manufacturing in the uk

Richard Brooks
& Peter Robinson

Institute for Public Policy Research
30-32 Southampton Street
London WC2E 7RA
Tel: 020 7470 6100
Fax: 020 7470 6111
postmaster@ippr.org.uk
www.ippr.org

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about the authors

Richard Brooks is Research Fellow in Economics at the Institute for Public Policy Research. His research interests include pensions and asset policy, long-term care, tax and benefit reform, manufacturing industry, local government and public-private partnerships. He was a co-author of ippr's 2002 report on pensions and long term care, and has previously worked at the Prime Minister's Strategy Unit, the Labour Party Policy Unit, and the Corporate Finance arm of the United Bank of Switzerland. He is a Labour Councillor in the London Borough of Tower Hamlets where he is the cabinet member with responsibility for Finance and Audit.

Peter Robinson has been Senior Economist at the Institute for Public Policy Research since 1997. He leads the ippr team dealing with economic and employment policy issues and is also closely involved in the institute's work on education and training policy. He was a co-author of ippr's 2002 report on the funding and structure of post 16 education; co-author of ippr's 2002 report on pensions and long term care; and co-author of the final report resulting from ippr's Commission on Public Private Partnerships. He is editor of *New Economy*, ippr's quarterly journal. He is a Research Associate at the Centre for Economic Performance at the London School of Economics, where he jointly taught a Masters course in the Social Policy Department. He will shortly be taking up a position as Senior Economist at the Greater London Assembly.

executive summary

Manufacturing industry has long held a special position for the centre-left in British politics. There has been a long discourse that sees the relative decline of UK manufacturing as a metaphor for the decline of the UK economy. Despite the recent difficult period that manufacturing has faced, we believe it is time to put an end to such unwavering pessimism. A period of *macro*-economic stability, with the exchange rate at an appropriate level, combined with an equivalent period of *micro*-economic stability, should create the conditions for a relatively successful manufacturing sector in the UK.

What has been happening to manufacturing?

It is important to distinguish between long term trends and the recent history of UK manufacturing. The long-term process sometimes called 'de-industrialisation', whereby manufacturing's *share* of output and employment falls over time, is common across the advanced industrial economies. There is no reason to believe that these long-term trends will halt or reverse, and achieving such a reverse should not be a goal of public policy. However, this is certainly not to say that we should be unconcerned about the manufacturing sector.

The experience of UK manufacturing since its emergence from the recession of the early 1990s has not been in line with experience elsewhere in the industrialised world. In most comparable countries manufacturing output has been steadily growing, even if not as fast as the rest of the economy. UK manufacturing output has grown very little in real terms over the last ten years, not at all in the last five, and the sector has performed poorly by international standards in the late 1990s on a range of other measures such as productivity growth, investment and Research and Development (R&D). The correct objective for the UK is not a *larger* manufacturing sector but a more *successful* manufacturing sector.

Why does it matter?

A successful manufacturing sector will contribute towards a high and stable level of employment, steadily growing incomes and an equitable distribution of income and employment across the UK. Manufacturing is a significant sector of the economy, directly employing over 4 million people and producing nearly a fifth of UK GDP in 2002. This is the primary reason for its importance. The size of the sector alone does not imply a higher priority for manufacturing than for any other sector of a similar size. However, manufacturing does have some distinctive and important characteristics.

Over the 1990s manufacturing accounted for an average of 62 per cent of UK exports of goods and services, and 40 per cent of current account credits. Given the consistently high sterling exchange rate from 1997 to mid 2002 we might expect the UK current account deficit to have been steadily widening over this period. In fact this was not the case, and the current account deficit stood at around one per cent of GDP in 2002. These levels are a far cry from those at the end of the unsustainable late 1980s boom, when the deficit reached more than five per cent of GDP. The explanation of these trends is partly that manufacturing

exports have proved more robust than expected to the high exchange rate, and partly that exports of services have grown relatively rapidly. Over the very long run we may expect exports of services to slowly catch up with and eventually overtake exports of manufactured goods. It is important that this is a gradual process, but it no longer seems credible to claim that a manufacturing sector of a certain size is imperative to avoid an unsustainable current account position.

Manufacturing activity is very unevenly distributed around the UK, and is concentrated in areas of relatively poor economic performance. The Midlands, the North East and North West, Yorkshire and the Humber and Wales form a distinct group of regions with a particularly high share of manufacturing in total output and employment. Poor performance by the sector is likely to contribute to worsening regional inequalities. However, the appropriate policy response may not consist primarily of measures related to manufacturing in the less prosperous regions. The key challenge for public policy is to help the less advantaged regions attract a greater share of traded services such as business and financial services.

Does manufacturing matter especially because of its contribution to productivity?

Manufacturing productivity is a component part of whole economy productivity, but this is not a reason to focus on manufacturing productivity in particular. Although manufacturing is a high productivity sector, and productivity growth does tend to be faster in manufacturing than in the rest of the economy, this is precisely one of the key reasons why the share of manufacturing in total output and employment tends to fall over time. If manufacturing output continues to grow at a slower rate than the economy as a whole, then the contribution of manufacturing productivity to total economy productivity will decrease over time. In addition, the available evidence suggests that the 'productivity gap' may be bigger in many service sectors than in the manufacturing sector. However, this is not to say that we should be unconcerned with manufacturing firm productivity: it is likely to be a key contributor to firm competitiveness, profitability and success.

The external environment and the economic framework

The external environment for manufacturing has been difficult, first in relation to a high sterling exchange rate from late 1996 to mid 2002, and from 2000 to 2003 in relation to relatively low demand growth from international markets. It may be the case that uncertainty over the future exchange rate has retarded manufacturing investment in recent years. However, the central problem has not been volatility, rather it has been a consistently high exchange rate which has impacted upon the competitiveness of UK exports.

The Government can justifiably claim a significant degree of success for its post-1997 macro-economic regime, and over the past ten years the UK as a whole has experienced a period of relatively low and relatively stable inflation with steadily rising employment. The UK competition regime has also been strengthened since 1997 and this represents an important gain. However, there are a number of related imbalances within the UK economy. The relatively poor performance of manufacturing; the imbalance between the growth of consumption, government expenditure and investment; the relatively modest current account deficit; and differences in regional growth rates all present greater or lesser concerns to policy makers. The fall in the sterling/euro rate from mid 2002 to mid 2003, whilst not a panacea, represents an important opportunity for some of these imbalances to unwind.

Investment

UK manufacturing industry operates with a significantly lower capital stock than the sector in some comparable countries. This materially affects its relative productivity. Two thirds of the UK manufacturing productivity gap with France and nearly one third of the gap with Germany can be accounted for by higher levels of physical capital in these countries. This is the result of very long-term trends, but in the recent past the UK appears to have been moving in the wrong direction rather than catching up. It is not appropriate to think in terms of a crude target for raising UK levels of investment: instead our response should be to establish the right macro- and micro-economic environment within which firms can make the appropriate investment choices.

The most important drivers of manufacturing investment are demand and profitability. The high sterling exchange rate has played a key role in affecting both of these in the latter part of the 1990s and the first years of the new decade. Thus one of the most important issues for manufacturing investment is one over which the Government has relatively limited influence. The depreciation of sterling from mid 2002 to mid 2003 is likely to improve the prospects for manufacturers, as long as exchange rate movements remain benign over the medium term.

The UK corporate tax regime has been and continues to be relatively favourable by international standards, with the UK enjoying the lowest marginal and average effective corporate tax rates in the G5. The tax regime thus fails to explain either the long-term capital gaps between the UK and these other countries or more recent low UK manufacturing investment levels. Whilst the UK regime could be further adjusted to encourage investment, there appears to be little scope to do so without compensating tax increases elsewhere in the economy. This suggests caution both in relation to arguments for more generous capital allowances and the Government's own suggestions set out in August 2002 for further reforms of the corporation tax system. At the same time we would urge that the corporate tax system is kept under careful review so that its benefits are not eroded as a result of emerging fiscal pressures in the UK. Given the role that uncertainty plays in retarding investment, the Government should strive to match its commitment to *macro-economic* stability with a period of *micro-economic* policy stability in this area.

An area which does require revisiting is the provision of specific investment support initiatives, where existing evaluation work is often extremely weak. In the absence of robust evaluation we do not know whether to shift the balance of spending between schemes, or whether to increase or decrease total spending. We welcome the DTI review of business support, but to be effective it must require that evaluation is capable of standing up to independent academic scrutiny, and that the failure of schemes to demonstrate appropriate benefits should result in their closure.

Skills

The commonly quoted data on the UK's relative lack of 'intermediate' skills compared to France and Germany conceals a complex picture. When wage differentials are used to quantify relative skills, we discover that the level of UK skills capital is very similar to that in the US, and around five per cent higher in France and Germany. Skills deficiencies make only a very small direct contribution to the UK's relative manufacturing productivity gap with the US, but account for a quarter of the gap with Germany, although this is likely to understate the contribution of skills to productivity via levels of innovation and enterprise.

Overall levels of skills shortages and skills gaps are very similar for manufacturing firms and other areas of the UK economy. However, the pattern of these shortages and gaps is very different in the manufacturing sector, with a high proportion accounted for by craft workers and operatives. The response to these deficiencies should not be to compel employers to increase levels of workforce training. What international evidence there is suggests that UK employers already provide relatively high levels of training, and there is no guarantee that compulsion would effectively address the existing deficiencies.

Government action to increase the level of education and training should build on the existing incentive mechanisms by which firms and individuals choose to train. The Government can play a role in ensuring that education and training providers, for example further education institutions, are sufficiently flexible and well informed to meet the needs of employers and individuals. Public funding should follow the learner. At the firm level the appropriate government role is not 'predict the requirements of the industry/region/locality and provide' but rather to help firms adopt best practice in planning their own personnel and training needs. This implies that government efforts to address skills issues at the firm level should be set within the context of business support.

Sector Skills Councils could fulfil their existing objectives more effectively, and could play an important role in the rationalisation of other aspects of business support, if they became Sector Councils whose key role was assisting firms to plan for and meet their business needs more widely, including their skills needs. Many of the roles and characteristics of Sector Councils would be similar to those of Sector Skills Councils but they would be business support networks rather than planning organisations, drawing together the skills and enterprise agendas. We support the business-led and sector-focused nature of these institutions.

Modern Apprenticeships are another specific policy area where we feel a change is justified. Revising the age limit upwards would seem to be a reasonable policy goal, so we welcome the Government's commitment in the 2003 Skills White Paper to removing the age cap. However, there is currently no timetable for extension of the age limit, and there is no detail about the level of funding individuals will receive at different ages. We would encourage the Sector Skills Development Agency, the DTI and the DfES to give priority to SEMTA, the Sector Skills Council for Science, Engineering and Manufacturing Technologies, in developing and implementing their proposals in this area. This might allow some well regarded MAs in manufacturing generally and engineering in particular, which have relatively low drop-out rates, to recruit from a wider base.

Innovation

The bulk of the manufacturing productivity gap between the UK and the US, as well as a significant proportion of the gap with Germany and France, is accounted for by differences in total factor productivity (TFP). Whilst we cannot be sure about its precise contribution, differences in innovation are likely to be one of the key factors affecting levels of TFP. Whilst there is a degree of consensus about some of the appropriate policies to promote innovation, an enormous amount remains unknown and disputed. The recent increases in the science budget should be welcomed, but it is important to distinguish between the objectives of science spending and business support.

Research and development (R&D) is an important factor in technological change and improvements in productivity. Manufacturing industry is the most important location of R&D activity and its funding: in 2000 two thirds of all UK expenditure on R&D occurred in business enterprises, of which the manufacturing sector was responsible for 80 per cent. However, at

the UK level R&D intensity has fallen through the 1980s and 1990s relative to the other G7 countries. The explanation of this decline is complex, but in the 1990s declining R&D intensity within manufacturing sectors was very significant. Many of the factors that are likely to affect general investment are likely to play a role in the level of R&D: current and expected demand, the tax regime, external factors such as the exchange rate, uncertainty, credit constraints and the availability of skilled labour. A competitive environment is also likely to act as a spur to innovative activity.

We should recognise that there are severe data problems in this area and there are good reasons to believe that the rate of innovative activity may change relatively slowly. We are supportive of the recently introduced R&D tax credit, but these issues mean that it will be difficult to judge its impact for some time. Once again, a period of micro policy stability and rigorous evaluation is called for. Some historical innovation initiatives appear to have had poor quality evaluation. The DTI's Innovation Review, due in the latter half of 2003, should take a very tough line on the evaluation of programmes of innovation support.

Enterprise

Enterprise can be most generally considered as the process by which inputs are brought together to generate outputs. Enterprise is thus another contributor to total factor productivity growth, and in this sense is as relevant to large businesses as it is to start ups. The best policies to promote enterprise within the manufacturing sector are likely to be macro policies: a robust competition environment and a stable macro-economic framework.

It is widely understood that product market regulation and employment legislation impacts upon levels of enterprise and productivity growth, and that governments need to exercise sensitivity in this respect. However, on the basis of international comparisons the UK performs strongly in terms of having a regulatory regime which is conducive to business success. There is little evidence that the regulatory regime could help explain the UK manufacturing sector's relatively poor performance in the late 1990s by international standards.

A potentially important micro level enterprise policy is the support of best practice, where there are sound theoretical reasons for a government role. As we have noted earlier, the Sector Skills Councils offer a potentially valuable mechanism as a gateway to best practice advice. What we lack at the moment is evidence of the link between government action and the spread of good management practice and the scale of the resulting effects. It is possible that rigorous evaluation across all existing programmes of support for investment, skills formation, innovation and enterprise could suggest a radically different allocation of resources.

A ten point plan for manufacturing?

One of the themes that has emerged from our analysis is the need for a period of *micro-economic policy stability* in many areas. In any report of this kind there is the temptation to present a 'ten point plan' listing a series of key policy changes that would assist the sector. That we have not is quite deliberate. Our aim has been to provide a judicious view of the prospects for UK manufacturing and the policy instruments available to us. We have made some specific policy proposals, particularly regarding the currently unsatisfactory age restrictions on Modern Apprenticeships, and regarding the provision of support for best practice via refocused Sector Councils. However, in many areas we have been circumspect. UK manufacturing would benefit in many ways from a period of micro-economic policy stability, coupled with much better evaluation of the policy instruments that we are already using.

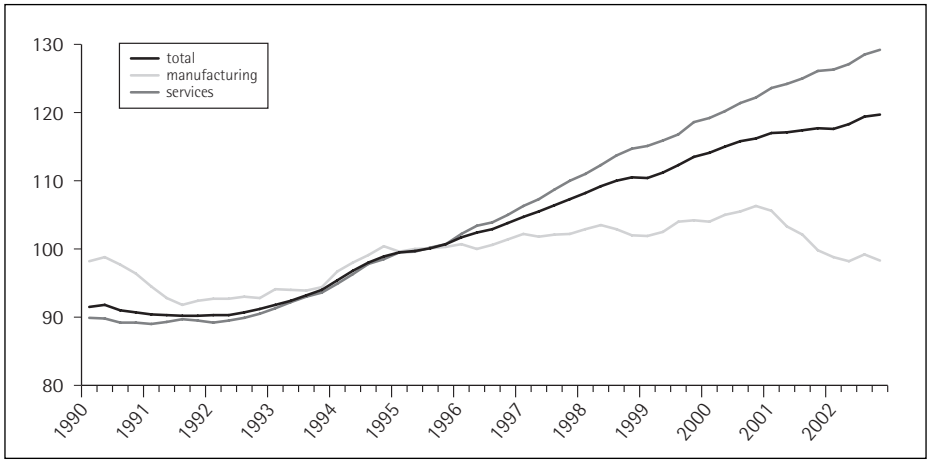
1 what has been happening to UK manufacturing?

UK manufacturing: a troubled decade

The UK economy as a whole has performed reasonably well since its emergence from the early 1990s recession, with steadily growing output and employment. However, the manufacturing sector has suffered a very bumpy ride, with extended periods of low growth and no growth. Manufacturing output fell in 11 out of 20 quarters in the five years to the end of 2002. By the end of this period manufacturing output was lower than it had been in 1995.

Over the ten years from 1992 to 2002 UK output as a whole grew by 31 per cent, but in manufacturing by just six per cent, in contrast with service sector output which grew by 42 per cent. Manufacturing's share of total UK output fell from 21 per cent in 1992 to 17 per cent in 2001. It is clear that UK manufacturing has been in trouble for some time. It is wrong to ascribe these problems solely to the downturn in world economic activity since the end of the late 1990s global boom.

figure 1.1 UK sector output
1995 = 100



source National Statistics

Manufacturing employment has fallen rapidly since 1997. Between May 1997 and November 2002 the number of people employed in manufacturing jobs in Great Britain fell by half a million. Over the same period total employment in the UK economy increased by more than 1.8 million, and over the decade the proportion of manufacturing in total employment fell from 21 per cent in May 1992 to 16 per cent in November 2002.

Manufacturing is a relatively high productivity sector, and is usually regarded as likely to experience faster productivity growth than the average for the economy. Indeed this is sometimes suggested as a reason for according special status to the manufacturing sector. However, over the last decade as a whole, manufacturing productivity has increased only by

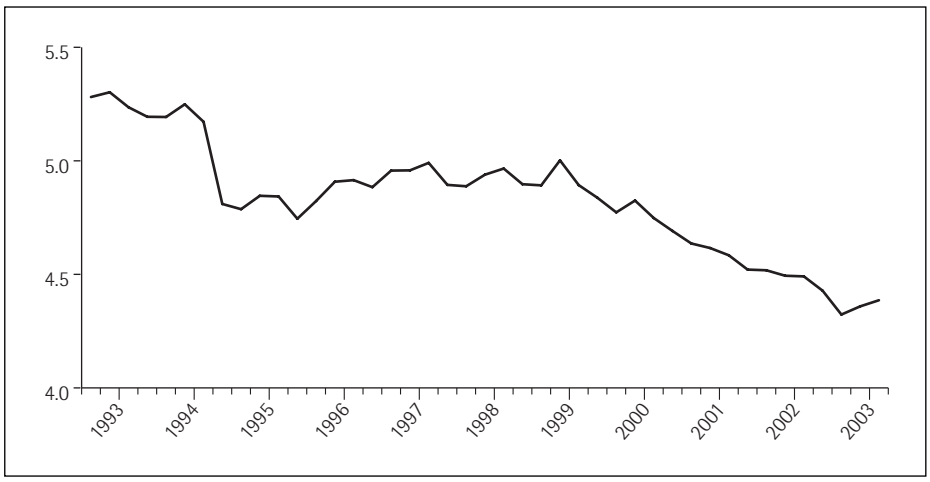


figure 1.2 Manufacturing employment in Great Britain (millions)

source Labour Force Survey

a very similar amount to whole economy productivity. This conceals significantly higher volatility within the decade in the growth of manufacturing productivity than in the economy as a whole. The employment falls in the early 1990s and the upturn in manufacturing output of 1994 correspond to more rapid increases in productivity over this period. Relatively stable output and employment between 1995 and 1998 were associated with a period of stagnation in productivity growth. In the late 1990s falling sector employment generated further productivity increases. 2000-02 saw productivity growth level off again, principally due to very weak output growth in the sector.

