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The impact of Government policies on UK manufacturing since 1945

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The impact of Government policies on UK manufacturing since 1945

By

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Contents

Executive summary

This report summarises government policies' effects on UK manufacturing since 1945. Government was more interventionist until the 1970s, with nationalisation common, industrial subsidies widespread and regional policy often important. Government intervention has since fallen, but macroeconomic policies, privatisation, and joining the EEC all affected manufacturing.

Today, Britain produces more manufactured goods in absolute terms than ever before. Against that, manufacturing output relative to GDP has fallen for around 40 years, to a third of previous levels. Half the decline can be explained by the fall in manufactured goods' prices relative to those of services and by the low income elasticity of demand for manufactured goods.

British manufacturing performed unevenly since 1945. Output and productivity growth was reasonable between 1951-73, poor between 1973-79 and recovered 1979-99. Productivity performance improved further after 1999, but output growth was weak, reflecting Britain's adaptation to its comparative advantage within Europe and the world.

The report goes on to analyse the effect of policies explicitly designed to support manufacturing industry. The creation of so-called "national champions" was rarely successful. British Leyland is the most obvious failure, but there were also failures in aviation, shipbuilding, machine tools, electrical engineering, computers and textiles. Nationalisation rarely resulted directly in successful firms, although the preservation of capabilities in sectors such as aerospace did allow later success. There was little evidence that privatisation had any direct effects on the success of manufacturing, although preparing manufacturing firms for privatisation was often highly successful. Here British Steel stands out as the obvious example, notwithstanding later difficulties. The literature on industrial subsidies described them as "an almost unmitigated failure". They were not successful in either supporting output or employment, nor did they successfully distinguish between sectors that were in inevitable decline and sectors with real prospects for the future. Exemption from the selective employment tax offered significant benefits to manufacturing firms, but did not lead to significant rises in manufacturing that might have led to higher productivity and an ongoing comparative advantage.

Government purchasing is potentially important. The government approach to purchasing pharmaceuticals has at least been compatible with the successful pharmaceutical sector, although it is unlikely that it is the principal cause of success in this area. Government purchasing decisions in defence have directly led to the maintenance of a defence sector of reasonable size, but it has not created a defence sector with significant levels of exports. More general campaigns to "buy British" have had little or no meaningful effect.

Foreign direct investment by overseas manufacturing companies has directly raised the level of manufacturing in Britain. They generally have high rates of productivity, but spillover effects to indigenous British manufacturing appear to be relatively low. Foreign direct investment should be welcomed, but should not be thought of as a panacea.

Manufacturing is also affected by general economic policies. For example, the National Institute of Economic and Social Research found that lower skill levels in Britain directly led to lower productivity compared with Germany. Vocational training has long been

neglected within Britain, although British schoolchildren do relatively well compared with children from other Western nations in OECD standardised tests. At an elite level, British universities continue to be extremely successful in science and technology, particularly in health science and medicine. Since 1979 there is good evidence that tax incentives were effective in increasing private-sector R&D, demonstrating a real role for government in this area.

British regional policy has had inconsistent effects on manufacturing. On the one hand regional policy often offered significant levels of financial support for manufacturing industry, but on the other it restricted the ability of manufacturers to grow in the greater south-east area. Competition policy has become increasingly effective over time. Cartels were permitted for much of the post-war era, and this reduced productivity growth in manufacturing significantly. Competition policy has become much more effective since the mid-1990s, with correspondingly favourable effects on manufacturing productivity.

Macro economic policy can also have an effect. Although the "stop go" policies of the post-war era were widely thought to be disruptive, it is apparent with the benefit of hindsight that the problems were rather small. In contrast, Britain's failure to engage with the European Economic Community from the beginning did harm manufacturing, by failing to subject manufacturing firms to the discipline of competition. By the time of Britain’s accession many British firms were then sufficiently uncompetitive to find adjustment difficult or even impossible. Competition then led Britain to specialise according to its comparative advantage, which did not always favour manufacturing. The resulting "shakeout" was reinforced by brief period of sterling's overvaluation in the late 1970s which made life difficult for manufacturing firms that were already struggling.

Some lessons from history have been drawn from the evidence.

It is important for policymakers to distinguish between avoidable and unavoidable trends. Clearly, changes in relative prices and the greater income elasticity of demand for services means that it was never likely that manufacturing would remain at its previous share of GDP. Nevertheless, it is legitimate to question whether the fall in this ratio needed to be as extensive as occurred.

The quantitative assessment of strong intervention in the form of "national champions" or nationalisation is damning. Government purchasing policies and regional policy are best seen as having erratic effects. It is easier to make a credible case for government intervention in terms of encouraging foreign direct investment by successful overseas manufacturing companies. Clearly, a successful education system at all levels is good for all firms in the economy. The emphasis on science and technology is, however, likely to favour manufacturing at the expense of services. We can see Britain's success in pharmaceuticals in this context. The two most successful policy innovations in the post-war era have been Britain's greater willingness to engage in international trade, particularly in Europe, and more recently the greater use of competition policy. Both of these policies increase the pressures on management to perform effectively, and thus better equip them to be successful in the medium term.

1. Introduction

This report provides a structured overview of the impact of government policies on the performance of UK manufacturing since 1945, drawing on both economic and historical insights, and placing the UK experience in international perspective. Broadly speaking our analysis stops c. 2000, as befits a historical overview.

This report looks at the size of manufacturing, based on output and employment, which are given in Table 1, and on productivity, which is given in Table 5. We place these measures in international context where possible, but for reasons of brevity we do not look at the policies pursued by other nations. Clearly there is a tension here: for any given level of output, employment and productivity are alternatives.

We do not take a view on whether post-war governments were right to be concerned about the size of the manufacturing sector, nor whether they should have preferred high rates of employment or high rates of productivity, save only to note that low productivity and low wages go hand in hand in an open economy.

It is not, of course, straightforward to assess the effects of policy, since policy is never made in a vacuum. Policies such as nationalisation or industrial subsidies are not performed as randomised controlled trials, and events such as joining the European Economic Community affect all of the economy simultaneously, and are contemporaneous with other events, in this case including the oil shocks and associated economic crises. In theory one could construct alternative counterfactual models, but the reality is that too many things vary at the same time for this to be an appropriate research strategy.

This report considers sector-specific, and non-sector-specific micro- and macro-economic policies, where we believe that the latter had important effects on manufacturing industry. Examples of micro- and macro-economic policies that can have an important effect on manufacturing industry would include issues such as regional policy, and competition policy. We track the effects of the three types of policy on a range of manufacturing industries including case studies drawn from both high-tech and low-tech sectors.

2. Perspectives on the share of manufacturing in economic activity

We begin by examining the changing size of the UK manufacturing sector over the last century and offer a number of perspectives on this, drawn from economic history. We begin by considering the impact of relative price changes before moving on to consider changes in comparative advantage. Finally, we identify a number of distinct periods during which policies affecting manufacturing can be seen as driven by particular underlying objectives.

2.1 Relative price changes, income effects and the share of manufacturing in economic activity over time

It is critical to understand the importance of the global change in relative prices between the industrial and service sectors since 1945. Almost without exception, the price of manufactured goods has fallen relative to the price of services. This rising relative price of services is sometimes referred to as Baumol's cost disease, named after the economist who noted the tendency of salaries in sectors where there was little or no increase in labour productivity, such as the performance arts, to rise in line with salaries in sectors characterised by rapid labour productivity growth, such as manufacturing (Baumol and Bowen, 1966). This means that the share of manufacturing in output at current prices in the first column of Table 1 cannot be used on its own as an indicator of that sector's relative size.

Although the share of manufacturing in output at current prices remained fairly stable during the interwar period, its share increased rather more when valued at 1924 prices, because the price of manufactured goods fell relative to the price of services between 1924 and 1937. With the share of the labour force in manufacturing remaining unchanged at 32.9 per cent, labour productivity in manufacturing was growing faster than in the economy as a whole. Since manufacturing's share of the capital stock declined substantially over the same period, manufacturing's total factor productivity growth performance exceeded the economy-wide average by an even greater margin.

Matthews et al. (1982) argued that the expansion of the manufacturing sector during the national emergency of World War II, although perfectly explicable in the extreme circumstances, ran into diminishing returns, so that Britain entered the postwar period with a larger manufacturing sector than could be sustained in the long run. A decline in the share of manufacturing in total output should therefore be expected between 1951 and 1973. Although this is indeed borne out by the current price data in the first column of Table 1, this fall is more than explained by the decline in the relative price of manufactured goods alone. In constant price terms, given in the second column, the share of manufacturing continued to increase.[1] Since manufacturing's share of the labour force and capital stock remained constant between 1951 and 1973, the wartime over-expansion of manufacturing continued to exercise a drag on UK productivity performance

[1] Notice that "constant prices" means that we use manufacturing-specific price series as the basis of adjustment, not whole-economy price series.

during the 1950s and 1960s, given that the output being produced was falling in value as the period progressed. It is best to view manufacturing as unsustainably large in 1973.

Table 1: Manufacturing shares of output, labour and capital in the whole economy (%)

	Share of output at current prices	Share of output at constant prices	Share of labour	Share of capital
		1924 industrial classification		
1924	30.9	30.9	32.9	20.3
1937	31.3	34.8	32.9	19.0
		1958 industrial classification		
1937	29.5	29.5	30.4	19.5
1951	35.7	34.6	35.1	23.8
1964	33.6	37.0	36.1	25.5
1973	30.1	38.2	34.7	22.8
		1995 industrial classification		
1973	31.9	31.9	26.1	14.5
1979	29.0	28.7	23.7	12.9
1990	22.8	25.7	16.3	10.0
2000	17.3	21.3	13.0	8.7
2007	12.4	18.7	9.5	6.7

Sources: 1924-1937 and 1937-1973: Matthews et al. (1982: 222-223); 1973-2007: EUKLEMS database (O'Mahony and Timmer, 2009).

Since 1973, in contrast to earlier periods, there has been a substantial decline in the share of manufacturing in economic activity on all measures. The sharpest decline has been in the share of manufacturing in total output at current prices, from 31.9% in 1973 to 12.4% in 2007. The second column shows that two thirds of this decline can be explained by the decline in the relative price of manufactures, since at constant prices manufacturing continues to contribute close to 19% of output. The third column highlights another aspect of the debate on deindustrialisation, which is the role of classification systems. Although some differences were already visible between the 1924 and 1958 industrial classification schemes used by Matthews et al. (1982), they are clearly much larger for the 1995 classification scheme used for the post-1973 data. The largest difference seems to be in the treatment of employment, where a much stricter definition of working in manufacturing has been applied. Whereas for the earlier periods, workers performing non-production related tasks such as cleaning, staff canteens etc. in manufacturing firms were counted as manufacturing workers, in the later data they have been classified as working in services. The growing extent of contracting out of business services has therefore apparently reduced the proportion of economic activity accounted for by manufacturing.

Another important factor to bear in mind when assessing the declining share of manufacturing in economic activity concerns the role of income elasticities of demand. National income grows over time. After a certain level of income, additional income is spent largely on services rather than manufactured goods. The idea that expenditure shares vary with income is termed Engel's Law, following Engel's observation that as people get richer, they spend a lower share of their income on food. In developed countries we find that expenditure on services rises disproportionately as incomes rise. Put simply, everyone wants to own one oven, but rich people also want to eat out frequently. Combined with the effect of the falling relative price of manufactured goods,

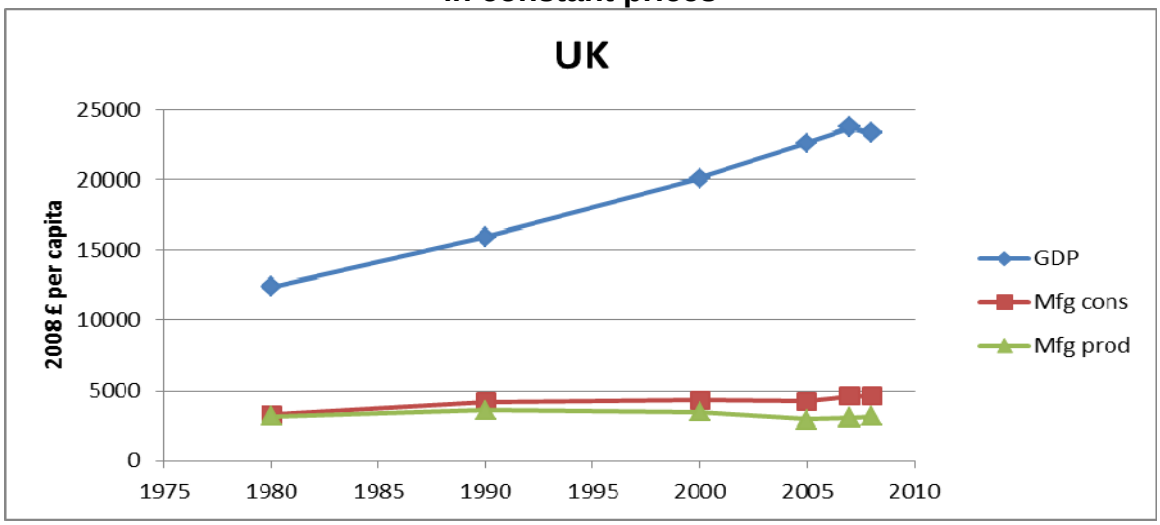
this meant that between 1980 and 2008, for example, the consumption of manufactured goods in Britain, measured at market prices, accounted for just 13% of the rise in real incomes.

That manufacturing consumption is falling in both Britain and the world as a whole, as a percentage of GDP, is an important result. It tells us that the working assumption for all economies is that manufacturing output as a share of GDP will fall. Manufacturing is, proportionately, a declining sector. Although some countries may be able to buck the trend, arithmetic tells us that the vast majority cannot. Something similar has happened to agriculture, which now accounts for 2 to 3 per cent of output in developed countries, having once been the dominant economic activity. At the time of the Industrial Revolution, the physiocrats worried about deagriculturalisation in much the same way as modern commentators worry about deindustrialisation.

The fall in manufacturing consumption is not, however, sufficient to explain all of the fall in UK manufacturing output since 1980. In that period UK manufacturing output has fallen from 25% to 13% of GDP, a far greater fall than the 26% to 20% fall in the consumption of manufactured goods. Nevertheless, the fall in consumption explains a majority (54%) of the fall in output. We can see the relationship between Britain's income, and consumption and production of manufactured goods in Figure 1, which gives figures per person, in real terms, for the period 1980-2008.

What is most striking about this graph is that the decline in manufacturing production relative to consumption over this period is small compared with the rise in national income. In this period GDP rose by 2.3% per year. Had manufacturing production risen in line with manufacturing consumption, then British GDP would have risen by 2.5% per year. This assumes, however, that manufacturing could have grown without using any resources that were in fact used by other sectors. This is clearly untenable. If instead we assume that a fifth of the rise in manufacturing could have been achieved without taking resources from the rest of the economy – still surely an over-estimate – we find arithmetically that the rate of growth would have been 0.04% higher over this period, at 2.33%, rather than 2.29%. Even compounded over 28 years this cumulates to just 1.2% of GDP.

