

Defending Democracy: Lord Weir and the organisation of Britain's rearmament drive in the 1930s

This paper focuses on a specific aspect of activity beyond the firm - the role in government of what has come to be called 'special adviser'. The vital question of how to organise armaments production and procurement was the catalyst for bringing back Lord Weir, one of the leading industrialist-technocrats of the age, to the centre of decision-making in Britain as the international crisis of the 1930s became ever more threatening. Confronting the enfeebled condition of Britain's defences, Weir set himself the objective of pursuing the various alternative ways of increasing peacetime production and at the same time perfecting the arrangements for preparing for war. He is credited as the progenitor of the shadow factory scheme - designed to take account of the existing, severe capacity-constraints in the engineering sector of the British economy. The scheme also provided a way to switch production, rapidly and comprehensively at the outbreak of war, away from civilian goods. The paper pays particular attention, therefore, to Weir's role and influence as adviser; it seeks to identify the range of constraints imposed on, and the degree of success achieved by, the organisation of rearmament in the build up to war.

Historians of the Second World War often try to identify unique features of a particular national war economy which help to explain the above- or below-average economic performance of that country in an international perspective. The institutional and organisational context may be highly significant: ideological or political factors may act either to constrain or facilitate industrial production and technological innovation, whilst military, business and scientific élites exercise varying degrees of power and influence within a state. The inadequacies in Britain's preparations for war in the 1930s are frequently explained by reference to the disadvantages suffered by democracies in comparison to dictatorships: Germany was able to create a *Wehrwirtschaft* – a war economy during peacetime – but British rearmament had to keep step with slowly-evolving public opinion.

At the beginning of the Second World War, however, it is often argued that the comparatively low productivity in German armament production was caused by the dominance of military authorities over the civilian administration when it came to the

procurement of armament goods.¹ In the US, too, civilian mobilization agencies were overruled by the armed forces.² But, in contrast to the German case, the dominance of military authorities in the American war economy appeared to increase rather than slow down the velocity of armament production. This raises the possibility, therefore, that the rearmament preparations and the war economies of the combatants were generally far more similar than many studies suggest, even if outcomes were different from state to state.

Certainly, there are many similarities at the macroeconomic level. In this respect, Harrison's study of Second World War economics offers a comprehensive framework for discussion.³ Many countries witnessed a dramatic rise of military spending on the eve of and during the Second World War; This rise in military spending triggered a rapid and unexpected increase in armament production which, in more than one country, was christened an "armament miracle" or a "production miracle". With the exception of the US, the combatants' war economies depended heavily on the import of raw materials and vital armament goods. Given the vulnerability of foreign trade during wartime, the availability of domestic strategic resources was decisive for the outcome of the war. It is possible to argue that a country's participation in World War II fostered R&D, human capital formation and investment in new machinery and technology and thereby led to modernization and faster growth in the postwar period.⁴ However, one analysis of the UK suggests that the long-run impact of the war on national wealth was negative.⁵

Apart from the macroeconomic level, an examination of the relationship between industry and government in national economies is also instructive. For, notwithstanding the obvious ideological differences between states, many similarities clearly existed at the level of implementing and operationalising armament policies. This implies that the Allied democracies used, by and large, the same means as the Axis dictatorships to foster armament

¹ Overy, R. J. (1994). *War and Economy in the Third Reich*. Oxford: Clarendon Press, p. 347.

² Cullen, J. and Fishback, P. (2008). *Does Large-Scale Military Spending Stimulate Local Economies? The Implications of WWII Spending for Local Economic Activity, 1939-1958*. Unpublished paper, p. 6.

³ See Harrison, M. (ed.) (1998). *The Economics of World War II: Six great powers in international comparison*. Cambridge: University Press.

⁴ See, for example, for the German discussion Abelshauser, W. (1999). *Kriegswirtschaft und Wirtschaftswunder. Deutschlands wirtschaftliche Mobilisierung für den Zweiten Weltkrieg und die Folgen für die Nachkriegszeit*. *Vierteljahrshefte für Zeitgeschichte* 47: 503-538; Buchheim, Ch. (2001). *Die Wirtschaftsentwicklung im Dritten Reich - mehr Desaster als Wunder. Eine Erwiderung auf Werner Abelshauser*. *Vierteljahrshefte für Zeitgeschichte* 49: pp. 653-664.

⁵ Stephen Broadberry & Peter Howlett (1998) *The United Kingdom: 'Victory at all costs'* Cambridge: CUP, p. 72.

production. All governments procuring weapons and other goods from private firms had to deal with the trade-off between increasing efficiency when using fixed-price contracts and decreasing expenses and transaction costs when deploying cost-plus contracts.⁶ Given the overheated boom of the war economies most governments had to rely on bilateral negotiations with single armament manufacturers instead of using competitive bidding to award armament contracts. Governments had to finance many additional armament plants because private firms were not willing to take the risk of investing in what they assumed would become excess capacity once the war had ended and, consequently, of little value. Geo-strategic considerations often determined the location of new plants and led to a geographical re-allocation of labour. In addition to creating new facilities, considerable adjustment costs were incurred in the short run by converting plants producing consumption goods to armament plants. Finally, there are several similarities at the microeconomic level of armament firms. Of particular interest are studies that have looked at how production was organised.⁷

The international similarities between both the armament policies of governments and the microeconomic changes within firms suggest that it might be misleading to make a sharp distinction between the “market-oriented” war economies of the Western Allies and the “centrally-planned” war economies of Russia and the Axis powers. Instead, perhaps it should be assumed that the requirements of fighting a material-intensive, global conflict led all warring countries to build up the same type of modern war economy, despite their insurmountable ideological differences.

⁶ See, for example, Streb, J. (2003). Can Politicians Speed Up Long-Term Technological Change? Some Insights from a Comparison of the German and US-American Synthetic Rubber Programs Before, During and After World War II. *Essays in Economic and Business History* 21: pp. 33-49, Streb, J. (2009). Negotiating Contract Type and Contract Clauses in the German Construction Industry during the Third Reich. *RAND Journal of Economics* 40: pp. 364-379.

