

# **The Deindustrial Revolution: The Rise and Fall of UK Manufacturing, 1870-2010**

Michael Kitson<sup>1</sup> and Jonathan Michie<sup>2</sup>

October 2012

---

<sup>1</sup> St Catharine's College and Judge Business School, University of Cambridge

<sup>2</sup> Kellogg College and Department for Continuing Education, University of Oxford

## **1. Introduction<sup>3</sup>**

This chapter considers the evolution of the manufacturing sector in the UK since 1870. It analyses the contribution of manufacturing to national income, employment and trade. Broadly, for almost a century, from 1870 to 1960, manufacturing played a key role in the development of the economy, undergirding success in other sectors of the economy and securing rising living standards. The subsequent fifty years, from 1960, have witnessed a relative decline of the UK manufacturing sector – relative to other sectors of the economy, and relative to the manufacturing sectors in other countries. The chapter considers the thesis that the relative decline of manufacturing is a natural outcome of the development of advanced economies, as against the counter-arguments suggesting that decline of UK manufacturing represented something more than this, reflecting economic weaknesses and structural imbalances.

We argue that in the case of the UK, the relative decline of manufacturing has indeed reflected deep-rooted structural problems. In particular there has been a chronic failure to invest in manufacturing, with the UK economy and investment being instead skewed towards short-term returns and the interests of the ‘City’. These structural problems have led to uneven growth in the UK. Regional problems emerged in the interwar period due to the relative decline of traditional industries located in the North and the growth of new industries located in the South and the Midlands. After the Second World War such disparities persisted but were ameliorated by active industrial and regional policies. Since the early 1980s, regional growth has diverged – with London and the South East expanding faster than the rest of the UK. The benign neglect of manufacturing by policymakers has led to an unbalanced economy with manufacturing balance of payments deficits emerging and then persisting since the early 1980s.

Following the 2007-8 credit crunch and the global recession of 2009, a political consensus emerged around the need to rebalance the economy, with a stronger manufacturing sector. Britain does still have pockets of competitive manufacturing – in such sectors as aerospace and pharmaceuticals. But this consensus around the need for rebalancing was not translated into any significant growth of investment, output or employment in manufacturing, nor did it result in the emergence of new sectors of manufacturing strength. A substantial devaluation assisted manufacturing exports, but even with rock-bottom interest rates, repeated quantitative easing, and agreement with the banks on providing increased credit to business, the results over the four years from the 2009 recession proved meagre.

## **2. The Historical Context: 1870-2010**

---

<sup>3</sup> We are most grateful for comments and suggestions received from Alexander Field, Tom Nicholas, and the Editors. We are also grateful to Holly Jennings, Mohamed Nagdy and Luke Sweeney for excellent research assistance.

The performance of any sector of the economy (including manufacturing) can be analysed in terms of the conditions of supply and demand. The supply conditions include: the cost and quality of labour; the cost and quality of capital (such as machinery and structures); and the way such factors of production are combined. The latter includes: innovation and technology; the competitive environment; the quality of management; and the effectiveness of entrepreneurship. The demand conditions include demand by domestic consumers and firms and demand by foreign consumers and firms - and the latter is influenced by the exchange rate as well as any restrictions on trade such as tariffs. A frequent refrain in the analysis of the performance of UK manufacturing is that it has been hindered by inappropriate supply conditions – in particular an uncompetitive environment which has led to low productivity growth and inadequate structural change (Crafts, 1996). Here, we argue that such a focus ignores many of the other constraints on manufacturing – in particular a lack of investment leading to low levels of capital (a supply constraint) and inadequate demand often due to an overvalued exchange rate (a demand constraint) (Kitson and Michie, 1996).

Britain acquired both the advantages and the disadvantages of being the ‘first industrial nation’ (Mathias, 1969). The industrial revolution led to an acceleration in economic growth, albeit slowly and sometime after the development of the technological and organisational innovations that generated economic change. But there were also first mover disadvantages, as other industrialising nations could copy Britain’s successes but not its mistakes; and there was also the concern that British manufacturing became locked into an industrial structure that was slow to adapt and change as the domestic and world economies grew.

The almost a century and a half from 1870 to 2010 can be characterised in two ways as regards the rise and fall of manufacturing. The first would be to see 1870 as the high point for the UK economy, in almost every sense, at least relatively. The UK was the leading economy globally, and with that economic leadership came military dominance and political sway. This strength had derived from the industrial revolution, causing the UK to also, then, be the global power-house in terms of manufacturing and industry. From this perspective we have witnessed 140 years of relative decline. In general economic, political and military terms that is indeed what has happened, with the growth in both absolute and relative importance economically of Germany, Japan and in particular the USA, and more recently the ‘BRIC’ countries of Brazil, Russia, India and China.<sup>4</sup>

The path of development of the manufacturing sector since 1870 can be analysed in four major phases: first, the age of maturity from 1870 to 1913; second, the age of uncertainty from 1919 to 1939; third, the age of transition from 1950 to 1973; and fourth, the age of decline from 1973 to 2007. Since, 2007 the world economy has suffered a financial and economic crises, which may usher in a new age of austerity.

---

<sup>4</sup> In March 2012, Brazil was reported to have overtaken the UK in the international economic league table, having grown by 2.7 per cent in 2011 as against the UK’s growth of 0.8 per cent, making Brazil the world’s sixth largest economy (*Guardian*, March 6 2012).

## 2.1 The Age of Maturity: 1870-1913

The growth of manufacturing output between 1870 and 1913 is shown in Figure 1. Although there were cyclical variations, overall the manufacturing sector grew at an average annual rate of 2.2% during this period. According to Matthews et al (1982, p.378), employment in manufacturing grew at an annual average rate of 0.8%, implying annual labour productivity growth of 1.4% per annum. Overall, employment in manufacturing had increased by 30% between 1870 and 1913 (Magee, 2004, p.75). This, of course, only measures the increase in the input of labour and not the quality of labour. It has been commonly argued that although education and skill levels increased in the UK at the end of the nineteenth century, in relative terms the UK was falling behind the USA (in terms, of formal education) and Germany (in terms of vocational training) (Sanderson, 1999). Although it should be noted that Broadberry (2004) argues that the international differences in human capital and skills should not be exaggerated – and Britain continued to invest in skills particularly in apprenticeships for industry. In addition to the increase in employment, there was also an increase in capital investment: with capital per worker increasing by 76% between 1869 and 1913 (estimates based on data in Feinstein, 1972). Although, this suggests a significant increase in investment in manufacturing, comparisons with other major industrial economies suggests a less optimistic picture. In the 1870s, capital per worker in UK manufacturing was approximately 10% higher than in the USA and 30% higher than in Germany. But by 1900 the position has changed and US manufacturing was 90% more capital intensive than British manufacturing and German manufacturing had caught up with the UK (Broadberry, 1997 and Magee, 2004, p.76). This suggests that Britain's poor relative investment performance identified for the post World War Two period (Kitson and Michie, 1996) may have had deep historical roots.

[Figure 1 around here]

In terms of the organisation of economic activity, it has been argued that the structure of production in UK manufacturing hindered growth and development. Elbaum and Lazonick (1986) have argued that the small family run businesses that proliferated in manufacturing were inefficient and relatively unproductive compared to larger multi-plant enterprises that were more prevalent in the USA and Germany. Two caveats to this view need to be highlighted. First, it is not axiomatic that small firms are less efficient than larger scale enterprises. They may not be able to exploit economies of scale but they may be more adaptable and responsive to economic changes and shocks. Much will depend on how small firms collaborate with one another within the industrial system – as emphasised by Marshall in his notion of 'industrial districts' (Marshall, 1890) and by others, more recently, when focusing on the role of economic clusters (Porter, 2000).

Another apparent failure of the organisation of economic activity was the inability or reluctance to adopt new technology and innovations. This is another recurring theme in the narrative of Britain's relative decline: that the UK is good at developing new ideas and technologies but is not good at commercially exploiting such ideas (see the chapter by Nicholas in this volume). This can either be considered as a technological failure (Mokyr, 1990) or as entrepreneurial failure (Levine, 1967). Prominent examples of the phenomenon were the cotton industry's failure to adopt ring spinning and automatic looms and the dyestuff industry's reluctance to utilise Perkin's synthesising aniline (Magee,

2004, p.88). There has been much discussion on whether the choice of technology should be considered as failure or that it merely reflected rational decisions in response to market conditions including the costs of labour and capital (McCloskey, 1970 [see also the discussion in chapter by Crafts in this volume](#)). Moving on from this debate, it is apparent that the UK did not adopt the leading technologies during this period and there was a lack of a coherent strategy for innovation and growth with state investment in R&D being limited to military-related expenditures (Edgerton, 1996).