Figure 1: UK manufacturing production and consumption per capita in constant prices



Sources: UK National Statistics; UNCTAD Handbook of Statistics

We have so far concentrated on the inevitable decline in manufacturing as a share of national income. The corollary of this inevitable decline is a decline also in the proportion of the workforce employed in manufacturing. Indeed, Table 1 makes clear that the decline in the share of labour is much faster than the decline in output at constant prices. This is because productivity growth is much faster in manufacturing than in other sectors of the economy. High rates of productivity growth inevitably imply lower rates of employment per unit of output. Notice that this productivity growth is not caused primarily by capital widening: the share of capital in manufacturing has also declined in this period, as Table 1 makes clear. This is a "better machines" story, not a "more machines" story.

That is not to deny that declines in employment in manufacturing are sometimes a symptom of entrepreneurial failure. Nevertheless, Rowthorn and Wells (1987) estimate that under 10% of the manufacturing jobs lost between1966 – 83 were caused by unnecessarily poor performance in the manufacturing sector. The remaining 93% of the jobs lost in manufacturing in this era were caused by the secular changes outlined here.

While it is important to understand the decline in Britain's manufacturing base, we need to maintain a sense of proportion. The service sector, which already dominates the UK and global economy, is much more important, both in terms of its scale, and in terms of its likely growth trajectory. This is true in terms of its contribution to GDP, and even more so in terms of employment.

Finally, it is important to emphasise that although the share of manufacturing has declined in both current and constant price output, the volume of manufacturing production in the UK today is greater than at any point in history. Table 2 sets out index numbers of the volume of output in manufacturing and the total economy. The key point to note here is that despite its declining share of economic activity, constant price output has continued to increase in manufacturing as well as in the economy as a whole, although the annual growth rate of 0.4% in manufacturing is rather slower than the 2.0% growth rate in the economy as a whole. The UK is thus characterised only by what Clingingsmith and Williamson (2008) call "weak" deindustrialisation, where manufacturing's share of economic activity has fallen, rather than "strong" deindustrialisation where the absolute level of manufacturing output actually falls.

Table 2: The volume of output in manufacturing and the total economy (1973=100)

	Manufacturing	Total economy
1973	100.0	100.0
1979	94.8	105.4
1990	104.8	129.8
1995	106.8	142.4
2000	111.6	166.8
2007	115.4	197.2

Source: EUKLEMS database (O'Mahony and Timmer, 2009). Volumes are obtained by deflating current price value added using sector-specific price indices

2.2 Changing comparative advantage

Manufacturing has shrunk in importance in all OECD economies as a result of the relative price changes discussed above. Nevertheless, it has shrunk by more in the UK than in Germany and this also needs to be placed in long run historical context, taking account of the UK's changing role in the world economy. Between the Industrial

Revolution and World War II, the UK increasingly consolidated its position as the industrial centre of a global empire, trading manufactured goods in return for food and raw materials. Interestingly, this period saw a controversy over the rebalancing of the economy away from agriculture, with concerns being raised about the vulnerability of the economy to economic blockade if self-sufficiency in grain was given up. The repeal of the Corn Laws in 1846 ushered in a period of free trade, and even when a general tariff was finally introduced in the globally protectionist era of the 1930s, Imperial Preference meant that British agriculture was left more or less unprotected in return for imperial markets remaining open to British manufactured goods. The growing share of "British" countries in UK exports until the early 1950s can be seen in Table 3, which also shows clearly the declining share of UK exports going to the original 6 members of the EEC.

Table 3: Shares of UK exports to "British countries" and EEC6 (%)

	"British" countries	EEC6
1907	32.2	24.8
1912	36.0	22.7
1924	42.1	18.7
1930	43.5	18.3
1935	48.0	14.7
1948	52.7	9.8
1951	55.0	10.4
1954	53.0	13.0
1958	49.3	13.1
1963	37.5	20.3
1968	31.2	19.3
1970	25.1	21.7
1980	20.1	34.6
1990	16.7	41.3
2010	--	34.2

Source: Broadberry (1997: 96); *UK Trade*, Office for National Statistics

Notes: The concept of "British countries" is no longer used in the trade statistics. It includes the Irish Free State/Republic and the Republic of South Africa as well as Empire/Commonwealth countries.

Since World War II, Britain has lost its role at the centre of a global empire and increasingly integrated with continental Europe. Within continental Europe, Germany has retained its position as the manufacturing centre, which reaches back at least as far as the last quarter of the nineteenth century. Britain's economic reorientation away from Empire towards Europe was one of the major challenges faced by British manufacturing after World War II, as emphasised by Owen (1999). Table 3 suggests that the EEC6 became more important than "British" countries only after Britain joined the Common Market in 1973. With the consolidation of Germany as the manufacturing hub of Western Europe, this has led to a substantial UK rebalancing away from manufacturing towards services, where the UK has a strong comparative advantage. Hence Germany stands pre-eminent as a manufacturing nation, just as Britain stands pre-eminent in finance and other services. Nevertheless, Britain's level of manufacturing remains broadly typical for a developed nation.

Table 4 sets out Britain's share of world exports of manufacturing over time, in comparative context. The trends are consistent with a shift of comparative advantage away from manufacturing in Britain, and retention of comparative advantage in manufacturing in Germany. However, Table 4 also illustrates a second shift of comparative advantage in manufacturing away from the rich world towards low cost manufacturing centres, largely in Asia. This begins with Japan in the early twentieth

century, through the newly industrialising nations of South Korea, Hong Kong, Taiwan and Singapore in the 1970s and 1980s, to China today. This has affected low cost manufacturing throughout high wage economies, and means that some elements of manufacturing are unlikely to ever return. However, this should not be a matter of regret, since the return of such jobs would be welfare reducing. Despite these trends in comparative advantage, it is worth remarking that the UK remains the seventh largest manufacturing nation, despite being 22nd by population.

Table 4: Shares of world exports of manufacturing (%)

	UK	France	Germany	USA	Japan	China
1881-85	43.0	15.0	16.0	6.0	0.0	
1899	34.5	14.9	16.6	12.1	1.6	
1913	31.8	12.8	19.9	13.7	2.5	
1929	23.8	11.6	15.5	21.7	4.1	
1937	22.3	6.2	16.5	20.5	7.4	
1950	24.6	9.6	7.0	26.6	3.4	
1964	14.0	8.5	19.5	20.1	8.3	
1973	9.1	9.3	22.3	15.1	13.1	
1979	8.7	10.0	18.7	14.6	12.3	
1987	7.3	8.9	19.3	12.6	16.3	
2005	4.1	7.6	13.5	12.4	12.1	15.6

Sources: Matthews et al. (1982: 435); Broadberry (2004: 64); http://www.indexmundi.com/trade/exports/

Notes: Total for world exports excludes exports from small manufacturing countries. China only joined the World Trade organisation in 2001, so data for earlier years are unavailable, but were relatively small before the 1990s.

2.3 Productivity performance

In assessing the effects of government policies, it will be helpful to keep in mind productivity outcomes as a key indicator of performance. Table 5 sets out average annual growth rates of output and productivity in British manufacturing during four sub-periods since World War II. Figures are provided for a six-sector breakdown within manufacturing, which will be useful in understanding the disaggregated picture, but we begin by focusing on total manufacturing.

During the period 1924-1937, for example, output grew at an annual rate of 3.2 per cent, labour productivity at 1.8 per cent and TFP at 1.9 per cent. 1951-73 output growth of 4.4 per cent per annum, combined with labour productivity growth of 4.3 per cent and TFP growth of 2.9 per cent per annum thus represented a considerable acceleration of growth. The period between the business cycle peaks of 1973 and 1979 saw a dramatic setback, however, with output and TFP actually falling, and labour productivity growing only very slowly. The period 1979-1999 saw a return to the rapid productivity growth of the 1950s and 1960s, but more through a shake-out of labour than through an acceleration of output growth, which remained relatively modest. These trends have continued since 1999, with productivity growth accelerating as output growth (measured using market prices) continued to slow. This can be seen as reflecting an acceptance of Britain's comparative advantage within Europe and the wider world.

Table 5: Growth of output and productivity in British manufacturing, 1951-1999 (per cent per annum)

A. Growth of output

	1951-1973	1973-1979	1979-1999	1999-2007
Chemicals & allied	7.4	-1.1	2.0	1.2
Metals	3.0	-5.2	-1.5	0.5
Engineering	4.1	-0.9	0.5	1.1
Textiles & clothing	2.6	-1.3	-2.0	-5.0
Food, drink & tobacco	5.6	-2.0	0.4	0.7
Other manufacturing	4.6	-2.4	1.3	0.0
Total manufacturing	4.4	-0.8	0.8	0.5

B. Growth of labour productivity

	1951-1973	1973-1979	1979-1999	1999-2007
Chemicals & allied	6.8	-0.5	3.4	4.8
Metals	2.7	-3.4	2.5	3.8
Engineering	3.5	-0.1	3.1	5.3
Textiles & clothing	4.7	1.9	2.0	7.0
Food, drink & tobacco	5.1	-1.1	2.0	2.8
Other manufacturing	4.1	-1.8	2.7	2.3
Total manufacturing	4.3	0.4	3.3	4.3

C. Growth of total factor productivity

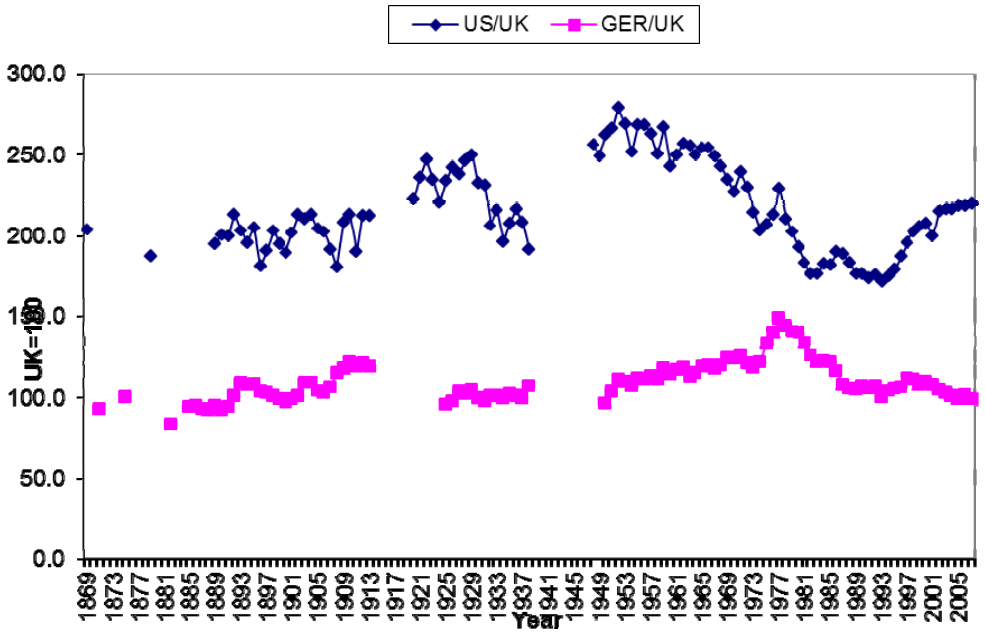
	1951-1973	1973-1979	1979-1999	1999-2007
Chemicals & allied	4.4	-1.0	2.7	3.7
Metals	1.6	-3.8	2.2	3.2
Engineering	2.8	-0.4	2.5	4.1
Textiles & clothing	3.2	1.7	1.6	5.1
Food, drink & tobacco	2.6	-2.1	1.0	2.2
Other manufacturing	1.9	-2.2	1.8	1.4
Total manufacturing	2.9	-0.1	2.6	3.2

Source: Derived from O'Mahony (1999; 2002) and the EUKLEMS Database

Notes: Labour productivity defined as output per person engaged; total factor productivity based on persons engaged and capital stocks weighted by shares of labour and capital in value added

The sectoral breakdown within manufacturing reveals faster than average output growth in chemicals and food, drink and tobacco, with metals and textiles and clothing shrinking in relative importance over the period 1951-99 as a whole. Engineering and other manufacturing saw output growing at around the average rate for manufacturing. However, there was no simple relationship between output growth and productivity growth. For example, chemicals experienced the fastest rate of productivity growth, while the productivity growth performance of food, drink and tobacco was below average. Furthermore, although metals experienced the slowest rate of productivity growth, textiles and clothing had one of the fastest productivity growth rates.

Figure 2: Comparative labour productivity in manufacturing (UK=100)



Source: Broadberry (2004), updated using EUKLEMS database

Figure 2 puts the performance of British manufacturing in comparative perspective for the period since 1870. Perhaps the most striking result is the long run stationarity of comparative labour productivity levels in manufacturing for both the US/UK and Germany/UK comparisons. Broadly speaking, the US is twice as productive as the UK while Britain and Germany have similar levels of labour productivity. Nevertheless, during the period after World War II, higher labour productivity growth in Germany meant that Germany was faster in closing the gap with the United States. The sharp deterioration of British manufacturing productivity performance during the 1970s led to the opening of a substantial Anglo-German productivity gap by 1979. The acceleration of productivity growth in Britain during the 1980s then led to the closing of much of that gap, although the United States retained a substantial labour productivity lead. The strong productivity performance of US manufacturing during the 1990s means that the US/UK comparative labour productivity ratio in manufacturing has returned to its long-run two-to-one level. It should be emphasised that these figures refer to output per person engaged rather than output per hour worked. Americans work longer hours, and therefore the differences in output per hour worked are smaller than in Figure 2.

Table 6 complements this picture of comparative productivity performance in manufacturing as a whole with information at a more disaggregated level for a number of benchmark years. This helps us to identify sectors where British performance has been above or below average. Data are provided for the six broad industry groups identified in Table 5, covering three heavy sectors (chemicals and allied industries; metals; engineering) and three lighter sectors (textiles and clothing; food, drink and tobacco; other miscellaneous industries). In addition, information is provided on comparative productivity performance in more disaggregated product areas. For most of the twentieth century, between 1907 and 1968, British productivity performance was better in the lighter industries, especially textiles and food, drink and tobacco. This is apparent from both the US/UK and Germany/UK comparisons.

To what extent does this variation in comparative labour productivity performance across industries reflect comparative advantage? Clearly, there is no one-to-one mapping

between variations in comparative labour productivity and comparative advantage, since labour is not the only factor of production. However, in manufacturing as a whole, labour's share of value added has varied between about two-thirds and three-quarters over the twentieth century. Clearly, it would have been difficult for an industry with below average labour productivity performance to have thrived, because the existence of a national unified labour market severely limited the extent to which low wages could have been paid to offset low labour productivity (Salter, 1960). Hence, it is not surprising to find a correspondence between industries in which a country had a relatively good labour productivity performance and a relatively strong export performance. Broadberry and Crafts (1992: 542), for example, note that for the 1930s there is a strong relationship between comparative labour productivity performance in Rostas' (1948) sample and revealed comparative advantage as measured by Crafts and Thomas (1986).