⁷ See Alchian, A. (1963). Reliability of Progress Curves in Airframe Production. *Econometrica*, 31:pp. 679-693. See Mishina, K. (1999). Learning by New Experiences: Revisiting the Flying Fortress Learning Curve. In N. R. Lamoreaux, D. M. G. Raff and P. Temin (eds.) *Learning by Doing in Markets, Firms and Countries*, Chicago: University Press: pp. 145-184. International evidence for continuous cost reductions in the production of various armament goods is presented in Harrison, M. (1996). *Accounting for War: Soviet Production, Employment, and the Defence Burden, 1940-1945*, Cambridge: University Press, pp. 225, 231. See Budrass, L., Scherner, J. and Streb, J. (2010). Fixed-price Contracts, Learning and Outsourcing: Explaining the Continuous Growth of Output and Labour Productivity in the German Aircraft Industry during World War II. *Economic History Review*, 63: pp. 107-136.

One important building block in the structure of war economies - somewhat neglected in the historical literature - were the “shadow factories” put up both in Germany and Britain from the mid-1930s. These factories were built and owned by the state but operated by private-sector firms; their purpose was not only to produce armaments and synthetic products in peacetime but also to lay down the capacity to satisfy a future and highly uncertain level of demand during wartime. The empirical analysis in this essay focuses on the history of the factories constructed in the city of Coventry – the key centre for the British scheme.

Both Britain and Germany were driven to establish shadow factories by the same political objective - the need to prepare for upcoming war by creating additional capacity for mass-produced armament goods which, it was clear from the beginning, could not be profitably disposed of during peacetime. But, in seeking to develop this capacity, both governments encountered major problems. These were the risk-aversion of private armament manufacturers, the necessity to hide or disguise in some fashion the building-up of new armament plants from domestic and foreign observers, the choice of locations which were both safe, or considered relatively so, from a strategic point of view and feasible from an economic perspective, the opposition of the local population against the new armament plants, and, last but not least, the utilization of the technological know-how of the established armament and engineering firms.

By the middle of the 1930s the Nazi government planned and promoted a considerable increase in investments by private firms in the armament industries and in autarky – the drive to achieve self-sufficiency in vital, strategically important raw materials by developing industrial capacity, especially in manufacturing synthetic products. Scherner shows that instead of using coercive authority or violence to enforce investment schemes the government, in general, tried to attain the voluntary cooperation of firms by offering a set of different investment contracts. Private investors could then choose the contract type that suited their own economic objectives best.⁸ Firms did not want to risk investing in unprofitable, excess capacity and therefore based their choice of contract primarily on their expectations about the return on the respective investment.

⁸ See Scherner, J. (2008). Investment Contracts between State Agencies and Industry in the Third Reich. In C. Buchheim (ed.), *German Industry in the Nazi Period*. Stuttgart: Franz Steiner: pp. 117-131.

The institutional solution for establishing shadow factories in Britain was the same as in Germany. As Lord Weir, the industrialist who is credited as the progenitor of the scheme, told Baldwin in 1935, he was against doing anything that would turn industry upside down but felt that, “we must quietly but very rapidly find an effective British compromise solution as opposed to merely copying the centralised dictator system.”⁹ This would certainly have appealed to the Conservative-dominated National Government; the shadow scheme was a way for the state to pay and own munitions factories that would, it was believed, be built and operated more efficiently by the private sector. One historian, David Edgerton, even suggests that the scheme demonstrated a straightforward bias in favour of private enterprise and that the government believed that the employers concerned would find it easier to shut the factories when demand for armaments fell.¹⁰

Concentrating on the development of a single war economy, Edgerton interprets state-industry relations in shadow production simply in terms of the ideological complexion of the British government – a traditional preference for entrepreneurship and private enterprise. But these developments should not be seen in isolation; only by locating them in a wider, international context of armaments production can they be properly explained. If the “lease contract” (between the state and firm) was introduced by Britain as the means to establish shadow factories, why was there a parallel and simultaneous development of this stratagem in Nazi Germany? Starting with the political objective to establish additional armament plants - common to many European economies in the 1930s - it would seem that the introduction of the “lease contract” was an internationally-efficient solution for the problem that private firms were not willing to take the risk of investing in excess capacity.

What haunted the British political élite was the deeply traumatic experience of fighting between 1914 and 1918 what proved to be the first modern, industrial war . The vain hopes that business could be carried on as usual, and that the free market would simply supply what war goods were required, led in 1916 to the so-called 'shell scandal' of a shortage of munitions and ensuing political upheaval. Rather than wait for hostilities to break out once

⁹ Quoted in, Robert Paul Shay (1977). *British Rearmament in the Thirties: Politics and Profits*. Princeton, p. 94.

¹⁰ David Edgerton (1991). *England and the Aeroplane: an Essay on a Militant and Technological Nation*. Basingstoke, p. 75.

more before mobilising society's resources, civilian expertise was, in the course of the 1930s, increasingly incorporated into the planning and preparations for war.¹¹

The question of how to reorganise armaments procurement was the catalyst for inviting Weir, one of the leading industrialist-technocrats of the age, to take a place at the centre of decision-making. In March 1935, Stanley Baldwin, who was soon to be Prime Minister, asked Weir to help Viscount Swinton (Philip Cunliffe-Lister) to develop a new programme for the airforce. Weir was given the unassuming title of Adviser to the Air Ministry. Indeed, he was always quick to declare to anyone in or outside Whitehall that he acted in a purely advisory rather than in any governmental or executive capacity. But he was no ordinary industrial adviser: he had been Director of Munitions and President of the Air Council in the First World War, served on important committees in the 1920s, and he enjoyed especially close relations with leading political figures. Furthermore, both the public in general and those inside government immediately grasped the significance of this appointment.¹²