In addition to the supply conditions it is also important to consider the demand conditions and one of the most important components of demand for manufacturing is exports. By the mid-1880s the UK had 43% of world manufactured exports, whereas the USA had 6% and Germany had 16% (Matthews et al, 1982, p.435). This dominant position, however, was increasingly eroded as other countries had superior growth of their manufacturing sectors and manufactured exports. By 1913, the UK's share of world manufactured exports had fallen to 32%, whereas the USA's share had increased to 14% and Germany's share had increased to 20% (Matthews et al, 1982, p.435). In part, the changing shares reflect the catching-up growth of the USA and Germany but it also reflected poor relative growth of UK exports. This can be explained by a lack of price competitiveness and the difficulty of entering or remaining in overseas markets which were increasingly developing their economies behind tariff barriers. Although distinguishing between supply and demand is a useful presentational device, it is also important to note that demand and supply conditions interact in a cumulative process. In the UK's case, the failure to invest and adopt new technologies may have harmed competitiveness, which in turn would have reduced exports, which would have deterred new investment.

### **The Age of Uncertainty, 1919-39**

During the interwar period, the development of the manufacturing sector was influenced by its earlier path of development as well as significant shifts in the macroeconomic environment. The period saw two major recessions and major shifts in trade policy including three exchange rate regimes and a move to widespread protectionism in the early 1930s. The data in Figures 2A, 2B and 2C shows the growth paths of output, employment and productivity during the interwar period. From 1920 to 1938, manufacturing output grew at an average annual rate of 2.8% - higher than that achieved during the Victorian and Edwardian periods. Overall, manufacturing employment showed a small decline of 0.2% over the period as a whole. But there were cyclical variations: with a rapid decline of employment during the 1920-21 recession; a moderate decline during the Great Depression of 1929-32; and sustained growth from 1932 to 1937. The annual growth of productivity was 2.7% - a major acceleration compared to the Victorian and Edwardian periods. The change in the interwar period compared to the earlier periods was that although manufacturing output grew, this reflected growth of productivity and not the growth of jobs.

[Figures 2A, 2B and 2C around here]

In terms of the supply of factors of production, the limitations apparent in the Victorian and Edwardian periods were also evident in the interwar period. There was a legacy of low skilled labour and a low level of investment. As Bowden and Higgins (2004, p.338) argue, a highly skilled labour force could not

be built as less than a quarter of the population received a secondary or tertiary education. Similarly, although apprenticeships were being increased, Britain lagged behind Germany in this form of skill development.

It has been argued that the low level of investment was a result of a financial sector that had not developed with the purpose of, or capability for, funding the development of domestic manufacturing (Best and Humphries, 1986). The financial strength of the City of London had developed alongside Britain's colonial and imperial role, funding and profiting from the UK's global economic operations and activities. This was part of the economic process that had led to the country's globally dominant position of 1870. As this global dominance waned, at least in relative terms, the nature and role of the 'City' began to be called into question, most notably by Winston Churchill proclaiming that he would rather see finance less proud and industry more content, and with Keynes concluding that:

When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done. Keynes (1936, p. 159)

In terms of the organisation and structure of the manufacturing sector, it has been argued that there was a supply side problem reflecting an over-commitment to traditional industries (such as iron and steel, shipbuilding and clothing). These traditional industries were concentrated in the so-called 'outer' regions of the UK (Scotland, Northern Ireland, the North West, the North East and Yorkshire), leading to the development of regional divergences and the so-called 'North-South divide'. For some optimists, there was an industrial transformation in the interwar period with the over-commitment to old industries being replaced in the 1930s with an industrial structure more dependent on faster growing 'new' industries (such as electrical engineering, chemicals and motor vehicles) (Richardson, 1967). This view is, however, subject to many limitations and criticisms. First, there are problems of definition; with fast growing industries being classified as 'new' and others being upgraded 'old' industries. Second, on whatever definition used, the new industries comprised a relatively small share of manufacturing activity (Kitson and Solomou, 1990). Third, there were strong linkages between the new and old industries which shows that the former cannot be considered as an independent development block (Von Tunzelman, 1982).

An additional issue in the organisation of production is the argument that British manufacturing was too small scale and lacked professional management (Chandler, 1990). British firms were unable to exploit economies of scale and scope which would have increased their competitiveness – and allowed them to capture a larger share of both domestic and overseas markets.

The interwar period saw the introduction of policies to address the structural, scale and regional problems. Industrial policy was concerned with promoting mergers to rationalise production, reduce excess capacity and promote economies of scale. To address regional disparities, the government established the Industrial Transference Board in 1928, which retrained workers from the declining industries and used grants to allow them to move and find employment in expanding industries. It was an instrument that moved workers to jobs rather than jobs to workers, which had many negative effects on the areas which workers left.

One prominent critique of both industrial structure and economic policy in the interwar period is that it harmed the supply side of the economy and left an anti-competitive legacy which hampered economic performance after the Second World War (Broadberry and Crafts, 1990a, 1990b, 1992, and 1996). This view stresses the importance of the competitive structure of manufacturing where more intense competition: increases efficiency; encourages firms to develop new products, services and technologies; and gives consumers more choice and lower prices. There are both theoretical and empirical limitations to this perspective. On the theory side: there are alternative arguments that scale and limited competition may have beneficial impacts on innovation and competitiveness. This suggests that it is not always the case that more competition leads to better economic outcomes. On the empirical side, there is evidence that in the 1930s, a period characterised by a retreat from competition, British relative productivity performance improved (Kitson and Michie, 2000, pp. 80-1). (for a counter view see Crafts in this volume)

On the demand side, the manufacturing sector benefitted from rising domestic demand but was hindered by volatility in exports caused by shocks to the world economy and exchange rate shifts and crises (see the chapter by Schenk in this volume). The interwar period saw a significant increase in consumers' expenditures on a range of goods and services, in particular on transport and communication and durable household goods (Bowden and Higgins, 2004, p.376). But there was more volatility in overseas markets as Britain adopted three exchange rate regime during the interwar period: a floating exchange rate until 1925; a fixed exchange rate (the Gold Standard) from 1925 to 1931; followed by a managed exchange rate. The problem for the tradable sector was that, for most of the duration of the first two regimes, the exchange rate was overvalued leading to a loss of price competitiveness for exports and import substitutes (Kitson, 2013). This had a particularly adverse impact on the manufacturing sector as a large share of its output was for export markets. The exports of manufactures were further reduced by the impact of the Great Depression which led to a lower level of world economic activity which reduced the demand for British goods. Although there was a revival in the world economy from the mid-1930s, world trade remained depressed as countries turned to protectionist policies to support their domestic economies.

There was a turnaround for the manufacturing sector in the 1930s: with annual growth averaging nearly 8% between 1932 and 37. Much of this growth was stimulated by the policy regime change that took place at the end of 1931 and early in 1932, which included: suspension of the Gold Standard and devaluation of sterling; lower interest rates ('cheap money'); and protectionism of manufactures through the introduction of the General Tariff. The combination of these trade and monetary policies increased demand for British goods and services, in particular manufactures, which promoted recovery from the Great Depression (Kitson and Michie, 2000, chp.5). Overall, the manufacturing sector contributed 47% of the overall growth of the British economy between 1932 and 37. In contrast, the building and construction sector – which is often identified as the key sector in the revival of the 1930s – contributed only 9% to overall growth in the period (Kitson and Solomou, 1990).

### **2.3 The Age of Transition, 1950 -1973**

The period from 1950 to the early 1970s has been called a 'golden age', as economic growth was rapid, unemployment was low, and inflation was low and stable. For the manufacturing sector it was a period of transition, as the 1960s saw the onset of 'deindustrialisation' (measured as the relative decline of manufacturing or the decline of manufacturing employment). As shown in Figure 3A, manufacturing output grew throughout the period - at an average annual rate of 3.1%. In historical terms this was high but compared to many other advanced countries it was relatively low. Also, as Figure 3B shows, employment followed a different path, rising up until 1966 and then falling; whereas productivity (see Figure 3C) increased throughout the period.

[Figures 3A, 3B and 3C around here]

Despite growing at a faster rate than in earlier periods, it has been argued that the golden age was tarnished as Britain failed to achieve its potential. As in earlier periods, there were arguments concerning skill shortages and, in particular a lack of investment (Kitson, 2004). Kitson and Michie (1996) argue that poor investment resulted in British workers lacking the quantity and quality of capital equipment used by workers in other countries.

Industrial policy in the period was characterised by state intervention to 'pick winners' and the state ownership of leading sectors. For those who emphasise the efficiency of market forces, this hampered the economy as it reduced competition and led to poor industrial relations (Crafts, 2002). Crafts (2002) has argued that the failure of successive governments to implement appropriate supply side policies led to a lack of competition in both product and labour markets. In particular, it is argued that the post war settlement between government, employers and trade unions resulted in a harmful policy regime which included nationalisation, the support of failing companies, the toleration of militant trade unions and a lack of an effective competition policy. An alternative perspective is that the performance of manufacturing was hindered by a failure to implement a coherent industrial policy (Kitson and Michie, 2000). In particular, there was a general failure to promote long-term investment in the British economy. There were some sectors where a long-term perspective prevailed but these sectors tended to be supported by state intervention – such as aerospace and pharmaceuticals.