The German productivity strength and export success in heavy industry, especially chemicals, in the mid-twentieth century is also apparent in Table 6b. The US productivity advantage before the 1970s was also strongest in heavy industry, especially engineering. Since the 1970s, however, there seems to have been a reduction in the dispersion of comparative productivity ratios around the aggregate manufacturing ratio. Most notably, British performance has improved dramatically in heavy industry, with very rapid productivity gains in chemicals, metals (especially steel) and engineering (notably motor vehicles).

Table 6: Comparative output per person engaged by manufacturing sector, 1907-1987 (UK=100)

A. US/UK

	1907	1935	1950	1968	1987	1997
Seedcrushing	77	105		277		
General chemicals			372	258	174	
Pharmaceuticals				305		
Soap and detergents	221	285	249	259		
Plastics and synthetics				216	128	
Matches		336	376			
Chemicals & allied	143	227	356	281	152	156
Iron and steel	283			259		
Blast furnaces		362	408			
Steelworks and rolling mills		197	269			
Metals	288	192	274	261	166	204
Mechanical engineering	203	268				
Machine tools			221	162		
Electrical machinery			239	255	209	242
Radio & electronic components				193		
Electronic tubes			355			
Broadcast receiving equipment				288		
Radios		347	400			
Household appliances			412	239		
Electric lamps		543	356			

Shipbuilding	95		111	185		
Motor vehicles	435	294	466	438		
Machinery/transport equipment					176	240
Engineering	203	289	337	294	186	241
Spinning & weaving	151	150	249	214		
Woollen & worsted	112	131	185	208		
Hosiery	230	156	187	209		
Boots & shoes	170	141	171	173		
Clothing					198	
Textiles & clothing	151	145	198	225	174	203
Grain milling	178	173	183	255		
Biscuits		345		349		
Sugar	110	102	148	169		
Margarine		152		405		
Brewing	146	201	300	294		
Tobacco	108	160	251	371	182	
Food, drink & tobacco	144	204	215	246	233	147
Bricks	217	132		169		
Glass		264	274	218		
Cement	219	99	116	191		
Paper & board	262	247	338	290		
Miscellaneous	227	211	285	276	208	
Total manufacturing	209	218	273	276	187	196

B. Germany/UK

	1935	1968	1987	1997
Seedcrushing	50			
Coke	174	102		
General chemicals		120	89	
Soap	110		71	
Chemicals & allied	123	124	88	105
Steelworks	116	149	81	
Blast furnaces	148			
Iron foundries	112			
Non-ferrous metals	85	113	144	
Metals	116	137	96	128
Mechanical & electrical engineering	112	111	109	
Electrical engineering		94	91	101
Motor vehicles	141	141	111	149
Engineering	120	117	112	120
Spinning	100	133	133	
Weaving	69	149	84	
Leather	99	97	117	
Boots & shoes	121	85	82	
Clothing		100		
Textiles & clothing	97	108	109	77
Grain milling		65	82	

Sugar	33	50		
Margarine	52		96	
Brewing	62	105	70	
Tobacco	26	114	83	
Food, drink & tobacco	41	94	114	108
Bricks		182	134	
Cement	87	150	81	
Paper & board		140	180	
Miscellaneous	102	141	132	
Total manufacturing	102	119	113	111

Sources: Broadberry (1997: 28-31); van Ark (1992); Smith et al. (1982); O'Mahony (1992): EUKLEMS Database

Notes: Dates refer to UK census years; US data based on the following years: 1909, 1937, 1950, 1967, 1987, 1997; German data based on the following years: 1935, 1967, 1987, 1997. Information is not available for all industries for all years due to changing classification schemes and the use of different levels of disaggregation by different researchers. The latest benchmark year in the EUKLEMS database is 1997, for which data are available only at a relatively high level of aggregation.

In their examination of manufactured exports in 1913 and 1937, Crafts and Thomas (1986) concluded that Britain had a revealed comparative advantage in the unskilled labour intensive "old staples" such as iron and steel, textiles and shipbuilding while Germany and the United States had a revealed comparative advantage in the more human capital intensive "new industries" such as chemicals, motor vehicles, aircraft and electrical engineering, although they saw signs of an emerging British revealed comparative advantage in electrical goods by 1937. For the period since 1970, direct estimates of the UK's revealed comparative advantage have been provided by Proudman and Redding (2000). An economy's RCA in a particular industry is given by the ratio of its share of exports in that sector to its average export share in all sectors. The UK figures in Table 7 have been updated to 2006 by Crafts (2010).

Table 7: Revealed comparative advantage in UK manufacturing

RCA index	1970-74	1980-84	1990-93	2006
Food and drink	0.71	0.87	0.93	0.79
Textiles and clothing	0.93	0.84	0.79	0.47
Timber and furniture	0.22	0.32	0.29	0.39
Paper and printing	0.54	0.62	0.80	1.15
Industrial chemicals	0.96	1.16	1.17	1.13
Pharmaceuticals	1.46	1.54	1.61	2.11
Petroleum refining	1.10	1.27	1.36	0.79
Rubber and plastic	0.96	1.02	0.95	0.82
Non-metallic minerals	0.98	0.84	0.81	0.75
Ferrous metals	0.58	0.51	0.89	0.69
Non-ferrous metals	1.27	1.21	0.98	0.79
Metal products	1.12	0.96	0.82	0.81
Non-electrical machinery	1.12	1.12	0.93	1.33
Computers	1.08	1.19	1.53	1.03
Electrical machinery	1.03	0.99	0.84	0.60
Communication equipment	0.72	0.72	1.02	2.52
Shipbuilding	0.59	0.52	0.94	0.34
Other transport equipment	0.72	0.61	0.40	0.36
Motor vehicles	0.94	0.62	0.67	0.94
Aerospace	1.49	1.98	1.83	1.72
Instruments	1.00	1.15	1.07	1.23
Other manufacturing	2.48	1.93	1.57	1.26

Sources: Proudman and Redding (2000); Crafts (2010)

Notes: The RCA index is normalised so that the mean revealed comparative advantage in manufacturing = 1.00

Table 7 suggests that Britain's comparative advantage in the old staples had largely evaporated by the 1970s, when the RCA index was less than one in textiles, ferrous metals and shipbuilding. In much of the post-war era Britain's remaining textile industry survived solely because it was able to utilise low-cost immigrant labour, primarily from the Indian subcontinent. Since the 1970s, Britain's comparative advantage has increasingly been in high technology branches of chemicals and engineering, such as pharmaceuticals, industrial chemicals, aerospace, computers & office machinery, non-electrical machinery, and communication equipment.

In the introduction, we noted that for any given level of output, there was an absolute trade-off between a high level of productivity and a high level of employment. Even endogenising the level of output still leaves a tension between productivity and employment at the margin. We can see this in a comparison between the data on employment in Table 1, and the data on productivity growth in Table 5. Both productivity growth and the decline in employment were faster in the post-1979 period.

2.4 Phases of government policy

The above perspectives concerning relative price changes and shifting comparative advantage have become clearer with the passage of time. Between 1945 and 1979, governments tended to treat manufacturing as a key sector that needed to be supported without question. This has to be seen within the context of wider perceptions concerning the appropriate role of government. At the highest level of aggregation, we can identify three major periods since the emergence of modern economic growth in the government's approach to economic policy. The first period began in the Industrial Revolution and continued up to the Second World War. The second period began with the election of the Attlee government in 1945, and continued until James Callaghan's speech to the Labour Party conference in 1976. The third period began then, was consolidated with the election of Margaret Thatcher as prime minister in 1979, and continues until today.

The first period consisted of the government believing that its overriding duty was simply to balance the books. Ideally this should be done every year, although borrowing for war and a few other contingencies was a necessary evil. It was not for the government to decide which industries should flourish, where they should be located, or anything else. The most extreme example of this belief was the repeal of the Corn Laws, and the adoption of unilateral free trade. Essentially, the British government took the view that if British people wanted to buy foreign goods or services it was no business of the government to obstruct them.

Of course, practical reality is never as pure as any simple ideological position. The government did intervene in welfare, with the creation of the new Poor Law and the Victorian workhouse. It legislated to improve conditions for all workers, and particularly for women and children. It gradually expanded its support for education, at least to the extent of filling in the gaps left by erratic church provision. All of these measures have survived the test of time.

A combination of the apparent failure of market economies during the Great Depression, combined with the apparent success of the planned economy in Britain during the Second World War, and in Soviet Russia between the wars, led Britain and other countries emerging from the Second World War to place much greater faith in the role of

planning, and government more generally. The post-war era was the era in which the idea that "the man in Whitehall knows best" was most widely accepted. It is this period that we shall analyse in most detail.

This era finished in 1976, with James Callaghan's speech to the Labour Party conference, in which he said that governments could not spend their way out of recessions. No more would politicians rail against the “gnomes of Zurich”, but instead they accepted the primacy of the market.

Thus we find that the period that was most strongly characterised by government intervention lasted for under 40 years, starting in 1945. During this period governments adopted a huge range of manufacturing sector-specific policies – from the micro level of cotton industry re-equipment subsidies to the broader brush “selective employment tax”. To the extent that these policies maintained employment in declining industries, they worsened UK productivity performance, and reduced living standards for people in Britain. Since 1979 there was a retreat from such sector-specific policies and a growing acceptance that manufacturing should “sink or swim” along with other sectors. Nevertheless, even during this later period, it is still necessary to consider the effects of non-sector specific microeconomic policies which had a large impact on manufacturing - from education and training to competition policy - and macroeconomic policy.

Since the financial crisis of 2008, a view has resurfaced that the economy needs to be rebalanced away from financial services towards manufacturing. Under the most recent Labour government, Business Secretary Lord Mandelson established the New Industry, New Jobs agenda, while the Coalition government has also appeared sympathetic to the need for rebalancing.

3. Effects of sector-specific policies

This section provides a summary and evaluation of many of the sector-specific policies which were widely adopted before 1979. Policies covered consist of: the encouragement of mergers to create national champions; nationalisation and privatisation; investment subsidies; selective employment tax; public sector purchasing; and the encouragement of foreign direct investment (FDI).

3.1 The encouragement of mergers to create national champions

Concern over Britain's lagging productivity performance and declining share of world export markets during the 1960s and 1970s led governments to adopt a policy of "national champions". The policy was predicated on a belief in economies of scale in manufacturing, which governments believed were not being realised sufficiently quickly by the private sector. The national champions policy had two distinct elements. The first, and stronger, policy was for government to create, or direct the private sector to create, national champions. British Leyland is the obvious example, but government involvement in creating shipbuilding firms was also extensive. The second, and weaker, policy was for the government to accept and welcome private sector mergers and takeovers that created what were expected to be strong British firms. The General Electric Company and Courtaulds, for example, were private sector creations, but had close links to government. Courtauld's Frank Kearton, was the first chairman of Harold Wilson's Industrial Reorganisation Corporation, which existed to promote mergers in industries that were held to be fragmented. He was also successful in persuading the subsequent Conservative government to negotiate voluntary textile import restrictions with Commonwealth countries (Owen, 2010: 66). Although the policy produced a range of outcomes in the short run, most were broadly unsuccessful in the medium to long run.

Perhaps the least successful national champion was British Leyland in motor vehicles, which was nicknamed "British Elend" in Germany (Elend is German for misery). The process of mergers amongst the British owned car firms began with the formation of the British Motor Corporation (BMC) from Austin and Morris in 1952 (Turner, 1971). BMC merged with Jaguar Group in 1966 to form British Motor Holdings (BMH), which merged with Leyland Motor Corporation in 1968 to form British Leyland Motor Corporation (BLMC). Leyland had begun life as a commercial vehicle producer but in 1961 acquired the car producer Standard-Triumph, formed in turn from the union of Standard and Triumph. Leyland had also acquired Rover in 1966. As the figures in Table 8 show, the British owned producers tended to see their share of UK production decline both individually and collectively as they merged to form the national champion (Dunnett, 1980; Church, 1994). Any temporary increase as a new company was added was soon followed by a resumption of the declining trend. The principal gainers during the early postwar years were the American multinational plants located in the UK, led by Ford, while the 1980s saw the growth of the newly-established Japanese multinational plants led by Nissan. European manufacturers also saw their market share increase after Britain's accession to the EEC. The financial consequences of the continued slide in market share after the formation of British Leyland led to a bailout in December 1974, followed by nationalisation.

Table 8: Shares of UK car production by manufacturers (%)

	1947	1954	1967	1978	1985	1989
Standard	13.2	11.0	7.9			
Austin	19.2					
Morris	20.9					
BMC/BLMC/Rover Group		38.0	34.7	50.2	44.4	35.0
Rootes/Chrysler/Peugeot	10.9	11.0	11.7	16.1	6.4	8.3
Vauxhall	11.2	9.0	12.7	6.9	14.0	16.0
Ford	15.4	27.0	28.4	26.5	30.3	29.5
Nissan						5.9

Source: Dunnett (1980: 20); Church (1994: 79)

In aircraft production, the failure of Britain's independent producers to break into the global market in an effective way during the 1950s led the government to encourage a series of mergers which led to the emergence of two groupings in 1960 (Reed, 1973). The British Aircraft Corporation (BAC) brought together the airframe and guided weapons interest of Vickers, English Electric and Bristol, while Hawker Siddeley took over de Havilland and Blackburn to form Hawker Siddeley Aviation (HSA) (Edgerton, 1991). Further attempts to reap economies of scale in aircraft production involved Anglo-French co-operation, with a number of spectacular failures, the most famous of which was Concorde. Although Concorde was a technical success, it was a ruinous disaster commercially. Following further difficulties in the early 1970s, the struggling BAC and HSA were nationalised in 1977 to form British Aerospace (Hayward, 1983).

A similar pattern can be seen in shipbuilding. Declining market share and financial difficulties led to a series of government sponsored mergers, but the merged groupings continued to have problems, and after a series of high-profile crises, the industry was nationalised in the mid-1970s (Hogwood, 1979). A Shipbuilding Industry Board established by the Labour government in 1966 encouraged a series of mergers including Upper Clyde Shipbuilders (UCS) on the Upper Clyde, Scott Lithgow on the Lower Clyde, Swan Hunter on the Tyne and Tees and Austin and Pickersgill on the Wear. Although the incoming Conservative government in 1970 initially espoused a policy of non-intervention, they soon backed down in the face of opposition to closures and an effective union campaign that included the famous "work in" on the Upper Clyde. Large amounts of public money were made available to save the UCS yards as well as Harland and Wolff in Belfast and Cammell Laird in Birkenhead. The Labour Party formulated plans for nationalisation of the shipbuilding industry while in opposition, but vesting day was delayed until July 1977 due to strong opposition in Parliament. Shipbuilding has since largely moved to lower wage economies such as Korea. Even Poland has struggled to see the iconic Gdansk yard survive in the face of lower wage competition.