As Hitler began to consolidate his power in Germany, Weir became preoccupied with the issues involved in organising an effective defence of Britain's vital, national interests. At the end of 1933, he was invited to meet members of the Committee of Imperial Defence. By February 1934, he had composed a long memorandum entitled 'Some notes on British Policy in regard to National Defence, Peace and Disarmament', and sent a copy to his friend, Neville Chamberlain, the Chancellor of the Exchequer. Weir argued for nothing less than a wholesale restructuring of the CID apparatus. This was immediately followed up by another analysis, undertaken by Weir in conjunction with Sir Arthur Balfour (the steel manufacturer), and Sir James Lithgow (the shipbuilder) on 'War Emergency Preparation'. This trio of leading industrialists detailed what would have to be done to mobilise industry for armaments production in general; they thought it would be expedient to 'make arrangements for the creation, at least on paper, of new shops and facilities operated by the firms'. The result was that Weir was asked, in March 1934, to discuss informally with the CID how some constructive proposals might be initiated.¹³

¹¹ For a comprehensive survey see, David Edgerton (2006), *Warfare State: Britain, 1920-1970* Cambridge.

¹² Churchill Archives Centre, Cambridge, UK, Lord Weir Papers (hereafter CAC, Weir), Weir 19/1, letter, 20 May 1935, from Lord Londonderry (Secretary of State for Air) to Weir. Londonderry, referring to the great problems facing them, wrote: "Your name carries such weight and inspires such confidence in the country..."

¹³ University of Glasgow Archives, Viscount Weir Collection (hereafter Glasgow), DC96 21/3, letter from Secretary, CID, to Weir, 14 Dec.1933; UGD 347 21/4, memos dated, respectively, 13 Feb. and 26 March 1934.

Rearmament for Britain in the 1930s involved making decisions about where and how to allocate resources after weighing up a bewilderingly array of geo-strategic issues, risk factors and opportunity costs. In addition to the existing threats posed to British interests by Japanese expansionism in the Far East, and Mussolini in the Mediterranean, German rearmament represented a new and growing danger. In March 1934, Baldwin had promised the House of Commons that Britain would not accept in air power a position of inferiority to any country within striking distance of British shores. The deterrent of counter-bombing – specifically targeted against Germany - was considered the most likely guarantee of British security.

In the face of these dilemmas, and perhaps also partly prompted by Weir's concerns, the Committee of Imperial Defence did indeed reorganise itself. A new sub-committee, known as the Defence Policy and Requirements Sub-Committee, was established in late 1935. It comprised the leading members of the Cabinet and the service ministers. The Chiefs of Staff Committee, Vansittart and Fisher (respectively Permanent Under-Secretary for Foreign Affairs and Permanent Secretary to the Treasury) served as expert advisers. At the end of the year, Sir Maurice Hankey (the Cabinet Secretary) informed Weir that Baldwin not only approved of Weir's proposals, but was appointing him to the membership of the new committee.¹⁴ Although Weir was a Privy Counsellor, this was a unique distinction for someone who did not hold one of the high offices of state.

When this special committee first met, on 13th January 1936 at 10 Downing Street, it was Weir who, at Chamberlain's prompting, initiated the case for concentrating resources on air power. In a private letter to Weir, sent from Edgbaston just before the meeting, Chamberlain wrote that, while he was not quite sure what the procedure was to be,

I don't want myself to make the main strategical point lest I should be thought to be prejudiced against the Army on the score of expense, and I am therefore looking to you to make the first step. I believe this was your intention...¹⁵

The committee met nine times in January 1936 - an indication, perhaps, of the intractable nature of the problems confronting British policy-makers. Vansittart and Fisher consistently argued the case for a continental commitment on the part of Britain - that resources should be

¹⁴ Glasgow, DC96 21/3, letter, Hankey to Weir, 28 Dec. 1935.

¹⁵ Glasgow, DC96 21/3, letter, Chamberlain (Westbourne, Edgbaston) to Weir, 9 Jan. 1936.

allocated in order to build up a field force that could help to resist a German invasion of western Europe. However, this ran counter to Chamberlain's strategy, which he continued to espouse after he succeeded Baldwin as Prime Minister. Chamberlain's alternative prescription - to remain isolated from the continent and to deter the German threat by building up the strength of the Royal Navy and RAF - prevailed for much of the second-half of the 1930s¹⁶.

When reflecting on critical comments made by Churchill in 1935 concerning the enfeebled condition of Britain's defences, Weir posed the key question: "Are doing all we ought to anticipate by proper planning and arrangement the grave delays which were the feature of our almost fatal unpreparedness in 1914?" Weir declared himself to be fully in sympathy with Churchill in believing that little or nothing was being done.¹⁷ Thus Weir set himself the objective of pursuing the various alternative ways of increasing peacetime production and at the same time perfecting the arrangements for preparing for war.¹⁸ To Churchill, and doubtless to many others, these preparations were far from obvious. He asked Weir: "Are you quite sure you are right in lending all your reputation to keeping this country in a state of comfortable peace routine?"¹⁹ But Viscount Swinton, the Secretary of State for Air, told the Committee of Imperial Defence that by erecting factories and allowing the shadow firms to gain experience, the scheme was turning this 'war potential' into an actual asset. The firms were engaged in estimating how far their civil plant would be useful for war work and the extent to which it would have to be supplemented by new machinery.²⁰ As the international crisis developed, the ideological battle intensified. Reviewing the position in the wake of the *Anschluss*, Weir believed that Britain had to avoid any admission that Germany's supposed super-efficiency in armament strength, "can only be secured by dictatorship rule. A democracy ought to be able to apply itself to these problems."²¹

The Air Ministry, in line with Chamberlain's priorities, drew up programmes that laid stress not only on the production of heavy bombers but also on establishing deep reserves. The combined efforts of the Ministry and the aircraft industry to reorganise the manufacturing base were supported by the Treasury which prioritised these efforts, allowing the necessary

¹⁶ B.J.C.McKercher, 'Deterrence and the European Balance of Power: The Field Force and British Grand Strategy, 1934-1938', *English Historical Review*, Vol. CXXIII, No. 500, Feb. 2008, pps. 98-131.