On the demand side, the manufacturing sector did benefit from growth of the domestic economy which stimulated consumption demand and rapid growth in the world economy which stimulated demand for UK exports. Despite this boost, the UK's share of world trade was falling and its propensity to import was rising. These deteriorating trends in trade performance were further exacerbated by periodic exchange rate crises. Kaldor (1971) argued that this acted as a brake on economic growth as the UK had *relatively* slow growth of demand as the trends in trade led to a balance of payments constraint on growth. Simply, the UK economy could not generate sufficient exports to pay for the imports the economy would want to buy if the economy was fully employed. Thus, the process of deindustrialisation locked the whole economy into a vicious cycle of slow growth (Singh, 1977).

#### **2.4 The Age of Decline, 1973 – 2007**

The world economy suffered a major shock in the early 1970s. In the UK, and in many other advanced countries, there was the emergence of 'stagflation' – rising inflation and rising unemployment. There

was also a major shift towards free market policies and a reduced role for state intervention (see the chapter by Middleton in this volume). For the manufacturing sector, this was a period of stagnation in output and continued decline in terms of employment. As shown in Figures 4A and 4B, the annual rate of growth of output was only 0.4% between 1973 and 2007; and employment in manufacturing fell by an annual rate of 2.6%. The one bright spot was the continued rise in productivity which, as shown in Figure 4C, increased at an annual rate of 2.9%.

[Figures 4A, 4B and 4C around here]

Although the process of deindustrialisation was apparent in many advanced countries, it was more rapid in the United Kingdom than in most other countries. As shown in Table 1, the growth of UK manufacturing output between 1973 and 2007 was much lower than in competitor countries; moreover, this is apparent in all three sub-periods. The divergences in performance are also apparent in terms of employment. As shown in Table 2, all the major countries have falls in manufacturing employment since 1973 but the decline was much steeper in the UK compared to the other countries.

[Tables 1 and 2 around here]

Although there was an economic policy regime change, the record of poor investment in manufacturing continued. Table 3 reports the growth of the manufacturing capital stock in various periods from 1964 for the UK and the other leading industrial economies. It can be seen that for total assets, the UK comes consistently bottom of the league table for these countries – and also the growth of the capital stock was declining over time.

A key part of the policy regime change was a raft of supply side policies which decreased the role of the state and promoted the operation of market forces including: privatisation, deregulation, weakening of trade unions and restraints on public expenditure. Crafts (2002) has argued that the regime change improved competitive pressures and helped to halt relative decline. There is, however, an alternative perspective that the regime change accelerated the decline of manufacturing with adverse long-term implications for the whole economy. The good productivity performance of manufacturing has been presented as evidence to support the regime change. But productivity was marginally higher in the 1950 to 73 period than in the subsequent period; moreover, in the 1973-2007 period, productivity was associated with job cuts and not rising output. Simply, the argument is that the manufacturing sector became too small – and this had implications for net exports, regional balance and overall economic growth.

The decline of manufacturing was also accelerated during some parts of the period by demand shocks and constraints caused by shifts in macroeconomic policies. During the early 1980s, the focus on controlling inflation led to periodic overvaluation of the exchange rate, which was particularly harmful during the monetarist policies in 1979-80 and during the UK's membership of the Exchange Rate Mechanism (ERM) (Kitson, 2004). When Britain was forced out of the ERM in September 1992, three administrations enjoyed the economic benefits from the devaluation and low interest rates – much as leaving the Gold Standard in 1931 had enabled devaluation and the introduction of cheap money. In both cases such a move had generally been regarded as being unthinkable – but as is so often the case

when alternative views are advanced to challenge orthodox thinking, once the deed is done, it becomes hard to find anyone who had been opposed.

More potentially significant for the subject of this chapter was the removal of the Conservative Party from office after almost twenty years of uninterrupted rule, with Labour winning the 1997 election. John Major had been the Chancellor of the Exchequer under Thatcher, and his government was generally seen as a 'steady as you go' administration that was not going to attempt anything very different from the previous Conservative (Thatcher) governments. The 'cones hot line' is perhaps what that government is best remembered for, although as noted above, the economic circumstances had fortuitously fallen nicely for manufacturing, with the failure of the 'ERM' policy leading to interest rate cuts and devaluation.

The election of the Labour Government in 1997 was potentially significant for British industry for a number of reasons. Firstly, the first Thatcher Government's pursuit of monetarist policies hit the manufacturing sector particularly hard, with high interest rates and an overvalued currency making UK manufacturing exports uncompetitive and UK products concomitantly uncompetitive domestically against imported goods. Secondly, the Labour Party might have been expected to be more supportive of the manufacturing sector, given its importance not just to the economy but also to employment and to the regional balance of the economy – and to be accordingly less supportive of the City of London and their demands. And thirdly, there were analysts and commentators who appeared to believe that 'New Labour' was an intellectually credible force, which would deliver policies appropriate to modernising the economy as a whole, including manufacturing.

Sadly, any such hopes or beliefs proved largely unfounded. 'New Labour' avoided any active industrial policy, generally claiming instead that governments could not or should not 'pick winners' – and for that orthodox view they always had mainstream academic backers. But arguably that is precisely what the Government did in seeing (or picking) the banking sector as representing the key to the UK economy's future prosperity; thus, the Chancellor of the Exchequer congratulated the City on their 'remarkable achievements', which were announced in June 2007 as unleashing 'an era that history will record as the beginning of a new golden age for the City of London' (Brown, 2007). The winner that New Labour picked, turned out to be a more expensive gamble than any amount of 'picking' or 'creating' winners within the manufacturing sector could have possibly cost.

## **2.5 An Age of Austerity, 2007 - ?**

Manufacturing was largely neglected until the dying days of the Brown administration, by which time it was too late to do much economically, and it also proved too late politically as well. Interestingly, a late attempt at industrial activism came from Peter Mandelson who was one of the architects of New Labour and its strategy of distancing the Labour Party from its previous commitments to active industrial and regional policies. It may be that Mandelson's time in Brussels opened his eyes to how other leading industrial economies operate, namely with active institutional support to the manufacturing sector, rather than just as a cheerleader for the banking sector.

The Coalition Government took office in 2010 in the aftermath of what had been the first global recession since the 1930s, with world output falling in 2009 following the 2007-08 credit crunch. The Coalition Agreement pledged to foster a more corporatively diverse financial services sector, including through the promotion of mutuals (HM Government, 2010).<sup>5</sup> The Chancellor of the Exchequer claimed to be supporting the ‘march of the makers’, as the economy rebalanced towards manufacturing.

Once again, the results were disappointing, not just in terms of outcomes, but even of actions. On the Coalition Government’s pledge to promote mutuals in order to bring about a more corporately diverse financial services sector, this was not in fact a very difficult pledge to fulfil, as one of the formerly successful mutuals which had become a private bank that failed, was actually in public ownership – so it would have been a simple matter to return it to the mutual sector. Indeed, representatives of UKFI (the organisation created to manage the public stakes in the banking sector) had met with the Oxford Centre for Mutual and Employee-owned Business, a meeting that the Government Minister had welcomed, and at which the proposals for how Northern Rock could be remutualised to the benefit of the UK taxpayer had been explained. This meeting was followed by the Government instead selling Northern Rock to Richard Branson. When the Government Minister was challenged in Parliament as to why they had short-changed the taxpayers in this way, he misled Parliament by claiming that the Oxford Centre had failed to provide any alternative advice.

### **3. Explaining Deindustrialisation**

Britain was the first industrial nation, and for much of the subsequent period it was considered the ‘workshop of the world’, but a process of deindustrialisation started from the 1960s. The causes and consequences of this deindustrialisation have been subject to much debate (Crafts, 1996; Eltis, 1996; and Kitson and Michie, 1996)<sup>6</sup>.

Kitson and Michie (1996) argued that Britain’s industrial performance since 1960 had been relatively poor and neither the specific problem of deindustrialisation nor the more general problem of relative economic decline had been solved during the 1980s, and that one of the key reasons for these continued industrial and economic failings had been an underlying failure to deliver sufficient industrial investment. Of course, underlying this failure to deliver such investment was a belief that it was not the

---

<sup>5</sup> ‘We want the banking system to serve business, not the other way round. We will bring forward detailed proposals to foster diversity in financial services, promote mutuals and create a more competitive banking industry.’ (HM Government, 2010, p. 9)

<sup>6</sup> These three contributions were published in the *Economic Journal* in 1996. The debate was published while academics and others were still evaluating the economic effects of the Thatcherite economic policies – of monetarism and financial deregulation – that had been pursued throughout the 1980s and into the early 1990s.

responsibility of government to deliver any such thing – for that would be to stray into the territory of picking winners. Instead, investors should be left to invest as and how they saw fit. And if that was largely overseas – and if within the UK the investment was in shopping malls and the banks – then so be it.