The machine tool industry was also subjected to government encouraged mergers, the standard remedy of the 1960s for perceived under-performance in manufacturing. Prior to the merger wave of the second half of the 1960s, the British machine tool industry was already made up of large firms compared to the rest of Europe, but this was not matched by large factories (Cowling et al., 1980). A detailed investigation of the Coventry Gauge-Tube Investments merger in 1969 showed little or no efficiency gain by 1975, but the most spectacular failure was surely the expansion by merger of Alfred Herbert, where Cowling et al.'s (1980: 119) measure of economic efficiency fell by more than a third during the first half of the 1970s. With the encouragement of the government-sponsored Industrial Reorganisation Corporation (IRC), Alfred Herbert absorbed a number of other machine tool producers, including in 1966 the machine tool department of BSA (Prais,

1981). By 1974 the Herbert Group was on the verge of bankruptcy, but was bailed out by the government. Further injections of public money were made before the Group went into receivership in 1980.

In electrical engineering, the difficulties caused by growing international competition in the 1960s led to the round of mergers that occurred in many other industries, as an attempt was made to produce a national champion. The General Electrical Company (GEC) took over Associated Electrical Industries (AEI) in 1967 and also absorbed English Electric (EE) in 1968 (Jones and Marriott, 1970). Cowling et al. (1980) see this as a success story, improving profitability and increasing efficiency in the 1970s. Certainly, in the medium term, GEC avoided the collapse of other national champions such as British Leyland. However, the company continued to concentrate on sectors with captive domestic customers, such as defence electronics, telecommunications equipment and electric power plant. As those sectors opened up to international competition in the 1990s, much of GEC's core business was sold off and the proceeds used to purchase technology companies at overvalued prices during the dot.com bubble. As the dot.com bubble burst in 2000, the company suffered a major share price collapse and imploded. We note that other European consumer-oriented electrical engineering firms such as Philips, Pye and Grundig have also struggled, and that some Japanese rivals, such as Sony, are now also struggling in the face of lower wage competition.

Whereas the British computer industry had been on a par with its American counterpart in the early 1950s, at least in terms of technological capability, if not in scale, by the early 1960s a two-to-three-year technological gap had opened up, and IBM had emerged as the dominant global producer. As in so many other industries, there then followed a series of mergers between the main British computer manufacturers in an attempt to produce a national champion that could compete across the full product range (Campbell-Kelly, 1989). Thus a merger between the Britsh Tabulating Machine Company (BTM) and Powers-Samas in 1959 produced International Computers and Tabulators (ICT), which then absorbed the computer interests of GEC, EMI and Ferranti between 1961 and 1963. Between 1963 and 1967 the computer interests of English Electric merged with Leo Computers, the Marconi computer interests and Elliott-Automation to form English Electric Computers. Finally, in 1968, ICT and English Electric Computers merged to form International Computers Limited (ICL). Initially, ICL attempted to compete directly with IBM across the full range, but as governments became increasingly reluctant to provide subsidies and preferential procurement policies, this proved unsustainable and the company switched to supplying systems targeted at specialised niches. When ICL was taken over by Standard Telephone and Cables (STC) in 1984, the government continued to worry about British control being retained, and the American company ITT was required to reduce its shareholding in STC to 24 per cent. However, a decline in economic nationalism in Britain meant that the government took a more relaxed view when STC sold 80 per cent of ICL to Fujitsu of Japan in 1990 (Owen, 1992).

A similar strategy of government encouraged mergers saw the emergence of Courtaulds as a national champion in textiles. Courtaulds had a virtual monopoly of rayon in Britain, but textile producers were increasingly using fully synthetic fibres, such as polyester, where ICI were dominant. After fighting off a hostile bid from ICI in 1962, Courtaulds pursued a policy of vertical integration based around cotton, acrylic fibres and filament yarn (Turner, 1969; Knight, 1974). In 1964, they acquired the Lancashire Cotton Corporation and Fine Spinners and Doublers. In weaving, small scale, privately owned companies were not susceptible to acquisition, and most weaving sheds were physically unsuitable for re-equipment in any case. As a result Courtaulds established their own

weaving operations on greenfield sites. By 1970, Courtaulds accounted for 34 per cent of the cotton-type spinning market in the United Kingdom and 10 per cent of the weaving market. The other two strands of Courtaulds' verticalisation strategy, based on acrylic fibre and filament yarn also involved substantial acquisitions. None of this stemmed the decline of British textiles. In fact, the most successful European producer across the full range of textiles and clothing was Italy, where a large number of small firms offered flexibility, and large integrated groups were split up (Ansom and Simpson, 1988).

Cowling et al.'s (1980) detailed investigation of 9 mergers during the national champions era is generally quite negative. Although they found that in 4 of the 9 cases, their measure of efficiency (the reciprocal of unit factor requirement) increased by more than 1½ % per annum following the merger, they concluded that this had little to do with the mergers, since in no case were the efficiency gains greater than in the non-merging firms in the same industry. Further, none of the merging firms exhibited improved export performance or increased R&D spending. Cowling et al. concluded therefore that the main impact of the mergers was to increase market power, leading to higher profits through higher prices. It is inherently unlikely that a single explanation can account for the failure of all of these companies. Nevertheless, we note that the emphasis on scale was achieved at the cost of reducing competitive pressure. By and large these were firms with no significant domestic rivals. Prior to joining the European Economic Community the extent of tariff protection in the British market meant that they essentially faced no meaningful rivals in the home market. As the Nobel prizewinner, Sir John Hicks, famously remarked "The best of all monopoly profits is a quiet life."

3.2 Nationalisation and privatisation

The initial Attlee government nationalisations were largely of utilities, rather than manufacturing firms. Thus, for example, suggestions that cotton should be nationalised came to nothing (Singleton, 1995). Nationalisation of manufacturing firms was pursued by the Labour governments of the 1970s largely as a desperate attempt to stave off collapse as national champions failed. British Leyland was nationalised in 1975 as losses mounted. A committee of enquiry was established in December 1974 when the company had to be given a financial guarantee, and a rescue package involving nationalisation and the injection of £1.4 billion of public money over eight years was agreed (Adeney, 1989). However, interference by the National Enterprise Board in the day-to-day running of the company and a new system of industrial relations machinery suggested by the committee report did not help the company to achieve the unrealistic assumed sales levels. When Michael Edwardes took charge of British Leyland in 1977, he was shown a daily list of disputes, which often ran to five sheets. He notes that it "was to be three years before the daily dispute sheets dwindled to the point where I was able to discontinue them" (Edwardes, 1983). The company rationalised its model range, and entered into cooperation with Honda, who took a 20% stake in the company. Jaguar was privatised in 1984 and was taken over by Ford and then Tata Industries. In 1988 Rover Group (including Land Rover) was sold to British Aerospace, and later to BMW, who also bought out Honda's stake. The core middle market section under the Austin and Rover brands was not successful, and was sold for a token sum to Phoenix, and later to SAIC, the Chinese firm. Only trivial levels of production remain. That said, BMW successfully re-created the Mini brand, which continues to be assembled at the Cowley plant, and revitalised the Land Rover/Range Rover franchise, which was later sold to Ford and then to Tata. These vehicles are also produced in the UK.

The shipbuilding industry was nationalised in 1977, but continued to struggle against low-wage producers from Asia. When the Conservative government came to privatise British Shipbuilders from 1983, relatively little revenue could be raised because of the unprofitability of the industry (Vickers and Yarrow, 1988). The exception is military ships, produced largely by the once nationalised, now privatised BAE Systems.

In aerospace, BAC and HSA struggled to cope with the slump in the airline market following the oil price shock of 1973, and were nationalised in 1977 when British Aerospace came into being (Hayward, 1983). This followed the earlier nationalisation of Rolls Royce in 1971, following a huge escalation in the development costs of the RB211 engine for the American Lockheed Tristar (Reed, 1973). Both Rolls Royce and British Aerospace returned to profitability and were privatised in 1987 and between 1981 and 1985, respectively. The key to success in civil aviation airframe manufacturing appears to have been co-operation with other European producers on Airbus, which emerged as a serious competitor to Boeing during the 1980s. In contrast to earlier periods, when launch aid exceeded revenues, the period 1991-2000 saw receipts of £1.02 billion on expenditures of £0.35 billion. Neven and Seabright (1995) conclude that Airbus represents a successful example of a rent-switching industrial policy, which is likely to produce a positive rate of return for the next half century. Since, 2000, however, BAE has sold off its civil aviation interests to EADS and now concentrates on its core defence interests, where it is highly dependent on government purchasing and financing of research and development. Hartley (2010) concludes that aerospace is one of Britain's most successful manufacturing industries. In a sector where government support has been crucial all across the world, the policy of nationalisation, which was so unsuccessful in many other industries, appears to have done no lasting damage. Rolls Royce in particular has successfully competed with General Electric with its Trent series of engines.

Whilst most cases of nationalisation in manufacturing reflected attempts to stave off bankruptcy for ailing national champions during the 1970s, there is also one case where nationalisation was pursued much earlier for more ideological reasons. Between the 1940s and 1980s, the steel industry moved between the public and private sectors in line with changes in the party of government. The industry was first nationalised by the Labour government in 1950, denationalisation was begun (but not completed) by the Conservatives from 1953, and renationalisation occurred under Labour in 1967 (Vaizey, 1974; Burk, 1988). Following a sea-change in general societal attitudes towards the performance of nationalised industries during the 1970s, the second denationalisation of steel in 1988 was rebranded more positively as privatisation (Aylen, 1988). Although the general view of the performance of the British steel industry during this period is highly negative, this assessment applies equally to the periods of private and public ownership. Before the 1980s, public ownership failed to secure effective reorganisation and private ownership failed to inject effective competition. Although Aylen (1988) notes that a remarkable turn-round in the productivity performance of the British steel industry occurred before 1988 while it was in public ownership, his conclusion that privatisation was unnecessary does not follow, since it is highly unlikely that the changes in the structure of incentives faced by the management and workforce could have been implemented without the expectation of an end to public ownership and the sense that the sector would be allowed to fail. A more appropriate conclusion is that of Green and Haskel, who write that "Did privatization itself raise productivity? No. … Did the process of privatization raise productivity? The answer is a re-sounding yes" (Green and Haskel, 2004:105).

There have been several quantitative studies of the performance of Britain's nationalised industries. Although most of these industries were in the non-manufacturing sector, their performance helps to shed light on the likely effects of nationalisation in the manufacturing sector. Hannah (2004: 93) describes the productivity growth of the nationalised industries in Table 9 as generally rather feeble during the 1950s, picking up during the 1960s. A similar pattern can be observed in manufacturing, which was largely in private hands. Pryke (1971) originally took an optimistic position, believing that the initial managerial problems of the 1950s had been largely resolved. However, the deterioration of the 1970s convinced him otherwise, so that Pryke (1981) provides a much more pessimistic assessment of the effects of nationalisation on productivity performance. The post-privatisation performance has also been erratic, and is best seen in the context of "sink or swim". Pressure from a competitive market mean that our best companies have thrived (Rolls Royce), while others have fallen (much of Rover), while the future of others remains uncertain (steel).

Table 9: Labour productivity growth in nationalised industries

Sector	1948-58	1958-68	1968-78	1978-85
Steel	--	--	-0.2	12.6
Airlines	14.0	8.9	6.4	6.6
Electricity	4.6	8.0	5.3	3.9
Gas	1.6	5.5	8.5	3.8
Road freight	0.8	4.9	--	--
Coal	0.9	4.7	-0.7	4.4
Railways	0.3	4.3	0.8	3.9
Buses	0.6	-1.4	-0.5	2.1
Post Office	--	--	-1.3	2.3
Telecoms	--	--	8.2	5.8
Manufacturing	1.9	3.7	2.7	3.0

Source: Hannah (2004: 93)

3.3 Investment subsidies

Industrial subsidies designed to increase investment in manufacturing plant and equipment were important in each of the two Wilson administrations, with a partial retreat under Heath, and subsequently. Subsidies came in two forms. First, there were general subsidies available to any manufacturing firm that invested in a relevant way that met the scheme criteria. The subsidies were greater for firms based in relatively poor parts of the country. In addition, there were specific subsidies available to firms in sectors the government felt were particularly important, such as aviation. Table 10 sets out spending levels in different periods for each of these.

Table 10: Investment subsidies (£m, 1980 prices)

	1965/6	1967/8	1969/70	1971/2	1973/4	1975/6
General investment grants		547	921	691	251	48
Regional investment grants	43	265	298	257	408	612
Civil aviation	93	213	292	400	235	211
Shipbuilding	22	30	143	47	108	125

Source: Wren (1996: 91). Note: investment subsidies for civil aviation went overwhelmingly to the Concorde project.

Investment support under the first Wilson administration divided into two parts. On the one hand the government used investment subsidies as a way to tackle regional problems. On the other hand, investment subsidies were seen as a means to push Britain to new heights. The "Ministry of Technology" was set up in October 1964, to ensure that Britain entered the "white heat of the technological revolution". This led to the creation in 1965 of the scientific research councils, which continue successfully to this day, while 1966 saw the creation of the Industrial Reorganisation Corporation (IRC). This was given access to substantial sums of government money which it could use to acquire companies, and to influence them to increase investment by providing financial support. As noted above, this was also an era in which the government supported the creation of large firms through mergers. The approach embodied in the IRC was then expanded in the 1968 Industrial Expansion Act which allowed the government to act directly rather than at arms' length in the manner of the IRC.

Government support for investment then declined under Heath's government, which initially set itself against such intervention. Industrial and investment subsidies became important again under the 1974-79 Wilson/Callaghan governments, when they reached their peak. On this occasion industrial support was essentially defensive, and was based on the 1974 White Paper "The Regeneration of British Industry" (H.M.S.O, 1974). This argued that manufacturing investment required "a closer, clearer and more positive relationship between government and industry" (paragraph 4). This in turn led to the nationalisation of the shipbuilding and aircraft industries, and the creation of the British National Oil Corporation. Subsidies were extensive, particularly when the government felt that the only alternative was redundancies. A classic example was the subsidies to the Chrysler motor company in 1976, to ensure that their car plant at Ryton remained open. The National Enterprise Board (NEB), set up in 1975, was expected to ensure that the acquisition of individual firms by the government would improve Britain's manufacturing performance. In reality the NEB's portfolio consisted largely of "lame ducks" rescued by the government. British Leyland alone made up 69% of the value of its total holdings.