¹⁷ Weir, 19/12, minute, 22 Aug.1935, Weir to P.Cunliffe-Lister, (created Viscount Swinton), Secretary of State for Air. In correspondence with Churchill, Cunliffe-Lister described Weir as "an absolute God-send".

¹⁸ Weir 19/2, minute, 30 Jan.1936, Weir to Secretary of State.

¹⁹ Weir 19/12, letter, 6 May 1936, Churchill to Weir.

²⁰ Weir, 19/2, minutes of C.I.D. meeting, 19 Nov.1936.

²¹ Weir, 19/18, note for talk with Secretary of State on 15 March 1938.

industrial resources to be secured.²² But, there were serious deficiencies and weaknesses in the performance of the British aircraft industry.²³ Military strategists were especially concerned at the apparent disparities between the British and German aircraft industries. In 1935, the General Staff in the War Office noted that, “The political and economic organisation of the German state is more favourable than our own to the adaption by industry to the production of war equipment of every variety”.²⁴

This view was endorsed by a succession of British visitors to Germany. Lord Rothermere, the *Daily Mail* proprietor who was on friendly terms with Hitler, passed on to Weir statistics from Göring: in 1936, Germany was apparently turning out a plane every half-hour and 80 per cent of the Luftwaffe fleet were bombers. Weir privately calculated this amounted to an annual output of 4700 planes - double Britain's rate. Likewise, Frederick Handley Page, the aircraft manufacturer, told Weir that he had toured the Junkers factories in Dessau and Köthen. He found it all very interesting in showing the way that Junkers was organising for mass production.²⁵

British plans were based on an estimate, dating from 1931, that the requirements for aircraft and aero engines during the first year of a future war would be procured by adding five large motor car firms to the existing aircraft constructors.²⁶ However, very quickly after taking up his new role of Adviser, Weir could see that even the peacetime demand for aero engines was likely to outstrip the means of supply. He told the Air Ministry, “The best expansion channel for this, if needed, should come from the automobile industry.”²⁷ Indeed, by the start of 1936, the Ministry had begun to realize that the existing firms were not going to be able to meet the current rate of demand for aircraft – 4000 per year – and that a large order would have to be placed with one or more of the big motor firms. As Sir Christopher Bullock, the Permanent

²² See Parker, R. A. C. (1989). *Struggle for Survival: the History of the Second World War*. OUP, p. 50; Peden, G. C. (1979). *British Rearmament and the Treasury: 1932-1930*. Edinburgh, p.160; Hancock, W. K. and Gowing, m. M. (1949). *British War Economy. History of the Second World War: UK Civil Series*. London, p. 66.

²³ Glyn Stone, ‘Rearmament, War and the Bristol Aeroplane Company, 1935-1945’ in Charles Harvey and John Press (eds.), *Studies in the Business History of Bristol*, Bristol: Bristol Academic Press, 1988, pp. 187-212.

²⁴ National Archives, Kew, UK (hereafter NA), WO 32/3593, ‘British and German Aircraft Industries’, note for the Committee of Imperial Defence, 29 April 1935.

²⁵ Glasgow, DC96, 21/3, letters, Rothermere to Weir, 15 March 1936, and Handley Page to Weir, 8 May 1936.

²⁶ CAC, Weir19/5, Defence Requirements Committee Paper, DC (M)(32) 138, April 1935, ‘British and German Aircraft Industries’.

²⁷ CAC, Weir 19/2, Note on Rearmament, 11 June 1935. Weir believed that the aircraft industry was strong enough, at least, to construct airframes and that it wasn’t necessary to encourage large shipbuilding firms, like Harland & Wolff, to enter the industry.

Secretary, noted, the War Office had started to draw on sources outside the normal armament industry and “they will have to rely on orders placed with a shadow supply organization for meeting an appreciable part of their deficiencies”²⁸ Bullock could see no reason in principle – as long as there was no undue dislocation of normal industry - why aircraft should not be procured in the same way.

The shadow scheme was designed to take account of the existing, severe capacity-constraints in the engineering sector of the British economy. The alternatives to using the private-sector – a state owned and operated armaments industry - would certainly have turned industry upside down. It would have required government to take powers to direct and control skilled labour and executive personnel; many feared that measures on such a scale would put the financial and economic stability of the country at risk.²⁹ At the very least, it would have caused enormous resentment among employers. The scheme also provided a way to switch production, rapidly and comprehensively at the outbreak of war, away from civilian goods.

However, one factor above all others determined the character of the shadowing of armaments production in Britain: an adequate supply of the right kind of skilled and semi-skilled labour and management expertise. The greatest barrier to expanding the output of the aircraft constructors was a shortage of workers with appropriate skills. One of the firms experiencing these difficulties was Armstrong Siddeley in Coventry. According to one Air Ministry official, the firm was forced to engage in the disputation practice of dilution – the substitution of semi-skilled for skilled workers – because “skilled labour is now practically unprocurable in Coventry”³⁰ Yet, paradoxically, the cause of this problem provided, at the same time, the means to solve it.

This city had a long-established background as a national centre for armaments production; the manufacture of munitions and weapons before and during the First World War had already included the participation of the new motor vehicle industry in the production of aircraft. While the Great Depression had wiped out swathes of industry, resulting in the deskilling of many workers, the Birmingham-Coventry industrial axis escaped the worst

²⁸ CAC, Weir 19/1, letter, 7 Jan.1936, Bullock (Air Ministry) to Weir, enclosing a copy of a memo to the Secretary of State.

²⁹ CAC, 19/2, note by Weir, 10 June 1936, “Acceleration of defence measures”. This note was drawn up after consulting Sir Thomas Inskip, the newly-appointed Minister for Co-ordination of Defence, and was circulated among ministries.

³⁰ Ibid., letter, 12 June 1935, B.E. Holloway (Air Ministry) to Weir.

elements of the crisis by combining technologically-advanced manufacturing with traditional metal-working interests. Buoyed up by the car industry, Coventry drew in waves of skilled and ambitious workers, engineers and entrepreneurs and became the fastest-growing city in Britain in the interwar years.