Eltis (1996) acknowledged that despite comparable economic growth overall, manufacturing output in particular had grown more slowly in the UK in the 1970s and 1980s than in other industrial countries, and this he put down to a failure to innovate, which in turn he saw as being due to UK companies investing *defensively* to cut costs, rather than positively to create new products and new markets.

Crafts (1996) argued that ‘a mixed verdict on the Thatcher Experiment is appropriate’ (p. 172), claiming that industrial relations reforms increased productivity growth, albeit with ‘less immediate success’ in improving the skills of the workforce or patenting performance. For alternative evidence regarding these reforms, see for example Michie and Sheehan (1999, 2003).

This debate was in part about the record of the Thatcher governments, in part a consideration of the longer term performance since 1960, and in part a contribution to the ‘deindustrialisation’ literature which had emerged during the 1970s. Indeed, Eltis was arguably one of the initiators of this debate, with the 1975 *Sunday Times* articles by him and Bob Bacon that culminated in their book, *Britain’s Economic Problems: Too Few Producers?* (Bacon and Eltis, 1976). In his discussion of deindustrialisation, Singh (1977) defined an ‘efficient’ manufacturing sector as being able to provide sufficient net exports to meet the country’s overall import requirements at socially acceptable levels of output, employment and exchange rate (p. 134).

#### **4. Does Deindustrialisation Matter?**

There is not only debate about the causes of deindustrialisation, there is also the related debate about whether deindustrialisation matters? For instance, if the relative decline of manufacturing has no adverse impact on employment and the overall level of economic activity then there may be no problem. There has long been interest in what causes and creates the wealth of nations, and what role industry and manufacturing plays in this process (for an early contribution, see Smith, 1776). This interest is still alive, and the resulting debates continue, with many of the key issues remaining unresolved or at least disputed (for a recent contribution, see Acemoglu and Robinson, 2012). The relative decline of manufacturing, as a share of both output and employment, has been apparent in all advanced economies, particularly since the 1960s (Kitson and Michie, 1997) - but the decline has been more rapid in the UK compared to the other advanced countries (see above). This has led some to argue that this reflects a process of historical evolution, as advanced economies are characterised by a large services sector and a small manufacturing sector (see Fisher, 1935; Rostow, 1960; and Kuznets, 1966). This process can be characterised as positive deindustrialisation (Rowthorn and Wells, 1987) – and not an issue of concern.

There are four main explanations for this process of 'positive deindustrialisation'. First, it reflects shifts in comparative advantage. Basically, the argument is that many advanced economies are relatively more efficient at producing services – particularly knowledge intensive business services (KIBS) – than they are at producing manufactures. Thus, advanced economies have increasingly imported manufactures from less developed countries – such as Brazil, Russia, India and China - who have a comparative advantage in manufacturing, particularly because of an abundant supply of low cost labour. This view was expressed by Nigel Lawson when, as Chancellor of Exchequer, he stated: 'there is no adamant law that says we have to produce as much in the way of manufacturing as we consume... If it does turn out that we are more efficient in world terms at providing services than at producing goods, then our national interest lies in a surplus on services and a deficit on goods' (Lawson, 1985, p. 554).

Second, there is the argument that as countries develop and grow, the structure of consumption (which is the largest component of aggregate demand) shifts towards services and away from manufactures. Simply, the argument is that the income elasticity of demand for services is greater than unity, so that the demand for services will outstrip the overall growth of the economy (Gershuny, 1978). This argument has been subject to significant interrogation. Rowthorn and Wells (1987) have argued that when measured in constant prices the demand for manufactures and services tend to increase at similar rates as economies develop. Furthermore, Fuchs (1968) and Baumol, Blackman and Wolf (1989) have argued that the shifts in the structure of demand cannot explain the relative decline of manufacturing and the relative growth of services.

A third explanation of positive deindustrialisation is that it reflects the faster growth of labour productivity in manufacturing compared to that in services - which will lead to the prices of the former falling when compared to the latter. This is likely to lead to a fall in the share of manufacturing in total employment (Baumol, 1967; Fuchs, 1968; and Saxonhouse, 1985). Analysing this differential productivity thesis is problematic, as it is fraught with data problems and limitations. In particular, it is difficult to measure changes in the quality of both manufactures and services, with the problem being especially acute with services as no physical output is produced. Figure 5 shows the productivity growth in the UK in different sectors between 1987 and 2007 based on official data. Although productivity in manufacturing was relatively high, the case that productivity growth is higher in manufacturing than it is in services oversimplifies the differences between sectors of the economy. Furthermore, the official data may not be a clear representation of the realities of productivity. The data in Figure 5 indicates negative productivity growth in the public sector but this has been shown to be an artefact and a product of poor data (Black, 2012).

[Figure 5 around here]

Statistical illusions are also apparent in the fourth explanation of positive deindustrialisation; which explains the perceived decline of manufacturing as the outcome of industrial restructuring, with the reconfiguration of supply chains. Simply, many activities that were undertaken by manufacturing firms (and so were classified as manufacturing) – such as R&D, design, transportation and logistics - have been subcontracted or purchased from external suppliers (and so are now classified as services).

The case that there is something special about manufacturing can be traced back to the arguments that it acts as a dynamic engine of growth (Lewis, 1954; Kaldor, 1966). Within this framework, an excessive decline of manufacturing may be characterised as negative deindustrialisation as it will lead to slower overall growth of the economy (Rowthorn and Wells, 1987).

There are primarily three arguments in support of the case that manufacturing does matter. First, manufacturing is seen as a source of productivity growth, as manufacturing firms can exploit the benefits of economies of scale. Such economies of scale can lead to increasing competitiveness which can lead to a growth in net exports – boosting aggregate demand and leading to further exploitation of increasing returns. Thus a dynamic manufacturing sector can lead to a virtuous cycle of economic growth. This argument may be limited by the fact that the argument that productivity growth is apparent in manufacturing and not in services is too simplistic. But it does draw attention to the importance of high productivity sectors for growth of any economy.

Second, there is the argument that manufacturing is important as a source of net exports – and this is more important than its share in income or in employment. From the industrial revolution onwards, Britain was a net exporter of manufactures – but as shown in Figure 6, this changed in the early 1980s when Britain became a net importer of manufactures. As discussed above, for many this just reflected shifts in comparative advantage. But there is another dimension to the phenomenon – since the early 1980s, Britain has had a structural balance of payments deficit as the growing deficit on manufactures was not offset by a surplus on services. This has led to the notion that not only does manufacturing not matter, but also that the balance of payments does not matter either. However, a structural balance of payments deficit does matter – as it has to be funded either by borrowing from other countries or by selling assets. This may have been relatively unproblematic in the pre-crisis era – how sustainable it will be in the future is highly questionable.

[Figures 6 around here]

A third argument is that a dynamic manufacturing sector is important as part of a productive economic system. A systems approach stresses the importance of linkages between the various economic actors within the system. Within this framework, it is important to consider the linkages between manufacturing and other parts of the economy – including services but also universities and the public sector. Such relationships and collaborations are important in generating innovation, technology and growth. Two of the most successful manufacturing industries in Britain are pharmaceuticals and aerospace; and both have been supported by active collaboration with, and contracts from, the public sector - in particular the National Health Service and the Ministry of Defence respectively. In all of the advanced countries, the state has taken an active role in industrial policy, and has supported key parts of the manufacturing sector; this has been the case in Germany, Japan and France - and is the case now in newly industrialising countries such as China and Brazil. Frequently, the United States is portrayed as a liberal market economy which has eschewed interventionist policies. But this has not been the case with industrial policy, where there has been active state intervention to support key industries and promote innovation: pharmaceuticals and biotechnology are supported by the National Institutes of Health; the Defense Advanced Research Projects Agency has invested in information technology; and

support for innovation in small and medium-sized enterprises is provided by the Small Business Innovation Research program. Governments have been picking winners whilst hiding behind the convenient veil of the free market. Of all the advanced economies, it is Britain in particular where there has been a systematic failure to pursue any sort of long-term industrial policy.

