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978-0-521-86748-1 - Arms, Economics and British Strategy: From Dreadnoughts to Hydrogen Bombs

G. C. Peden

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Introduction

The starting point for this study of British defence policy between 1904 and 1969 is the tendency for the costs of new weapons systems to rise more rapidly than the national income.¹ Three main insights are offered. First, British defence policy was based upon technological innovation. Second, reductions in the size of the armed forces to accommodate new weapons systems in defence budgets were not evidence of a decline in power. Third, British grand strategy, incorporating economic as well as military responses to external threats, was much more ambitious than is commonly believed.

I first approached the relationship between economics and strategy in my book *British Rearmament and the Treasury, 1932–1939*, which showed that Treasury attempts to influence strategy reflected concern about Britain's ability to sustain a long war, and were related to trade and industry as well as money.² Since then there have been a number of case studies of interaction between economics and strategy. For example, David French and Avner Offer have described how British strategic planning before 1914 assumed that naval blockade would cause the German economy to collapse, while Britain's access to raw materials and her industrial power would enable her to supply continental allies with munitions.³ David Edgerton has challenged assumptions about British military backwardness by putting forward a broad-arching thesis of Britain as a pioneer of technologically focused war, possessed of a powerful military-industrial-scientific complex that emerged in the first decades of the twentieth century and was cut back only in the late 1950s

¹ See Philip Pugh, *The Cost of Seapower: The Influence of Money on Naval Affairs from 1815 to the Present Day* (London: Conway Maritime Press, 1986).

² G. C. Peden, *British Rearmament and the Treasury, 1932–1939* (Edinburgh: Scottish Academic Press, 1979).

³ David French, *British Economic and Strategic Planning 1905–1915* (London: Allen and Unwin, 1982); Avner Offer, *The First World War: An Agrarian Interpretation* (Oxford: Clarendon Press, 1989).

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and the 1960s.⁴ The time seems ripe for an interdisciplinary study of the interaction between technology, economics and strategy over a similar period.

This book addresses three major questions that confront every government: how to compete internationally in military technology; what proportion of national income to devote to defence; and how best to deploy the armed forces. British governments had to relate defence policy to a world role that reflected economic and strategic interests acquired when Britain had been the leading industrial nation, but which was increasingly difficult to maintain as other countries caught up with or overtook the British economy. The idea that there is a relationship between a nation's economic fortunes and its importance as a military power is a familiar one, thanks to Paul Kennedy's *Rise and Fall of the Great Powers*. Kennedy emphasised that the historical record only supports this thesis in the long run. Far from being a proponent of economic determinism, he showed that some powers chose not to use economic power to build up armed forces. For example, the United States preferred in the inter-war period to withdraw into isolationism. Likewise, when Britain experienced economic decline relative to other powers, politicians had some degree of choice in grand strategy. He noted the importance of ability to afford increasingly expensive weapons systems, but saw the main dynamic of change as technology that increased the output of an economy and altered its relative size compared with other economies.⁵ In contrast, this book focuses on the related, but distinct, dynamic of changes in military technology.

Both economic decline and military technology feature in Correlli Barnett's four-volume account of the 'collapse' of British power between the First World War and the Suez crisis of 1956.⁶ Barnett used a concept of total strategy which encompassed all factors that he believed to be relevant to a nation's ability to preserve or extend its power: education, literature, religion and national myths, for example, as well as armed forces and economic and technological resources. His work may

⁴ David Edgerton, *England and the Aeroplane: An Essay on a Militant and Technological Nation* (Basingstoke: Macmillan, 1991); 'Liberal militarism and the British state', *New Left Review*, 185 (1991), 138–69; *Warfare State: Britain, 1920–1970* (Cambridge University Press, 2006).

⁵ Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (London: Unwin Hyman, 1988).

⁶ Correlli Barnett, *The Collapse of British Power* (London: Eyre Methuen, 1972); *The Audit of War: The Illusion and Reality of Britain as a Great Nation* (London: Macmillan, 1986); *The Lost Victory: British Dreams, British Realities 1945–1950* (London: Macmillan, 1995); *The Verdict of Peace: Britain between her Yesterday and the Future* (London: Macmillan, 2001).