This era also saw White Papers appear in quick succession. Following the August 1974 White Paper on the Regeneration of British Industry, the government's next White Paper, "An Approach to Industrial Strategy" appeared in November 1975 (H.M.S.O, 1975). This created a more sector specific approach, but the actual interventions were essentially the same: government provided money to industrial sectors to improve efficiency and competitiveness, usually through investment in capital equipment. All sorts of sectors received support, and it is not clear that the government was particularly expert in picking areas that were likely to grow in the future. Thus the electronics components industry received £12.1 million, while the red meat slaughterhouse sector received £13 million (Wren, 1996: 99). Poultry meat processing received £7.3 million, making it slightly more important than the instrument and automation sector, which received £6.8 million. Again, regional aspects were important in determining which sectors received support. There were particular problems with investment grants to the shipbuilding industry, where it was later discovered that more than three quarters of the £609 million paid out in investment grants for shipbuilding between April 1967 and March 1978 was paid for ships constructed outside of the United Kingdom (Hansard, 13 July 1978, written answer).

The mid-to-late 1970s saw the European Union begin to intervene to reduce the level of domestic industrial subsidies in individual countries, whether for capital investment or any other purpose, in order to ensure a level playing field across Europe. This began to affect British government policy in December 1977 when ministers felt obliged to require the NEB to target particular rates of return, something they struggled to deliver.

The period after 1979 saw a major decline in subsidies for investment (Wren, 1996: 204). This was caused partly by the election of a new government with different ideological foundations, partly by a greater emphasis on supporting employment directly (the youth training scheme, and so on), and partly because the European Union became ever more concerned about enforcing a level playing field in which firms had to compete without subsidies. This period also saw industrial support becoming more closely tied with regeneration of regions and particularly urban areas. When looking at changes to the taxation system for investment, Sumner (1998: 61) found that “trivial temporary changes in the tax system will have trivial effects on investment spending”.

Wren's "Industrial Subsidies" is the standard work on the subject. He concludes that: "the post-war UK economic record suggests that industrial subsidies were an almost unmitigated failure" (1996: 210). He notes that there have been few effective evaluations of the effects, but argues that evaluations of the administration of industrial policy have generally been damning. Conclusions include "incoherent", "confusion of objectives", and so on. In particular he is critical of the failure of government schemes to distinguish between different objectives. Improving productivity may involve reducing employment, for example. Evaluations of regional policy show that support for capital intensive plants was particularly expensive in terms of the number of jobs created. Perhaps the extreme case of this was the massive support for ICI and British Steel in the 1970s, periods in which both firms reduced their employment levels substantially (Wren, 1996: 213). The conclusion that the policy was an almost unmitigated failure should be seen as indicating not that industry failed to take up the subsidies on offer, or that they failed to respond in the way that government wanted. On the contrary, industrial subsidies that were designed to encourage firms to be more capital intensive achieved just that. Rather, the effects were not sustained, and the firms did not thrive in the marketplace.

The only glimmer of light is Wren's finding that the job effects from supporting small firms were greater than the job effects from supporting large firms. This finding mirrors recent work by LSE authors which also suggests that industrial policy should target small firms, rather than large (Criscuola et al., 2012).

3.4 Selective Employment Tax

The Selective Employment Tax (SET), introduced in the 1966 budget, was a creation of Harold Wilson's interventionist first term as prime minister. Its intellectual genesis lay in Cambridge, home to the influential economist, Nicolas Kaldor. It was a simple idea: employers in the service sector (including construction) would have to pay a "selective employment tax". The money raised would be used to subsidise manufacturing employment. Manufacturing firms were therefore not only exempt from paying the selective employment tax, but also received a “selective employment premium” for every worker that they employed. The "selective employment premium" was withdrawn for firms in areas outside the development and special development areas one year after introduction, and abolished everywhere by 1971. The premium was relatively small, amounting to little more than 1/10 of the value of the exemption from the selective employment tax (Wren, 1996: 68). The aggregate value of these items is set out in Table 11.

Table 11: Selective Employment Tax and Selective Employment Premium: Expenditure (£m, 1980 prices)

	1967/8	1969/70	1971/2	1973/4	1975/6
SET refund and SEP	3335	4502	3116	408	8

Source: Wren (1996: 91)

The arguments in favour of this system were two fold. First, Verdoorn's law that faster growth in output increases productivity owing to increasing returns, implies a market failure. If all firms increase output, returns will increase, but it will not be economically efficient for a single firm to do so. Government can and should step in, therefore. Second, the policy was designed to support exports, particularly in the context of devaluation. In addition, it was believed that the service sector, and in particular the retail sector, were prone to using "excessive" labour.

Reddaway's (1973) government commissioned evaluation of the selective employment tax was generally favourable, arguing that the reduction in employment in the retail sector had led to an improvement in productivity. Nevertheless, independent research did not support this result, noting, for example, that an increase in measured productivity in retailing often masked a reduction in service. Employing extra cashiers on the till will shorten queues, but lower the number of people served per cashier. Measured productivity appears to fall with an increase in employment, but only because the quality of service is not included in the definition of output. The National Institute of Economic and Social Research estimated the effect of the selective employment tax on exports to be virtually zero (Price, 1978).

In terms of manufacturing there were no obvious increases in productivity. The selective employment tax was abolished by the subsequent Heath administration, and from the 1970s onwards the idea of a tax to deter employment in any sector has seemed at best quixotic.

3.5 Public sector purchasing

The government acts as a significant purchaser in various sectors of the economy. The two areas that stand out are pharmaceuticals and defence. We will deal with each in turn before looking at government purchases more generally.

3.5.1 Pharmaceuticals

British health care is provided overwhelmingly by the National Health Service, which therefore gives the government considerable influence over the pharmaceutical industry. The UK government has de facto regulated the price of pharmaceuticals since 1957 via the "voluntary price regulation scheme", since renamed the "pharmaceutical price regulation scheme". Participation by drug companies is voluntary, but universal. Every five years the government sets out a price trajectory that is designed to provide a reasonable rate of return, while ensuring value for money for taxpayers. The promotion of "a strong and profitable pharmaceutical industry" became an explicit objective of the scheme in 1969.

Broadly speaking, the scheme is seen as a success. Expenditure on medicine is relatively low in Britain by developed country standards: the Italians and Swedes pay about a quarter as much again per person as we do, the Danes and Germans a third

more, the Irish, Japanese and Belgians over 50 percent more, the French 75 percent more and the Americans more than two-and-a-half times as much (Owen, 2010). Britain is also particularly strong on the use of generic medicines, and is a relatively low user of new drugs that tend to offer the highest profit margins for the industry.

Yet despite the low bill for medicines, the low take-up of new drugs, and the widespread use of generic medicines, the price regulatory schemes have been seen as a successful part of Britain's industrial policy. Thomas (1994), for example, considers it critical in explaining the difference between the success of British pharmaceutical firms and the failure of their French rivals. Olson (1995) agreed that the scheme was effective in encouraging research and development.

Other academics have been more sceptical. Bloom and Van Reenen (1998) argue that while the scheme may have contributed to the success, other factors such as Britain's strong record in biomedical research at university level, the early introduction of efficacy regulation and the role of the NHS were more important.

3.5.2 Defence

The world's largest military powers – the United States, Britain, France, the Soviet Union and China – are all committed to the indigenous manufacture of weapons systems at a high level. In each case governments are a near monopsonistic purchaser, and - particularly in the smaller nations - one manufacturer is often a near monopoly supplier. As such, government matters in this sector as in no other. In addition, products are expensive and increasingly so. Defining the cost of a Spitfire in 1934 as 100, Hartley (2010) found that the 1969 Harrier cost 17 times as much in real terms, while a 2003 Typhoon cost more than 50 times as much, and the Lockheed Martin F-22 Raptor is 50% more expensive again. The Raptor is literally worth its weight in gold.

In the case of Britain, BAE is the dominant UK defence industry supplier. As well as being a UK company, it has deep links with Saab, EADS, Finmeccanica, and Lockheed Martin. The UK is also home to various foreign-owned defence companies, including AgustaWestland, Shorts, and TRW (formerly Lucas Aerospace). Rolls-Royce also provides engines for various military planes.

At the start of the post-war era the UK, like other countries with similar international ambitions, preferred to produce its own products. This era came to an end with the cancellation of three British military aircraft: TSR-2, P1154 and HS681, and the decision instead to buy planes "off-the-peg" from the United States. Since then Britain has increasingly engaged in cooperative efforts in order to try to gain the necessary economies of scale. For more individual projects, such as submarines or aircraft carriers, contracts are awarded on a "cost plus" basis. This was made explicit in the 1968 profit formula, and reiterated in the 2009 review board report.

The system is clearly successful in that British manufacturing is able to produce a sizeable portion of Britain's military hardware, allowing Britain to preserve some modicum of military independence. Given that Britain still sees itself as an important military power it is unlikely that Britain will want to abandon indigenous capability to produce military equipment. Nevertheless, with the exception of a few niche areas such as ejector seats, penetration of overseas markets by British firms is relatively limited. Britain sold the Hawk training aircraft to Saudi Arabia, but India has recently chosen the French Rafale as its preferred fighter aircraft.

There are a relatively small number of nations which purchase military hardware of this calibre and which do not seek to produce it themselves. As such the global market is relatively small and no country is likely to achieve dramatic export success. Ultimately, industrial policy in this sector is not about winning exports, but about preserving domestic military production capability for domestic military objectives. It should be seen as part of defence policy and not as part of industrial policy.

3.5.3 Other areas

From time to time there are campaigns to "Buy British". As part of the "I'm backing Britain" campaign in 1968, for example, union flags were placed on carrier bags to encourage shoppers to be more patriotic in their choices. Bruce Forsyth even recorded a single in support of the campaign, although it sold only 7000 copies. At a more local level there are often campaigns to "keep money local", inspired by groups such as the so-called New Economics Foundation, which have led to the creation of the "Brixton pound", "Lewes Pound" and so on. None of these have had a substantial effect.

In the past government agencies were much more likely, perhaps unconsciously, to purchase British products. For example, Royal Mail continued to purchase LDV (formerly Leyland) vans based on the obsolete "Sherpa" design when almost everybody else was purchasing either the Ford Transit or the Mercedes Sprinter. In the era of nationalised industries, British Rail produced its own equipment in the same manner that other countries also produced their own equipment.

That is not in general the case today. Pretty much the only residual of this policy is that it is hard to imagine the Prime Minister being ferried around in a BMW or Mercedes, rather than in a British manufactured Jaguar. More typical was the recent selection of Siemens as the preferred supplier for the new ThamesLink trains, in preference to Derby-based, although Canadian-owned, Bombardier. It is worth noting that South West Trains also selected the same Siemens train over the same Bombardier train for all mainline services into Waterloo, a much larger and more important contract. A bias would have increased British manufacturing in the short term however would have harmed passengers who would have ended up travelling on a train that lost a fair and open competition. It would also have been harmful in a more fundamental manner: the whole point of a "common market" is to increase the incentives to all firms to produce products that people want to buy at a price they want to pay. Biasing competition towards firms in your own countries is deeply inimical to that outcome. Nor are British firms unsuccessful in international competition. The Financial Times recently quoted Chantal Hughes, European Commission spokeswoman for the internal market, as saying that UK companies won 17 percent of contracts that public bodies awarded to companies from other member states, with only Germany more successful (Wright et al, 2011). Britain is specialising within Europe, and this contract reflects that specialisation.

3.6 Encouragement of foreign direct investment

Policies to encourage Foreign Direct Investment (FDI) in UK manufacturing have had some success. Driffield (1999) suggests that 4 out of 5 gross jobs created by inward investment are additional. For example, whether someone who has worked at the Nissan plant in Sunderland for 20 years would otherwise be in employment is a very difficult question to answer. Irrespective of the effects on employment, there is good evidence that FDI leads to higher productivity, and may have had some spillover effects for

domestic firms. The spillovers tend to be for firms close to the site of foreign direct investment, in the same industry, and with a similar level of overall technology (Liu et al., 2000).

Britain has long been a major centre for foreign direct investment by overseas multinational companies. The motor industry is the best example, with a long history of – mostly successful – foreign direct investment. For example, Henry Ford opened his first international plant at Trafford Park in 1911, replaced 20 years later by the Ford Dagenham plant. Ford Dagenham was modelled on Henry Ford's River Rouge plant in Detroit Michigan, and was designed to be large enough to supply all of Europe with Ford motorcars. Ford Dagenham remains in operation, and is currently London's largest industrial employer (Ford website).

Motor cars have proven to be an important part of overseas investment in Britain, and offer us an excellent case study for the effects of foreign direct investment more generally. As well as Ford, General Motors have invested in Britain via their UK arms, Vauxhall and Bedford. Chrysler and later Peugeot also produced cars in Britain at different times, and more recently Britain has seen investment by BMW, Nissan, Honda, Toyota and Tata.

The role of foreign direct investment needs to be understood in the context of a competitive market economy. Britain had relatively high levels of domestic competition in the interwar era, with six significant producers (four notable indigenous suppliers: Austin, Morris, Standard and Rootes, as well as American owned Ford and Vauxhall), and the industry was in good shape.

Britain's failure to join the European Economic Community at its inception altered the economic conditions for the car industry. German and French firms, for example, could easily export cars throughout the community if they produced products that people wanted to buy. This made Continental European countries much more attractive as bases for American firms, whose European manufacturing presence rose in this era. Ford's Factory in Genk, in Belgium, for example, opened in 1964, when Belgium was part of the EEC and Britain was not. Ford also began making engines in Cologne in the same era (Ford website).

By 1970, therefore, the French and German industries were in very good shape. By this point Britain's output of 1.6 million cars was dwarfed by the 2.5 million produced in France and the 3.5 million produced in Germany. Furthermore, UK exports of 700,000 cars were dwarfed by France's exports of 1.1 million and Germany's exports of 1.9 million vehicles.

By the time Britain joined the European Union it was in some sense "too late" for many existing producers, notably British Leyland and its successors. But the failure of existing British car manufacturers did not mean that Britain was a bad place to produce cars. Once Britain was within the European Union, it became an attractive location for companies such as Nissan. The Sunderland plant is rightly famous, and continues to be a major export earner for Britain and a major source of jobs in an otherwise relatively poor region.

The arrival of Nissan, Toyota and Honda were important events in and of themselves. All three companies employ significant numbers of people, and make a significant contribution to the balance of payments, even net of imported components. Further, as

Cameron et al. (1999: 29) have shown, inward and outward foreign direct investments were the most important elements in increasing the openness of the British economy after 1979.

Foreign direct investment did not manage to transform the existing British car industry. This is true even in the case of Honda, which owned 20% of Rover group for a time during the 1980s. Neither Honda, nor BMW subsequently, were able to maintain Rover group as a successful mass-market or semi-premium car company. With the benefit of hindsight this was probably inevitable. At the time of writing in 2012 both French mass-market companies (Renault and Peugeot Citroen) are losing significant amounts of money and may have no long-term future. The same is true of GM's European operations, while Fiat is losing money on both its mass-market Fiat operation, as well as its "near premium" Alfa Romeo and Lancia marques. Two other "near premium" firms have also been in difficulty: Volvo has been acquired by the Chinese Zhejiang Geely Holding group having failed to be successful as part of the Ford empire, while Saab has been liquidated following an unsuccessful stint as part of General Motors, and a short period as an independent company.