With aircraft production made a priority, the particular expertise in engineering and metal fabrication of the motor manufacturers, and the concentration of 'part-making' firms in the west Midlands, once again brought this region, and Coventry in particular, to prominence in the re-armament effort. These factors made it the obvious choice, in 1936, as the main base for the shadow factory scheme. Facilities to produce airframes, and particularly aero engines, could be located next to the existing factories of the motor companies, in order to utilise relevant skills and expertise of both managements and workers. Few, if any, alternative locations recommended themselves; the only realistic answer was to locate production in or close to those firms able to undertake the work. A study completed towards the end of the Second World War concluded that the dominant factor in the shadow factory plan was the attempt to benefit from the economy of large-scale organisation as distinct from that of large-scale production. In other words, the aim was to make the best use of the exceptionally able, higher management that was to be found in Coventry - an economy of entrepreneurship.³¹ The willing co-operation of the existing aircraft industry was also required if the scheme was to operate effectively. A key manufacturer was the Bristol Aeroplane Company - responsible for building the Blenheim bomber.³²

As the scheme progressed, earnings in the Midlands shadow factories came to be among the highest in the engineering industry. The Air Ministry felt vulnerable over the difficulties in controlling the distortions in the labour market that this caused, such as the competitive bidding up of wages as managements were released from the constraints that would have operated normally. This risked alienating other employers who did not enjoy such a privileged position. However, the scheme could also take advantage of the stance taken by the Midlands engineering firms on dilution which, in spite of the concerns of the trades

³¹ A. Shenfield & P. Sargant Florence (1944-45), 'The Economies and Diseconomies of Industrial Concentration: the Wartime Experience of Coventry', *Review of Economic Studies*, Vol. 12 (1) pt. 2, 79-99.

³² G. Stone, 'Rearmament', p.202.

unions, was not automatically considered an abnormal practice in the sector. Once war broke out, dilution was introduced rapidly on a large scale.³³

The layout and plant of the shadow factories were designed for quantity production rather than experimental or development work. The most important were the factories that were to produce aero engines; the No.1 group (as it came to be called) was laid down in 1937-8 and the No.2 group in 1939-40. Swinton initiated this aspect of the scheme when, on 24 March 1936, he wrote to the motor manufacturers - Austin (based at Longbridge in Birmingham), Morris (based in Cowley, Oxford) and Coventry-based Daimler, Rover, Rootes (in the form of its subsidiary, Hillman Motors), and Standard. The Singer car company in Coventry was also contacted but was to play a very small part in the scheme.³⁴

The first group of shadow engine factories were built alongside or very near to their parent works in Coventry. Most of the land was owned by the firms and might, in any case, have been used at some point for extensions to the car plants. Extraordinarily, only after construction had begun were terms discussed for the sale of the sites. The price the Air Ministry was prepared to pay was largely determined by valuing the opportunity costs for the companies concerned. As Hillman Motors had little room to expand for their own purposes at their Humber works (where the shadow factory was to be built) and because the Ministry wished to avoid alienating Rootes (the parent company), Swinton settled quickly to get the scheme underway as speedily as possible. The price the company wanted for the land was accepted.³⁵ In contrast, the Ministry believed that the price sought by Daimler was grossly inflated as their works occupied a large site (the Radford Estate) with plenty of space to expand. A price - £750 per acre instead of £1500 per acre originally sought - was not agreed until September 1937. The land was not legally conveyed until February 1938, by which the time the factory was in full production.³⁶

German military planners had a strong interest in hiding the location and purpose of the shadow factories from the international public. Rearmament had begun in secret to hide violations of the Versailles Peace Treaty and to avoid antagonising neighbouring powers,

³³ Inman, P. (1957). *Labour in the Munitions Industries. History of the Second World War: UK Civil Series.* London, pp 22-9, 320-1.

³⁴ NA, AIR 2/1738.

³⁵ NA, AIR 2/2325, minute by Swinton, 16 Aug. 1936.

³⁶ NA, AIR 2/2324, letter, 28 Sept. 1937 from Daimler to Capt. Davies, Air Ministry; minute, 7 Feb. 1938, by Treasury Solicitor.

and, in the early years of the Third Reich, the exact dimension of the rearmament programme was concealed. The planners wanted to protect the shadow factories from air raids. Although the isolated locations of German plants made them very difficult to spot and bomb from the air, one of the ironies of the pre-war years was that a great deal was known about some of them in Britain.

In early 1935 Hitler repudiated the Versailles Treaty. Indeed, the frantic pace of rearmament became evident throughout the country and the growing strength of the Luftwaffe was even used as a propaganda weapon to cower potential enemies. But one British visitor, Roy Fedden, from the Bristol Aeroplane Company, was particularly well informed. Twice in 1937 he travelled to Germany and toured around different production facilities. His reports provided British intelligence services with the last accurate and comprehensive account before the outbreak of war of German capabilities and organisation in aircraft production.³⁷ That he was permitted such access is a reflection of how familial and close-knit the world of aviation was in the interwar years. Airframe design and engine technology was exchanged between British and German manufacturers such as Rolls-Royce, Supermarine, Heinkel and Messerschmitt, until the early 1930s.³⁸ Not only did Fedden remain on friendly terms with German apprentices he had trained in the 1920s but, as one of the leading aircraft engineers of his day, he was held in high respect by aircraft manufacturers everywhere.

Fedden's tour included a visit to Eisenach, where BMW had a motor car plant and a shadow aero engine plant; while the former occupied a site in the middle of the town, the latter was located a mile away on the town's outskirts. What amazed Fedden was that the shadow plant was invisible from anywhere in the vicinity: "Passing through the entrance gate you suddenly come upon the different buildings of the engine plant cunningly hidden amongst the pine trees on the sides of the hill". Equally impressive was the way air raid shelters were incorporated into buildings, and the general layout and organisation of the plant. Operations had commenced in early 1936 and the 1500 workers were engaged in switching production from the 'Hornet' - Pratt and Whitney air-cooled radial engines – to a more powerful German version.³⁹

³⁷ Wesley K. Wark (1986), *The Ultimate Enemy: British Intelligence and Nazi Germany 1833-1939*. Oxford: OUP, pp. 65, 163.