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be seen as the combination of two Anglo-American historiographical traditions. The first attempts to explain Britain's relative decline as an industrial economy by asserting that economic performance was undermined by anti-industrial and anti-scientific biases in British culture, broadly defined. The second attributes relative military decline to shortcomings in the doctrine and equipment of the British armed forces, and technical backwardness in the industries supplying them, all usually judged by comparison with an idealised Germany, if not perfection. In fact the British elite was very interested in exploiting science and technology for military purposes and, as Edgerton has pointed out, the British aircraft industry was more efficient than its German counterpart for most of the Second World War.⁷

Power has to be related not only to resources but also to commitments. Barnett argued that the British Empire, far from being an asset, was a political and military liability that policymakers failed to tackle with clear-sighted, strategic calculation.⁸ Sir Michael Howard, in his seminal work, *The Continental Commitment*, stated more cautiously that his thesis that the Empire brought Britain no strength in her dealings with Germany in the 1930s was intended to be a starting point for further discussion.⁹ Colonies and dominions that together covered about a fifth of the world's land mass at the beginning of the twentieth century, a proportion raised to about a quarter as a result of mandates acquired after the First World War, would certainly seem to have represented strategic overextension in terms of Britain's own resources. However, as I have argued elsewhere, the Empire represented assets in the form of naval bases, control of access to raw materials, and reserves of manpower, and did not in fact divert very significant defence resources overseas in the 1930s.¹⁰ Phillips O'Brien has shown that the Royal Navy was so concentrated in European waters in the years immediately before 1914 that it would not have been much smaller even

⁷ David Edgerton, 'The prophet militant and industrial: the peculiarities of Correlli Barnett', *Twentieth Century British History*, 2 (1991), 360–79. The contributors to Bruce Collins and Keith Robbins (eds.), *British Culture and Economic Decline* (London: Weidenfeld and Nicolson, 1990), deal critically with Barnett's thesis and also the work of Martin J. Wiener, *English Culture and the Decline of the Industrial Spirit 1850–1980* (Cambridge University Press, 1981), pointing out that cultural differences between Britain and Germany were less significant than is often supposed.

⁸ Barnett, *Collapse of British Power*, pp. 74–83, 123–4, 133–40, 163–233; *Lost Victory*, pp. 51–69; *Verdict of Peace*, pp. 146–50, 487.

⁹ Michael Howard, *The Continental Commitment: The Dilemma of British Defence Policy in the Era of the Two World Wars* (London: Temple Smith, 1972), p. 7.

¹⁰ G.C. Peden, 'The burden of imperial defence and the continental commitment reconsidered', *Historical Journal*, 27 (1984), 405–23.

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had there been no colonies to defend.¹¹ Orest Babij, John Ferris, Greg Kennedy and Keith Neilson have taken a very different tack from Barnett and Howard by emphasising that the defence of Britain was tied to the defence of the Empire and trade routes. From their perspective, there was a failure after 1929 to maintain the naval superiority, and the naval and air bases and army garrisons, necessary to defend Britain's world-wide interests.¹²

Arms

Assessment of Britain's technological backwardness or otherwise in armaments has to be made against a background of a series of innovations that transformed warfare. At the beginning of the twentieth century the wireless telegraph, as radio was then called, was a novelty; subsequently, electronics were applied not only to communications, but also to detecting the enemy with radar and to enabling warships, aircraft or guided missiles to find their targets. At sea Britain took a technological lead in 1906 by launching HMS *Dreadnought*, which set a new standard for ships armed with big guns. However, submarines and aircraft soon posed threats to surface warships and merchant ships, and battleships were eventually displaced by aircraft carriers. On land, the firepower of armies was greatly increased by improved artillery and machine guns, and the tank, originally designed in the First World War to support infantry in breaking through barbed wire and trenches, displaced cavalry as the mobile military arm from the 1930s. The development of air power ended Britain's insular security as early as the First World War, and in the 1950s Britain came to be regarded as indefensible against a nuclear attack. From the foundation of the Royal Air Force (RAF) in 1918 to the 1960s the strategic bomber was the principal justification for the existence of a service independent of the navy and army, but in 1969 the British nuclear deterrent was transferred from Bomber Command to submarine-launched Polaris missiles. The transfer was significant not only as regards

¹¹ P. P. O'Brien, 'The titan refreshed: imperial overstretch and the British navy before the First World War', *Past and Present*, 172 (2001), 145–69.

¹² John Ferris, "'The greatest power on earth': Great Britain in the 1920s', *International History Review*, 13 (1991), 726–50; John Ferris, "'It is our business in the Navy to command the seas': the last decade of British maritime supremacy, 1919–1929' and Orest Babij, 'The Royal Navy and the defence of the British Empire, 1928–1934', in Greg Kennedy and Keith Neilson (eds.), *Far Flung Lines: Studies in Imperial Defence* (London: Frank Cass, 1997), pp. 171–89 and 124–70 respectively; Keith Neilson, 'The Defence Requirements Sub-Committee, British strategic foreign policy, Neville Chamberlain and the path to appeasement', *English Historical Review*, 118 (2003), 651–84.