#### **4.1 Polices for Manufacturing**

The issue of the appropriate policies for manufacturing depends on whether the process of deindustrialisation is perceived as positive or negative. If it is considered to be a positive outcome then there is no cause for concern. However, if deindustrialisation is regarded as being a negative phenomenon then there may be need for changes in public policy. But there will still be differences concerning the direction that such policies should take. This reflects the fact that economics is not a science but is a subject that is subject to much discussion, debate and disagreement. This is apparent in this volume: for instance we take a very different view to Crafts ([see the chapter by Crafts this volume](#)) on how the economy works and what is the appropriate policy framework to generate growth and improve welfare. For those who believe in the power of market forces, policy should be concerned with deregulation and the promotion of competition. In this vein, the interventionist policies of the 1930s and the Keynesian 'Golden Age' harmed both manufacturing and overall economic growth (Broadberry and Crafts, 1992); whereas, the Thatcherite free market policies helped to reverse relative economic decline (Crafts, 1996). Conversely, for those who conclude that the state needs to play an active role in supporting manufacturing and the development of new products and processes, the relative decline of manufacturing in Britain reflects the lack of a coherent industrial policy and persistent under-investment (Kitson and Michie, 1996). Within this latter perspective, manufacturing has been in long-term retreat – which poses a serious challenge to the late converts who now wish to promote a 'march of the makers'. Increased manufacturing output per head may prove to be of little benefit to the economy as a whole if it simply represents stagnant output levels delivered with fewer employees – which has been broadly the consequences of, and outcome from, the Thatcher era. Policies need to look beyond productivity levels to the scale of production itself. To turn around this 35-year problem would require a serious industrial policy that provided the necessary productive infrastructure, combined with policies to support and promote manufacturing output levels that would need to include attention to innovation and investment, and these in turn require progressive and long-sighted management practices. These have been analysed in detail by, for example, Michie and Sheehan (2003), and Bloom and Van Reenen (2007).

#### **5. Conclusions**

The rise and fall of UK manufacturing has been inescapably linked with the rise and relative decline of the UK economy overall. In 1870 the UK was still the workshop of the world, and the country as a whole enjoyed the highest income per head in the world. Traditionally, Britain had earned a surplus in manufacturing trade to pay for net imports in food, fuel and raw materials. This turned into a manufacturing trade deficit following the Thatcher recession of 1979-81, which hit manufacturing particularly hard. The UK's international trading for the manufacturing sector has remained in deficit ever since.

According to the IMF's economic league tables (rather than just for manufacturing), the UK was the 6<sup>th</sup> largest economy in 1970, and remained there through to 1980, and indeed to 1990, before rising at the expense of the collapse of the Soviet Union, and with the UK switching places with France during the first decade of the 2000s; however, by 2010 France had overtaken the UK again, as by now had China. And as reported above, in 2011, Brazil overtook the UK, which therefore slipped down to 7<sup>th</sup> place in the world economic rankings.

The UK's Coalition Government in 2012 claims to want a rebalancing of the economy, with a 'March of the Makers', which the 2011 Budget was trumpeted as launching – putting fuel in its tank. There is no reason why the UK manufacturing sector could not grow and prosper, but manufacturing firms do need a financial services sector that is focussed on supporting them rather than 'innovating' new financial products to sell globally. Manufacturing growth areas such as renewable energy technologies have generally seen success for manufacturing in Germany, Denmark, Korea, the US and elsewhere – in some cases related directly to the extent to which their governments responded to the 2008 credit crunch with a 'green new deal' in 2009 and beyond.

One of the more recent contributions to this long debate on the relative decline of UK manufacturing and of the economy more generally comes from the Commission on Ownership that was launched in the UK in 2010 and which issued its final Report in March 2012. The Commission concluded that Britain needs greater corporate diversity, including a larger and more vibrant 'mittlestand' of medium sized family owned companies; improved funding arrangements for SMEs; incentives for employee ownership, including through facilitating employee trust-based ownership; and enabling mutuals to raise investment funds, including by being able to issue bonds to members (Commission on Ownership, 2012, pp. 96-7). Alongside this, the dominant PLC model needs to be reformed, including through giving tax relief to equity finance as well as to debt finance;<sup>7</sup> by requiring a clear statement of business purpose; widening the fiduciary obligations of directors to include a 'duty of stewardship' to deliver this purpose rather than as at present simply to 'have regard' to any interest other than the shareholders; by requiring investment institutions to similarly have stewardship obligations alongside their fiduciary obligations; and by revising takeover rules to no longer give an advantage to firms from countries where companies are less strictly governed than in the UK, and with a strategic public interest test being applied (pp. 98-100). Alongside better stewardship of PLCs within a more corporately diverse economy, the Commission also advocated various enabling strategies, from the Office of National Statistics collecting and reporting consistent ownership data, through to promoting greater employee participation and engagement at work, and helping pension funds exert their ownership rights (pp. 96-102).

The Commission on Ownership was analysing the performance and prospects for the economy as a whole, but their overarching conclusion was to stress the need for and importance of corporate plurality

---

<sup>7</sup> Also supported by the Mirrlees Review – see IFS (2011), especially chapters 17 and 18.

as a route out of the UK's longstanding problems of the PLC monoculture and short-termism.<sup>8</sup> These arguments apply if anything with even greater force to the manufacturing sector than they do to the economy as a whole, with manufacturing firms often suffering from the short-term pressures of quarterly reporting and living with overdraft facilities which can be withdrawn at any time. Conversely, a stronger manufacturing sector would help to deliver much of what the Commission on Ownership identified as being necessary for the future success of the economy as a whole, such as a strengthened and sustainable 'mittlestand'.

A stronger manufacturing sector would help to rebalance the UK economy away from an over-reliance on the banking sector, would help rebalance the UK economy and society in regional terms, is necessary to tackle the continued balance of payment problems that have been created by the trade surplus on manufacturing having been pushed into a trade deficit by the Thatcher recession of 1979-81 from which it has yet to fully recover, and would help support those other areas of the economy that interact with and benefit from a healthy manufacturing sector. Indeed, in many areas the distinction between manufacturing and services are blurred, including within individual companies, and without a prosperous manufacturing sector such companies are vulnerable. To achieve such a rebalancing requires active government policies along the lines referred to above, along with investment in education, skills, R&D and innovation.

---

<sup>8</sup> On the detrimental outcomes from such short-termism, see for example the World Economic Forum's report on the *Future of Long Term Investing*, [www.weforum.org/issues/future-long-term-investing](http://www.weforum.org/issues/future-long-term-investing)

## References

- Acemoglu, D. and J.A. Robinson (2012), *Why Nations Fail: the origins of power, prosperity and poverty*, London, Profile Books
- Bacon, R. and W. Eltis (1976), *Britain's Economic Problems: Too Few Producers*, Macmillan
- Baumol, W. (1967), Macroeconomics of Unbalanced Growth, *American Economic Review*, 57, 415-26
- Baumol, W., S. Blackman and E. Wolf (1989), *Productivity and American Leadership: The Long View*, Cambridge, MIT Press
- Best, M. and J. Humphries (1986), The City and Industrial Decline, in B. Elbaum and W. Lazonick, *The Decline of the British Economy*, New York, Oxford University Press
- Black, N. (2012), Declining health-care productivity in England: the making of a myth, *The Lancet*, Volume 379, Issue 9821, 1167-1169
- Bloom, Nick and John Van Reenan (2007), Measuring and Explaining Management Practices Across Firms and Countries, *Quarterly Journal of Economics*, November
- Bowden, S. and Higgins, D.M. (2004), 'British industry in the interwar years' in R. Floud and P. Johnson (eds), *The Cambridge Economic History of Modern Britain. Volume II: Economic Maturity*, Cambridge, Cambridge University Press, 374-402.
- Broadberry, S. (2004), 'Human skills and capital', in R. Floud and P. Johnson (eds), *The Cambridge Economic History of Modern Britain. Volume II: Economic Maturity*, Cambridge, Cambridge University Press, 56-73.
- Broadberry, S. and Crafts, N.F.R (1990a), 'The impact of the depression of the 1930s on the productive potential of the United Kingdom', *European Economic Review*, 24, 599-607
- Broadberry, S. and Crafts, N.F.R (1990b), 'The implications of British macroeconomic policy in the 1930s for long-run growth performance', *Revista di Storia Economica*, 7, 1-19
- Broadberry, S. and Crafts, N.F.R (1992), 'Britain's productivity gap in the 1930s: some neglected factor', *Journal of Economic History*, 52, 531-58.
- Broadberry, S. and Crafts, N.F.R (1996), 'British economic policy and industrial performance in the early post-war period', *Business History*, 38, 65-91
- Brown, Gordon (2007), Mansion House Speech, Bankers & Merchants Dinner, City of London, 20<sup>th</sup> June
- Chandler, A.D (1990), *Scale and Scope: The Dynamics of Industrial Capitalism*, Cambridge, Mass
- Commission on Ownership (2012), *Plurality, Stewardship and Engagement*, London, Mutuo.
- Crafts, N. (1996), Deindustrialisation and Economic Growth, *The Economic Journal*, Volume, 106(434), 172-183