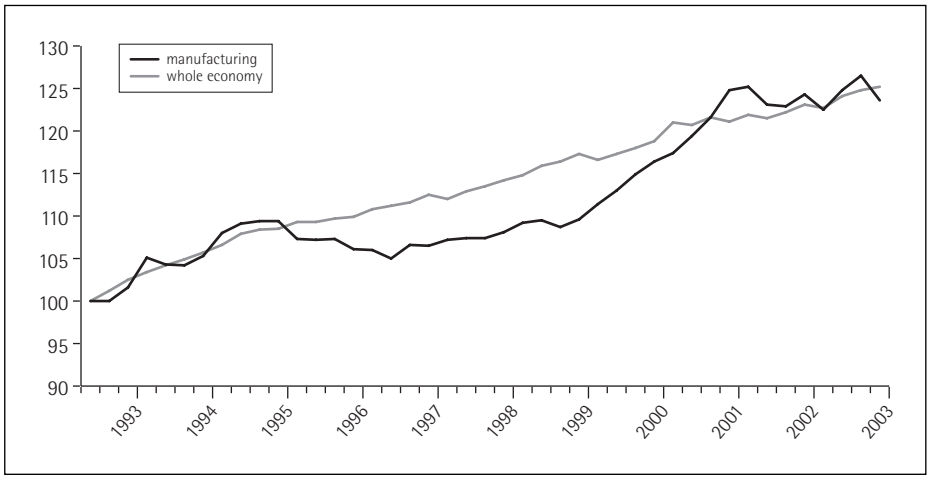


figure 1.3 UK manufacturing and whole economy productivity

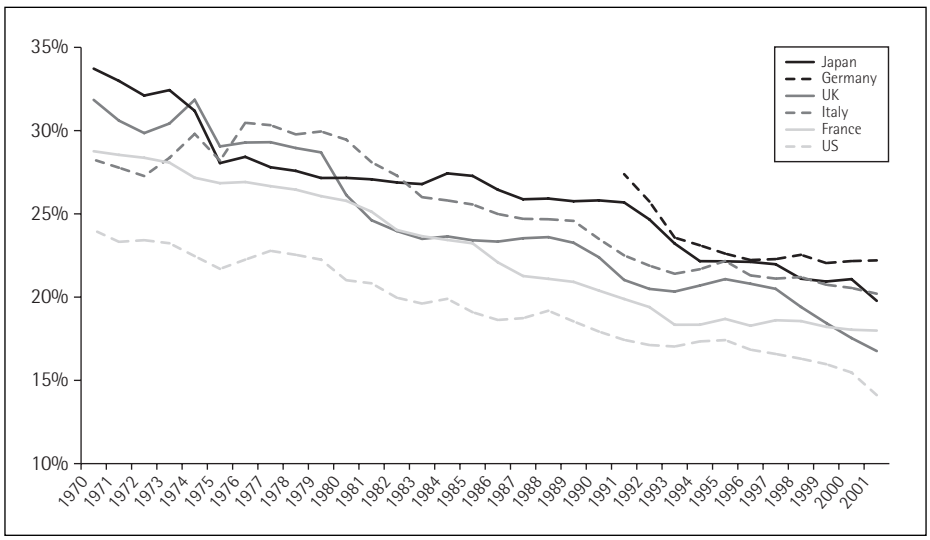
(output per hour worked, 1992 Q2=100)

source National Statistics

UK manufacturing in international context

There is a large amount of literature in the UK describing the process of 'de-industrialisation', whereby manufacturing's share of the total economy declines. This literature sometimes gives the impression that the UK experience has been unique. In fact, as the following charts indicate, the process has been a longstanding feature of the development of all the major industrial economies. Some aspects of the UK story have been distinctive, such as the unusually severe recession and associated industrial shakeout of the early 1980s which can be clearly identified on the charts below. In other respects the UK manufacturing sector has developed over time in a similar way to the sector in many other advanced industrial economies: its productivity tends to rise whilst its share of output and employment tends to fall over time.

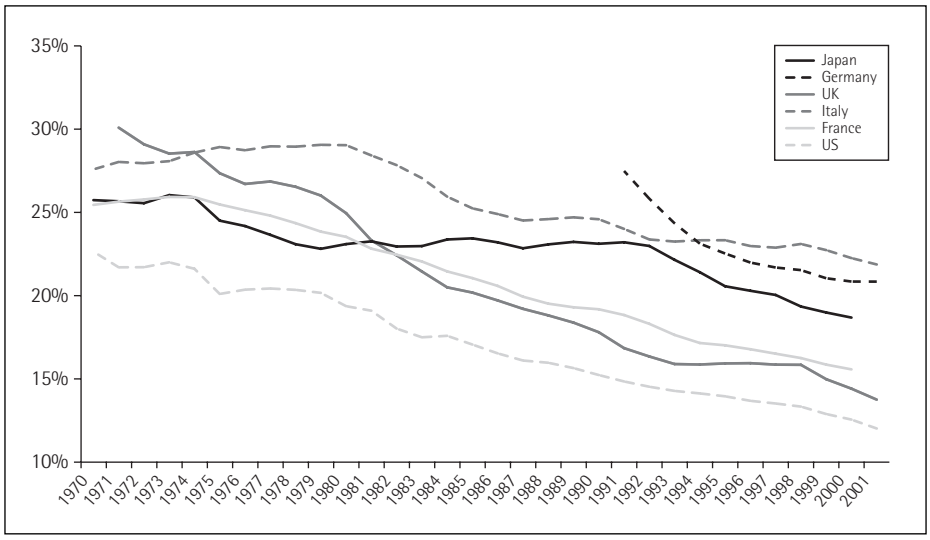
figure 1.4 Manufacturing share of value added in the G6



note Germany is shown post unification only

source OECD STAN database

figure 1.5 Manufacturing share of employment in the G6



note Germany is shown post unification only

source OECD STAN database

There are longstanding structural reasons why the share of manufacturing is declining in the advanced industrial economies. Perhaps the most important explanation of the long run decline in manufacturing's share of the total economy is a shift in consumer demand from goods to services. As the Government's Manufacturing Strategy states, 'As prosperity grows, consumers spend more on labour-intensive services like healthcare, entertainment, restaurant meals and holidays. In step, the relative importance of spending on goods, particularly consumable goods, tends to fall'. (DTI 2002) In addition, relatively high productivity growth in the manufacturing sector allows the prices of goods to fall relative to the price of services, further reducing the measured output of the sector.

Competition from emerging economy producers is another of the key drivers of this process, with input costs including land and labour significantly higher in industrial countries such as the UK compared with regions such as South America and Asia. These emerging economies are no longer just producers of low quality goods: they are increasingly competitive on the basis of quality as well as cost. Many UK manufacturers have expanded their supplier base to include companies in these regions. China's recent accession to the WTO signals a significant increase in competition for UK manufacturers.

A further widely discussed reason for the decline of manufacturing as a share of the economy is the shift towards higher levels of service inputs into manufacturing firms. Over the period 1992 to 2000, National Statistics input-output tables indicate that the share of services in UK manufacturing firms' gross inputs rose from 17 per cent to 20 per cent. In part this is a

measurement issue: some services that used to be produced and consumed within manufacturing firms are now out-sourced, reducing the measured value of the manufacturing sector's output. However, it is important to note that whilst a significant portion of service sector activity depends upon manufacturing, the reverse is also true: 20 per cent of UK service sector inputs in 2000 were manufactured goods.

Whilst the long run trends in the UK reflect international patterns, the experience of UK manufacturing since its emergence from the recession of the early 1990s has not been in line with trends elsewhere in the industrialised world. It was supposed to have emerged 'leaner and fitter' in the early 1990s after two periods of recession and shakeout. But output trends have been disappointing and manufacturing has been buffeted by a further shock in the late 1990s associated with a high sterling exchange rate.

How big a problem is lower UK manufacturing productivity?

UK manufacturing productivity on a per worker basis is similar to the average for a group of comparable industrialised countries. Figure 1.6 shows that whilst there is a positive relationship between manufacturing productivity and GDP per capita, there is also a wide distribution of manufacturing productivity levels between countries with similar GDP per capita. The US is a clear outlier with very high GDP per capita and very high manufacturing productivity.

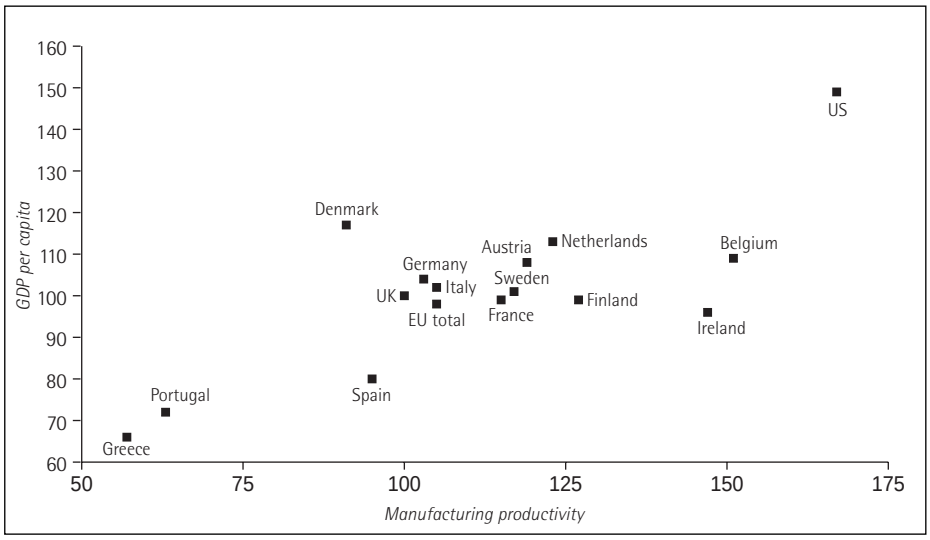


figure 1.6 Manufacturing productivity vs GDP per capita, 1999 (UK=100)

source O'Mahony, NIESR 180

UK manufacturing productivity is significantly lower than in France, Germany and the US, the countries for which the best data is available and with which the UK is most frequently compared. However, levels of GDP per capita in France, Germany and the UK are very similar, with higher productivity in France and Germany being almost exactly offset by lower levels of employment. It is not therefore clear why the higher productivity of, for example, French manufacturing relative to the UK is seen to be particularly advantageous when it does not result in overall higher levels of income per head. This is not to deny the obvious point that if UK productivity was higher and all other things were equal, then UK GDP per capita would be higher. The point here is simply that material living standards are not higher in France than in the UK as a result of higher levels of manufacturing productivity.

What is productivity and why does it matter?

'Productivity' is frequently used as shorthand for *labour productivity*, a measure of output per unit of labour input. It is normally expressed either in terms of *output per worker employed* or *output per hour worked*. Due to problems with data on actual hours worked, output per worker is easier to calculate, and is therefore more often used by the current UK government for international comparisons. It is also a relatively intuitive measure that can easily be converted into total output by multiplying by total employment. However, output per hour worked may be considered a purer measure of the *efficiency* with which inputs are converted into valuable outputs, and is a better measure to use when the data is available.

Productivity matters principally because it is a key driver of GDP per capita, which is the best summary measure of economic performance, the improvement of which is usually seen as a first order policy goal. Productivity is also important at the firm level: other things being equal more productive firms are likely to have a competitive advantage and generate higher profits. The term, however, does not seem to resonate with business people, many of whom think primarily in terms of profitability or 'competitiveness', a term which looses its meaning when comparing the macro-economic performance of national economies.

Improved productivity is best seen as a means rather than an end in itself. Output and income may also be raised by increasing the labour supply, either through higher employment or through increased working hours of those already in employment. Reduced hours of work for some seems to be a goal of public policy in the UK, but this is likely to reduce output per worker employed even if it results in some improvement in output per hour worked as labour is more efficiently utilised. Similarly, we may wish to see employment rise at the bottom end of the labour market even if this holds back productivity growth, although whether it in fact does so is an empirical issue.

In addition to there being different measures of productivity, there are also formidable difficulties in acquiring accurate data with which to produce the various measures. This applies particularly to international comparisons given different currencies and accounting conventions. Discussion of productivity differences, especially between different countries, should thus be informed by realism about the margin of error attached to the reported measures.

Understanding the UK's manufacturing productivity gap

Table 1.1 presents recent work by the National Institute for Economic and Social Research (NIESR) using an accounting framework to analyse productivity, measured as value added per hour worked in the UK, US, France and Germany, and providing a decomposition of the factors contributing to the relatively poor performance of manufacturing productivity in the UK at the end of the 1990s.

table 1.1 Decomposition of relative labour productivity in the manufacturing sector, 1999

	US	*France*	*Germany*
Value added per hour worked			
Relative levels, UK = 100	155	132	129
Percentage contributions			
Total capital	25		54
Physical capital	21	68	29
Skills capital	4		25
Total factor productivity	75	32	46

note Skills capital is included with TFP for France

source O'Mahony & de Boer (2002) Table 16

In 1999, output per hour worked in manufacturing was 55 per cent higher in the US than in the UK, 32 per cent higher in France and 29 per cent higher in Germany. In this accounting framework, lower UK productivity performance in manufacturing compared to France and Germany is to a significant extent explained by lower UK capital/labour ratios. Indeed, fully two thirds of the manufacturing productivity gap with France and nearly one third of the gap with Germany can be accounted for by higher levels of physical capital, that is the accumulation of past investment

in plant and machinery. However, we should be careful about inferring from this that *if* the UK had the same levels of physical capital as France *then* the productivity gap with that country would be reduced by 68 per cent. This would depend upon the additional UK investment being used productively. There is some evidence in NIESR's work of rather poor utilisation of the generous physical capital stocks in Germany and France, reflected in low levels of capital productivity relative to the US. It is not appropriate to think in terms of a crude target for raising UK levels of investment. However, we can see that levels of physical capital and to a somewhat lesser extent skill levels are important drivers of productivity performance.

The explanation for poor UK manufacturing productivity performance relative to the US, or perhaps more accurately the explanation of the very strong productivity performance of the US, is more elusive. Only 25 per cent of the very large gap is explained by relative levels of skills and physical capital, of which physical capital is much the most important. Indeed, in this accounting framework little of the productivity gap with the US is explained by differences in skill levels, although given the formidable data issues in this kind of calculation it is dangerous to assert this with absolute confidence. It should be noted that some of the impact of skills will not be directly identified by the growth accounting framework. A significant impact from management skills is likely to be hidden within the total factor productivity residual.

Fully three quarters of the UK's manufacturing productivity gap with the US, and half the gap with Germany, is explained by differences in total factor productivity (TFP, sometimes also called Multi-Factor Productivity: MFP). TFP measures labour productivity after accounting for the measured contribution of capital, usually physical capital only but in some analyses skills capital also. It attempts to capture the impact of how an economy is organised to bring together the factors of production in an efficient manner. Key factors such as how 'innovative' and 'enterprising' an economy is, how competitive its markets and how robust its economic institutions are, all contribute to raising TFP. A key difficulty is that it is not possible to use the accounting framework applied to skills and physical capital to quantify the contribution of these various hidden factors. The importance of TFP in explaining much of the UK's manufacturing productivity gap, especially with the US, emphasises the difficulty of explaining the causes of that gap. If we cannot be sure about the causes of the gap it is difficult to know where to focus our efforts to close it.

Is the UK catching up with or falling further behind comparable industrial countries? Whilst UK manufacturing productivity grew only marginally slower than in the US, France and Germany over the decade to 1999, comparing only the beginning and end of this period conceals a worrying pattern. UK Productivity growth in the early part of this period was faster than in the US and France, and Germany's very fast productivity growth can be explained by the effects of re-unification of the former East and West. However, UK manufacturing productivity growth from 1995-99 was less than one per cent per annum: far behind rates

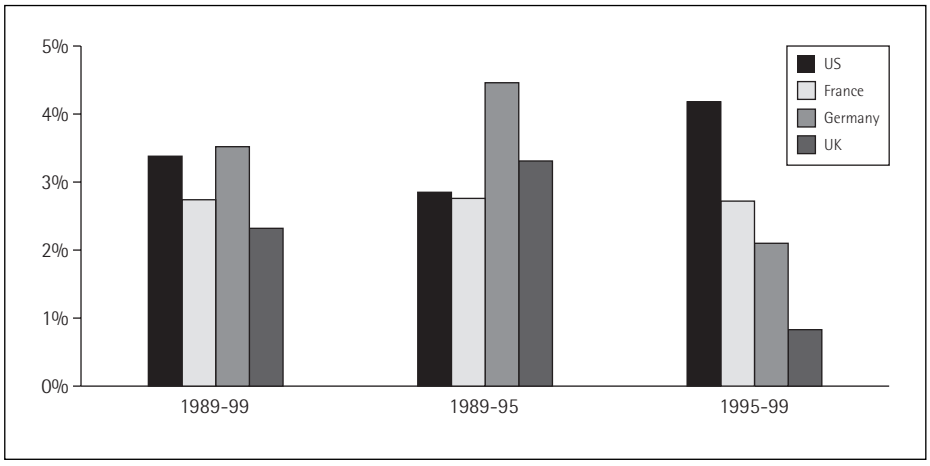


figure 1.7 Manufacturing productivity growth rates, % per annum

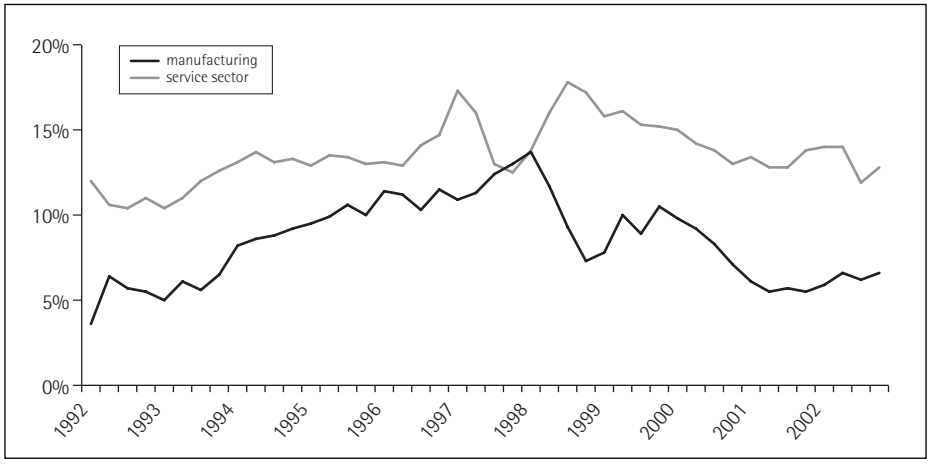
source O'Mahony & de Boer (2002)

in France and Germany and a fraction of the very strong US performance of the late 1990s. It is this pause in UK manufacturing productivity growth that is both puzzling and troubling.