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the balance between the services but also because British-designed bombers were being replaced by an American-designed weapons system. Britain, it would seem, was no longer a technological leader.

If Britain's armed forces were to be up to, or in advance of, contemporary standards, growing investment in research and development was required to produce increasingly sophisticated equipment. There were three possible responses to growing costs: the size of the armed forces could be reduced; obsolescent equipment could be made to last longer; or the proportion of national income devoted to defence could be increased. Some examples of the rising cost of armaments may convey the scale of the problem. The last conventional cruiser built for the Royal Navy, HMS *Blake*, completed in 1961, cost £14,940,000; HMS *Cornwall*, an armoured cruiser of similar size completed in 1904, cost £756,274. Most of the difference in price is accounted for by the changing value of money, but the relative costs in terms of what the nation could afford can be compared by measuring them as percentages of national income in 1904 and 1961 at current prices. Thus, *Cornwall* cost 0.046 per cent of national income, but *Blake* cost 0.067 per cent.¹³ If the navy had taken the same share of national income in both years, and had been equipped solely with cruisers of just under 10,000 tons, it could have afforded only two-thirds as many ships in 1961 as in 1904. This example understates the problem: the first dreadnought battleships cost about 0.1 per cent of national income; forty years later an aircraft carrier cost twice that percentage, or more than twice including its aircraft. Moreover, from 1918 the navy had to share the defence budget with the air force as well as with the army. The navy was bound to become smaller over time.

Comparison of costs of most weapons systems is difficult, for whereas ships can be priced as individual items, the cost of a tank or an aircraft depends upon how many are produced. Costs of research and development, and of industrial plant, per item of equipment are lower according to the number built, and the longer the period of production the greater are the opportunities to raise productivity (through learning by doing) and therefore to reduce the amount of labour and capital embodied in each item. However, it was estimated in 1951 that, whereas it had taken 1,100 machine hours to make a pre-war Hurricane fighter, the Hunter jet fighter first flown in that year took 8,000 machine hours to make.¹⁴ The

¹³ The figures used for national income in the calculation are for gross national product at factor cost, compiled by Charles Feinstein and published in B. R. Mitchell, *British Historical Statistics* (Cambridge University Press, 1988), p. 829.

¹⁴ Progress of Defence Programme, minutes of meeting between the Minister of Defence and the Secretary of State for Air, 11 Dec. 1951, PDP/M (51) 1, Ministry of Defence

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average cost of a Canberra bomber, which was manufactured between 1949 and 1961, was £250,000, but in 1964 it was estimated that the production cost of its successor, the TSR-2, would be £2.8 million, plus £2 million for research and development, for each of the aircraft that the RAF wished to order.¹⁵ It is true that more advanced weapons systems were more effective than the ones they replaced, but similar technical advances were being made by potential enemies, and any relative advantage gained by adopting new technology tended to be short-term. The great powers were in the position of Alice and the Red Queen, in *Through the Looking-Glass*, of having to run very fast merely to maintain their relative position.

The problem was compounded by the tendency of the costs of paying, clothing and feeding service personnel, and employing civilians in depots, dockyards, design offices and research establishments, to rise in line with national income. As weapons systems became more complex, they required more maintenance: for example, a Lightning jet fighter squadron in the 1960s required twice as many men to service its aircraft as a wartime Spitfire squadron had required.¹⁶ Thus the proportion of the services' manpower devoted to support front-line units tended to rise. Consequently, any cuts in the size of the armed forces tended to be disproportionately at the expense of front-line units. One way to keep personnel costs down was to use conscripts, who could be paid less and kept in cheaper accommodation than long-service volunteers. Conscription was continued after the Second World War until it was phased out in the early 1960s, but was not popular with the services on account of the time required to train men who would serve only for a short period.

The costs of weapons systems could be cut if they were mass produced, which required standardisation, but with three armed forces carrying out a wide variety of roles there were limits to the extent to which the range of equipment could be reduced. Research and development costs could be shared by importing technology, either by buying equipment abroad or by producing foreign designs under licence. Imported equipment could be cheaper than home-produced equipment if the exporting country had larger-scale production, as was the case in the United States from the 1940s. Importing technology was not always

records, series 7, file 970 (DEFE 7/970), The National Archives of the United Kingdom (TNA).