This case study raises the general issue of the extent to which policies to attract foreign direct investment can be expected to improve the performance of British manufacturing. The multinational enterprise literature certainly tends to show that foreign-owned firms outperform domestically-owned firms (Caves, 1996). However, this may be due to a selection bias, if foreign owners “cherry-pick” the firms to take over. This can be dealt with using panel data on firms, allowing firms subject to domestic acquisition and firms subject to no ownership changes to be used as controls. For a database covering UK manufacturing 1989-94, Conyon et al. (2002) show that firms acquired by foreign companies exhibited an increase in labour productivity of 13%. Wren and Jones (2011) find that when foreign direct investment is supported by regional aid from government, firms are more likely to locate in less economic and prosperous areas, but that their location decision is contingent on ongoing financial aid from government. As such, the arrival of foreign direct investment does not typically create a self-sustaining successful local economy. Foreign direct investment, and foreign takeovers of domestic firms are best seen as useful for British manufacturing, but not transformational.

4. Effects of non-sector-specific microeconomic policies with large effects on manufacturing

This section considers the effects of manufacturing-relevant non-sector-specific microeconomic policies, including: education and training; science and technology policy; regional policy and agglomeration economies; and competition policy.

4.1 Education and training

Education and training policies affect the supply of labour to manufacturing. A persistent theme of most evaluations of post war policy has been the “Cinderella” treatment of vocational training, particularly compared with continental Europe, where apprenticeship continued to thrive as it declined in Britain.

It will be helpful to take a long run historical perspective on the accumulation of human capital in Britain. In the late nineteenth century, as we have seen, Britain had higher labour productivity than both the United States and Germany. At this time, Britain also had one of the most skilled labour forces in the world. However, this was largely as a result of the early contraction of agriculture, so that Britain had a very high proportion of workers in industry and services performing specialised tasks and accumulating vocational skills, through experience, apprenticeships and professional examinations (Broadberry, 2003).

As the twentieth century progressed, the accumulation of human capital in Britain fell behind both the United States and Germany, but in rather different ways. In the United States, an early expansion of secondary education in the interwar period followed by tertiary education in the post war period led to high levels of general education, on which firms can build with specialised workplace training (Goldin, 1998). The growing army of American workers with degree level qualifications eliminated any advantage that Britain had in higher level qualifications as a result of an early abundance of professional associations, which provided qualifications in areas such as accountancy and law.

In Germany, and also in much of continental Europe, by contrast, an expansion of vocational training has produced a labour force with an abundance of intermediate level craft skills. During the post war period, as Germany was expanding its system of apprenticeships into the service sector, Britain was reducing its provision of apprenticeships even within industry.

A very detailed international comparative study of labour force skills and the implications for productivity at the plant level was conducted during the 1980s and 1990s by researchers at the National Institute of Economic and Social Research, the results of which are summarised in Prais (1995). By comparing qualifications in different countries in detail, with examiners getting together to evaluate quality, the NIESR researchers were able to pinpoint where shortfalls of particular skills occurred. By examining production on the shopfloor at the plant level, they were also able to trace the consequences of the lack of particular skills for productivity. The conclusion was that there were insufficient opportunities for acquiring high quality vocational qualifications in Britain. This can be

seen as a result of market failure, due to the free-rider problem. If a firm invests in training its workers, but those workers are then poached by other firms that do not provide training, in the long run training will be under-supplied. State subsidies or compulsory levies on firms are needed to ensure that adequate training is provided.

Whilst high quality vocational training has been allowed to decline, policy has too often supported low level training schemes which did little to enhance the employability of participants. This was particularly true of the periods of high youth unemployment during the 1980s (Wolf, 2011).

While vocational training has been neglected, general education has been the subject of a great deal of policy intervention. Although this has tended to attract a lot of criticism from educationalists, British school pupils have tended to do reasonably well relative to other western countries in standardised tests, such as the OECD Programme for International Student Assessment (PISA). That said, a number of Asian countries have tended to do better still, and there is a worrying tail of poor performing children from low socio-economic backgrounds.

One interesting aspect of the PISA results is that UK schools have tended to perform significantly better in science than in reading or mathematics. In 2009, for example, the UK ranked 16th out of 65 in science, compared with 25th in reading and 27th in mathematics. To the extent that the education system can be geared towards strengthening the manufacturing sector, then success in science education is surely one of the key ways, and in this respect UK policy can be judged to be achieving some success. This theme will be picked up and related to Britain's revealed comparative advantage in the next section on science and technology policy.

4.2 Science and technology policy

The scientist-novelist C.P. Snow coined the phrase "the two cultures" in the 1950s to describe the gulf between what he saw as an arts-educated mandarin class with little comprehension of science, and a scientific establishment with little interest in the arts. Since then, British policy-makers have often been characterised as having a deep-rooted bias against science and technology (Landes, 1969; Wiener, 1981). However, as Edgerton (1991) argues, it would not be difficult to argue the opposite case, since the British establishment throughout this period continued to place a great deal of faith in science and technology, particularly when it came to defence matters.

Figures on research and development (R&D) expenditure, much of it financed by the state, indicate that between the 1930s and the 1980s, the United States spent a larger share of manufacturing value added than did Britain. However, Britain in turn spent a larger share than other European countries, including Germany (Broadberry, 1997: 121-126). This impression of a relatively strong British R&D effort reaching back into the interwar period is also confirmed by data on the employment of researchers in manufacturing firms (Broadberry, 1997: 124-125). More recently, Germany's higher share of R&D spending in GDP and share of R&D researchers in total employment reflects the greater size of the manufacturing sector, rather than a greater intensity of R&D within the sector.

It is usual to point out that in Britain and the United States a large share of R&D has been in defence-related areas. In 1981, for example, defence budget R&D accounted for 54

per cent of government funded R&D in the United States and 49 per cent in the United Kingdom, compared with just 9 per cent in Germany (Ergas, 1987: 54). Whilst this has undoubtedly allowed Britain to retain capacity in hi-tech defence sectors, it has also had a wider distorting effect on science and technology policy. Here, Ergas draws a distinction between “mission oriented” and “diffusion oriented” approaches to science and technology policy. In mission oriented countries like Britain and the United States, technology policy is geared towards radical innovations aimed at clearly set out goals of national importance. By contrast, in diffusion oriented countries like Germany, science and technology policy is aimed at the provision of innovation-related public goods, to help diffuse technological capabilities throughout industry.

There is a large literature which is built on the idea of spillovers from R&D to manufacturing performance, over and above private returns, which opens up a space for government policy to stimulate R&D (Griliches, 1992; Coe and Helpman, 1995). Furthermore, Bloom et al. (2002) present empirical evidence from a panel of 9 OECD countries (including the United Kingdom) over the period 1979-1997 to suggest that tax incentives were effective in increasing private R&D intensity, even after allowing for permanent country-specific characteristics (such as the supply of scientists, language and culture), world macroeconomic shocks (captured by time dummies) and other policy influences (such as the tax treatment of physical capital and the amount of government funded R&D). The results suggest that a fiscal change leading to a 10% reduction in the user cost of R&D leads to a 1% rise in the level of R&D in the short-run, and just under a 10% increase in the long run.

One area of science and technology policy which does seem to have been relatively successful is the support of a world-class scientific research community. As noted earlier, this has produced a positive pay-off in the pharmaceuticals sector, and although the spin-offs to engineering have been less consistent, the revealed comparative advantage data in Table 7 do suggest that Britain is now more successful in science-based industries. There is certainly strong evidence for a link between scientific research success and success in science-based industries. German scientists, for example, achieve approximately 50 percent more citations than British scientists in the physical sciences. They are also about 20 percent ahead in mathematics. British scientists, in contrast, achieve almost twice as many citations as their German rivals in health, and are also ahead in biological sciences and clinical areas. This in part reflects Britain's long-running commitment to basic science as part of medical funding. In total the Medical Research Council has funded the work of 29 Nobel Prize winners, with Britain taking a lead in the discovery of penicillin, the structure of DNA, and the discovery of DNA fingerprinting (Cooksey, 2006). The contribution of the Wellcome Trust, Cancer Research UK and the British Heart Foundation, who together spend almost £1 billion a year on research, is also worth noting. Just as Germany's commercial success in almost all areas relating to engineering is built on strong foundations in the university sector, Britain's success in pharmaceuticals is based on world-class universities in this area.

4.3 Regional policy and agglomeration economies

Recent work in new economic geography has emphasised the importance of clusters to success in both manufacturing and services. This was not widely understood in much of the post-war era, which saw the aim of regional policy as being about “the proper distribution of industry” (Thirlwall, 1967). Post war regional policy worked to try to preserve some clusters (e.g. support for clustered manufacturing industries such as

cotton and shipbuilding), while working to break up others (e.g. support for new car factories away from existing clusters).

What unites both strands is a belief in bringing work to workers. This means that regional policy was determined primarily by unemployment, not by industrial needs. Areas to be supported - known as Development Areas, Development Districts, and Assisted Areas at various times - were to be aided by both financial support and regulatory incentives. Without an understanding of the existence of agglomeration economies there was no corresponding understanding that "successful" regional policy (in the sense of persuading firms to locate in areas other than those in which the firms wish to expand would be likely to adversely affect industry in some way). The most likely effect would be a fall in productivity, with a knock-on effect on either competitiveness or wages.

The 1945 Distribution of Industry Act allowed governments to financially assist particular regions, either via the provision of transport and infrastructure or through direct payments to firms or through labour subsidies. Broadly speaking, expenditures were low prior to the mid-1960s, and significantly higher thereafter, before falling back to some extent in the 1980s (Scott, 2004: 350). The figures are given in Table 12.

Table 12: The extent of British regional policy (£m, 1975 prices)

	1946/7-1948/9	1949/50-1951/2	1952/3-1958/9	1959/60-1960/1	1961/2-1963/4	1964/5-1971/2	1972/3-1975/6	1976/7-1979/80	1983/4
Govt factory building and land work	9.7	5.5	3.8	6.3	8	12	17	84	105
Investment grants and depreciation allowances						71	225	475	538
Labour subsidies						69	157	67	
Total	36	20	12	22	55	383	578	407	261

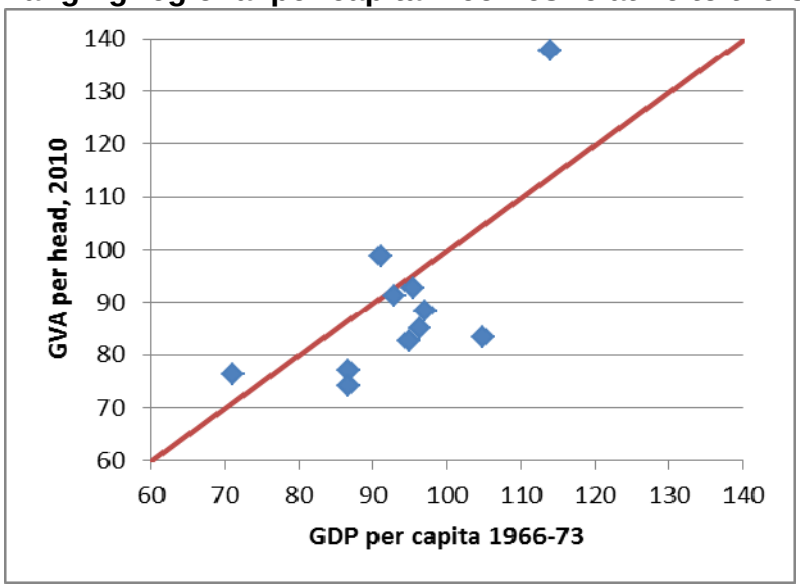
Source: Dunnett (1980: 20); Church (1994: 79)

It is easy to point to individual successes: the Nissan plant in Sunderland is probably the most famous. It is equally easy to point to individual failures: the Fujitsu chip factory in Newton Aycliffe, for example. Case studies such as this tell us little: given the number of firms who were supported it is inevitable that some will have succeeded and others will have failed. Insofar as support went overwhelmingly to manufacturing industry it is likely that subsidies did increase the extent of manufacturing in Britain, but the size of the effect would have been small. This is particularly true given that many of the firms that were supported were in industries such as merchant shipbuilding, which has since disappeared altogether.

In addition to subsidies, the government used regional policy regulations in a way that had significant effects on manufacturing. The strongest form of regulatory "incentive" was the use of industrial development certificates. These stated that a firm could only expand a manufacturing plant if in possession of such a certificate. Broadly speaking such a certificate would always be granted in a depressed area, and was much less likely to be granted in a prosperous area. The peak level of refusals came in 1966, when 30% of the requests to expand manufacturing activity in the Midlands and the south-east, weighted by employment, were refused (Moore et al., 1986: 28). Being refused led 50% of firms to

choose a smaller expansion in their preferred region, so that they did not need a certificate. 13% abandoned their expansion plans, 18% reorganised or closed their existing factory, 1% moved abroad, while 18% of firms moved to an area favoured by government (Wettman and Nicol, 1981: 120). Although Ashcroft and Taylor (1977) find that regional policy caused 500 UK plans to relocate to assisted areas during the 1960s, this success needs to be seen at best in the context of a trade-off between industrial efficiency and regional equity. Overall the policy is best seen as positively harmful to manufacturing, as it made it much less likely that manufacturing firms would expand. The system was abolished in the 1970s.

Figure 3: Changing regional per capita incomes relative to the UK average



Sources: 1966-73 from Scott (2004: 338), 2010 from http://www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--income-approach-/december-2011/index.html)

Since subsidies will have increased the extent of manufacturing, and regulations about location and land-use will have reduced the extent of manufacturing the overall effect of regional policy on the size of manufacturing in Britain is ambiguous, but is likely to have been very small given the overall trends that have occurred. It is worth noting in passing that regional policy has not led to a convergence in the prosperity of different regions of the United Kingdom. This is shown in Figure 3, which plots the relative success of each part of Britain in 2010 against its performance in 1966-73. A mark above the diagonal line is an area whose performance has improved relative to that of the nation as a whole in this period, whereas a mark below indicates a region whose relative performance has weakened in that period.

As we can see, London and the south-east have continued to diverge, with Scotland and Northern Ireland showing signs of convergence. Wales and all other areas of England have fallen further behind. Given the importance that economists now attach to agglomeration economies, policymakers need to be aware that moving work to workers is an extremely risky policy. Trying to move manufacturing - or any other employment type - from one place to another risks making it uneconomic altogether, as the evidence from the history of industrial development certificates shows.