- Crafts, N. (2002), *Britain's Relative Economic Performance, 1870-1999*, London, Institute of Economic Affairs,
- Edgerton, D.E.H. (1996), *Science, Technology and the British Industrial Decline*, Cambridge, Cambridge University Press
- Elbaum, B. and W. Lazonick (1986), *The Decline of the British Economy*, New York, Oxford University Press
- Eltis, W. (1996), How Low Profitability and Weak Innovativeness Undermines UK Industrial Growth, *The Economic Journal*, 106(434), 184-195
- Eurostat (2011), *Yearbook 2011*, December, Brussels, European Commission
- Feinstein, C.H. (1972), *National Income, Expenditure and Output of the United Kingdom, 1855-1965*, Cambridge, Cambridge University Press.
- Fisher, I. (1935), *The Clash of Progress and Security*, New York, Macmillan
- Fuchs, V. (1968), *The Service Economy*, New York, Columbia University Press
- Gershuny, J. (1978), *After Industrial Society*, London, Macmillan
- HM Government (2010), *The Coalition: our programme for government*, Cabinet Office, London.
- Institute for Fiscal Studies (2011), *Tax By Design*, London, IFS
- Kaldor, N. (1966), *Causes of the Slow Rate of Growth in the United Kingdom*, Cambridge, Cambridge University Press
- Kaldor, N. (1971), 'The conflict in policy objectives', *The Economic Journal*, 81, 1-18
- Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, London, Harcourt Brace
- Kitson, M. (2004), 'Failure followed by success or success followed by failure? A re-examination of British economic growth since 1949', in R. Floud and P. Johnson (eds), *The Cambridge Economic History of Modern Britain. Volume III: Structural Change and Growth, 1939-2000*, Cambridge, Cambridge University Press, 27-56.
- Kitson, M. (2013), Britain's withdrawal from the gold standard: the end of an epoch' in R. Parker and R. Whaples (eds), *Handbook of Major Events in Economic History*, London, Palgrave.
- Kitson, M. and J. Michie (1996), Britain's Industrial Performance Since 1960: Underinvestment and Relative Decline, *The Economic Journal*, 106(434), 196-212
- Kitson, M. and J. Michie (1997), Does Manufacturing Matter?, *International Journal of the Economics of Business*, 4(1), 71-95
- Kitson, M. and Michie, J. (2000), *The Political Economy of Competitiveness*, London, Routledge.
- Kitson, M., Nagdy, M. and Sweeney, L. (2012), UK Manufacturing; Historical Dataset, University of Cambridge (available on request)

- Kitson, M. and Solomou, S. (1990), *Protectionism and Economic Revival: The British Interwar Economy*, Cambridge, Cambridge University Press.
- Kuznets, S. (1966), *Modern Economic Growth: Rate, Structure and Spread*, New Haven, Yale University Press
- Lawson, N. (1985), Oral Evidence, *Report from the Select Committee on Overseas Trade*, Volume 11, London, HMSO
- Lewis, W.A. (1954), Economic Development with Unlimited Supplies of Labour, *The Manchester School of Economic and Social Studies*, 22, 139-91
- Levine, A. L. (1967), *Industrial Retardation in Britain, 1880-1914*, Levine Weidenfeld & Nicolson.
- MacMillan, Harold (1957), 'Never had it so good' Speech, to Conservative Party rally, Bedford, 20<sup>th</sup> July.
- Magee, G. B. (2004), 'Manufacturing and technological change', in R. Floud and P. Johnson (eds), *The Cambridge Economic History of Modern Britain. Volume II: Economic Maturity*, Cambridge, Cambridge University Press, 74- 98
- Marshall, A. (1890), *Principles of Economics*, London, Macmillan.
- Mathias, P. (1969), *The First Industrial Nation: an Economic History of Britain, 1700-1914*, London, Methuen &Co.
- Matthews, R.C.O., Feinstein, C.H. and Odling-Smee J.C. (1982), *British Economic Growth, 1856-1973*, Oxford, Oxford University Press.
- McCloskey, D.N. (1970), 'Did Victorian Britain fail?', *Economic History Review*, 23, 446-59.
- Michie, J. and M. Sheehan (1999), No Innovation without Representation? An analysis of participation, representation, R&D and innovation, *Economic Analysis*, 2 (2), 85-97
- Michie, J. and M. Sheehan (2003), Labour 'flexibility' – securing management's right to manage badly?, in B. Burchell, S. Deakin, J Michie and J. Rubery (eds), *Systems of Production: markets, organisations and performance*, Routledge, Chapter 10, 178-191
- Mokyr, J. (1990), *The Lever of Riches: Technological Creativity and Economic Progress*, Oxford, Oxford University Press.
- Porter, M. E (2000), 'Location, clusters and economic development: local clusters in the global economy, *Economic Development Quarterly*, 14, 15-31
- PricewaterhouseCoopers (2009), *The future of UK manufacturing: Reports of its death are greatly exaggerated*, London, PwC.
- Richardson, H.W. (1967), *Economic Recovery in Britain, 1932-9*, London, Weidenfeld & Nicolson.
- Rostow, W.W. (1960), *The Stages of Economic Growth*, Cambridge, Cambridge University Press
- Rowthorn, R. and J. Wells (1987), *Deindustrialization and Foreign Trade*, Cambridge, Cambridge University Press.

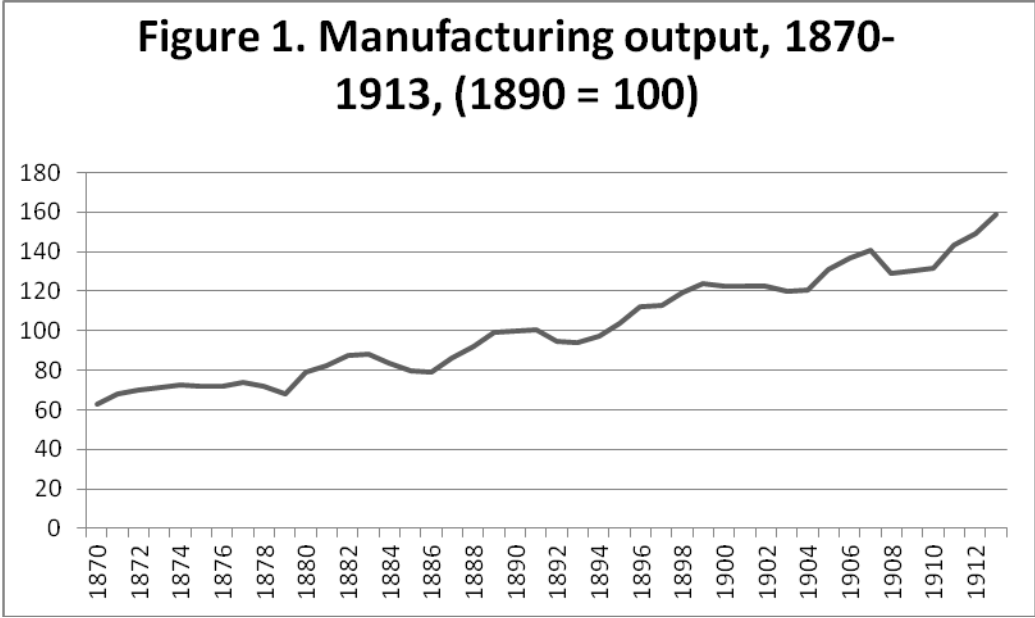
Sanderson, M. (1999), *Education and Economic Decline in Britain, 1870 to the 1990s*, Cambridge, Cambridge University Press.

Saxonhouse, G. (1985), Services in the Japanese Economy, in R.E Inman (ed.), *Managing the Service Economy: Prospects and Problems*, Cambridge, Cambridge University Press

Singh, A. (1977), UK industry and the world economy: a case of de-industrialization?, *Cambridge Journal of Economics*, 1 (2), 113-136

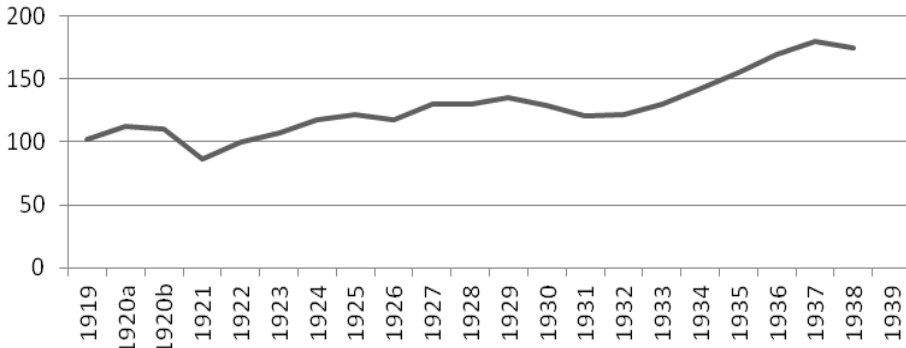
Smith, Adam (1776), *The Wealth of Nations*, London, Methuen

Von Tunzelman, G.N. (1982), 'Structural changes and leading sectors in British manufacturing, 1907-68' in C.P. Kindleberger and G. di Tella (eds), *Economics in the Long View*, Vol.III, London, Macmillan.