Over the past ten years the profitability of UK manufacturing firms has been low relative to the service sector, with the exception of a very brief period towards the end of 1997. This was shortly after a significant rise in the sterling exchange rate, and presumably represented the period when the value of those export contracts which had already been agreed benefited from the appreciation. Manufacturing profitability subsequently fell sharply, and the rate of return on assets net of depreciation was down to 6.6 per cent by Q4 2002. This was around half the level of the service sector.

It is sometimes said that UK manufacturing suffers from a cycle of low investment, low returns and subsequent low investment. It is certainly true that the profitability of an investment project may depend upon an earlier investment having taken place. However, focusing on rates of return draws out the point that it cannot be the case that shareholders and owners require unusually high returns from UK manufacturing businesses. If this were the case then they would only fund and allow managers to pursue the most attractive projects, and sector profitability would be higher. At the same time the low rates of return in the sector should make us cautious about the task of increasing levels of investment, which is premised upon future returns.

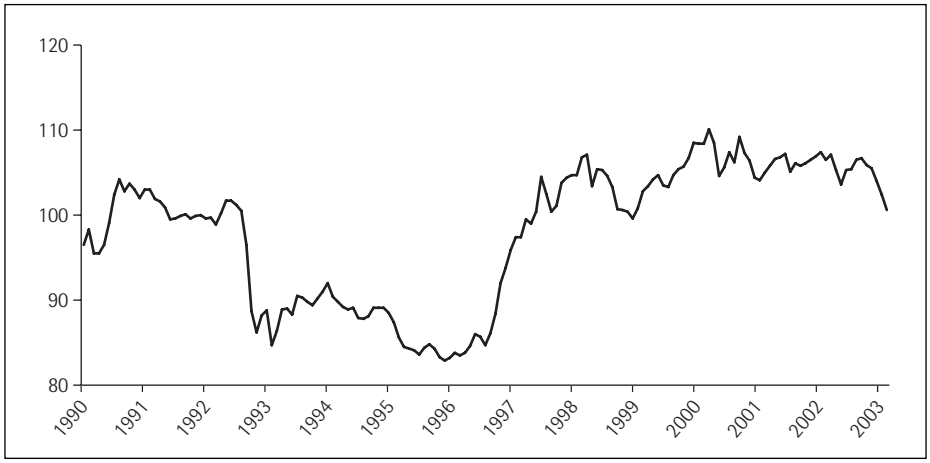
figure 1.8 Net rate of return on assets



source National Statistics

The external environment for manufacturing has been difficult, first in relation to a high sterling exchange rate from late 1996, and from 2000 to 2003 in relation to relatively low demand growth from international markets. The exchange rate moved favourably from 2002, with the sterling/euro rate in particular falling by some ten per cent from mid 2002 to the end of 2003 Q1. Despite this fall, the average trade weighted exchange rate still looks relatively high by recent historical standards: it ended the period around the same level as it was in 1992 prior to the UK's exit from the ERM.

figure 1.9 Sterling average exchange rate 1990 = 100



source National Statistics

The international demand picture is worse now than it was in 2000 when the manufacturing sector was already in difficulty. We should thus be very cautious about assuming that the modest weakening of the exchange rate will be a panacea. Table 1.2 compares forecasts by the National Institute for Economic and Social Research made in April 2000 and April 2003. It indicates that projections of GDP growth in the US and EU are now significantly less optimistic than they were three years ago. A comparison of the National Institute's April 2000 and April 2003 forecasts of world trade growth indicates a similar pattern. Despite this, consensus forecasts are for better performance from UK manufacturing from 2003 onwards than was experienced from 2000-2003. In April 2003, NIESR forecast manufacturing output growth of 2.3 per cent in 2003-04 and 2.5 per cent in 2004-05.

	April 2000 GDP growth % pa			*April 2003* GDP growth % pa	
	World	*EU*		*World*	*EU*
2000	4.1	3.4	2003	3.2	1.3
2001	4.1	3.1	2004	3.2	2.0
2002	3.9	2.7			
2003-06	4.0	2.8	2005-09	3.5	2.6

table 1.2 Forecast GDP growth: contrasting 2000 with 2003

source National Institute Economic Review April 2000 and April 2003

As we have seen, UK manufacturing is not alone in shrinking as a proportion of output: the pattern is common to most developed economies. However, in most comparable countries manufacturing output has been steadily growing, even if not as fast as the rest of the economy. Figure 1.10 shows that despite entering recession in the early 1990s at different times, the overall increase in manufacturing output from 1990 to 1997 was remarkably similar in France, Germany and the UK. It is from 1998 that the trends sharply diverge as the appreciation of sterling takes its toll. UK manufacturing output has grown very little in real terms over the last ten years, and not at all in the last five. In addition, the sector has performed poorly by international standards in the late 1990s on a range of other measures such as productivity growth, investment and R&D. We need an explanation of what has been different in the UK, and an understanding of what difference government action could make to the sector.

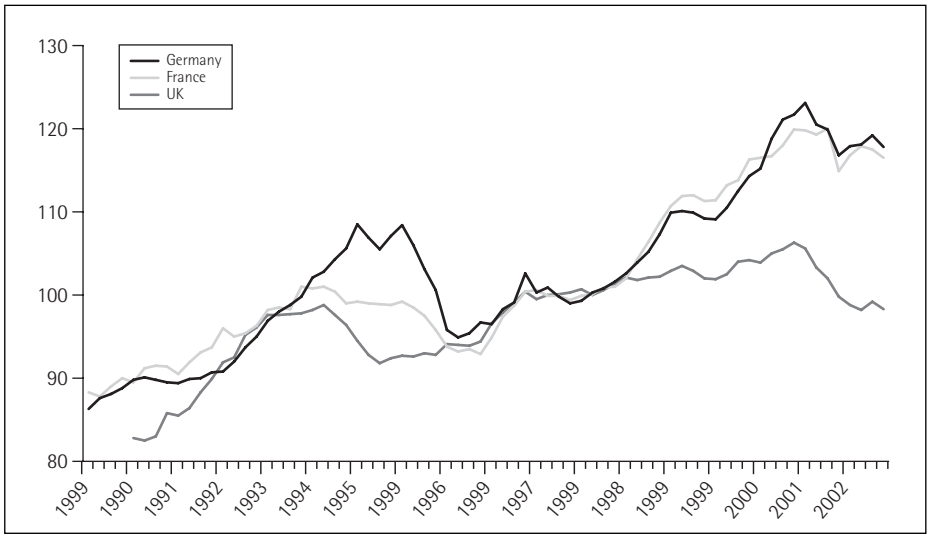


figure 1.10 Manufacturing output in the UK, France and Germany (1995 = 100)

source Eurostat/EEF

2 why does manufacturing matter?

A high and stable level of employment, steadily growing incomes, and an equitable distribution of income and employment across the UK are first order goals for a progressive government. The first two are certainly explicit Government objectives, whilst the DTI, HM Treasury and ODPM share a Public Service Agreement target to reduce over the long term the persistent gap in growth rates between the regions. How does manufacturing fit into this framework, and are there other reasons why we might care especially about this particular sector?

Manufacturing is a significant sector of the economy, both in terms of output and employment, and this is the primary reason for its importance. We should certainly care about a sector which directly employs over 4 million people and produces nearly a fifth of UK GDP. However, the size of the sector alone does not imply a higher priority for manufacturing than for any other industrial sector of a similar size, nor is it what representatives of manufacturing businesses such as the Engineering Employer's Federation argue for.

A number of arguments have been advanced in support of the special importance of manufacturing:

- its contribution to the current account of the balance of payments
- its importance to the less prosperous regions
- its role as the location of the majority of business expenditure on research and development
- its significance in terms of whole-economy productivity and growth levels

Manufacturing and the current account

Manufacturing exports make a significant contribution to the current account of the UK balance of payments. Over the 1990s manufacturing accounted for an average of 62 per cent of UK exports of goods and services, and 40 per cent of current account credits. These figures have been on a gentle downwards trend since 1997, and at the end of 2002 stood at relative lows of 55 per cent and 36 per cent respectively, although we should not draw strong conclusions from a single quarter's data. As shown by Figure 2.1, the historical trend is for these shares to reflect economic cycles. The current falls appear somewhat more severe than those experienced during and following the early 1990s recession, although much less pronounced than the experience of the early 1980s.

The UK current account deficit is principally funded by foreign investment which balances currency flows. Whilst the US experience of consistently high current account deficits indicates the difficulty of predicting when the situation will deteriorate, we should expect there to be limits to the willingness of foreign investors to fund the domestic consumption of imported goods. The process of correction can be extremely painful, with capital flight and

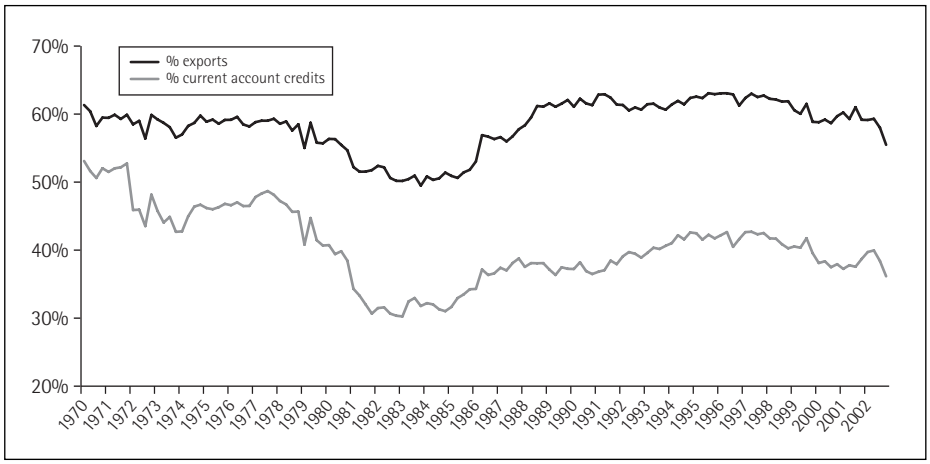


figure 2.1 Manufacturing as % total exports and current account credits

source National Statistics

a rapid depreciation of the currency followed in certain circumstances by rising inflation. In such a situation the lower exchange rate eventually stimulates export growth and a return to equilibrium. This is the kind of cycle we should strenuously seek to avoid in the UK.

Given the consistently high sterling exchange rate we might expect the UK current account deficit to have been steadily widening from 1997 to 2003. It is true that the balance of trade in *manufactures* worsened significantly from 1998 to historically high levels in 2001. However, as figure 2.2 shows, the current account as a whole does not reflect this pattern. From 1997 Q1 the current account moved from close to balance to a deficit of 2.5 per cent of GDP by 1999 Q1. The deficit then fluctuated around two per cent of GDP until 2000 Q4 and then fell back to around one per cent of GDP from 2001 Q3 to 2002 Q4 as reported in early 2003. Whilst we should be cautious about drawing inferences from such a volatile and problematic indicator, these deficit levels are a far cry from those at the end of the unsustainable late 1980s boom, when the current account deficit reached more than five per cent of GDP. These are the sort of levels currently being experienced by the US economy, and in comparison the UK position appears far less threatening.

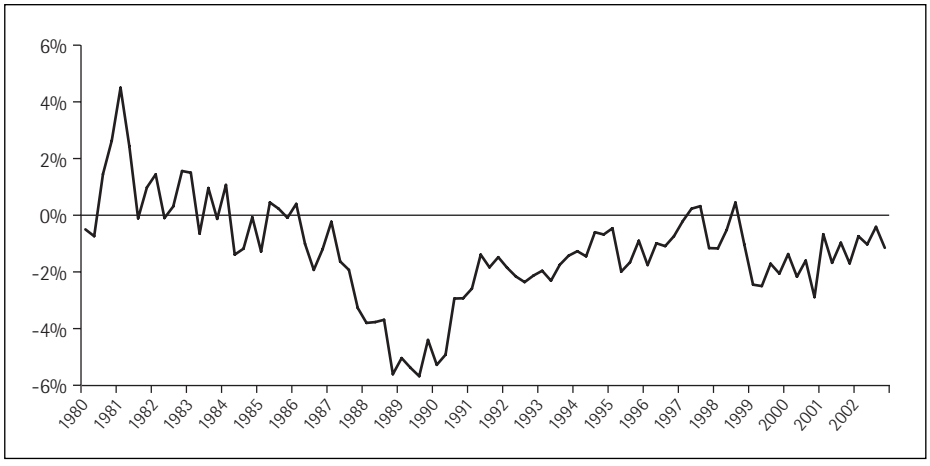


figure 2.2 Current account balance as % GDP

source National Statistics

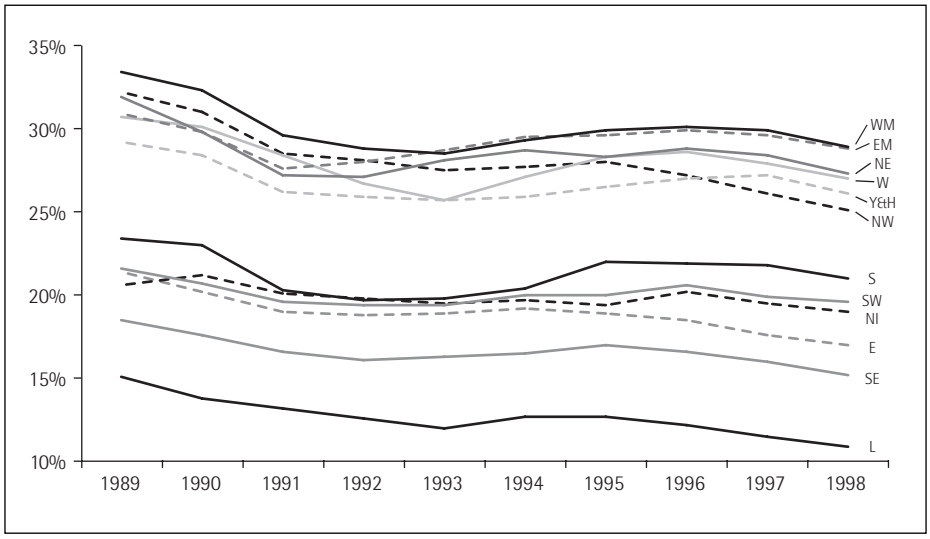
There are at least two possible explanations for the resilience of the UK current account. One is that manufacturing exports have proved more robust than expected to the high exchange rate. Alternatively, other income items in the current account may have taken the place of lost exports of manufactured goods. In fact both explanations find some support from the available evidence. Over the period 1973-1996 exports of goods grew at an average rate of 4.6 per cent per annum whilst exports of services grew at an average rate of 3.1 per cent per annum. More recently, exports of services have grown more rapidly than exports of goods, but nonetheless goods exports have held up relatively well. Between 1996 and 2002 exports of goods grew at an average rate of 4.2 per cent per annum whilst exports

of services grew at an average rate of 5.3 per cent per annum. Over the long run, as manufacturing gradually declines as a proportion of GDP, this pattern is consistent with a stable current account deficit. We would expect exports of services to slowly catch up with and eventually overtake exports of goods as the structure of the economy changes over time (Hawksworth 2001). For the reasons outlined above, it is important that this is a gradual process generated by a smooth structural adjustment. However, it no longer seems credible to claim that a manufacturing sector of a certain size is imperative to avoid an unsustainable current account.

Manufacturing and the regions

Manufacturing activity is very unevenly distributed around the UK, and is concentrated in areas of relatively poor economic performance. Both manufacturing output and employment account for widely different shares of the regional economies. The Midlands, the North East and North West, Yorkshire and the Humber and Wales form a distinct group of regions with a particularly high share of manufacturing in total output. Manufacturing employment is somewhat more evenly distributed, but the rankings of the regions are very similar. The most prosperous and fastest growing areas of London, the East and South East are the regions with the lowest share of manufacturing activity.

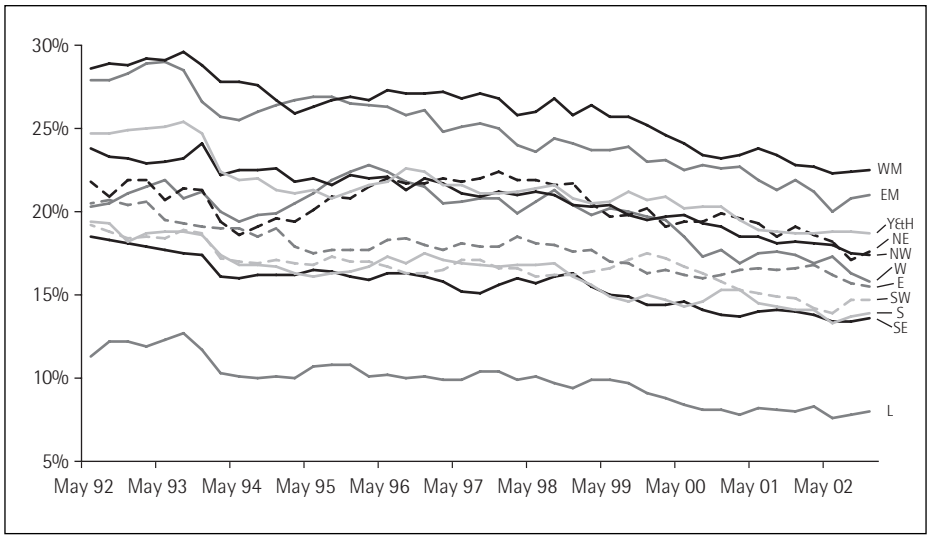
figure 2.3 Regional share of manufacturing in output



note Regional GVA figures have been delayed, 1997 and 1998 figures are still provisional

source National Statistics

figure 2.4 Manufacturing employment as % of total by region



source Labour Force Survey/Nomis

We should be careful about arguing that the relative economic success of the southern regions is a result of their relatively low share of manufacturing industry. The structure of such an argument is roughly that the greater extent of the service sector in the southern regions, combined with the stronger performance of the service sector as a whole, explains the higher growth rates of the more economically successful regions. In fact, less than a third of the difference in growth rates between the Southern regions (London, the South East and the South West) and the rest of the UK in the late 1990s is explained by the share of manufacturing in regional output (Morris 2001). Further, despite a higher proportion of 'high-tech' manufacturing in the southern regions, growth of manufacturing output was very similar over this period in the two regions, although it should be noted that this is a very high level of geographical aggregation. The most important factors in explaining the difference in growth rates were faster growth within the service sector and faster population growth in the southern regions. This type of analysis is still difficult to perform due to the limitations of regional output and inflation data. There is some relationship between the growth of manufacturing and total output in individual regions over the period 1989 to 1998, for example the North East and North West, the two regions with the weakest total growth, were also the regions with weakest manufacturing output growth.