4.4 Competition policy

The 20th century saw economists and policymakers wrestle with a new challenge: large firms. On the one hand we have known since Adam Smith (1776) that monopoly, cartels and collusion are bad for consumers. On the other hand, following Schumpeter (1942), we have the notion that we need large firms with large profits in order to finance research into innovations that will benefit consumers later on. Furthermore we know, following the work of Alfred Chandler (1977), that large firms can be necessary to gain the economies of scale that will lower prices for consumers. Finally, following researchers such as Aghion et al. (1997), we know that competitive pressure can be a spur to firms to reduce the cost of production, both by being more efficient, and by being more innovative.
The early post-war period essentially saw a rise in the intellectual influences of Schumpeter and Chandler. The protectionist policies from the interwar era were maintained, competition policy was neglected, and government had a tendency to "pick winners", at both the individual firm and sectoral level. Significant sections of the economy were taken into public ownership, and were generally run on a monopolistic basis. In 1979 the public sector accounted for 10% of GDP, 8% of employment, 17% of the capital stock (Vickers and Yarrow, 1988: 140). Not only were these firms run on a monopoly basis, but "deficiencies in the overall framework of control" led to poor outcomes in terms of financial returns, productivity, and consumer welfare (Vickers and Yarrow, 1988: chapter 5).

In theory the government created an effective merger control regime in the post-war era. The 1948 Companies Act clarified the role of company accounts, so that shareholders could better hold management to account, and other firms could better identify takeover targets. The Monopolies Commission was also created in 1948, with further legislation in the 1950s such as the Restrictive Practices Act, and the creation of the Monopolies and Mergers Commission in 1965. That said, the process was generally ineffective (Crafts, 2012). The Restrictive Practices Act was effective at banning cartels, but ultimately the firms that had participated in cartels were able to bypass the restrictions on cartels by merging. Broadberry and Crafts (2001) have shown that almost three quarters of manufacturing was engaged in some form of price fixing in 1956, while the largest firms increased their dominance over time (Clarke, 1985, Hannah, 1983). This in turn generated a higher-price-cost margin in British than in German manufacturing (Crafts and Mills, 2005), although it is likely that most of the potential benefits were dissipated in rents. For example, van Reenen (1996) estimates that around a third of the rents were taken by workers in the form of a wage premium. This may help to explain the great contraction in wage inequality in this era.

As well as the creation and dissipation of rents in a static context, both Broadberry and Crafts (2001) and Symeonidis (2002) found adverse effects from lack of competitive pressure in a dynamic context. Broadberry and Crafts found that cartelisation was strongly and inversely correlated to productivity growth in manufacturing from the mid-1950s to the early 1960s. Symeonidis found that abandoning a cartel increased labour productivity growth by a total of 20% more in the decade after the cartel was abandoned, than in the preceding decade. Economists now clearly understand the benefits of strong and vigorous competition policy in improving the productivity of firms that are subject to competitive pressure. It is likely that the lack of competitive pressure did harm some of the "national champions" in post-war British manufacturing. Nevertheless, it would be unreasonable to imagine that greater competitive pressures could have preserved the vast swathes of British manufacturing. The cotton industry declined because the cost of

producing cotton cloth was much lower in low-wage Japan, Hong Kong, and later China than it was in Britain. British Leyland ran into trouble notwithstanding significant competitive pressure from companies such as Ford and Vauxhall. Competition ensures that those companies that survive are effective: it does not ensure that all companies survive.

This conclusion is reinforced by trends in more recent history. The strength of product market competition increased from the 1970s onwards, through a combination of greater trade after Britain joined the European Union, a government less willing to protect companies that were failing, and, particularly from 1990 onwards, an increasingly strong application of competition policy. The extent of product market competition is given in Table 13, which covers Britain and its major competitors. Table 14 shows that in the application of competition policy, Britain went from being a laggard to close to best practice from the mid-1990s onwards. The effect of stronger competition policy and generally higher levels of competitive pressure more generally reduced price cost margins in four British manufacturers dramatically. These fell from 100% or more before 1972 to around 25% by 2005 (Crafts and Mills, 2011: 297).

Table 13: Index of product market regulation

	1975	1990	1998a	1998b	2003	2008
France	100	37	72	42	29	24
Germany	87	77	47	34	27	22
UK	80	50	23	18	14	14
USA	62	38	27	21	17	14

Based on Crafts (2012). Notes: 100 means that product market regulation strongly impedes product market competition. There is a break in series in 1998, and the figures cannot be compared across this break

Table 14: Index of the effectiveness of competition policy

	1995	2005
France	45	52
Germany	49	52
UK	30	60
USA	59	62

Based on Crafts (2012).
Notes: 100 means that competition policy is completely effective.

5. Effects of macroeconomic policies

Finally, we examine the effects of macroeconomic policies on manufacturing, covering the role of demand management; international trade, with Britain and Europe as an examplar; and exchange rate regimes.

5.1 The role of demand management

The era between the end of the Second World War and the mid-to-late 1970s has been characterised as one in which economic theories of "demand management" were pre-eminent. The idea was that governments could stabilise the level of demand in order to ensure full employment, without the economy overheating, which would lead to either inflation or more commonly in that era a crisis in the balance of payments. This led governments to pursue a policy that has been termed "stop-go". When the economy was overheating, the government would apply a "stop", in the form of tax rises, spending cuts, rises in interest rates, or controls on credit. If the economy appeared not to be growing fast enough the government would do the reverse.

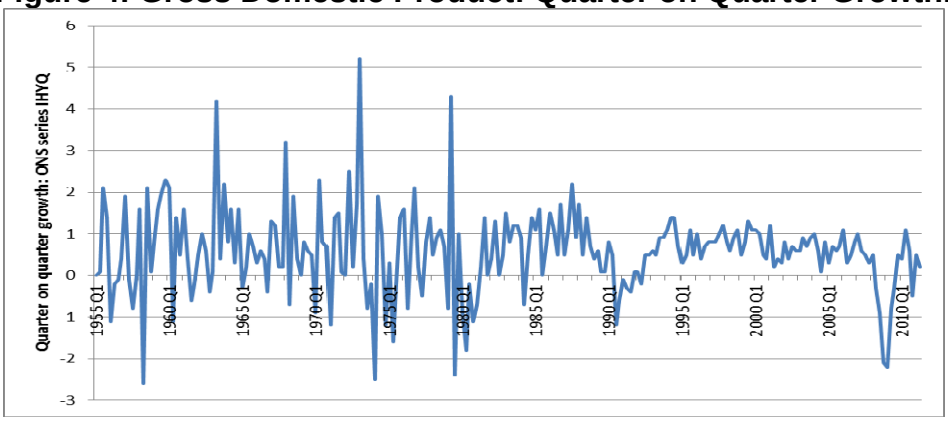
The adoption of demand management and "stop-go" policies was not as extensive as might once have been thought. Thus, for example, the Chancellor cut income taxes in 1955, shortly before the general election, even though it was not supported by the needs of the economy (Dow 1964). The inappropriateness of this decision led to other taxes being raised before the end of 1955. Three years later, in January 1958, the Chancellor of the Exchequer Thorneycroft was forced to resign when his fellow ministers did not comply with the "stop" policies that he was pursuing. His successor did not pursue the "stop" policy, but instead brought down Bank Rate and relaxed credit restrictions in order to stimulate the economy. The economy then grew rapidly, to the point where the record surplus on the balance of payments in 1958 became a deficit by 1960. Interest rates were raised as a result, and stronger deflationary measures taken in 1961 (Cairncross, 1994: 55).

These rapid reversals indicate that policy was at best incoherent. In reality, the evidence basis for making decisions as to whether government should press the accelerator or the brake was very poor. The 1951 Conservative administration sought to eliminate economic forecasts from government publications, believing that a forecast was part of the socialist panoply of economic planning (Cairncross, 1994: 54) and thus, for example, the Inland Revenue predicted a deficit of £53 million for 1954/5, compared with an outturn surplus of £433 million (Cairncross and Watts, 1989: 263). The government simply didn't have the evidence base to be able to apply its policies in a timely manner. The government also had difficulty in persuading the Bank of England to enact the policies that it felt necessary, an issue that was most apparent in 1957 after the Suez debacle.

Ultimately, the policies of "stop-go" ended with the first oil shock. At this point it became apparent that the British government could not stabilise the economy in the way that had been hoped in the early post-war period. Neither the Conservative government elected in 1979, the Labour government that replaced it, nor the current coalition government show a wish to return to the fine tuning policies pursued in the early postwar era.

There are good reasons for this reticence. In Figure 4, we see that the standard deviation of quarterly growth rates in the 1950s and 1960s was slightly lower than that which prevailed in the 1970s, but far higher than the figures for the 1980s, and dramatically higher than the figures that prevailed in the "noninflationary constant expansion" era. Economies are simply too complex for governments to be able to fine-tune them in the way that was once believed.

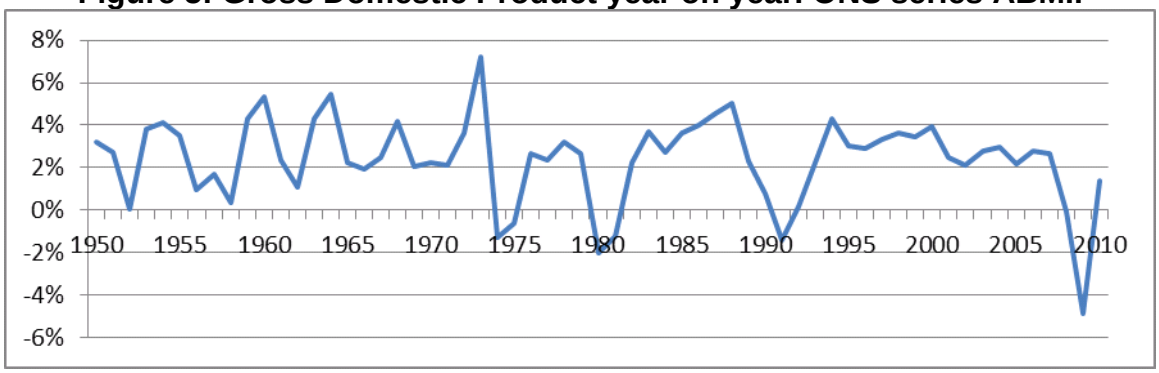
Figure 4: Gross Domestic Product: Quarter on Quarter Growth.



Source: (chain value method, seasonally adjusted) http://www.ons.gov.uk/ons/rel/naa2/quarterly-national-accounts/q1-2011/gross-domestic-product--o-.html

The effect on manufacturing of the failure to provide a steady rate of expansion should not be overstated. Although there were strong variations in quarterly growth rates, annual growth rates offered a much firmer foundation to British firms selling into the home market. In Figure 5, we see that Britain had a positive rate of growth in every year from 1950 to 1973, an era that was ended only by the first oil shock. In contrast, there have been two years in each of the 1970s, 1980s and 2000s in which Britain saw negative growth, and one such year in the 1990s. It is very difficult to imagine that what are ultimately relatively small swings from one quarter to the next are that important to industrial planning. The only exception is the car industry. Cars are expensive items, and frequently bought on hire purchase. One aspect of stop-go was that the government could control the minimum deposit, the interest rate and the term for hire purchase agreements. Thus the car industry was subject to significant swings in demand that were hard to predict. Foreman-Peck et al. (1995: 194-204) find that this did have an adverse effect on the British car industry.

Figure 5: Gross Domestic Product year on year. ONS series ABMI.



Source: (chained volume measures: Seasonally adjusted) http://www.ons.gov.uk/ons/rel/naa2/quarterly-national-accounts/q1-2011/gross-domestic-product--o-.html

Notwithstanding the current recession, however, it is worth commenting that the period subsequent to 1992 has been one of remarkable stability in the British economy. It is also worth commenting that this is the period in which the ratio of manufacturing to income has fallen at least as fast as it fell in earlier periods. There is no obvious connection between macroeconomic stability and manufacturing success, so no obvious reason to believe that there is a causal connection in either direction.

5.2 International trade: Britain and Europe as an exemplar.

The post-1945 period has seen a massive growth in merchandise trade. In Britain's case the single biggest element was the (belated) accession to the European Economic Community. The EEC had its roots to the creation of the European Coal and Steel Community, consisting of France, Italy, (West) Germany, Belgium, the Netherlands and Luxembourg. It created a "common market" for coal and steel. This in turn led to the creation of the EEC, following the 1957 Treaty of Rome. Britain was not a signatory. As a result, tariffs on manufactured goods were much higher in Britain than in (say) West Germany. Thus, for example, Britain levied a 23% tariff on imports of electrical machinery, while Germany's tariff was just 6% (Broadberry and Crafts, 2011: 265). Britain, along with Denmark, Ireland and Norway applied to join in 1960. That application was vetoed by Charles de Gaulle, and British trade with the EEC6 stagnated in the 1960s as a result (Broadberry and Crafts, 2011: 264).

Britain applied again in 1967, and negotiations began in earnest in 1970, with Britain joining in 1973. The EEC, later known as the European Community, and still later as the European Union had significant economic implications, particularly after the implementation of the Single Market Programme in 1992. This stated that goods that could be sold in one country could be sold in any, without having, for example, to be retested for safety or efficacy. In short, it created a real single market for manufactured goods.

Table 15: Growth of output per hour worked in manufacturing (% per annum)

Sector	1960-73	1973-9	1979-85
Britain	4.1	1.0	4.3
France	6.6	4.4	3.1
Germany	5.7	4.2	2.2

Source: Owen (1999: 4)

Britain's failure to be a founder member of the European Union had significant implications for British manufacturing. European nations have relatively similar economies. This means that firms in each country compete with each other in a potentially vigorous manner. This is not true for Britain and the Commonwealth. These are complementary to each other, reducing intra-industry competitive pressure. Trade with the Commonwealth was therefore not a potential substitute for trade with the European Union. The same was true for Britain's membership of the European Free trade Area (EFTA), whose other nations had relatively small manufacturing sectors. Table 3, above, documents the relatively low level of interaction between Britain and Europe and the relatively high level of interaction between Britain and the Commonwealth. British manufacturing was therefore relatively insulated from competitive pressure. This in turn meant that the 1960s saw relatively low rates of productivity growth. Thus, for example, between 1960 and 1973 labour productivity in British

manufacturing grew more slowly than in (West) Germany or France, as Table 15 makes clear.

Membership was not, of course, a panacea. In particular, many firms found themselves simply outcompeted by their European rivals after Britain joined. "Cold turkey" is not a pain-free way of modernising an economy. Furthermore, British accession to the EEC in 1973 coincided with a period of very high oil prices. This, combined with poor macroeconomic policy-making, and the bailing out of many unsuccessful firms, meant that the pro-competition benefits of joining the EEC were delayed. As Table 15 shows, between 1973 and 1979, for example, labour productivity growth in British manufacturing was very poor compared with the performance in (West) Germany and France.

The failure of accession to lead to a rapid response in terms of productivity was caused partly by the inevitable lag between the rise in imports and competitive pressure, and the ability of firms to respond successfully. It was compounded by government’s willingness to protect firms that were struggling, most obviously by nationalising them. Cameron et al. (1999: 29) find that two thirds of the rise in openness in this era was caused by rises in imports and exports, demonstrating the importance of accession in generating competitive pressure.