³⁸ Jonathan Glancey (2006), *Spitfire: the Biography*. London: Atlantic Books, p.38.

³⁹ NA, CAB 64/17, Report (Part II), by A.H.R. Fedden, of second visit to Germany, 2-12 Sept. 1937.

Whenever possible, new munitions plants in Britain were also built in locations away from parts of the country closest to continental Europe, even if no particular attempts were made to conceal them. Also considered, from 1935, were ways to induce the aircraft industry to transfer plants from London and surrounding district – regarded as especially vulnerable - to areas which were strategically safer. At the same time, as the Air Ministry ruefully admitted, absolute safety was becoming increasingly impossible as the range of aircraft developed.⁴⁰

In the case of shadow aero-engine factories, a range of options simply did not exist and it was decided to concentrate the plants in just one city. Fedden, along with other Bristol Aeroplane Company representatives, met with Swinton and Weir in March 1936 to discuss how to implement the shadow scheme. The Bristol delegation wanted each of the shadow firms to produce just one part of the engine: the firms would be educated in the manufacture of relevant components, duplication could be avoided, and variations in design could be introduced. This arrangement, it was said, would be less disruptive to the firms' normal activities. Weir disagreed because he thought there was no time for such a plan. There is also evidence that in organising how the technology - such as the Bristol engine - should be transferred from the aircraft companies and set up in the new plants, both Weir and Swinton, deferred to the motor manufacturers.⁴¹

But the Secretary of State raised his own objections: under Bristol's plans the destruction of one firm by bombing would have jeopardized the entire production process, and he "did not wish to add to the number of cases in which this eventuality was already dangerous."⁴² The same argument could also be applied to situations where the sheer volume of production from a single works rendered a whole dimension of rearmament vulnerable. Weir argued that this was the case with the Rolls Royce aero engine plant in Derby and that, consequently, a shadow factory located elsewhere (but operated by Rolls Royce) was justified.⁴³ Similarly, when deciding on additional airframe shadow capacity at the end of 1937, Swinton ruled that the factories had to be located in safe areas since there could be no excuse for spending public money in establishing them in vulnerable areas.⁴⁴ Thus, the British government recognised, albeit implicitly, that basing the shadow aero engine scheme in one major centre

⁴⁰ CAC, Weir 19/19, minute, 17 June 1935, Bullock to Secretary of State.

⁴¹ Sebastian Ritchie, *Industry and Air Power: the Expansion of British Aircraft Production, 1935-41* (London, 1997), p.59.

⁴² CAC, Weir 19/15, Notes of 32nd Progress Meeting, 13 March 1936.

⁴³ CAC, Weir 19/2, Note to Air Member Supply & Organisation, 11 Sept.1936.

⁴⁴ CAC, Weir 19/9, Note of Progress Meeting, 17 Dec.1937.

would risk turning it into a primary target for the enemy. Herein lay something of a strategic gamble: that the benefits of harnessing the motor industry – the rapid expansion of a fleet of bomber aircraft acting as a deterrent – would mean that the costs resulting from enemy action would not have to be faced. It was a gamble which was not, of course, to pay off: Hitler was not deterred and Coventry was devastated.

The history of how shadow factories were developed in Britain reveals a curious paradox. In principle, building a new factory meant a welcome increase in employment opportunities within a region; in practice, the precise sites selected for the new factories frequently stirred up a great deal of local controversy, even anger. The local authorities of the so-called “Special and Depressed Areas” engaged in intense lobbying to secure rearmament-based jobs for their regions rather than for the prosperous southern half of Britain. So many requests were received that an inter-departmental committee was set up, in 1937, to examine the issues around the location of new munitions factories. The government felt compelled to declare that its policy was to establish such factories in depressed areas so far as practical considerations permitted.⁴⁵

By early 1938, the Air Ministry had decided to schedule large-scale production of a promising fighter – the Spitfire - built by the Supermarine Company. This required switching production from other types already being constructed by different aircraft companies and, in order to achieve anything like the required number of Spitfires, adding shadow capacity to those companies. One of the towns selected for this production was Stockport, in Lancashire – the manufacturing-base of the Fairey Aviation Company. The region was both a depressed one and was farther away from an enemy’s bombers than many parts of Britain. However, there then followed a protracted dispute over where to put the shadow factory and, once a site was chosen (some redundant works adjacent to Fairey’s existing factory), how much land to acquire and whether it should be compulsorily purchased.⁴⁶ This district bordered a purely residential area, and preserving the latter’s amenities suddenly became a major concern of the Stockport authorities. Chief among these amenities was the Heaton Moor Golf Club. The Ministry's Lands Officer visited Stockport in November 1938 and reported that the Golf Club's secretary was “very much disturbed at the prospect of the greens and tees being taken

⁴⁵ NA, CAB 21/662. The first meeting took place at the Ministry of Labour on 9 Feb. 1937.

⁴⁶ NA, AIR2/3304, Notes of meeting – Air Council Committee of Supply, 5 May 1938.

away". Fortunately, Stockport's Town Clerk was a club member and was asked by the Ministry representative to offer all necessary reassurances to the club committee.⁴⁷

Because the shadow factories built in Coventry under the No.1 scheme were co-located with existing motor vehicle plants, the local authorities raised no objection over the sites and generally supported the scheme. A few residents who lived in newly-built houses close to the Daimler works did object, but the level of local complaints during peacetime appears muted in comparison to the protests accompanying the second phase of the shadow scheme.⁴⁸ As war grew near in 1939, and the need to produce a greater quantity of engines became apparent, the No.2 group was established. The four firms involved were organised into two partnerships: Daimler and Standard formed one pair, while Rootes and Rover made up the other.⁴⁹ Daimler's management wanted to develop its No.2 factory away from the city, but was instructed to build the plant within five miles of Standard's new Banner Lane works. The site selected was adjacent to Browns Lane in Allesley, a district on the outskirts of Coventry. In late June 1939, the local ratepayers and residents association objected strongly. They had been reassured by the city surveyor that the district was scheduled exclusively for housing; to overturn this, they alleged, would be a grave breach of faith as many other, more suitable sites existed.⁵⁰ However, given the intention to concentrate production in order to exploit the benefits of industrial clustering, the existing local infrastructure and facilities, the choice of available sites was limited.