Because of the uneven distribution of manufacturing activity, poor performance by the sector as a whole is likely to contribute to worsening regional inequalities. However, the appropriate response may not consist principally of policy measures related to manufacturing industry in the less prosperous regions. If we expect manufacturing's share of output and employment to decline steadily over time, the key challenge for public policy is to help the less advantaged regions attract a greater share of traded services such as business and financial services. The economic base of regions such as the North East and Wales needs to be diversified. This does not necessarily mean less support for manufacturing from such policy instruments as Regional Selective Assistance, but it does mean more support for traded services from such instruments (Adams, Robinson & Vigor 2003 forthcoming).

Manufacturing and innovation

Manufacturing is the location of the majority of UK business expenditure on research and development activity, and R&D is thought to have wider benefits to the economy than are captured by the innovating firm. New products and processes embody knowledge and value which is difficult to entirely retain within the innovating firm. Individuals who carry out R&D, or who simply participate in innovative activity, move between firms spreading these benefits. This is a potentially important mechanism by which manufacturing can contribute to better aggregate economic performance and living standards. UK R&D performance has been relatively poor since the mid 1990s, and this can be largely explained by low levels of manufacturing R&D (Griffith and Harrison 2003). This is an issue we will turn to in the next section.

Manufacturing and productivity

Does manufacturing matter especially because of its contribution to productivity? Manufacturing productivity is a component part of whole economy productivity, but this is not a reason to focus on manufacturing productivity in particular. We already know that there is not a close correlation between manufacturing productivity and GDP per capita amongst the advanced industrial economies. Although productivity growth does tend to be faster in manufacturing than in the rest of the economy, as already noted this is precisely one of the key reasons why the share of manufacturing in total output and employment tends to fall over time. There are real productivity gains in manufacturing which are

difficult to achieve in some service industries. In competitive markets consumers are likely to secure the benefits of these gains, and thus the price of manufactured goods tends to fall against, for example, the price of a haircut. A significant part of the fall in manufacturing's share of the economy is thus attributable to the falling price of manufactured goods, or equivalently to increases in quality which are not reflected in higher prices.

If manufacturing output continues to grow at a slower rate than the economy as a whole, then the contribution of manufacturing productivity to total economy productivity will decrease over time. In addition, the available evidence suggests that the 'productivity gap' may be bigger in many service sectors than in the manufacturing sector. Whilst there is a very significant gap between UK and US manufacturing productivity, the measured gap with France and Germany is almost as big for the market services sector as it is for manufacturing industry. The UK market services sector is more than two and a half times larger in terms of its share of output and more than three times larger in terms of its share of employment than the UK manufacturing sector. If we are particularly worried about the whole economy productivity gap we should be at least as concerned about the productivity of the service sector as with manufacturing industry. In particular, the significant measured productivity gap in financial and business services and in the distribution sector seem worthy of further analysis and possibly attention by policy makers.

table 2.1 Relative productivity and shares of output and employment, 1999

	Share of UK		*Productivity* UK = 100		
	Output	*Employment*	*US*	*France*	*Germany*
Manufacturing	19.6	15.7	155	132	129
Market services	51.3	53.4	132	125	125
Distributive trades	15.6	22.4	161	150	112
Financial & business services	21.0	18.6	153	126	161

source O'Mahony & de Boer (2002)

One reason why we should care particularly about manufacturing productivity is that we expect it to be associated with improved manufacturing competitiveness and profitability: in short, with firm success. The Government should change its rhetoric here: the argument that it is manufacturing productivity especially that must improve so that whole economy productivity can improve is unconvincing. Manufacturing productivity must improve so that manufacturing firms can be successful, delivering our first order policy goals concerned with employment and output.

Manufacturing's contribution understated

The impact of manufacturing on UK economic performance is likely to be understated by the measured size of the sector. As indicated earlier, manufacturing industries create significant demand for market services, and there are complex links between manufacturing and non-manufacturing businesses. Whilst recognising these inter-relations we should also be aware of double counting problems and the way in which service sector firms create demand for manufactured goods. As discussed earlier, the trend towards contracting out may mean that some of the measures of de-industrialisation are exaggerated. In addition there are significant classification problems in measuring output. For example, should we consider product design or software companies to be manufacturing businesses? There is a clear need to keep these categories up to date, and the lengthy process of international negotiation around revision of the Standard Industrial Classification System is currently ongoing.

Manufacturing in the long run

There is no reason to believe that the long-term trends for the manufacturing sector to shrink as a proportion of the advanced industrial economies will halt or reverse, and achieving such a reverse should not in any case be a goal of public policy. The US, for example, has a smaller manufacturing sector in relation to its total economy than the UK at the same time as significantly higher GDP per capita and levels of whole economy productivity, and amongst a large group of industrialised countries there is a limited relationship between manufacturing's share of an economy and GDP per capita.

What will happen if the long-term trends we have identified continue over the next several decades? Hawksworth (2001) maps out a long-term scenario where UK manufacturing output grows by its 20-year historical average of one per cent per annum, manufacturing productivity grows by 3 per cent per annum, and GDP grows by 2.5 per cent per annum. This would result in a UK manufacturing sector accounting for some 10 per cent of output and less than 5 per cent of employment by 2050. If the long-term growth rate of manufacturing output rises to 1.5 per cent per annum, and we keep the other assumptions constant, then the sector will account for around 12.5 per cent of output by 2050. Should we face such a future with equanimity? The answer is: only if such a transition can be managed smoothly, without harmful impacts on particular regions where manufacturing is concentrated, without any sudden worsening of the current account balance, and without unacceptable negative effects on the high return activities related to manufacturing such as research and development.

Such a transition is entirely compatible with, and in fact to some extent relies upon, the continued success of the firms that make up the UK manufacturing sector. To accept that the UK manufacturing sector will continue to shrink as a share of the UK economy is not to say that we should not care about it. The correct objective is not a larger manufacturing sector but a successful manufacturing sector.

This conclusion may still dismay some of those, especially on the centre-left, who have historically emphasised the unique importance of manufacturing. A long literature has suggested that manufacturing's too rapid decline posed a real threat to the progressive's first order policy objectives in relation to output and employment, and has especially emphasised the importance of manufacturing to the current account of the balance of payments. It is the absence of any real pressure on this front that should lead one to question this story.

3 the public policy response

UK manufacturing has suffered an extended period of relatively poor performance. Our desire for high and stable levels of employment, steady growth in GDP per capita, an acceptable regional pattern of economic activity and, as a necessary concomitant, a sustainable external account, all motivate a concern to improve the position of the sector. This does not mean that manufacturing should receive specially favourable treatment from public policy, and as noted earlier this is not what the representatives of manufacturing businesses argue for. Instead we want a consistent strategy for business which is supportive of manufacturing. Manufacturing is not a special case, but it is an important case.

At times the Government's broad economic agenda seems to boil down to a focus on the 'productivity gap' between the UK and comparable industrialised countries and an associated 'productivity agenda' as the policy response. There is no question that higher productivity, other things being equal, is a worthwhile intermediate goal. However, it is important to keep productivity in perspective. It is an important component of our first order economic policy goal of steady growth in GDP per capita. However, a focus on productivity alone does not directly address other first order objectives such as high and stable levels of employment and a balanced pattern of regional development. Indeed, the relationship between productivity and these other objectives may be complex and at times antagonistic. Whether there are conflicts between higher productivity, levels of employment and the economic development of under-performing regions is an important question, and one that the Government should recognise and seek to answer rather than avoid. There are also indications that the language of the productivity agenda is attractive neither to the public, who associate it with 'rationalisation' and job losses, nor to businesses who think in terms more immediately applicable to their success such as competitiveness and profitability.

Despite these caveats, the rest of this chapter will be structured around a set of issues which are often referred to by the Government as the key 'productivity drivers'. This will be done for three reasons. Firstly, it is accepted that productivity is closely related to the issues which matter for individual manufacturing businesses and which determine company success. In a sense it does not matter if we start by discussing competitiveness or productivity: either way we will arrive at the other. Secondly, the productivity agenda is relevant to our wider objectives, notably steady growth in GDP per capita, and other supporting goals such as a successful export sector and a sustainable current account. Finally, because government policy is structured around a productivity agenda it is helpful to frame our discussion in the same way for ease of cross reference.

The Government's productivity agenda is most clearly set out in a series of joint Treasury/DTI publications beginning with *Productivity in the UK: The Evidence and the Government's Approach* (HM Treasury 2000) and continuing with a series of productivity themed reports in every subsequent year. These documents identify five drivers as central to improving productivity performance. Macro-economic stability can be considered a sixth driver, the importance of which is continually emphasised by the government as the foundation for all economic success. UK policy for the manufacturing sector was set out in *The Government's Manufacturing Strategy* (DTI 2002). This document is also focused strongly on productivity improvement, and identifies seven pillars, rather than drivers, for manufacturing success.

The five drivers of productivity	*The seven pillars for manufacturing success*
(Macro-economic stability)	Macro-economic stability
Physical capital	Investment
Skills and human capital	Skills
Innovation	Science and innovation
Enterprise	Best practice
Competition	Market framework
	Infrastructure

table 3.1 Key elements of the productivity agenda

There is clearly a very close relationship between the five drivers and the seven pillars. The pillars include macro-economic stability as an explicit member, enterprise is missing from the manufacturing strategy and replaced with best practice, and 'market framework' is used here as a synonym for the competition environment. A notable addition to the manufacturing group is infrastructure, which can be considered a type of shared physical capital.

This consistency is a good thing. The Treasury and the DTI share a PSA target to 'Demonstrate progress by 2006 on the Government's long-term objective of raising the rate of UK productivity growth over the economic cycle, improving competitiveness and narrowing the productivity gap with the US, France and Germany' (HMT 2002b). This is an ambitious goal: it means not just increasing the rate of UK productivity growth, but raising it above the rate of these other countries in order to close the gap. Although over the past 20 years as a whole UK productivity growth compares reasonably well with France, Germany and the US, in the recent past the UK has demonstrated a distinct productivity slowdown relative to the international comparators, as can be seen from the table below. In the manufacturing sector the comparison is even less flattering.

	Whole economy		*Manufacturing*	
	1989-95	1995-99	1989-95	1995-99
US	1.43	3.32	2.85	4.18
France	1.08	1.08	2.76	2.72
Germany	3.21	2.07	4.46	2.1
UK	2.39	1.07	3.31	0.83

table 3.2 Labour productivity growth rates (percentage growth per annum in output per hour)

source O'Mahony & De Boer 2002

As will be discussed in more detail below, there are good reasons to believe that all of the Treasury/DTI drivers are associated with changes in productivity. One immediate question is: are there any drivers which are missing? To some extent this depends upon how broadly each one is drawn, and a sufficiently flexible account could probably accommodate any productivity related issue within one of the existing categories. As we discuss each area in turn we will try to identify relevant issues which do not appear to be sufficiently addressed at present.

The following section briefly examines each of the drivers and their relationship to manufacturing success, the recent trends in each case, the Government's policy response, and how policy may be developed. Key questions throughout are: do we have the policy levers that would significantly affect the drivers? Is there a distinctive manufacturing strategy? Manufacturing policy should naturally be a consistent subset of overall industrial and economic policy. However, we have seen that manufacturing is a sector of the economy experiencing particular difficulties at the moment. The question that arises is whether manufacturing could receive more effective attention within a consistent economic policy framework.

i) The economic framework

a) Macro-economic policy

The Government can justifiably claim a significant degree of success for its post 1997 macro-economic regime, building on a framework that was developed after sterling's exit from the ERM in 1992. The key elements of this regime are operational independence for the Bank of England in pursuing its symmetrical 2.5 per cent inflation target, the fiscal rules and the Code for Fiscal Stability. These will not be discussed in any detail here. Whilst commentators have noted various ways in which the rules may be sub-optimal or ambiguous (for example, Emmerson & Frayne 2002) there is general consensus that they represent an important contribution to macro-economic stability in the UK. Over the past ten years the UK has experienced a period of relatively low and relatively stable inflation with steadily rising employment, testament to the success of the post-1992 macro-economic framework.

There is good evidence that both monetary policy stability and output stability are beneficial for output growth (Ramey and Ramey 1995; Kroft and Lloyd-Ellis 2002; Holmes *et al* 2001). It is a relatively short step to imply that such stability should be good for manufacturing industry as part of the wider economy. In fact, even if stability was not a factor promoting higher growth, it should still be a central goal of government policy because of the very high personal impact of employment instability on personal well being (Donovan & Halpern 2002).

On the other hand, during the period from the end of the Second World War to the first oil shock in 1973, growth rates in the UK lagged behind many comparable countries even though UK output volatility was relatively low. The period 1979 to 1993 then saw the UK go through two severe recessions with an unsustainable boom in between. Problems such as the productivity gap, or the low levels of physical capital stock in the UK economy, were already apparent by 1979 after a long period during most of which the UK had *not* experienced excessive macro-economic volatility relative to comparable industrial countries. Macro-economic stability is a necessary rather than sufficient condition for better outcomes in manufacturing.

b) The unbalanced economy

As the first section of this report has indicated, whilst the UK economy as a whole has performed reasonably well since 1993 in terms of output growth, employment, and price stability, manufacturing has presented a stark exception to the overall picture. There are a number of serious and related imbalances in the UK economy, of which the weakness of manufacturing relative to the service sector is one.

Another key related imbalance is that between the different categories of domestic expenditure. In a simple national accounting framework, domestic expenditure is divided between private consumption, government spending and investment. Business investment generally and manufacturing investment specifically have been squeezed since the late 1990s. In a simple accounting sense this has been a necessary counterpart to strong growth in private consumption and government spending. The corollary is that the rate of growth of one of these must fall if private investment is to recover. Specifically, either private consumption or government expenditure must grow more slowly than the trend rate of growth of the economy for the share of business investment to increase. Given the importance of the Government's commitment to the key public services, there is little scope for reductions in the rate of growth of public spending in the short or medium term. The implication must be that the rate of growth of consumer spending must abate if investment is to recover.

An alternative scenario is that a recovery of business investment, which is relatively import intensive, is reflected in a widening current account deficit. This imbalance is itself related

to the other imbalances we have discussed, with the present current account deficit reflecting in part a high exchange rate. As already noted, that deficit is significantly less than

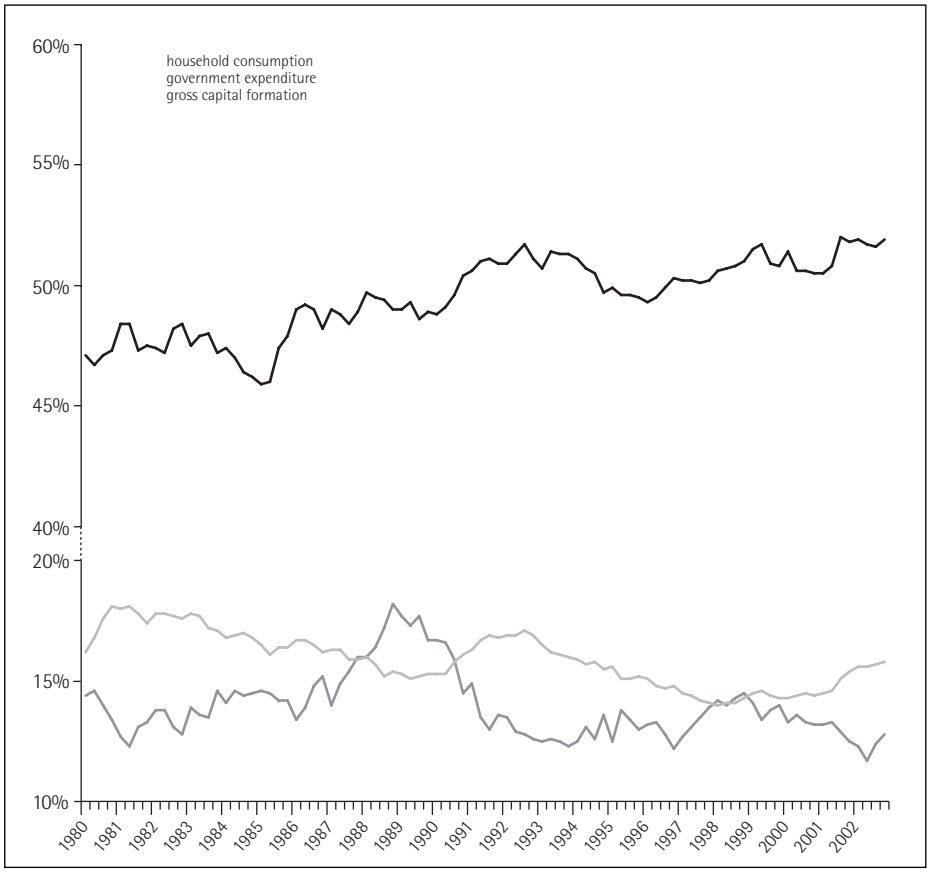


figure 3.1 Shares of UK final expenditure

note series do not sum to 100 per cent due to exclusion of external sector

source National Statistics

it was in the UK in the late 1980s, and significantly below that in the US at the present time. However, a significant recovery in business investment, which would seem to be highly desirable, is likely to be associated with an increasing UK current account deficit.

