whole economy	75.5	75.7

Source: Derived from Broadberry, S.N., "How did the United States and Germany Overtake Britain? A Sectoral Analysis of Comparative Productivity Levels, 1870-1990", *Journal of Economic History*, 58 (1998), 375-407.

¹ Hansard, 13 May 1940, col. 1502 reports Prime Minister Winston Churchill as saying: "I would say to the House, as I said to those who have joined this Government: 'I have nothing to offer but blood, toil, tears and sweat'". However, the phrase has been popularly remembered as "blood, seat and tears".

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