The City Council was itself upset, arguing that ordered planning - the objective of the interwar Town Planning Act - was being thwarted and even made ridiculous by the flagrant disregard of local authorities. The impact of the shadow factory scheme in different parts of the country raised the same issues elsewhere and led to the same kinds of protest. The Crown was not bound by the Act and, therefore, the council had no effective, legal means of complaint or appeal.⁵¹ City councillors told the local Members of Parliament that they

⁴⁷ Ibid., letter, 18 Nov. 1938, Surveyor's Office, County Borough of Stockport, to E.H. Williams, Lands Officer, Air Ministry, and note by latter, 23 November 1938. The site purchased was that occupied by the Crossley Brothers Works, Heaton Chapel.

⁴⁸ NA, AIR 2/1842, statement by residents to the council, 28 Oct. 1937 and letter, 2 Nov. 1937, from Town Clerk to Director of Works, Air Ministry.

⁴⁹ For background on the schemes see, Thoms, D. (1989). *War, Industry and Society: the Midlands, 1939-45*. London.

⁵⁰ Herbert Trust, Town Clerk's files (hereafter HT), CCA/3/1/7601/1-4, letter, Residents Association to Councillor Myers, 22 June 1939,

⁵¹ *ibid.*, letter, Coventry City Council to Capt. Strickland MP, 28 June 1939.

understood the “national necessities”, but that because of a complete lack of consultation, the choice of sites had been “haphazard” and threatened the establishment of the “green belt”. Coventry had been in the vanguard of enshrining this novel principle - of preventing urban sprawl by preserving rural areas around a built-up area - in planning future growth.⁵² This now seemed to have been a waste of time and money. Building and operating the two factories involved large-scale capital projects; a new infrastructure of utility supply networks and systems, together with the construction and widening of road systems, were all soon to have a major impact. The council urged the government to set up some effective administrative machinery to avoid a recurrence of actions that were “so contrary to the general public interest”.⁵³ Ironically, the destruction caused by bombing was to give town planners opportunities to redesign an urban environment on a scale scarcely conceivable before 1940. As a result, a 'modernised' city centre emerged after the war.⁵⁴

Rather curiously, the outbreak of war did not force a re-definition of this view of the public interest; if anything, the obvious need to step up the pace of rearmament heightened local concerns. In October and November 1939, directors of both Standard and Rootes wrote to the council over the slow progress of housing development. Rootes were rapidly constructing their No.2 aero engine factory at Ryton. This lay just outside the city to the south, but it depended on Coventry for most of its facilities and amenities. The factory was expected to employ between 4,000 to 5,000 workers. But construction of a large housing-estate adjacent to the factory had come to an halt and Rootes were naturally anxious over how they were going to accommodate their employees.⁵⁵

Whilst the Air Ministry regretted the way the scheme had been imposed, it offered no solutions to the problems. The council believed that a “vast army of additional workpeople” was about to descend on the city. Bodies such as the Engineering Employers' Federation estimated an additional 35,000 workers and 15,000 dependents would migrate to the city in 1940, suddenly swelling the total population from 240,000 to almost 300,000. There was neither anywhere to house these workers nor to attend to their health or educational needs. The Ministry of Health refused to allow permission for an expanded house-building

⁵² Green Belts were not formally recognised as part of a national legislative framework until 1955.

⁵³ HT CCA/3/1/7604/1-16, *Synopsis*, statement by the Town Planning and Buildings Committee, 10 July 1939.

⁵⁴ For a discussion see, N. Tiratsoo (1990), *Reconstruction, Affluence and Labour Politics: Coventry 1945-60* London:

⁵⁵ HT CCA/3/1/7601/1-4, letter, 15 Nov. 1939, Col. J.A. Cole (Rootes Securities Ltd) to Town Clerk, Coventry.

programme, encompassing some 5,000 new houses, because of raw-material shortages. Deploring the apparent absence of any constructive thought by government, the council imagined that the whole future of the city was at stake over how to finance the infrastructure required to meet such a rapid expansion in industrial activity. Worse still, when the war ended and armament production ceased, it was assumed that the unemployed workers would have to be supported by public assistance.⁵⁶ The faith expressed in an eventual successful outcome to the conflict was tinged with memories of the recession that has followed the First World War.

At the beginning of 1940, Walter Elliot, Minister of Health, and representatives from all the relevant Ministries met Strickland, the city's MP, and leading council members. The Minister remained unmoved by the deputation's lobbying. He urged the council to make better use of existing houses standing empty and the opportunities for lodging. He pointed out that the City, itself, had asked to be made an "evacuable" area: hundreds of children and other evacuees were being provided for voluntarily, and without resort to compulsory powers under the Defence Regulations, by the inhabitants of surrounding, rural areas. Elliot challenged Coventry's citizens to demonstrate an equal desire to help - by offering accommodation - in work of national importance, whatever the inconvenience and hardship it might cause.⁵⁷

The disputes between local and central government remained unresolved even as Britain faced, by March 1940, what was euphemistically called the "national emergency". Although the government had undertaken to cover all of the costs of new roads required for the shadow factories, the financing arrangements for improving existing roads had been left undecided. The council offered to pay for air-raid shelters, including ones to accommodate the shadow factory workforce, if the government would pay for most of the road improvements; the councillors claimed that "it will be an advantage for the Government and the local authority to work in friendly co-operation."⁵⁸ Under the conditions of the "phoney war", local authorities jealously guarded rights related to local autonomy and accountability. There was no sense that Britain's dire geo-strategic situation required drastic remedies. However much the British public supported the mobilisation of resources by central government, local democratic interests did not always sit easily with the dictates and demands of the war.