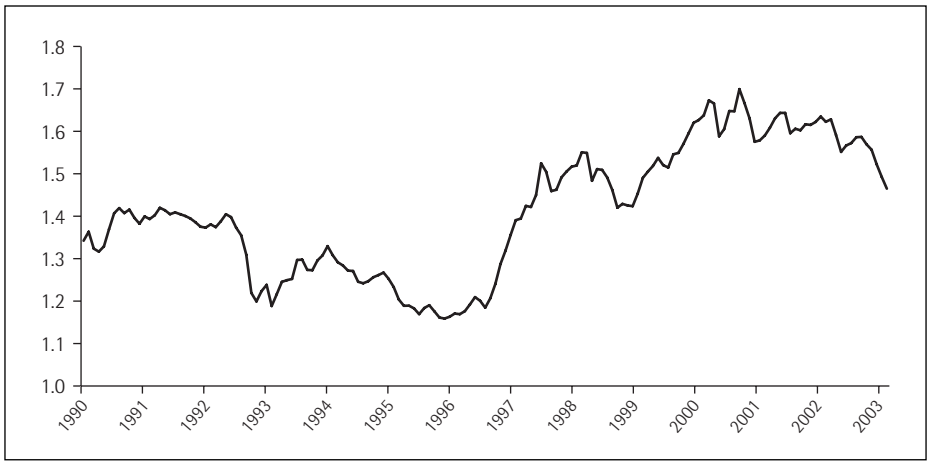
The final related set of important economic imbalances are those between the greater south east and other regions of the UK, resulting in stresses in both more and less affluent areas (Adams, Robinson and Vigor 2003, forthcoming). As discussed earlier, only a modest part of the difference in growth rates between the southern regions and the rest of the UK in the late 1990s is explained by the share of manufacturing in regional output. Despite this, a broadly based recovery in manufacturing would be of some help in preventing a further divergence of economic activity across the regions.

In summary, some important and related imbalances in the UK economy have emerged at a time of good overall macro-economic performance. The relatively poor performance of manufacturing; the imbalance between the growth of consumption, government expenditure and investment; the relatively modest current account deficit; and differences in regional growth rates all present greater or lesser concerns to policy makers. However, they have not amounted to a 'crisis' for macro-economic policy and sterling's depreciation since the summer of 2002 offers an opportunity for the unwinding of some of them.

c) The euro

The euro has been a high profile issue for manufacturing industry over recent years. The following chart indicates clearly why this has been so: sterling appreciated against the single currency by some 40 per cent over the three years from 1997 to 2000, impacting strongly on the price competitiveness of UK manufactured exports.

figure 3.2 The sterling/euro exchange rate



source National Statistics

There are good in-principle reasons why manufacturers should want their costs and revenues denominated in the same currency. If this is not the case then exchange rate movements will affect their profitability, and manufacturers are in the business of making things rather than speculating in financial markets. It may be the case that uncertainty over the future exchange rate has retarded manufacturing investment in recent years. However, the central problem has not been volatility, rather it has been a consistently high exchange rate from 1997 onwards relative to the conditions of 1993-1996 which has impacted upon the competitiveness of UK exports and the profitability of UK manufacturing firms.

One of the Government's five economic tests, which must be passed before a referendum is held on euro membership, concerns the impact of UK membership on investment. There are a number of aspects to this. The first concerns macro-economic stability, both in terms of the exchange rate and other variables such as interest and inflation rates. It is generally accepted that volatility in these variables is likely to reduce at least the short term rate of investment, and possibly the longer term level as well. When decisions are at least partially irreversible, uncertainty about the future makes waiting a valuable option for potential investors, who may thereby gain a more accurate picture of the likely returns (Ashworth *et al* 2001; Pain 2003).

Would joining the euro lead to increased macro stability for the UK? It would certainly remove one source of volatility: the sterling/euro exchange rate, and this in itself can be considered good for UK investment (Byrne and Davis 2002). However, this is far from being the end of the story. Euro membership removes the possibility of an independent UK monetary policy, which might lead to increased volatility in UK output, depressing investment. Estimating the relative size of these two effects depends on a complex set of assumptions about the convergence of the Euro economies (and thus the suitability of a single monetary policy regime), the effectiveness of the euro area institutions, the ability of prices to adjust in the member countries, and the relative sensitivity of investment to uncertainty in the different macro-economic variables. These issues are, to say the least, not clear-cut. One issue that is tractable is the effectiveness of the Bank of England, which has effectively managed price stability in the UK over recent years and whose structure and operation is widely respected. There is unlikely to be a significant gain in price stability from exchanging this institution for the European Central Bank.

A second aspect of the impact of the euro on investment concerns foreign direct investment (FDI) into the UK. FDI often receives special attention, primarily because foreign firms are thought to have an important role in transferring new technologies and techniques to the host country, but also because they are often high performers generating competitive pressure in their sector (Griffith *et al* 2002). A less coherent reason that is sometimes given for efforts to attract FDI is the impact of such investment on local employment. In the

absence of the spill-over effects mentioned above, such investment should be no more attractive than domestic projects, and thus deserve no more attention or expenditure.

Currency volatility might be expected to affect FDI in a similar manner to that in which it affects domestic investment, because foreign investors care about the domestic value of their overseas earnings. However, volatility of the exchange rate between host and investor country can work both ways. It may discourage international trade and thus encourage FDI as the alternative mechanism for entering a new market. Pain (2003) indicates that the net direction of the effect is likely to depend upon the type of FDI, and particularly whether it is for intra-company production, domestic sale or export. He suggests that the balance of these effects might actually lead to a reduction of FDI flows between the UK and Europe as a result of euro membership.

The situation is different again for inward investors outside the euro zone, and it is notable that companies from these areas have been the most vocal about the importance of UK membership of the euro. Many use the UK as a production base from which to export to the euro zone, and investment into the UK from this group of nations might indeed be stimulated by euro membership. US FDI into the UK has in fact held up remarkably well over the past decade, a further instance of the UK economy performing surprisingly well in the face of a high exchange rate.

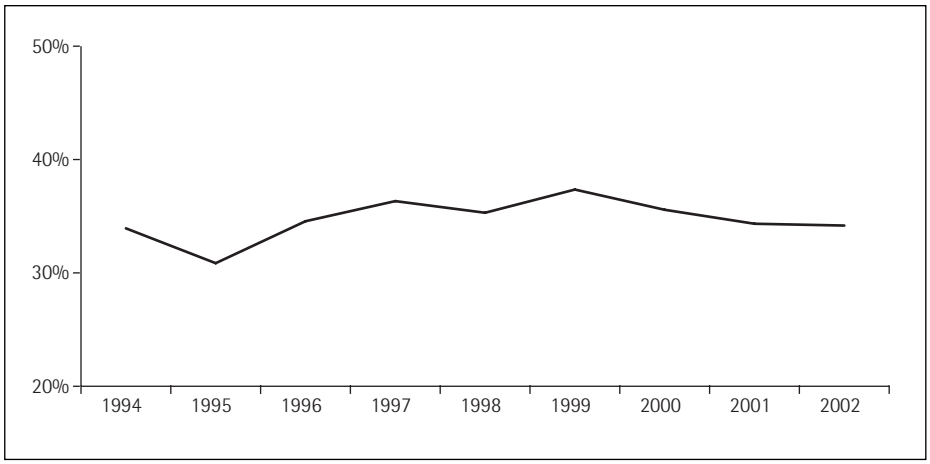


figure 3.3 UK share of US foreign direct investment into Europe

source Barrell & Weale 2003

A third mechanism by which euro membership could affect UK investment would be its impact on the longer term output of the EMU and UK economies. If EMU successfully improves the performance of member economies, for example through stimulating cross border competition and trade, it may have a significant positive impact on long term output growth. One area of dispute is the degree to which euro membership itself will improve the openness of the member economies, given the already high degree of economic integration between the member states and the other possible means of addressing the issue of European economic development. For example, reform of EU competition policy and state aids may be considered a more important source of growth than currency union in what is already a free trade area. A further issue is the degree to which UK membership would generate additional benefits: euro area growth will benefit the UK even if it remains outside of EMU membership. The extent to which growth in the two areas would be accelerated by UK membership is hotly disputed (see Frankel and Rose 2000, Thom and Walsh 2002 for contrasting perspectives).

d) The UK competition regime

The UK Government has undertaken robust reform of the competition regime in recent years. The Competition Act 1998, The Enterprise Act 2002, a range of industry specific reviews and various measures of secondary legislation have significantly strengthened the competition

framework. Whilst increased competition makes life more difficult for incumbent firms, there is evidence that increased measures of competitive pressure lead to improved firm performance (Nickell 1996). There is even stronger evidence that competition drives productivity growth through the process of firm entry, exit and changing market share. Disney *et al* (2000) found that such processes accounted for 50 per cent of productivity growth on a per employee basis in UK manufacturing over the period 1980-1992.

It is important to continue pressing for more openness to trade and competition internationally with our European partners. However, the OECD has now stressed for some time that the UK has one of the strongest product market competition regimes and broadly sensible levels of product and labour market regulation by international standards (OECD 2002; Nicoletti 1999). It is therefore difficult to ascribe any shortfall in the UK's comparative productivity performance to relatively low levels of competition or relatively high levels of regulation, a point we will return to later. This is not to say that further measures to stimulate product market competition are not welcome. Those that suggest the agenda of product market liberalisation has run its course exaggerate their case (Porter and Ketels 2003). However, it is true that we need to look elsewhere for explanations of the performance of UK manufacturing.

i) Investment

Capital investment is a crucial determinant of firm productivity, profitability and competitiveness. However, it is certainly not the case that investment must always lead to higher profitability. Indeed, periods of low corporate profitability are frequently associated with earlier periods of over-investment following which projects fail to generate an adequate return. Aggregate UK business investment levels are determined by the sum of firm level investment decisions, and our discussion of investment will be framed by this consideration.

In 1999, levels of capital per hour worked in manufacturing industry were 30 per cent higher in the US and Germany than in the UK, while the corresponding figure for France was 80 per cent (O'Mahony & De Boer 2002). As we have seen, these differences in capital stocks accounted for 21 per cent of the gap between UK and US manufacturing productivity, 29 per cent of the gap between the UK and Germany, and fully two thirds of the gap between the UK and France. These gaps are the result of extended historical periods of higher capital stock growth in these countries compared to the UK. Closing them will be a long-term endeavour.

Explaining the recent pattern of UK manufacturing investment

Investment by UK manufacturing firms in the 1990s has been relatively low in comparison to manufacturing investment in some comparable advanced industrial countries, particularly the US. Figure 3.4, created from the NIESR productivity dataset, indicates rates of manufacturing capital accumulation in the US, Germany, France and the UK. It should be noted that the choice of comparator countries is important. For example, the inclusion of Italy, for which consistent data is unavailable, would probably flatter the UK's investment performance. The sharp downturn in capital accumulation rates in 1999 is worrying, as more recent UK investment data show further falls in UK manufacturing investment levels in 2000-2002.

A rational decision to invest depends upon the cost of the investment and an assessment of the future cash flow generated by that investment, which in turn will depend on the demand for the goods and services which the investment is designed to deliver. Expectations of future demand are thus central to the investment decision: this reinforces the importance of macro-

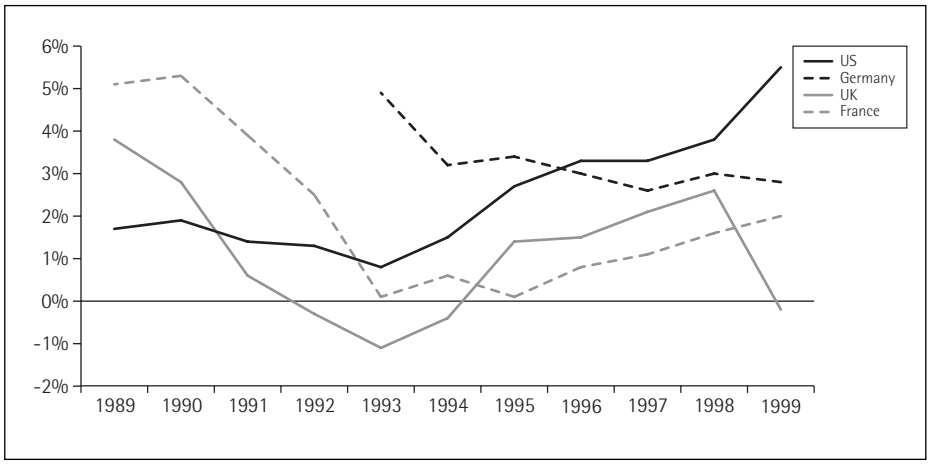


figure 3.4 Per annum growth rates of manufacturing sector capital stocks (constant prices)

source NIESR productivity data set 2002

economic policy relative to specific policy instruments aimed at boosting investment. Current demand and the current rate of demand growth is likely to provide an important signal of future demand, and thus we would expect levels of manufacturing investment to be influenced by the rate of sector output growth, with higher output growth leading to higher investment levels and periods of output contraction leading to lower investment levels. Naturally, this extremely simple formulation is far from explaining the pattern of UK manufacturing investment in the 1990s, but by placing demand at the centre it tells us something important about the relevance of different public policies.

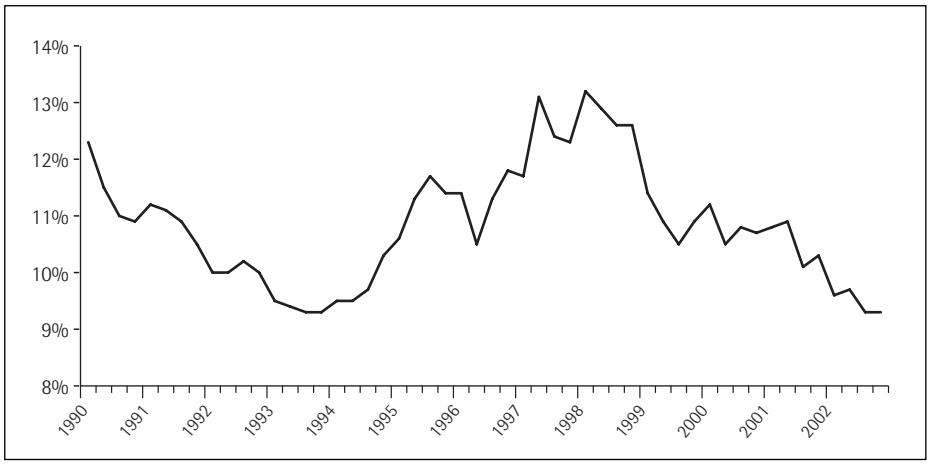


figure 3.5 Manufacturing investment as % manufacturing output

note constant prices are used for ratios

source National Statistics

Manufacturing investment indeed fell rapidly during the early 1990s as the sector and the wider economy moved into recession. Manufacturing output returned to growth in 1993, and investment slowly began to pick up from a low of nine per cent of sector output in 1993 to an average of 12 per cent for 1996-1998, throughout which period sector output was growing. At this stage the simple pattern breaks down. Sector output was still growing slightly in 1999 and more strongly in 2000, yet manufacturing investment fell sharply in 1999 and failed to recover in 2000. From 2001 to the end of 2002 both sector output and investment as a proportion of output fell significantly, with investment intensity ending the period back at its mid 1993 level. It is worth noting that using current rather than constant price data tells a slightly different story, with somewhat lower investment levels from 1997 but a similar pattern to that described here.

What caused the sharp fall in UK manufacturing investment at the end of the 1990s? One clue can be gained from our information on rates of return in the sector (see figure 1.8 p18). The net rate of return on manufacturing assets grew steadily from a trough of 5.3 per cent in 1992 to a peak of 13.7 per cent at the beginning of 1998, but then fell sharply to 9.3 per cent for 1999, 8.6 per cent for 2000, 5.7 per cent for 2001 and 6.3 per cent for 2002. It

appears that UK manufacturers read the writing on the wall in 1998 and cut back investment in the face of lower expected future demand and profitability. With the wider UK and global economies growing relatively strongly in 1999 at the time UK manufacturers started to reduce investment levels, the most obvious explanation is our now familiar culprit: the sterling exchange rate. The strong appreciation of sterling from late 1997 would have generated a period of abnormally high profits as confirmed export orders generated unexpectedly high receipts, explaining the spike in sector profitability in late 1997 and early 1998. However, the impact of the high rate on export competitiveness would quickly have been felt on future orders and is reflected in the decline in sector profitability, with knock on effects for investment.

The corollary of this story is that the recent shift in the sterling exchange rate, if it proves durable, may be expected to contribute to a similar pattern of effects in reverse. Other things being equal, manufacturing profitability may fall briefly as sterling export receipts are depressed, but the improved competitiveness of UK goods should result in increased foreign demand, higher projected returns to UK manufacturers and a consequent recovery in manufacturing investment. The National Institute projections in April 2003 for exports of goods, manufacturing output and sector investment were consistent with such a scenario. However, much depends upon external factors such as the trade weighted sterling exchange rate either stabilising or falling further from its current level, and external demand strengthening or at least remaining robust.

The role of uncertainty

The economic literature attempting to explain investment behaviour is extremely complex and has somewhat limited predictive power (Driver 2002). However, it is worth pausing to discuss the stream of work which highlights the role of uncertainty in investment decisions (for example, Dixit & Pindyck 1994). Most capital investment is at least partially irreversible: plant cannot usually be sold at its purchase price if it turns out to be unneeded. Thus in the presence of uncertainty there is a value to firms in waiting to gain more information about the factors that will affect project returns. The key result is that uncertainty means firms will not invest when the net present value of an investment just marginally exceeds its cost: the option value of waiting means that the returns must be greater than the costs by some extent. Whilst this process should retard the accumulation of capital, the same effect in reverse should also retard its disposal: uncertainty about a projected fall in demand should retard the process of selling unneeded capital.

If the two effects are symmetrical then uncertainty would affect only the short term rate of change in the capital stock rather than its long term level. However, there is no compelling theoretical reason for the two effects to be symmetrical: uncertainty may have more effect on capital accumulation than on disposal. The empirical evidence is somewhat mixed, but the general conclusion is that whole economy long run investment levels are negatively correlated with various measures of uncertainty. A similar conclusion holds, with more mixed empirical support, for the manufacturing sector specifically (Carruth *et al* 1998).