¹⁵ Sir Richard Clarke to Sir William Armstrong, 3 Nov. 1964, Sir Richard Clarke papers (CLRK), 1/3/3/2, Churchill College, Cambridge.

¹⁶ Guy Hartcup, *The Silent Revolution: The Development of Conventional Weapons 1945–85* (London: Brassey's (UK), 1993), p. xxiv.

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popular with British armaments firms, or even with patriotic historians: the adoption in the late 1930s of the American Browning machine gun by the RAF, and the Czech Bren light machine gun and the Swedish Bofors light anti-aircraft gun by the army, all for production under licence in Britain, was taken by Barnett as evidence of the 'partial decrepitude' of Britain's arms industry.¹⁷ However, from the point of view of economising on research and development costs, it made sense to import some designs, while exporting others.

Economics

The relative decline in Britain's economy, compared with other industrial countries, during the first eight decades of the twentieth century was clearly a factor limiting her ability to compete as a military power. Even so, output per person remained above French and German levels until the 1960s. Since Britain spent a higher proportion of her national income on defence than other Western European countries after 1945, her military expenditure remained greater than France's until 1968 and West Germany's until 1970. The disparity between Britain, on the one hand, and the United States and the Soviet Union, on the other, as regards ability to produce the full range of weapons systems was not obvious until the 1950s. From 1950 to 1969, however, total British defence expenditure averaged about 9.4 per cent of the American level and her attempt to match the superpowers' range of research and development with much more limited numbers of scientific and technological personnel resulted in high unit costs and cancelled projects.¹⁸

The connection between arms and wealth was first noted by Thucydides, who commented in the fifth century BC that 'war is a matter not so much of arms as of money, which makes arms of use'.¹⁹ The money to which Thucydides referred to was gold and silver, which could be used to purchase supplies abroad as well as at home. In fact, what he called money was identical to what we would now call foreign exchange. Britain could supplement her reserves of gold and foreign exchange by exporting goods and services, by selling overseas assets (in which there had been large-scale investment before 1914), or by borrowing from abroad. The availability of loans depended on the credit-worthiness of the British state and on the foreign policies of other countries, of which the most important was the United States. Pounds could be used for

¹⁷ Barnett, *Collapse of British Power*, p. 477.

¹⁸ Figure calculated from table in Kennedy, *Rise and Fall*, p. 495.

¹⁹ Thucydides, *The History of the Peloponnesian War*, ed. and translated by Sir Richard Livingstone (Oxford University Press, 1943), book I, section 83.

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purchases only in the United Kingdom and in the sterling area, the latter comprising countries that tied the value of their local currencies to sterling and banked their reserves in London. Insofar as these countries could be persuaded to add to their reserves of sterling, Britain could import from them without increasing exports of goods and services. However, lack of industrial development in the sterling area outside Britain meant that such imports would be largely confined to food and raw materials. Ability to spend pounds on munitions depended upon what British industry could produce, and an attempt to spend more would push up prices, as clearly happened in both world wars, and could happen at other times. What mattered most as regards output of munitions were Britain's natural resources (very limited; mainly coal, prior to the development of North Sea oil in the 1970s), and the productivity of her labour force, the latter being strongly influenced by investment in industrial plant and new technology, as well as by the quality of management and the state of industrial relations.

Economists have put forward a number of reasons why defence expenditure may have an adverse effect on the economy. Malcolm Chalmers lists three: first, it tends to be at the expense of investment, and therefore of capacity for future production; second, it diverts scientific and technical resources away from commercial production; third, it harms the balance of payments by absorbing resources that might otherwise have been used to produce exports.²⁰ The idea that defence expenditure would crowd out investment in the civil sector was accepted by the Ministry of Defence by the 1950s (and much earlier by the Treasury), but international comparisons in the 1980s by Keith Hartley and John Singleton showed that the crowding out effect was felt unequally in different countries.²¹ This result is not surprising since crowding out is less likely to occur if there are unemployed resources (such as labour with appropriate skills). A fourth possible way in which defence expenditure can harm the economy is the effect of contracts on industry. Mary Kaldor has argued that the defence services were conservative in their requirements, and wanted more powerful versions of existing weapons systems rather than completely new ones. Her thesis is that over-elaboration of existing technologies produced what she called a 'baroque arsenal'. In her view, firms that became accustomed to contracts that had higher specifications than would be required for civil goods, and which neglected costs, became less able to compete in

²⁰ Malcolm Chalmers, *Paying for Defence: Military Spending and British Decline* (London: Pluto Press, 1985), p. 114.

²¹ Keith Hartley and John Singleton, 'Defence R and D and crowding out', *Science and Public Policy*, 17 (1990), 152–6.