It was only after 1979, when firms had had a chance to react and the Thatcher government stopped sheltering firms that were suffering from the cold winds of European and other competition, that Britain gained the benefit from being part of a larger competitive market. Table 15 shows that between 1979 and 1995 British labour productivity growth in manufacturing was significantly faster than in Germany or France. In this era, growth in imports and exports relative to national income can explain only a small part of the growing openness of the British economy. Instead, Cameron et al. (1999: 29) show that inward and outward foreign direct investment account for over 80% of the rise in openness. Joining the EEC was a two-stage process. In the first stage, British firms were subject to increasing competition from their European rivals. In the second stage productivity rose partly because British firms responded, partly because of the decision of foreign firms to invest in Britain, and partly because of the growing specialisation of the economy which saw successful British firms investing abroad.

This model, of competition, adaption and specialisation is potentially very powerful in understanding the sectoral trajectory of the British economy. As a relatively protected economy until the late 1960s there was little pressure for Britain to adjust the structure of its economy from that which had been determined in an earlier era in which Britain was the workshop of the world. In contrast, the period after Britain joined the EEC, buttressed by the general move to freer trade in the last quarter of the 20th century, led Britain to specialise much more extensively in those areas in which it had competitive and comparative advantage. The theoretical model underpinning this intuition is set out well in Cameron, et al. (1999), and builds on the endogenous growth models that in turn rely on the intuition of increasing economies of scale. Put simply, if you are productive, you will increase your market share. An increase in your market share will in turn increase your productivity, and so a virtuous circle is created. Broadly speaking, and at a level that is almost a caricature, Germany has established this in manufacturing, while Britain has established it in a range of high-value services (such as management consultancy, insurance, accounting, law, higher education, as well as finance). Of course there are exceptions, most obviously Britain's successful position in pharmaceuticals, as noted in the earlier discussion of revealed comparative advantage. The idea that openness raises

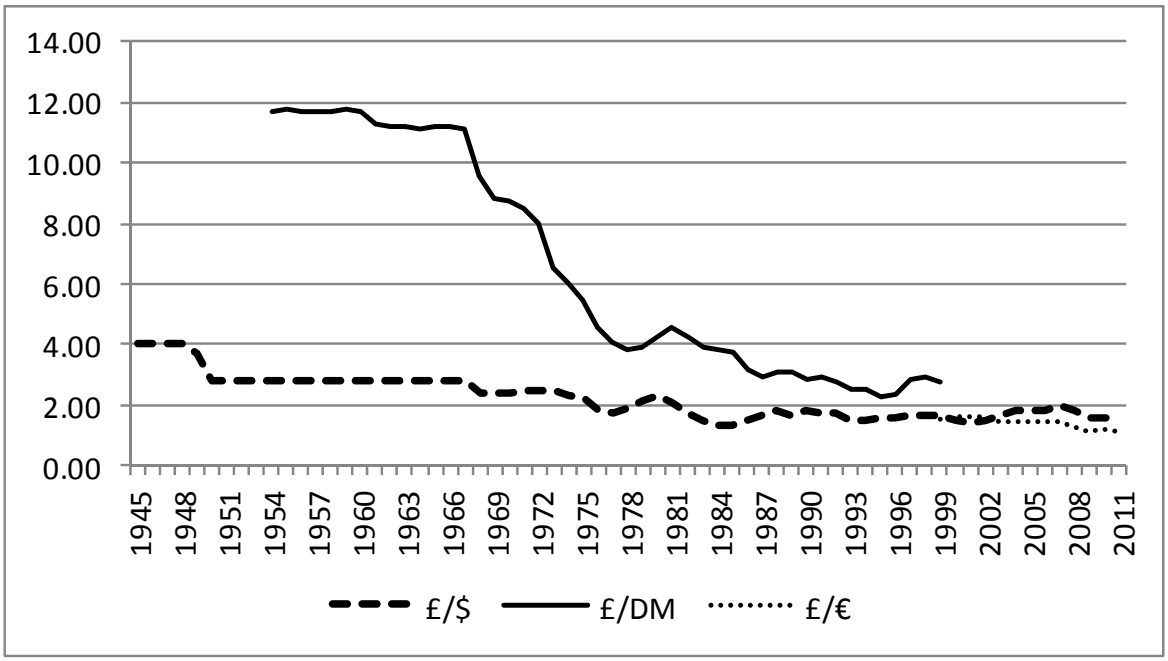
both specialisation and productivity in remaining sectors has strong theoretical and empirical foundations.

5.3 Exchange rate regimes

One aspect of macroeconomic policy which has disproportionately affected the manufacturing sector is the exchange rate regime, since manufactured goods have accounted for the vast bulk of exports and imports. It has already been noted above that the balance of payments played a role in stop-go policies during the Bretton Woods era of fixed exchange rates, with the recurrent emergence of a deficit on current account triggering deflationary policies. This led to the idea that devaluation could free the economy from a balance of payments constraint and permit faster growth (Thirlwall, 1980). So long as the sum of the price elasticities was greater than unity (the Marshall-Lerner conditions), a devaluation would lead to an improvement in the current account and the economy could be run at a higher level of demand. The problem with this argument is that after both the postwar devaluations of sterling in 1949 and 1967, the decrease in imports and increase in exports proved temporary, as the higher price of imports fed through into higher wages and domestic prices, and as exporters took the opportunity to raise profit margins rather than lower prices (Cairncross and Eichengreen, 1983). By 1972, the gains of the 1967 devaluation had been dissipated, and sterling floated downwards as the Bretton Woods system broke up. In the long run, the decline in the external value of sterling against the US dollar and the German mark shown in Figure 6 led to higher rates of inflation in Britain than in the United States and Germany rather than an improved performance of the British manufacturing sector (Broadberry, 2002).

The episode of exchange rate appreciation between 1977 and 1981, which is clearly visible in Figure 6, is often seen as an important episode in British deindustrialisation. The appreciation of sterling against both the US dollar and the German mark can be attributed to a combination of the start of North Sea oil production and the imposition of deflationary monetary policy. The former is often seen as an example of the Dutch disease, or crowding out of manufacturing by a positive shock to the balance of payments caused by a natural resource discovery, while the latter is a paradigm case of exchange rate overshooting, analysed by Dornbusch (1976). Krugman (1987) analysed how such policies could have permanent consequences for the competitiveness of the manufacturing sector. Clearly the appreciation led to something of a “shake out” of UK manufacturing, but all countries have had to cope with over-valued exchange rates from time to time. We do not see this incidence, therefore, as being critical in determining the long run changes in the size of UK manufacturing.

Figure 6: Sterling exchange rates (foreign currency units per pound)



Sources: Broadberry (2002); http://www.oanda.com/currency/historical-rates/

After this experience, the government paid attention to a wider range of monetary indicators including the exchange rate as well as the money supply and interest rates. The logical conclusion of this policy was that Britain joined the Exchange Rate Mechanism of the European Monetary System in October 1990, with a commitment to maintain the value of the pound within a band of ± 6% around the central parity of DM2.95. However, it was widely believed that this rate was too high, and to keep the pound within the band required high interest rates, which helped to keep the economy in recession during 1991-92. As markets came to doubt the sustainability of the government's position, the pound came increasingly under speculative pressure and Britain left the ERM in September 1992. This episode made it highly unlikely that Britain would be an early member of the Euro area when it was launched in 1999, and Britain has so far remained outside. This is likely to have helped Britain's manufacturing sector during and after the financial crisis of 2007-08, as the pound depreciated against the Euro by around 20 per cent.

After Britain's exit from the ERM, the government needed to find a new policy framework that provided a credible commitment to low inflation, but without tying itself to either a fixed exchange rate or rigid money supply targets. The solution was to adopt an explicit inflation target, combined with the monitoring of a wide range of monetary indicators and the appointment of an independent panel of economic advisers. The Labour government elected in May 1997 immediately signalled its commitment to a strict anti-inflation policy by making the Bank of England operationally independent. This policy has much to recommend it, but it should be noted that it also means that the government can no longer exercise control over the exchange rate, the major macroeconomic variable for affecting the performance of manufacturing.

6. Lessons from history: policy conclusions

6.1 Distinguishing between unavoidable and avoidable trends

The main lesson to be drawn from section II is that it is important to draw a distinction between unavoidable and avoidable trends. This requires an understanding of the historical context of the declining share of manufacturing in economic activity. As countries get richer, they spend less of any additional increase in incomes on manufactured goods. In addition, because manufacturing has been characterised by higher rates of productivity growth than services, the relative price of manufactured goods has fallen, reducing the share of manufacturing in current price GDP still further. These trends have been experienced by all developed countries and are therefore unavoidable.

To the extent that Britain has experienced a greater deindustrialisation than other countries, particularly Germany, it should also be borne in mind that Britain has moved from being the manufacturing centre of a global empire before 1939 to a services centre within an increasingly integrated Europe since World War 2. This still leaves some scope for rebalancing towards manufacturing in the wake of the setback to the financial services sector since 2008, but it is unlikely that the trend towards a services-dominated economy will be reversed completely.

6.2 Identifying successful sector-specific policies

The main lesson to be drawn from section III is that any attempts to rebalance the economy should avoid the mistakes of the past, particularly from the experience of the 1960s and 1970s, when sector specific policies were widely adopted. It is much easier to identify the costs than the benefits of these policies. The quantitative assessment of the effects of mergers during the “national champions” era is quite damning, with Cowling et al. (1980) concluding that none of the merging firms studied achieved greater efficiency gains than non-merging firms in the same industries. Similarly, Pryke’s (1981) quantitative study of productivity growth in the nationalised industries provides a pessimistic assessment of the effects of nationalisation on productivity performance, while Wren (1996) concludes that investment subsidies were largely channelled to sectors where they could have little long term benefit. Even government-sponsored research on the Selective Employment Tax focused more on the alleged benefits to productivity in retailing than in manufacturing, while independent researchers tended to discount even those benefits.

In only two main areas, public sector purchasing and the encouragement of foreign direct investment, could a credible case be made for significant lasting beneficial effects. In public sector purchasing, the pharmaceutical price regulation scheme had to strike a balance between providing a reasonable rate of return to the industry and ensuring value for money for taxpayers. Although the policy has generally been seen as helpful in promoting a strong pharmaceutical industry in Britain, Bloom and van Reenan (1998) place more emphasis on Britain’s strong record in biomedical research. Similarly, it is likely that defence procurement has helped to ensure the survival of a strong military hardware industry, although the export market for such equipment is quite limited. Policies to encourage FDI have been successful in attracting some manufacturing jobs to

Britain. Furthermore, Conyon et al. (2002) provide evidence that firms acquired by foreign companies have exhibited a significant increase in labour productivity.

More generally, in formulating policy for Britain's economy today, it is important to recognise that many of the sector-specific policies of the past would be illegal under European laws designed to ensure a level playing field.

6.3 Identifying successful non-sector-specific microeconomic policies

Section IV reviews the evidence on non-sector-specific microeconomic policies, in an attempt to distinguish between successful and unsuccessful policies. In education and training, there have been persistent worries about the poor treatment of vocational training, particularly in comparison with Germany. This can be seen as resulting in an under-investment in just the kind of intermediate level skills which are highly valued in manufacturing, and which are likely to be under-supplied by the market. Nevertheless, in formal schooling, Britain's PISA scores tend to be higher in science than in reading or mathematics, which would tend to favour manufacturing. Britain also lagged behind the United States in the provision of secondary and tertiary education for much of the post-war era.

Although Britain was a relatively large R&D spender in the early post war period, this has fallen back as manufacturing's share of GDP has declined. Quantitative evidence provided by Bloom et al. (2002) supports the idea that tax incentives increase private R&D intensity, so there is scope for positive policy intervention here. However, there have also been concerns throughout the post war period that Britain's R&D has been too "mission oriented" rather than "diffusion oriented". Most technology used in Britain is invented abroad, and the biggest gains are likely to come from encouraging the diffusion of existing technologies.

One area of science and technology policy that has been relatively successful is the support of a world-class scientific research community, which has been helpful in sustaining Britain's revealed comparative advantage in pharmaceuticals and other science-based industries. Although the spin-offs to engineering have been rather less consistent, British scientists have also been rather less successful in terms of citations in this field, where German scientists have had a stronger record.

Although regional policy has often been portrayed as a way of supporting manufacturing, it is not clear that it has really played this role in practice, because of the overwhelming dominance of unemployment considerations. Regional policy supported regionally clustered manufacturing industries such as cotton and shipbuilding that proved to be in decline, and at other times it reduced clusters in newly emerging industries such as motor vehicles, with adverse effects on productivity and long term sustainability. And although regional subsidies tied to manufacturing must have helped to boost the sector, the use of regulations such as industrial development certificates hindered the expansion of manufacturing.

Although the government established a Monopolies and Mergers Commission in 1948, policy remained weak in this area for much of the post war period. Although within a Schumpeterian framework monopoly power might have created incentives for research and innovation, in post war Britain it is easier to point to negative effects through the

dissipation of rents in terms of higher wages for lower effort, resulting in low productivity growth and loss of competitiveness.

Product market competition strengthened from the 1970s following British entry to the EEC, and with it came a strengthening of competition policy, particularly from 1990 onwards. Britain now has a more strictly enforced competition policy than its major competitors. We expect this to support productivity growth in future.

6.4 Identifying successful macroeconomic policies

Section V examines the implications of macroeconomic policies for the performance of manufacturing, again with a view to identifying successful and unsuccessful policies. The first conclusion from this section is that there has been no obvious connection between macroeconomic stability and manufacturing success. Despite concerns about stop-go policies constraining the growth of manufacturing during the 1950s and 1960s, growth was actually quite stable during this period, certainly compared with the 1970s and 1980s. Furthermore, the decline of manufacturing gathered pace during the period after 1992, despite the reduced volatility of GDP.

The analysis of this section nevertheless suggests an important role for economic policy towards openness. By staying outside the EEC until 1973, British manufacturing remained relatively insulated from competitive pressure, and then faced an uncomfortable period of “cold turkey” particularly between 1973 and 1979, before adjusting to the new competitive pressures after 1979 (Cameron et al., 1999).

One important aspect of macroeconomic policy in an open economy is the choice of exchange rate regime, which disproportionately affects manufacturing, given its emphasis on exports and imports. Much emphasis has been placed in the literature on the appreciation of the pound between 1977 and 1981, which led to a serious deterioration in the competitiveness of British manufacturing. Similar conclusions have been drawn, albeit on a more modest scale from the apparent overvaluation of the pound in the ERM during the period 1990-92. However, these episodes have to be balanced against the rather transient nature of any gains in competitiveness following the devaluations in 1949 and 1967, and the depreciation of sterling following the financial crisis of 2007-08. Indeed it would be difficult to draw the conclusion from Figure 6 that Britain has suffered from too little depreciation of the pound during the post war period. It should also be noted that the granting of operational independence to the Bank of England in 1997 means that the government no longer has control over exchange rate policy, whatever its importance in determining the size of the manufacturing sector.

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