These results suggest that the Government's aims of achieving stable output, inflation and interest rates, all of which are correlated with uncertainty, should have positive effects on investment levels. Other key variables contributing to uncertainty are outside the control of the government, specifically foreign demand, with the exchange rate remaining a difficult case. Another lesson of the literature on investment and uncertainty is that in the presence of significant uncertainty, pro-investment government policies such as changes in the corporate tax regime may not immediately lead to changes in investment levels if firms continue to use their option to 'wait and see'. In addition, frequent changes to such policies might make things worse by generating additional uncertainty.

The UK tax regime

Corporate taxation plays an important role in investment decisions, as the costs and benefits of an investment project must all be considered by the firm net of tax. Higher capital allowances reduce the cost of investment by generating valuable tax savings, whilst corporate taxes straightforwardly reduce the net return on a profitable project. Other things being equal, we would expect more generous capital allowances and lower statutory corporate tax rates to increase investment levels.

However, the corporate tax regime does not explain the relatively low level of UK manufacturing investment. By international standards, the UK regime is relatively advantageous. Table 3.3, reproduced from work by the Institute for Fiscal Studies, indicates both effective marginal and effective average tax rates in the G5 in 2001. Marginal rates are more important for projects which are barely viable, whilst the importance of average tax rates increases as an investment becomes more profitable. Both measures take into account the level of allowances and the applicable rates of taxation. On either measure the UK has the lowest corporate tax rates of any G5 country, but all of the other G5 countries have displayed significantly higher levels of investment than the UK over both the longer term and recent past.

	Value of tax allowances as % of investment cost	*Effective marginal tax rate*	*Effective average tax rate*
Japan	76%	28%	35%
Germany	74%	27%	33%
USA	79%	23%	32%
France	82%	19%	29%
UK	75%	19%	25%

table 3.3 Corporate taxation in the G5, 2001

note time and country specific inflation rates. See www.ifs.org.uk/corptaxindex.shtml for detailed assumptions.

source IFS effective tax rate data

How has this picture changed over the past 20 years? In 1982 the effective UK marginal corporate tax rate was effectively zero due to 100 per cent investment allowances, and the average tax rate was also lower than any of the other G5 countries. UK investment allowances became significantly less generous in the early 1980s, but average tax rates fell at the same time due to other corporate tax reforms. Over the whole of the 1980s and 1990s the UK has maintained lower effective marginal and average tax rates than the rest of the G5 average. It is true that over the last two decades the UK's corporate tax 'advantage' has very slightly narrowed, but overall corporate tax levels cannot explain either the long term capital gaps between the UK and these other countries or more recent low UK manufacturing investment levels.

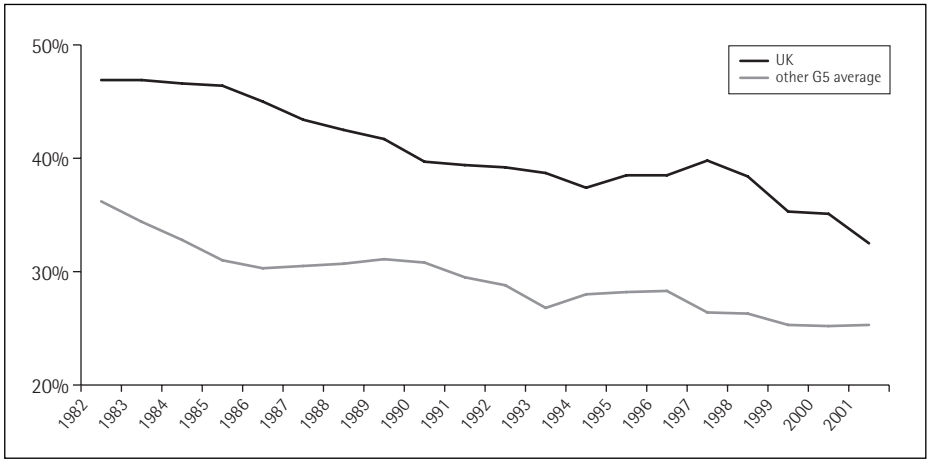


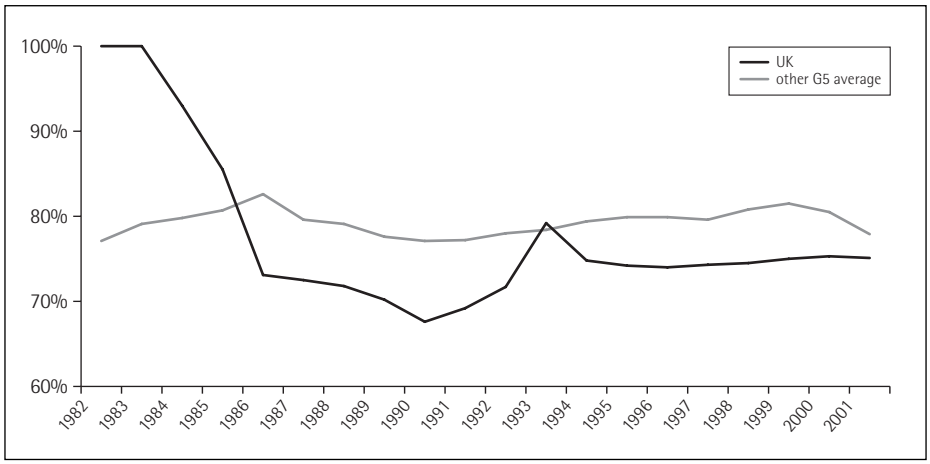
figure 3.6 Effective average tax rates: UK and other G5 average

note Other G5 is simple average. Time and country specific inflation rates. See www.ifs.org.uk/corptaxindex.shtml for detailed assumptions.

source IFS effective tax rate data & IPPR calculations

It is also true that the value of UK investment allowances is lower than in some other comparable countries. However, the present discounted value of UK allowances is now only very slightly less than the average for the other G5 countries. Because of lower statutory tax rates, effective marginal rates in the UK remain the lowest in the G5. Given these two factors, it is hard to ascribe low levels of UK investment to ungenerous investment allowances.

figure 3.7 Present discounted value of investment allowances: UK and other G5 average



note Other G5 is simple average. Time and country specific inflation rates. See www.ifs.org.uk/corptaxindex.shtml for detailed assumptions.

source IFS effective tax rate data & IPPR calculations

Should the UK Government change the UK tax regime further, or would disruption to the existing regime be more harmful than any likely benefit? Every one of the G5 countries, and many other OECD states, reduced statutory corporate tax rates between 1982 and 2001. At the same time most have reduced the value of investment allowances. The result of these trends has been that effective marginal tax rates in these countries have tended to remain relatively stable over the 1980s and 1990s, falling somewhat at the end of the period. At the same time effective average tax rates have fallen consistently, and the impact on government revenues has been to hold corporate tax receipts as a proportion of GDP relatively stable. The result of this is to shift the burden of corporate taxation, reducing the value to firms of the tax allowances from marginal projects and increasing the value of the cash flow from profitable ones (Devereux *et al* 2002). One interpretation of this is that countries are competing for profitable internationally mobile investment. Another is that they are seeking to shift the incentives for firms towards investments which are more profitable before tax but were previously equally attractive due to the corporate tax structure.

The case for further significant changes to the UK corporate tax regime seems weak. The current UK arrangements are relatively advantageous and do not help explain the UK's relatively poor manufacturing investment performance. Firms dislike uncertainty and there is a strong argument for a period of *micro*-economic policy stability to accompany the hard won *macro*-economic stability that the UK economy may now be enjoying. This suggests caution both in relation to arguments for more generous capital allowances and the Government's own suggestions set out in August 2002 for further reforms of the corporation tax system (HMT 2002c; Bond *et al* 2003). Moreover, given the Government's ambitious spending plans for the public services and the relatively difficult fiscal position facing the UK in the medium term from 2003, it will be very difficult to cut corporate taxes without raising taxes elsewhere, with the attendant uncertainty that would bring. At the same time, it will be important to keep corporate tax levels under close review and to avoid weakening the incentives for firms to invest, particularly in a tightening fiscal environment where the Government may soon be seeking means of increasing overall tax revenues.

Specific investment support initiatives

One area where there has been little stability in the UK is in the provision of specific government support initiatives for business investment. The longest standing policy tool in this area is Regional Selective Assistance, which subsidises investment in economically

deprived areas. This scheme formally has three aims: to create or safeguard jobs; to attract or retain internationally mobile investment; and to improve the competitiveness of firms in disadvantaged areas. The objectives of regional policy and the role of RSA are addressed in detail in Adams, Robinson and Vigor (2003, forthcoming). Our point here is to note that compared to other investment support schemes RSA has been subject to relatively extensive scrutiny. Harvey Armstrong described this situation at an IPPR seminar as one of 'asymmetric evaluation'.

Many government schemes aimed at businesses are more appropriately discussed in the context of support for innovation or enterprise. A common characteristic, however, is the lack of robust evaluation of these schemes, with the quality of the analysis critically compromised by the extensive use of interview survey data rather the econometric analysis of performance data. We are not saying that these schemes are a bad thing: the point is that in many cases we do not know whether they are a good thing. Rigorous evaluation across the field of business support schemes could imply a very different pattern of expenditure, and the failure of schemes to demonstrate benefits should result in their closure. We welcome the DTI review of business support, due to reach its conclusions in the latter half of 2003, but it will have to take a much more robust approach to the issue of evaluation than the Department has in the past.

This discussion also allows us to pass some comment on the argument that UK manufacturing is held back by lower spending on state aids in the UK than in other EU countries. Whilst it is true that the UK spends less on such programmes, it is not clear that these other countries evaluate their business support schemes any more effectively than we do here in the UK. It is entirely unclear, therefore, that such expenditure has any beneficial effect which might help account for the more successful manufacturing sector performance of some of these countries. In the absence of robust research on the impact of other countries' schemes, the argument that we should spend more because they spend more is very weak.

Do manufacturing firms suffer from finance gaps?

A frequently considered explanation of low UK investment levels is the possibility of finance gaps which prevent firms undertaking projects which would otherwise yield positive returns. Firms can finance projects from internal cash flow or from external sources such as bank debt and public equity, but UK firms seem especially reliant on internal cash flow to finance investment, a factor that would make firm profitability an even more important variable. Where firms do not have access to sufficient internal cash flow, imperfections in the financial markets might retard investment through raising the cost of capital, thus reducing the number of viable projects.

The structure of such capital market imperfections is relatively well understood. Borrowers are likely to be better informed about the risks and returns of possible investment projects than lenders. This generates an adverse selection problem: lenders will charge a risk premium which will incentivise firms with less risky projects to finance them through internal cash flow, thus increasing the average risk of projects seeking external finance. There is also a moral hazard problem: lenders are generally unable to perfectly monitor the behaviour of borrowers, and are unlikely to be able to write and enforce contracts governing such behaviour. These considerations are likely to generate significant risk premia for borrowers. Similar information problems apply in the case of equity finance, and in addition equity purchasers can reasonably expect firms to issue new shares when they are overvalued, and will attempt to charge a compensating premium as a result.

There are a number of reasons why finance problems are more likely to affect smaller rather than larger firms. The first is the relative availability of cash flow: small and especially start-up firms are likely to require external finance to a much greater extent relative to their size

than mature enterprises. The second is that agency costs to lenders are likely to be proportionately lower where the amount of finance required is large. A third is that lenders may treat large firms as better risks for a variety of reasons: they are more likely to make use of sophisticated internal audit and financial controls; are more likely to have a track record of success; may be financing projects which make up a smaller proportion of their total business; and may have better incentives to avoid bankruptcy.

As we would expect, there is strong empirical evidence that the availability of cash flow does influence investment levels in UK firms (for example, Tsuru 2000; Ashworth *et al* 2001). However, the questions we must ask are whether finance problems help explain any of the UK's poor investment performance relative to other countries, whether the UK manufacturing sector suffers in particular, and what the appropriate policy response should be.

There are considerable differences between the corporate financial arrangements in different countries. For example, the UK and US demonstrate consistently lower corporate debt to equity ratios than Germany or Japan, and the nature of firm ownership is quite different across these countries. Equity ownership is more concentrated in German than UK firms, bank finance is more important relative to bond finance in Germany than in the UK, and banks often have close and long-term relationships with German firms which sometimes includes board representation for the banks. These factors may all help to reduce the information problems highlighted earlier, and would suggest that financial constraints may play less of a role in relation to investment in Germany than the UK. Empirical work by Bond *et al* (1999) finds that investment by UK companies is more sensitive to cash flow than investment by German companies, suggesting that UK firms may indeed be relatively capital constrained.

Theory suggests that the dispersion of equity ownership may affect investment levels. Where there are many relatively small shareholders, the costs of monitoring the firm's activities are relatively high for each shareholder. As a result, the shareholders may require higher dividend payouts to reduce the risk that their longer term returns are not being maximised by managers, and this may in turn drive managers to adopt an excessively short-term approach to business planning.

Is there any evidence that UK *manufacturing* firms are particularly capital constrained relative to firms in other sectors? The hypothesis here must be that lenders are irrationally prejudiced against manufacturing. If the risks in the sector are significantly higher than elsewhere, then lenders will be behaving rationally in exercising relative caution. Unfortunately there is little evidence in this area.

There is thus some evidence of finance problems affecting UK firms, and evidence that the situation is worse here than in other countries with different corporate finance arrangements. It is possible that investment by UK firms would be higher in the absence of the finance problems they appear to experience. However, it is notable that the UK and US share a very similar pattern of corporate ownership and finance, whilst investment levels are considerably higher in the US. As we have seen, many factors affect investment, and figure 3.8 presents evidence from the Engineering Employers' Federation on what firms themselves perceive as their key barriers to investment, with the results split into domestic and US-owned firms located in the UK. The cost of finance clearly plays a part, but apparently no more for UK-owned firms than US ones, and other finance issues, such as the views of external financers, are mentioned rarely as barriers. The most important issues are demand and uncertainty, with the exchange rate also a big issue for US firms especially.

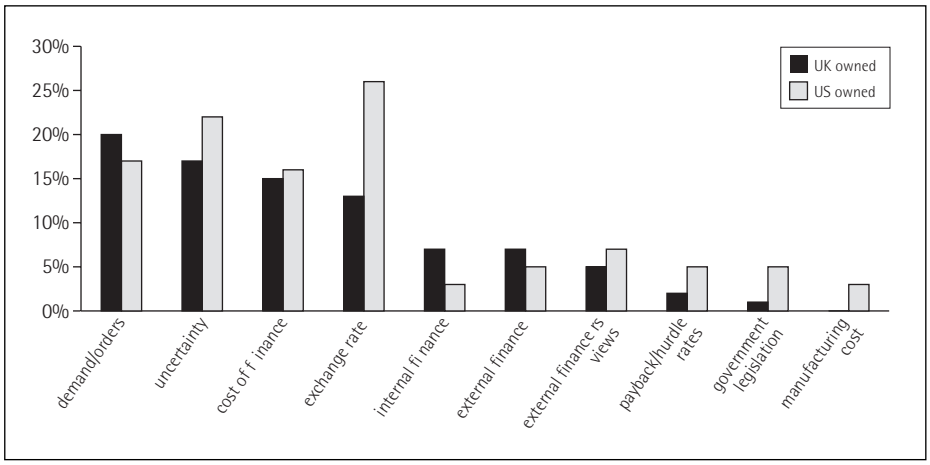


figure 3.8 Barriers to investment, % of respondents mentioning each factor

source EEF/NOP Productivity Survey

Links between skills and investment

Another potential explanation of low levels of UK investment is a possible shortage of skilled labour to make capital sufficiently productive to justify the necessary investment. It is generally accepted, both for theoretical reasons among economists and more practically among firm managers, that capital and skilled labour are complements (Pain 2002). However, there is a relative lack of robust empirical support for this view. Rather than try to resolve this debate, the next section will examine more generally the levels of skills in the UK economy and in the manufacturing sector.

Investment conclusion

There are a number of different strands to this discussion of manufacturing investment. It is not in question that the UK manufacturing industry operates with a significantly lower capital stock than the sector in some comparable countries, and that this materially affects its relative productivity. This is the result of very long-term trends in the sector, but in the recent past the UK appears to have been moving in the wrong direction rather than catching up. It is not appropriate to think in terms of a crude target for raising UK levels of investment: instead our response should be to establish the right macro and micro-economic environment within which firms can make the appropriate investment choices.

The most important drivers of manufacturing investment are demand and profitability. The exchange rate has played a key role in affecting both of these in the latter part of the 1990s and the first years of the new decade. Thus one of the most important issues for manufacturing investment is one over which the government has relatively limited influence. The depreciation of sterling from mid 2002 to mid 2003 is likely to materially improve the prospects for manufacturers, as long as exchange rate movements remain benign over the medium term. Another important driver of profitability and thus investment on which the government has relatively little influence is the state of the world economy and international demand for traded goods, and here the picture is somewhat less benign now than it was in the mid to late 1990s.

We have seen that the UK corporate tax regime has been and continues to be relatively favourable by international standards. Whilst it could be further adjusted to encourage investment, there appears to be little scope to do so without compensating tax increases elsewhere in the economy. At the same time it will be important to keep the UK corporate tax regime under careful review, particularly in the context of emerging fiscal pressures, and to avoid changes which are likely to be detrimental to investment trends. Whilst UK firms do appear to suffer from some finance problems relative to some of their international counterparts, these are neither a priority for manufacturers themselves, nor is it obvious what the appropriate government response should be. Given the role that uncertainty plays in

retarding investment, the government should strive to match its commitment to *macro-economic* stability with a period of *micro-economic* policy stability.

An area which does require revisiting is the provision of specific investment support initiatives, where existing evaluation work is often extremely weak. In the absence of robust evaluation we do not know whether to shift the balance of spending between schemes, or whether to increase or decrease total spending. As we have said, we welcome the DTI review of business support, but to be effective it must require that evaluation is capable of standing up to independent academic scrutiny, and that the failure of schemes to demonstrate appropriate benefits should result in their closure.