⁵⁶ HT CCA/3/1/7604/1-16, Coventry City Council, notes, 7 Dec. 1939.

⁵⁷ HT CCA/3/1/7601/1-4, letter, Strickland to Elliot, 12 Dec. 1939; memo, Ministry of Health, 5 Jan. 1940.

⁵⁸ HT CCA/3/1/7606, letter, 11 March 1940, to Sir John Nixon (Midlands representative for the Air Ministry) from the Policy Advisory Committee, Coventry City Council.

The decision-makers in both Britain and Germany decided against establishing state-run armament firms. Instead, shadow factories were financed and leased to private entrepreneurs because this procedure was the most promising way to make use of the know-how of established manufacturers who knew better than state administrators how to set up and operate these factories. To facilitate knowledge transfer between the parent motor company and the shadow factory, Britain mostly chose – as in the case of aircraft production in Coventry – to locate the latter directly in the neighbourhood of the former. The intention was to bring about external economies in production. It was assumed - not unreasonably for as long as Britain remained at peace - that the parent company's skilled workers and managers would be able to train a greatly expanded workforce coming into the shadow factory to the required high level of efficiency. The large number of ancillary firms in the region would help to facilitate the new production processes. If these aspirations proved difficult to realise before 1940, they were especially challenging under wartime conditions that brought raw material shortages and decision-making that was both arbitrary and increasingly centralised. As a result, shadow factory productivity up to 1942 appears to have been in line with the poor performance of the aircraft industry as a whole.⁵⁹

Furthermore, what appeared to be the right decision for Britain in the late 1930s - to cluster a high proportion of strategically-vital production in a confined urban area – seemed sheer folly once war had actually broken out. Allied fortunes suffered a disastrous reversal with the Fall of France. In planning air-raid protection, the Coventry authorities seemed to recognize that the shadow factory workforce and the general population were equally vulnerable. Certainly, the Standard and Daimler works were among the armaments factories specifically targeted by the Luftwaffe on the night of the Coventry blitz (13/14 November 1940). Daimler's No 1 factory in Radford was singled out for particular punishment - it was hit by an estimated 150 HE bombs and 3000 incendiaries. However, during the 11 hours the raid lasted, 43, 000 homes were destroyed or badly damaged and 554 people killed across the city as a whole. In its intensity the raid was without precedent. It is not the case that the city's defences had not been neglected: with over 40 anti-aircraft guns in action, Coventry was as well protected as anywhere in Britain at that stage of the war. But, the vagaries of ground gun-control, and the

⁵⁹ Stone, 'Rearmament, War and the Bristol Aeroplane Company', p.194.

inability to deploy radar-equipped night fighters, allowed all but one of the German raiders to escape unharmed.⁶⁰

With much of Daimler's factory severely damaged, the Air Supply Board discussed measures for the dispersal of production.⁶¹ Consequently, the big raid, and another destructive one in April 1941, interrupted the policy of localisation; a limited number of shadow factory units and departments were dispersed to minor industrial centres and rural areas. It is difficult to quantify production losses at Coventry's shadow factories as a result of the bombing, but stoppages proved to be temporary. Repairs to the infrastructure (under the leadership of William Rootes) were made a priority. Furthermore, as the bombing of Germany later confirmed, factory machine tools were difficult to destroy and could be repaired. Similarly, pessimistic predictions in the immediate aftermath of the 1940 raid were not realised: civilian morale did not collapse. Nonetheless, a proportion of the population left the city, making available undamaged accommodation for the shadow factory workforce. This allowed the authorities to continue a process of voluntary billeting - much as the government had urged. In addition, by 1943 the Ministry of Labour had built 16 hostels with 8,000 places for workers in Coventry and south-east Birmingham.⁶² The city remained, therefore, a key centre for the war effort.

In order to understand the similarities and differences between the war economies of Second World War combatants it is necessary to look, first, at the underlying economic problems all countries had to deal with, and, secondly, at the particular national solutions each country found for these problems. Applying this research concept to an analysis of the business history of shadow factories yields some important and surprising results. Despite all ideological and political differences, the governments in both Britain and Germany shared a common goal to build up additional capacity for producing armament goods before the actual outbreak of war. The problem was that the relevant private firms judged an investment in additional or new armament factories as very risky and unprofitable in the longer run; consequently, they declined to use their own funds for these investment projects.

⁶⁰ Colin Dobinson (2001), *AA Command: Britain's anti-aircraft defences of World War II* London: Methuen. p. 271

⁶¹ NA, AIR 2/1842, minutes 9 Dec. 1940.

⁶² Shenfield & Sargent Florence (1944-45), 'The Economies and Diseconomies', pp. 96-7.

Given the choice between establishing state-run shadow factories and leasing state-funded shadow factories to private operators the government opted for the second solution. This decision was driven by the conviction that in contrast to the state, the traditional manufacturers of armaments, aircraft and vehicles had the know-how to build up and operate these new factories. This suggests that armaments policy was driven less by ideological objectives and rather more by economic necessities. In a broader perspective, the tasks of preparing for, and engaging in, a material-intensive modern war, such as the Second World War, might have led to very similar, national solutions for shared, economic problems. Certainly, Lord Weir - the leading business figure of the day who was called upon to devise and carry out a major aspect of British policy - believed that a democratic state was just as capable as the Nazi dictatorship in achieving an effective rearmament drive. Weir was also a major influence in helping to shape Britain's grand strategy and the production of certain types of weapons - aircraft - that were contingent upon it. The debate over whether this strategy offered the best defence against the coming onslaught on British interests lies outside the scope of this essay. What is undeniable, however, is that there could be no more important a business beyond the firm than that which Weir discharged with such great enterprise and success in the lead up to the Second World War.

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