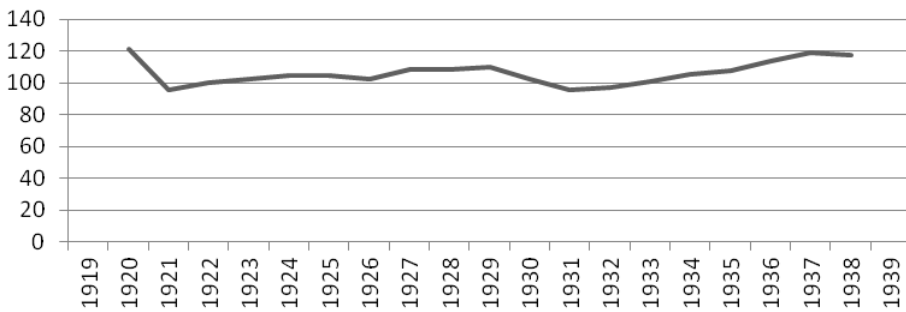


Date source: Kitson et al (2012)

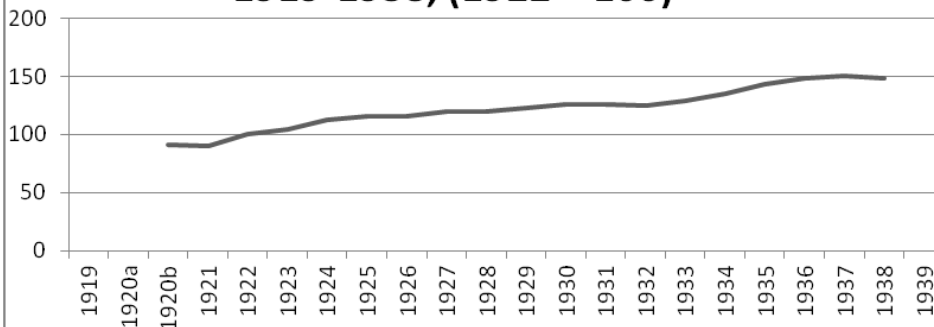
**Figure 2A Manufacturing Output 1919-1939, (1922 = 100)**



**Figure 2B Employment in manufacturing 1920-1939, (1922 = 100)**

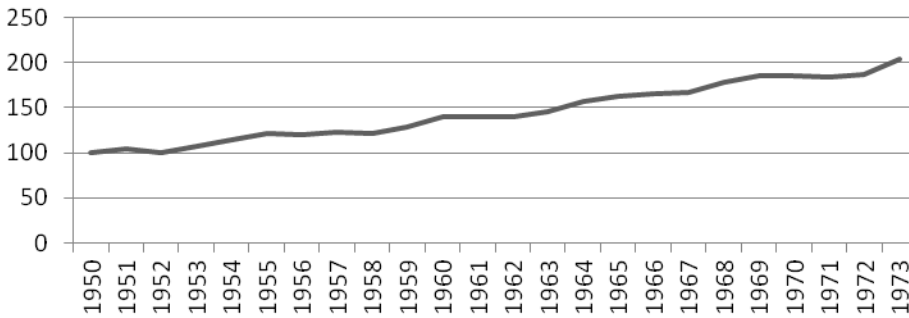


**Figure 2C Manufacturing Productivity 1919-1938, (1922 = 100)**

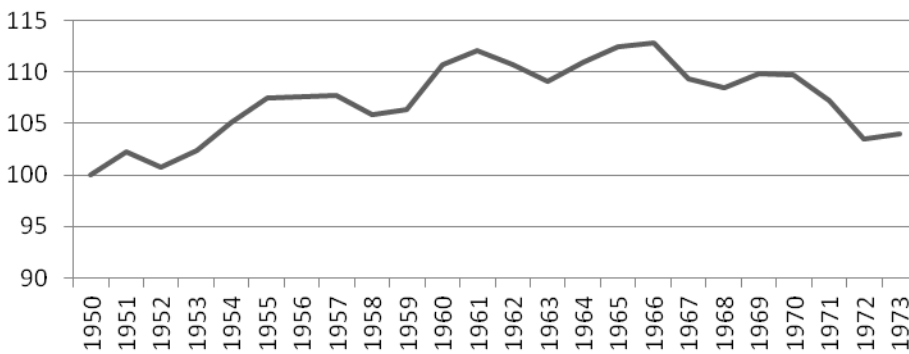


Date source: Kitson et al (2012)

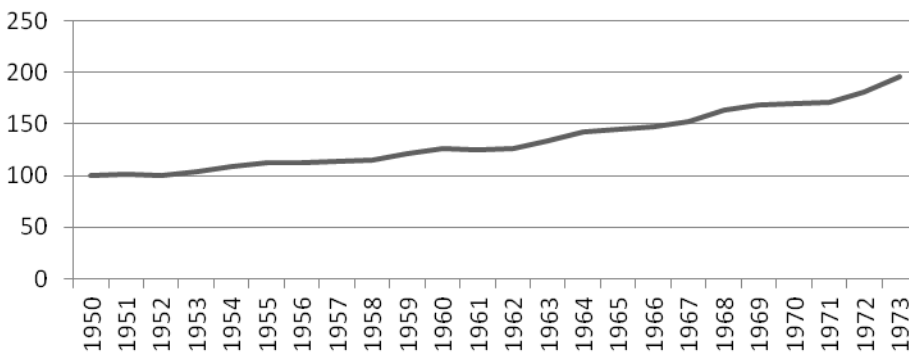
**Fig 3A Manufacturing Output 1950-1973, (1950 = 100)**



**Fig 3B Manufacturing Employment 1950-1973, (1950 = 100)**

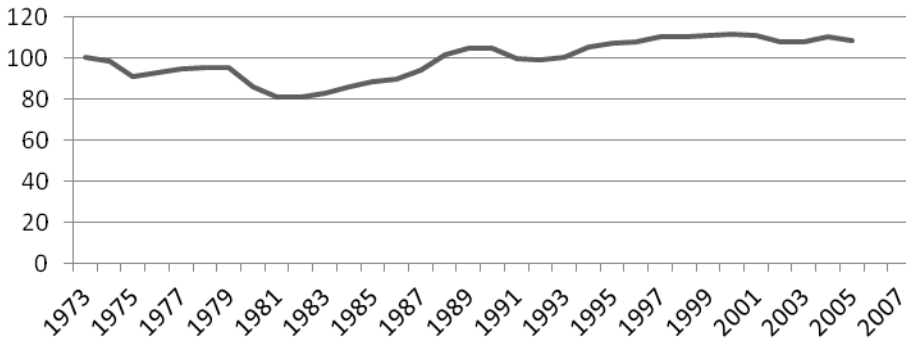


**Fig3C Manufacturing Productivity 1950-1973,(1950 = 100)**

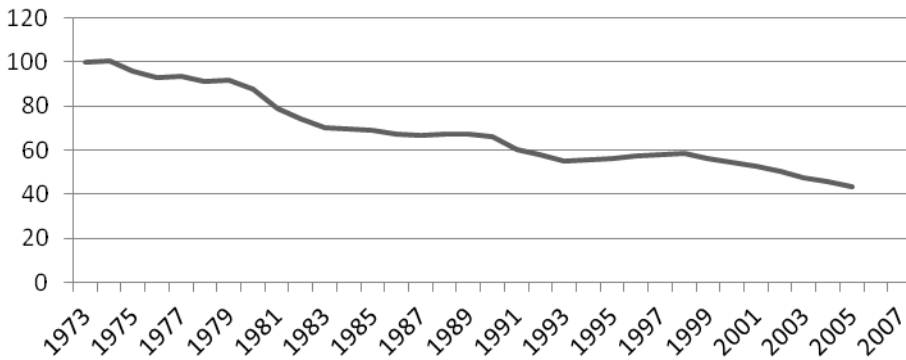


Date source: Kitson et al (2012)

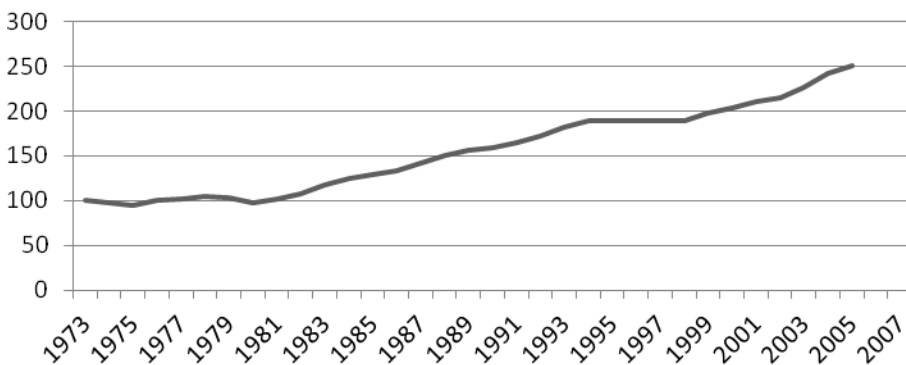
**Fig 4A Manufacturing Output 1973-2007, (1973 = 100)**