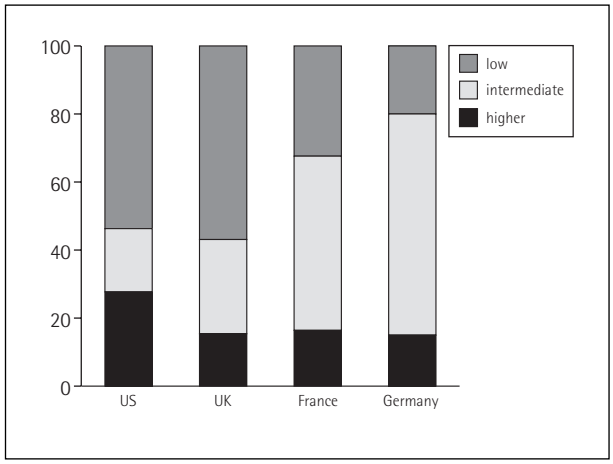
Skills

Managerial and workforce skills are a crucial input into the production process. Specific aspects of managerial skills will be considered in more depth in the later sections of this document which focus on enterprise and innovation. This section will discuss workforce skills more generally, and looks at the direct impact skills may have on productivity. However, given the importance of certain skills in relation to enterprise and innovation, there also is likely to be an indirect impact in terms of the influence of these drivers on total factor productivity through levels of innovation and enterprise.

Qualification levels and their contribution to productivity

It is common practice to use workforce qualifications as a proxy for workforce skills. As a result of data limitations, it is also common practice to divide qualifications into three categories for the purposes of international comparison, although further research will hopefully allow for a finer categorisation. Higher level qualifications are degree level or equivalent, the 'intermediate' category covers a wide range of academic and vocational qualifications, and the lower category includes those with basic schooling only and those with no qualifications at all. Figure 3.9 indicates the proportions of the workforce in the US, France, Germany and the UK with different qualification levels in 1999.

figure 3.9 Qualification levels (% of employees)



source O'Mahony & de Boer (2002)

It is well known that a much lower proportion of UK employees have 'intermediate' qualifications compared to France and especially Germany. The US has a similar proportion of low qualification workers and an even smaller intermediate segment compared to the UK. Levels of higher qualification are similar across the UK, France and Germany, but significantly higher in the US.

'Intermediate' qualifications, which may be held by many people performing skilled craft and technical jobs, could be of particular importance to manufacturing businesses. However, the

position of the US, with a highly successful manufacturing sector and relatively low levels of 'intermediate' qualifications, clearly demonstrates the need for caution in drawing simple conclusions from the data. There are many other factors affecting firm performance, and superior US levels of higher qualifications and capital investment are likely to have a counterbalancing positive effect on their lower levels of 'intermediate' workforce qualifications.

One reason for caution is the difficulty of performing international comparisons of this kind. These require fine judgements about the relative worth of different qualifications within different educational systems. Another reason for caution is the potential for wide variation in skill levels within given categories. If we are primarily interested in the impact of skills on the production process, we can use relative wage rates to circumvent some of these problems, although this methodology is not without its own limitations. This approach is used in O'Mahony & de Boers (2002) study of productivity in the UK, which indicates that at the whole economy level skills capital is very similar in the US and the UK, and around five per cent higher in France and Germany. The same study estimates the direct contribution of these differences to the productivity gap between the UK and these countries.

table 3.4 Contribution of skills capital to labour productivity differences

	US	*France*	*Germany*
Total economy			
Relative productivity (UK = 100)	130	129	117
Percentage contribution of relative skills	1%	12%	19%
Manufacturing			
Relative productivity (UK = 100)	155	132	129
Percentage contribution of relative skills	4%	na	25%

source O'Mahony & de Boers (2002)

A quarter of the productivity gap between UK and German manufacturing can be directly accounted for by differences in skills capital. Just 4 per cent of the gap with the US can be accounted for in this way, and figures are not available for France. It is interesting that where we do have data, the contribution of skills capital to the gap is somewhat greater for manufacturing than it is at the whole economy level. There is thus some evidence from this source that there may be more of a skills problem in the manufacturing sector of the UK than in other parts of the economy.

It should be noted that the focus of government policy on basic 'level 2' qualifications and basic skills may be a necessary *pre-condition* but is not *sufficient* for improving productivity. Basic qualifications and skills are more relevant to improving individual employability than productivity: they are about equipping individuals with the qualifications and skills required to gain some employment, rather than for higher quality employment. Generally, education and training policy fails to make a clear distinction between these employment and productivity objectives.

Does manufacturing suffer from particular skills shortages and gaps?

The Employers Skills Survey measures the extent of vacancies by sector including those which are hard to fill, as defined by employers, and those which are hard to fill due to applicants lacking the required skills, experience or qualifications: *skills shortage* vacancies. The data for 2002 is presented in Table 3.5.

Total vacancies as a percentage of sector employment are relatively low in manufacturing industry compared to the whole economy average. This is what we might expect given the relative growth rates of the different sectors. The proportion of manufacturing vacancies which are skill shortage vacancies is slightly higher than the whole economy average at 25 per cent compared to 19 per cent. However, skill shortage vacancies as a percentage of

manufacturing sector employment, which indicates the scale of the problem for the sector as a whole, are similar to the average for the whole economy.

table 3.5 Vacancies by sector

	Total vacancies as % of employment	*Skill shortage vacancies as % of employment*	*Skill shortage/ total vacancies (%)*
Manufacturing	**2.0**	**0.5**	**25**
Construction	3.9	1.9	49
Wholesale, retail and hospitality	3.6	0.5	14
Transport and communications	3.4	0.8	24
Finance & business services	3.2	0.6	19
Public administration	2.4	0.3	12
Education	2.2	0.6	27
Health & social care	3.5	0.9	26
Total	**3.1**	**0.6**	**19**

source Employers Skill Survey 2002, Table 2.5

These patterns have remained relatively constant for the four-year history of the survey. It may, however, still be the case that particular areas of manufacturing suffer from shortages of specific skills. Data at the whole sector level will not indicate this kind of detail.

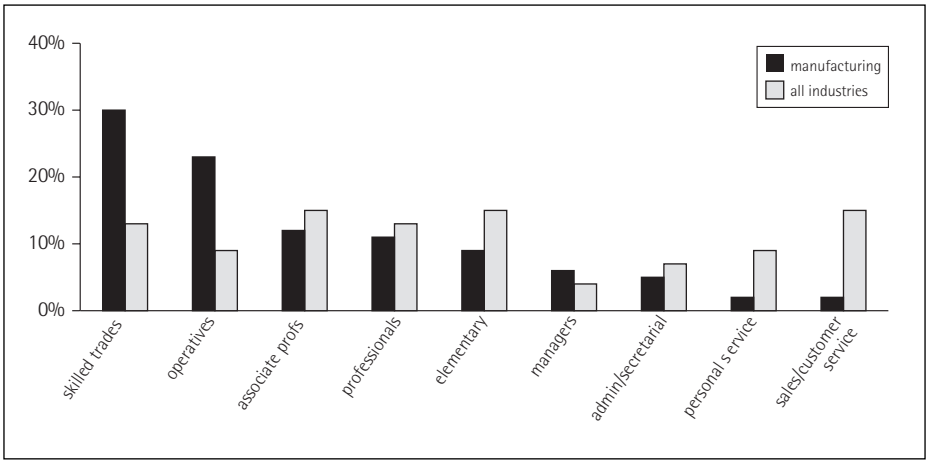
table 3.6 Manufacturing vacancies

	Total vacancies as % of employment	*Skill shortage vacancies as % of employment*	*Skill shortage/ total vacancies (%)*
1999	2.0	0.5	25
2001	2.2	0.6	27
2002	2.0	0.5	25

source Employers Skill Survey 1999, 2001, 2002

Whilst manufacturing does not suffer a notably higher overall level of skills shortages relative to other sectors, the occupational pattern of the skills shortages within the manufacturing sector is unusual. Skills shortage vacancies for skilled trades account for almost a third of the total within manufacturing, and shortages of operatives another quarter. Compared to the rest of the economy, manufacturing can be said to have more of a skills shortage problem at the 'intermediate' end of the skills spectrum, that is for skilled and semi-skilled manual workers.

figure 3.10 Distribution of total skills shortages within sector by occupation



source Employers Skill Survey 2002

A similar analysis can be performed in relation to skills gaps, which occur where existing employees are not fully proficient at their current job. Significant skills gaps are likely to be just as important for firms as significant skills shortages. However, the identification of skills

gaps is much more problematic than the identification of skills shortages: it relies on employers making accurate subjective judgements about the level of proficiency of their workforce. Both the proportion of manufacturers reporting skills gaps and the proportion of manufacturing employees with skill deficiencies are similar to the average for the whole economy. The earlier Employers Skill Surveys of 1999 and 2001 indicate a similar pattern of results, although the overall volatility of the survey results is remarkably high.

	% of firms reporting significant skills gaps	*% of employees not fully proficient*
Manufacturing	**24**	**7.0**
Construction	19	5.0
Wholesale, retail and hospitality	26	7.8
Transport and communications	26	6.7
Finance & business services	23	5.7
Public administration	18	4.4
Education	15	3.1
Health & social care	22	5.2
Total	**23**	**6.3**

table 3.7 Percentage of establishments reporting internal skills gaps

note A 'significant skills gap' means that 65 per cent or fewer of the employees were judged by employers to be fully proficient

source Employers Skill Survey 2002

Once again, whilst manufacturing does not suffer a notably higher overall level of skills gaps relative to other sectors, the occupational pattern of the skills gaps within the manufacturing sector is highly distinctive. Skills gaps among operatives account for over half of all skills gaps within the sector, and the rate of skills gaps in skilled trade occupations is also much higher than the average for other sectors. Whilst the level of managerial skills gaps is similar in manufacturing and non-manufacturing businesses, this is another area where such gaps are important to manufacturers.

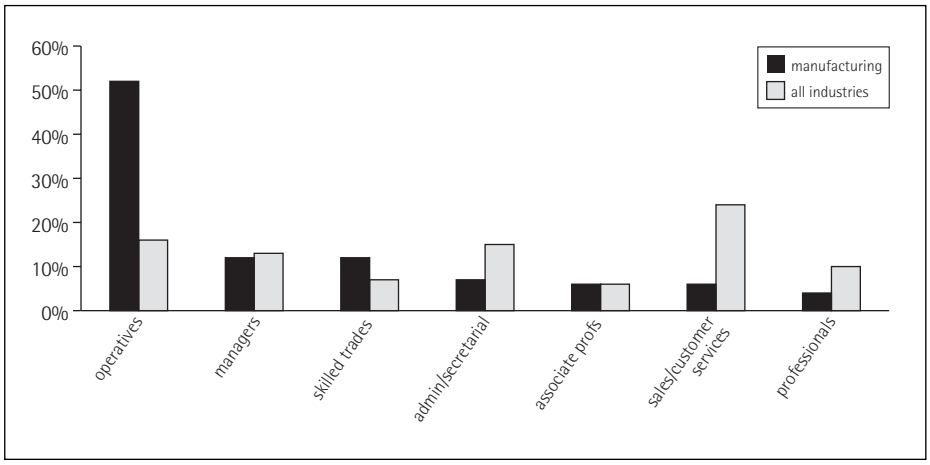


figure 3.11 Distribution of total skills gaps within sector by occupation

source Employers Skill Survey 2002

The organisation of UK training

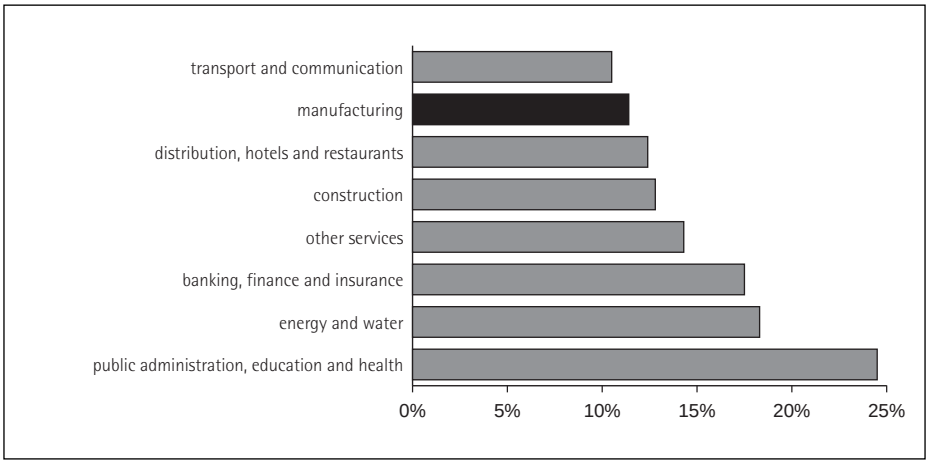
The data on skill levels in the economy and skill demand by employers is consistent with the view that there is some degree of mismatch between the skills generated by the UK's education and training system and the skills demanded by employers. However, the data on skills shortages and gaps does not suggest that this is a problem which affects manufacturing as a whole to a significantly greater degree than the rest of the economy, even if there are specific areas where there appear to be problems. There is also no evidence that skills shortages and gaps in the sector are getting worse.

We should thus be cautious about advocating significant changes in education and training policy with manufacturing specifically in mind. The relatively modest level of mismatch between measured supply and demand of skills in the manufacturing sector may in part reflect low expectations by employers. This does not mean that we should be unconcerned about raising skill levels in the manufacturing workforce through both the initial education system and continuing education and training. However, this needs to be linked to other initiatives and mechanisms designed to help firms think about their business objectives and the implications for the development of their workforce. The demand for training is a derived demand: one that comes from a firm's broader objectives. Policy instruments which treat firm level training in isolation are unlikely to be effective.

It is very difficult to obtain good international comparative data on continuing vocational training. Evidence from the European Commission, which refers back to 1993, suggests that in terms of continuing vocational training time per employee the UK performs better than the EU12 average (Green 2001). This conclusion is supported by more recent work at the OECD comparing international surveys such as the International Adult Literacy Survey and European Labour Force Survey (OECD Employment Outlook 1999). Significantly then for public policy, if the performance of the UK economy and manufacturing sector is held back to some extent by the skills of the workforce, it is not at all clear that UK firms' relative training efforts are to blame.

Unfortunately, international comparisons of training effort are not readily available at the sector level. Within the UK, manufacturing firms demonstrate a relatively low level of job related training compared to the other sectors. Figure 3.12 is taken from Labour Force Survey data, and indicates the proportion of male employees who had received job related training in the four weeks prior to their interview in autumn 2002. Manufacturing employees report a relatively low rate of job related training compared to most other sectors. However, this should not be seized on as a reason to compel manufacturing employers to increase levels of workforce training. Despite the relatively low level of training intensity within the sector, manufacturers do not report unusually high levels of skills gaps overall. Further, there is no guarantee that compulsion would address the gaps which do currently exist.

figure 3.12 Proportion of UK male employees receiving job-related training by industry (autumn 2002)



source Labour Force Survey

From the employer perspective, the motivation to provide training is that it helps to achieve business objectives. From the individual perspective, the motivation to undertake training is that it leads to personal returns in the form of higher wages and job advancement. Despite these motivations, the level of training could be below the optimum in the absence of some form of government action because of the existence of various externalities. A firm which trains an employee is likely to impart skills which are transferable to another job with another firm. Similarly, the higher skill levels of one individual are likely to benefit others in their workplace, who may for example learn from their colleague's experience.

Government action to increase the level of education and training should build on the existing mechanisms by which firms and individuals choose to train. This means making use of the market mechanisms of supply and demand rather that setting crude targets for organisations in terms of expenditure or hours of training. The key principle governing public funding of continuing education and training should be that the funds should follow the learner (Piatt and Robinson 2001): the individual should be subsidised for acquiring transferable skills where we believe the education or training generates positive externalities. It is now widely understood that this may involve a public role in stimulating informed demand from individuals (Cabinet Office 2002), but government lacks the information to plan the specific courses or qualifications that individuals might wish to aim for.

Government may also have a role to play in supporting firms' training activities. However, the term 'workforce development' needs to be reclaimed for the process whereby businesses act to meet their personnel and skills needs and make them congruent with their business objectives. It should not be a catch-all phrase for all aspects of post-compulsory training and education outside of higher education. The appropriate government role here is not in subsidising employers to provide job specific skills, but in helping firms adopt best practice in planning to meet their personnel and training needs. This could help address the issue of low expectations and thus low demand from employers for skills, and is an issue we will return to in the section on enterprise below. However, if firm level training is not especially low in the UK compared with other countries, a statutory framework for firm level training seems designed to address a problem that does not really exist. On the other hand, it is also not clear that there should be a significant shift of resources that subsidise individuals on their various education and training routes to funding streams that directly subsidise firms.

The logic of making use of existing market mechanisms should also apply to the organisation of public training and skills related organisations. We should not build up public organisations whose purpose is to predict the supply and demand of skills by sector, region, sub-sector and sub-region and then to intervene to correct imbalances before they occur. Making the funding follow the learner cuts across arguments about how best to organise training, and whether a sector or regional or local focus is more appropriate.

Modern Apprenticeships

Modern Apprenticeships (MAs) are one specific area of education and training policy where a discrete policy change is warranted. This programme supports young people on the work based training route to gain level 2 (Foundation MAs) and level 3 (Advanced MAs) qualifications whilst in paid work or at least placed with an employer. Whilst MAs are widely available across sectors and not just in manufacturing, the scheme would seem to be designed to address precisely some of the problems which manufacturing employers in particular report, namely skills shortages and skills gaps amongst craft workers and operatives.

Prior to the publication of the 2003 Skills White Paper (DfES 2003), central funding for MAs was available only to those aged 16 to 24, and courses had to be completed before the trainee's 25th birthday. There seems to be no clear logic to an age restriction of this type: if the programme generates benefits that exceed the public cost in the case of a 21-year-old it is difficult to see why the same should not be true for a 26 year old. Indeed Scotland and Wales, some Local Authorities and Regional Development Agencies have used their own funding to allow older workers in the 25 to 40 age bracket, often with relevant experience, to access MAs in specific sectors such as shipbuilding.

Revising the age limit for Modern Apprenticeships upwards would seem to be a reasonable policy goal, so we welcome the Government's commitment in the 2003 Skills White Paper

(DfES 2003) to removing the age cap. After all, such age restrictions are not applied to Higher and Further education courses. In the end individuals will vote with their feet to access the courses they believe will pay off. Many do not vote for the MA route because of doubts about the quality and labour market value of some MAs. However, a level playing field between the different post-compulsory education and training routes is a worthy aspiration.

The Government's proposal is for a staged lifting of the age cap. Young people who join the scheme before their 25th birthday will now be able to complete their courses. However, there is currently no timetable for further extension of the age limit, and there is no detail about the level of funding individuals will receive at different ages. We would encourage the Sector Skills Development Agency, the DTI and the DfES to give priority to SEMTA, the Sector Skills Council for Science, Engineering and Manufacturing Technologies, in developing and implementing their proposals in this area. This might allow some well regarded MAs in manufacturing generally and engineering in particular, which have relatively low drop-out rates, to recruit from a wider base.