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markets for commercial products.²² This tendency, although difficult to quantify, may be added to the long list of reasons that have been put forward for Britain's relative economic decline.²³

Taxation is another factor that has to be taken into account. Normally chancellors of the exchequer tried to balance their budgets, either because that was what was expected of them in peace, down to 1939, or because the consequence of too great a gap between expenditure and revenue was a tendency for prices to rise, imports to exceed exports, the balance of payments on current account to move into deficit, the gold and foreign exchange reserves to fall, and for sterling to depreciate against other currencies, thereby raising import prices. In war, borrowing and its adverse effects would be accepted, just as a runner in a race will use up his or her reserves of strength in a final sprint, but normally borrowing was limited to what international financial markets would accept as sustainable. Even balanced budgets could have adverse economic effects if high tax rates discouraged enterprise or risk-taking on the part of businessmen, or effort on the part of workers, as may well have happened during and after the Second World War.

It should be emphasised that defence expenditure was only one of many factors that may have tended to hold back the growth of the national economy, and it was probably not one of the major ones, except in wartime. On the other hand, unlike most factors influencing the performance of the private sector, such as the structure of firms and the training of management, industrial relations, the productivity of labour or the design and marketing of products, it was something that government could act on directly. It should also be made clear that defence expenditure can have economic benefits, in the form of scientific and technological advances that may have applications within the civilian economy. Nor is all of the expenditure a net burden on the Exchequer: some of the money will return in the form of taxes paid by contractors

²² Mary Kaldor, *The Baroque Arsenal* (London: Deutsch, 1982). Seymour Melman, *The Permanent War Economy: American Capitalism in Decline*, rev. edn (New York: Touchstone, 1985), argues that American experience shows that lack of effective competition results in unnecessarily expensive products.

²³ Defence expenditure is not mentioned in Nicholas Crafts' comprehensive analysis in his *Britain's Relative Economic Performance 1870–1999* (London: Institute of Economic Affairs, 2002), but may have been a contributory factor to some of the reasons that he does give: cartelisation and poor productivity in firms that were kept going instead of being allowed to fail (defence departments tried to keep contractors going, often peddling out small orders, so that these firms would be available in war) and poor productivity in nationalised industries (which include the royal dockyards and royal ordnance factories, and one major aircraft firm, Short Brothers, taken over in 1943, and kept going on account of the employment it offered in Northern Ireland long after it would have otherwise been closed down).

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and their workers, and unemployed or underemployed resources may be activated by the increase in demand originating from the government expenditure.²⁴ Given all the uncertainties about the interaction between defence expenditure and the economy, the best litmus test of whether defence expenditure is too high to be sustained indefinitely is whether the balance of payments on current account is in deficit. However, this test is not infallible as it may be possible to correct the deficit by cutting civil expenditure, both public and private.

A warning about statistics used in the chapters that follow is in order. There was no series of official statistics of British national income before the 1940s, although revenue per penny in the pound of income tax gave chancellors of the exchequer some idea of how the economy was prospering. Earlier figures for national income are estimates by economic historians. There is a bewildering variety of statistics for defence expenditure as a percentage of national income. Data for defence expenditure were compiled by the Central Statistical Office and the North Atlantic Treaty Organisation (NATO) according to different definitions. For national income, or product (which should in theory be equal), there are different data depending upon whether it is measured at market prices or factor cost. Gross domestic product (GDP) excludes net income from abroad; gross national product (GNP) includes that income. Figures in different tables may not be directly comparable, and should be regarded as showing trends rather than precise measurements.

Strategy

Turning to the third of the principal questions posed in this book, how best to deploy the armed forces, we come to strategy. Recently the term 'strategy' has often been used by politicians as a synonym for 'policy', but in this book strategy retains its military meaning, and policy covers the setting of political goals by ministers, the mobilisation of research and industrial resources, and the distribution of these resources between the services.²⁵ Traditionally strategy was concerned with the larger movement of armed forces in a campaign, on land or sea, in contrast with tactics, which dealt with manoeuvring in the presence of the enemy. However, by the twentieth century war was seen as involving all those parts of an economy that sustained the armed forces, justifying blockade to reduce imports of raw materials and other inputs required to

²⁴ Clive Trebilcock, 'Science, technology and the armaments industry in the UK and Europe, with special reference to the period 1880–1914', *Journal of European Economic History*, 22 (1993), 565–80.

²⁵ See Hew Strachan, 'The lost meaning of strategy', *Survival*, 47, Autumn 2005, 33–54.