**Fig 4B Manufacturing employment 1973-2007, (1973 = 100)**



**Fig 4C Manufacturing Productivity 1973-2007, (1973 = 100)**



Date source: Kitson et al (2012)

Table 1 Growth of manufacturing output between 1973 and 2007: International Comparisons

	Average annual growth (%)	Total (%) growth from 1 <sup>st</sup> to last year (1973-2007)		
		1973-1979	1979-1989	1989-2007
UK	0.4	-7.6	-8.7	10.5
Italy	2.9	27.5	37.7	36.7
France	2.4	19.6	20.9	46.2
Germany	2.1	15.7	14.4	51.7
USA	2.0	N/A	16.5	41.7
Japan*	2.2	14.9	49.9	17.5

Sources: Kitson and Michie (1996), EU KLEMS database and own calculations

Table 2 Manufacturing output and employment: international comparisons. Average output (1985=100) and employment (millions) over each period, and average annual % growth (in parentheses) during each period

	1973-1979		1979-1989		1989-2007	
UK						
Output index	130.9	(-1.1)	103.0	(-0.8)	116.3	(0.6)
Employment	7.247	(-1.4)	5.610	(-3.0)	4.117	(-2.6)
Italy						
Output index	76.5	(4.3)	99.8	(3.3)	145.2	(1.8)
Employment	5.937	(1.3)	5.733	(-1.0)	5.139	(-0.5)
France						
Output index	84.9	(3.1)	99.7	(1.9)	138.9	(2.2)
Employment	5.328	(-1.0)	4.604	(-1.9)	3.697	(-1.4)
Germany						
Output index	84.3	(2.6)	95.4	(1.4)	122.2	(2.4)
Employment	10.553	(-1.6)	10.008	(-0.1)	8.513	(-1.6)
USA						
Output index	N/A		100.8	(1.6)	143.5	(2.0)
Employment	N/A		20.119	(-0.7)	18.125	(-1.6)
Japan						
Output index	71.7	(2.5)	96.6	(4.2)	131.3	(1.0)
Employment	13.907	(-1.6)	14.072	(1.0)	13.187	(-1.6)

Source: EU KLEMS, [www.euklems.net](http://www.euklems.net).

\* Data for Japan's growth of manufacturing output and employment is available until 2006.

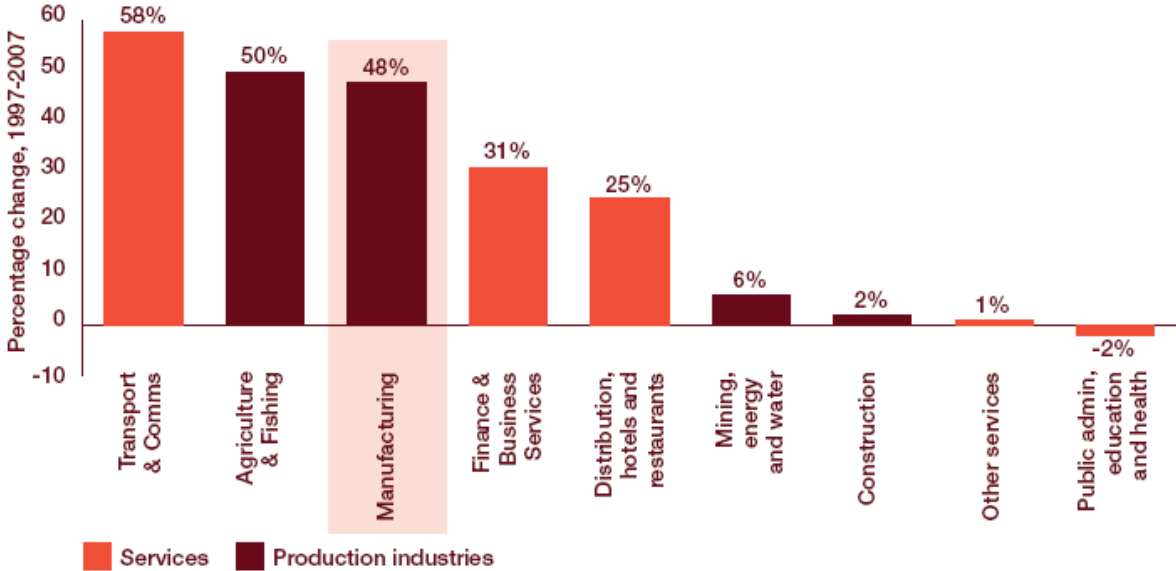
<b>Table 3: Growth of the manufacturing gross capital stock: international comparisons (annual % growth rates)</b>				
	1964-73	1973-9	1979-89	1989-2007*
UK				
Equipment	4.6	2.6	0.2	0.9
Structures	2.5	0.8	-0.5	0.5
Total assets	3.9	2.1	0.0	0.8
USA				
Equipment	4.2	5.0	2.4	2.3
Structures	4.9	2.6	1.4	0.4
Total assets	4.4	4.1	2.0	1.9
Germany				
Equipment	7.6	2.9	1.7	1.2
Structures	4.1	1.8	0.4	0.2
Total assets	6.1	2.5	1.2	1.0
France				
Equipment	7.8	3.5	1.7	1.4
Structures	8.4	6.6	3.4	0.1
Total assets	8.0	4.2	2.1	1.1
Japan				
Equipment	14.0	5.5	5.0	3.9
Structures	13.9	7.3	5.7	1.8
Total assets	14.0	6.0	5.2	3.4

**Notes:**

1. 'Equipment' includes all types of machinery, furniture and fixtures and vehicles. 'Structures' includes all types of buildings and other forms of infrastructure
2. \*Annual growth rates for Germany are for 1991-2007 and for Japan are 1989-2006

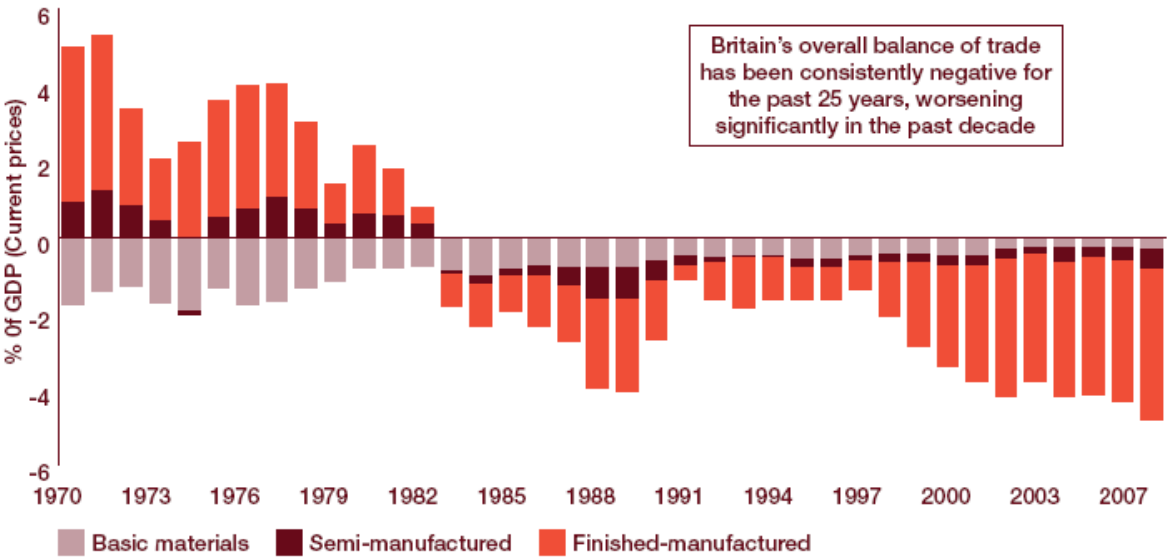
Sources: Kitson & Michie (1996), Table 1: O'Mahony (1993) and the EU KLEMS database and own calculations

Fig 5. Sectoral productivity growth in the UK (output in constant prices per employee), 1987-2007



Sources: UK Office for National Statistics and PricewaterhouseCoopers (2009)

Fig 6. UK manufacturing balance of trade by product type as a % of GDP, 1970-2007



Sources: UK Office for National Statistics and PricewaterhouseCoopers (2009)