Skills conclusion

The commonly quoted data on the UK's relative lack of 'intermediate' skills compared to France and Germany conceals a complex picture. When wage differentials are used to quantify relative skills, we discover that the level of UK skills capital is very similar to that in the US, and around five per cent lower than in France and Germany. Relative skills make only a very small direct contribution to the UK's relative manufacturing productivity gap with the US, but account for a quarter of the gap with Germany. We have already noted the significant data problems in this area and the potential for these figures to under-emphasise the contribution of skills to productivity through improved levels of innovation and enterprise. There is certainly evidence that improving workforce skills may improve manufacturing performance, but once again we must be careful of adopting crude targets in this area. It is important to create the right environment in which the incentives for individuals and firms to acquire valuable skills can operate most effectively.

Overall levels of skills shortages and skills gaps are very similar for manufacturing firms and other areas of the UK economy. However, as is well known the pattern of these shortages and gaps is very different in the manufacturing sector, with a high proportion accounted for by craft workers and operatives. The response to these deficiencies should not be to compel employers to increase levels of workforce training, firstly because what international evidence there is suggests that UK employers already provide relatively high levels of training, and secondly because there is no guarantee that compulsion would effectively address the existing deficiencies. From the firm's perspective the demand for training derives from wider business objectives: this should be our understanding of the term 'workforce development'. Government may have a role to play in assisting firms in this process, potentially helping to address the issue of low expectations and thus low demand for skills from employers and this is an issue we will return to in the section on enterprise. The key principle governing public funding of continuing education and training, whether this is performed within or outside of firms, should be that the funds should follow the learner.

Revising the age limit for Modern Apprenticeships upwards is a reasonable policy goal, so we welcome the Government's commitment in the 2003 Skills White Paper to removing the age cap. The Sector Skills Development Agency, the DTI and the DfES should give priority to SEMTA, the Sector Skills Council for Science, Engineering and Manufacturing Technologies, in developing and implementing proposals for extending the age limits for these courses.

iv) Innovation and enterprise

Innovation

Innovation can be considered most broadly as the generation of new products and processes, or new ways of combining the factors of production. It has long been understood that innovation is the critical ingredient in long term economic growth: in its absence diminishing returns to capital and labour eventually set in (Solow 1970). In the early literature, innovation, or technological change, was an unexplained variable which determined the long run rate of economic growth. Whilst more is now known about innovation, and there is a degree of consensus about some of the appropriate policies to promote innovation, an enormous amount remains unknown and disputed in this area.

As discussed earlier, the bulk of the manufacturing productivity gap between the UK and the US, as well as a significant proportion of the gap with Germany and France, is accounted for by differences in total factor productivity (TFP). Whilst we cannot be sure about its precise contribution, differences in innovation are likely to be one of the key factors affecting levels of TFP. One important reason we cannot be precise about this contribution is that innovation broadly considered does not have a strict definition which is susceptible to a growth accounting analysis. We can measure the contribution to growth of certain types of input which are associated with innovation, but there is no measure which captures all innovative activity. This is not surprising given the very wide range of activities which can be considered innovative, from the design of new products, to advances in human resource management, to minor improvements in management practice at a single firm.

Partly because of these conceptual issues, and partly because of a desire to generate results which are relevant to policy, research has tended to concentrate on a subset of inputs to innovation and indicators of innovative activities. Among the most studied inputs are research and development (R&D) activity, basic research and highly skilled labour. Output measures which have attracted attention more recently include patents, trademarks and new products. True outcome measures of innovation are somewhat conceptually difficult. In a sense, we can only know ex-post which activities were innovative and valuable as opposed to novel but unproductive. The measurement of innovation is a relatively young science.

Manufacturing R&D

There is a large body of empirical evidence that expenditure on R&D is an important factor in technological change and improvements in productivity (for example Griliches 1998). In a multi-country study for the OECD, Guellec and van Pottelberghe (2001) find that at the whole economy level a one per cent increase in business R&D expenditure generates 0.13 per cent total factor productivity growth. These are powerful results: R&D does not only represent a form of investment but is associated with the more effective use of resources. Recent work also suggests that R&D plays an important role in allowing firms, and by extension countries, to catch up to the leading edge of performance elsewhere. This may be particularly important in the UK, which in many areas lags relatively far behind the technology frontier that is usually represented by the US (Griffith *et al* 2001).

It is also widely accepted that the social returns to R&D are significantly above the private returns to firms, even though the private returns are generally quite high (for example, Griffith 2000 for a survey). The reasons for this are relatively well understood: it is difficult for the innovating firm to appropriate all the benefits of their own research because knowledge spills over into other firms. Once a product has been developed and released into the market it can be copied by others, even if intellectual property laws prevent its immediate commercialisation by rival firms. In addition, individuals working in innovating firms may change employer, transferring knowledge between firms as they move. The net

result is that in the absence of government action firms are likely to perform less than the socially optimal level of R&D. Before discussing what the UK Government is doing and should do to promote R&D we will examine the pattern of R&D activity within the UK manufacturing sector.

Manufacturing industry is the most important location of R&D activity, and also the most important source of R&D funding. In 2000, two thirds of all UK expenditure on R&D occurred in business enterprises, and from the mid 1980s to 2000 the manufacturing sector has been responsible for a very stable 80 per cent of UK business expenditure on R&D measured in current prices. As a result economy wide R&D trends closely mirror those in the manufacturing sector. These trends are described in the most detail in work by Griffith and Harrison at the IFS (2003).

From the beginning of the 1980s to the end of the 1990s, UK gross expenditure on R&D (GERD) has fallen steadily as a proportion of GDP. By comparison, R&D intensity in the other G7 countries has either increased or shown no trend. As table 3.8, the result is that the UK has moved from having relatively high levels of R&D intensity within this group to relatively low levels.

table 3.8 Gross expenditure on R&D as % of GDP

	1981	*1985*	*1990*	*1995*	*2000*
Japan	2.29	2.73	2.96	2.89	2.98
US	2.34	2.76	2.65	2.51	2.72
Germany	2.43	2.68	2.67	2.26	2.49
France	1.93	2.22	2.37	2.31	2.18
UK	**2.38**	**2.24**	**2.15**	**1.95**	**1.85**
Italy	0.88	1.12	1.29	1.00	1.07

source OECD

The explanation of the UK's relative decline is complex. During the 1980s, most of the fall in UK GERD intensity can be attributed to a fall in the intensity of UK government expenditure on R&D, and especially on defence related R&D. Over this decade business expenditure on R&D (BERD) as a proportion of GDP was almost constant. In the 1990s the opposite was true. Between 1990 and 2000 the intensity of total government and higher education expenditure on R&D remained almost constant, whilst the intensity of business R&D fell significantly. Over the 1990s lower BERD intensity accounts for all of the widening of the R&D gap between the UK and the other G5 countries.

Looking specifically at business expenditure on R&D in the 1990s an interesting pattern emerges. Most of the G5 countries and Italy experienced a downturn in business R&D activity during the early 1990s. However, Germany, Japan and the US staged a strong recovery from the middle to the end of the decade. By contrast UK BERD continued its gradual decline, with a slight recovery in 1999 before falling back again in 2000.

Analysis by Griffith and Harrison reveals a complex underlying pattern behind this trend. Over the 1990s taken as a whole, most of the fall in UK R&D intensity can be attributed to a fall in the share of the economy accounted for by the relatively R&D intensive manufacturing sector. However, this structural pattern of de-industrialisation was even more pronounced in the other G5 countries, who nevertheless managed to increase their over all level of BERD intensity. The explanation for the relative gap is that these other countries generally increased the intensity of R&D activities within their industrial sectors. The absolute fall in UK BERD intensity is a result of *structural change*; the relative fall is a result of stagnant levels of R&D intensity *within* the manufacturing sector.

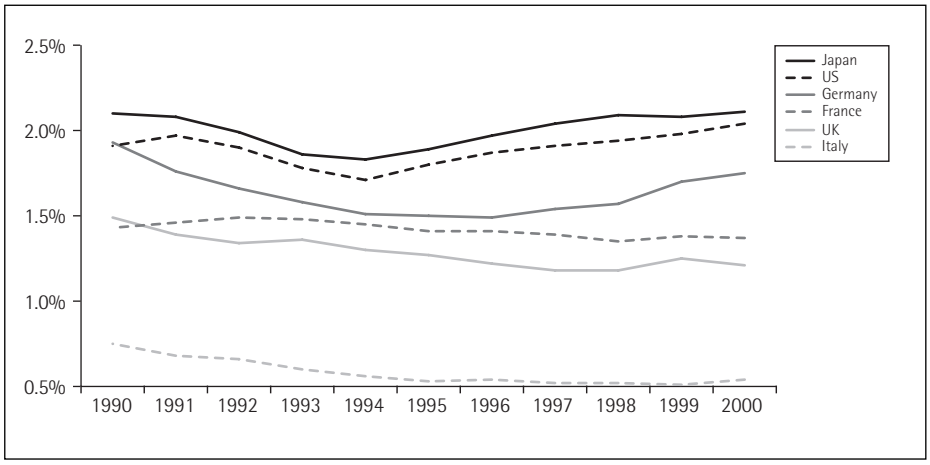


figure 3.13 Business expenditure on R&D as % of GDP

source OECD Main Science and Technology Indicators

There is another complexity which we must take account of in this story concerning the pattern of manufacturing R&D intensity during the 1990s. Whilst the level of intensity was similar at the beginning and end of this period, this conceals significant changes within the decade. BERD intensity within manufacturing sub-sectors fell sharply from 1993 to 1997 before staging a dramatic recovery from 1997 to 1999, thereby ending the period in 2000 back at its 1990 level. At the same time the structure of the sector was shifting so that output was shifting gradually towards more R&D intensive sectors. We do not have more recent data on the intensity of R&D within the UK manufacturing sector, and thus it is difficult to know either what is happening now, or whether there has been any effect resulting from recent government policy changes.

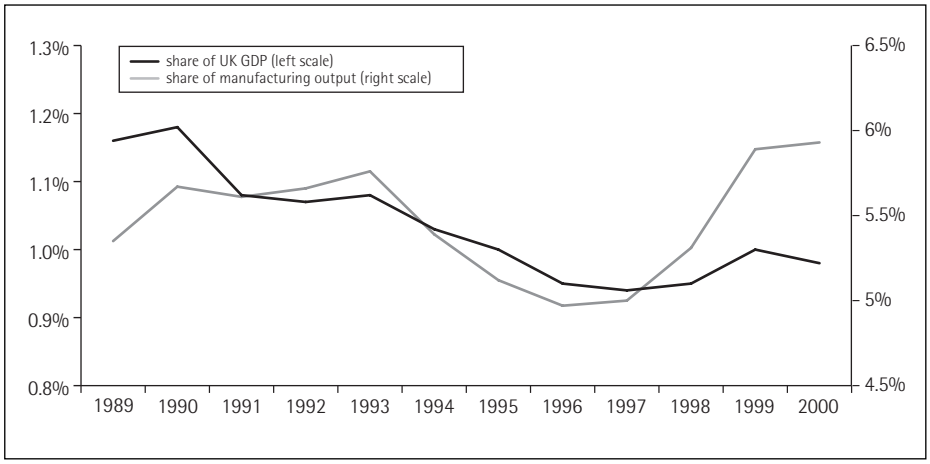


figure 3.14 Manufacturing R&D intensity - two different stories

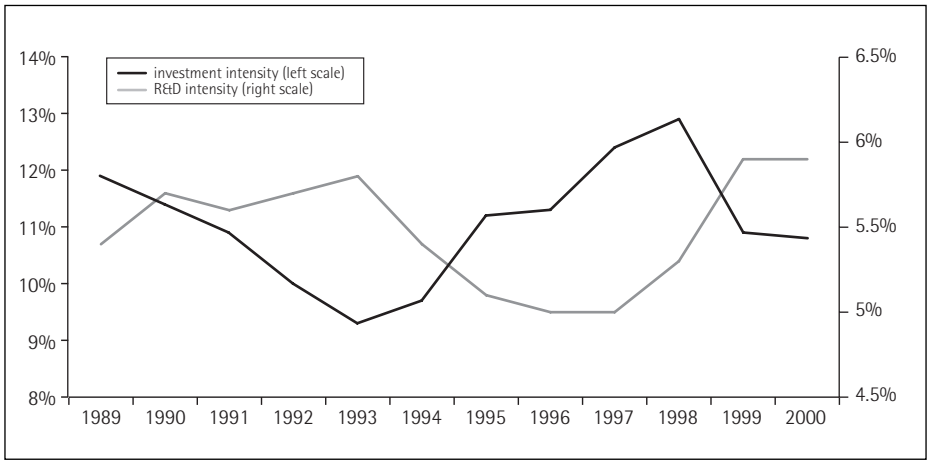
source Becker & Pain (2003) Chart 3

What drives R&D investment?

From the firm's perspective, R&D is essentially a form of investment, although much of the expenditure will be on the salaries of skilled workers rather than on capital goods. We would expect that a firm's decision about whether to perform R&D would be similar in structure to the decision to proceed with an ordinary investment, involving an analysis of the costs and likely returns from the investment. The factors identified earlier as affecting general investment are likely to play a role in the level of R&D: current and expected demand, the tax regime, external factors such as the exchange rate, uncertainty, credit constraints and the availability of skilled labour. Work by Becker and Pain (2003) attempts to quantify the impact of a variety of factors affecting R&D expenditure, and their key results are reproduced in table 3.9, broadly confirming this intuition. However, R&D activities also have distinctive characteristics: they are generally long time horizon, high risk and high return projects. We should not expect R&D investment intensity to exactly mirror general investment, and figure 3.15 confirms that the two series do not move in parallel. Clearly there are different lags between, for example, trends in demand and output and trends in general investment as

opposed to trends in R&D intensity. In addition, UK business R&D is highly concentrated in the aerospace and pharmaceutical sub sectors, and these are likely to be subject to specific pressures and trends.

figure 3.15 Comparing R&D intensity with general investment intensity in UK manufacturing



source Becker & Pain (2003) and National Statistics

table 3.9 Factors affecting R&D expenditure

Impact on R&D volume of a 1 per cent rise in:	
Output	+0.71% to +1.08%
Impact on R&D volume of a 1 per cent rise in:	
Real exchange rate	-1.16% to -1.58%
Import penetration	+0.47% to +1.21%
Real interest rate	-11.9% to -13.4%
Government funding share	+0.62% to +1.70%
Foreign funding share	+0.46% to +0.66%
Skilled employment share	+16.3% to +18.6%

source Becker & Pain (2003)

Innovation policy

It is fairly clear that the Government should promote R&D, and indeed it does so through direct funding of research as well as spending on the education and training of the skilled individuals who perform R&D. At the same time, we should be clear that science policy is not the same thing as innovation policy. The primary purpose of the research funded by, for example, the Medical Research Council is to improve the health and quality of life of the UK population, not to assist pharmaceutical companies to develop profitable products. Similar considerations apply to all seven UK research councils. Indeed, one could venture the proposition that only by concentrating on wider public policy outcomes such as better health or a better physical environment can the government's science budget be sure to fund the kind of research that firms would not fund themselves.

In addition, the Government also has numerous schemes, initiatives and fiscal incentives to help firms with their own innovation. We will not address here the important issue of improving links between the research institutions and business which will be covered by the Lambert review, due in the second half of 2003.

R&D has in fact long benefited from favourable tax treatment compared to general investment, and this has been augmented by the recently introduced UK R&D tax credits for small to medium-sized enterprises (from April 2000) and larger companies (from April 2002). The previous regulations allowed 100 per cent of R&D costs to be deducted from taxable profits in the year the costs were incurred. The new regulations mean that SMEs can deduct 150 per cent of qualifying R&D costs against profits in the same year, and if they have

insufficient taxable profits they can either claim a 24 per cent cash payment or carry forward their allowance. The cash amount payable is limited to the company's PAYE and National Insurance Contributions for the relevant period. Larger firms can set 125 per cent of R&D costs against profits but do not have the cash payment option.

There is quite good theoretical and empirical evidence that the currently proposed scheme will indeed raise the level of R&D in the UK economy (Griffith *et al* 2000). However, due to data limitations we do not yet know how R&D spending has developed since 2000, and it will be some years before conclusive evidence on the impact of the tax credit will be available. The appropriate response to this lag is a period of policy stability to allow proper scheme evaluation.

Should there be more government funded R&D? Perhaps, despite the fact that the 1990s fall in UK R&D expenditure relative to comparable countries is not explained by a fall in government funded R&D expenditure. A number of studies indicate that government funded R&D has a positive impact on total R&D. The results quoted above from Becker & Pain (2003) suggests that a one per cent increase in the share of UK R&D funded by government is associated with a 0.62 per cent to 1.70 per cent rise in the total volume of R&D expenditure. This may reflect relatively capital constrained firms carrying out more R&D activity when they are supported by government funding.

There are a large number of DTI-sponsored schemes which support companies undertaking innovative activity. These range from support for what is almost basic research, through funding of bodies involved in the dissemination of best practice in innovation, to relatively straight forward industrial support. Some of these schemes may well represent very good value for money. However, there is a remarkable paucity of publicly available evidence evaluating their effectiveness, and this is often of very limited value. For example, 'Smart' is a programme which makes grants to small businesses to support innovative activities. This scheme has been evaluated for the DTI (PACEC 2001) with the key finding that 'Each £1 million of public expenditure on Smart during its lifetime has increased current levels of turnover in the economy by £2.4 million and current exports by £1.3 million'. These figures have been quoted in both the DTI's expenditure plans (DTI 2002) and in the Government's Manufacturing Strategy. Leaving aside the interpretation of 'turnover in the economy', these figures are based entirely on telephone surveys of recipient firms. Their production involved no independent measurement of actual firm outputs whatsoever. Smart may represent value for money, but this sort of research does not supply reliable evidence for that conclusion.

Another scheme that has recently been evaluated is the Regional Innovation Fund (RIF) which started funding (through the RDAs) in 1999. This report (DTZ Pieda Consulting 2003) is careful not make empirical claims about value for money. Indeed, it provides an analysis of why such a judgement was not possible due to the relatively early stage that funded projects had reached; failures to set targets for economic outcomes from funding; the difficulty of tracing the impacts of institutional level funding; and the problem of quantifying the impact of additional funding which makes up only a small part of total project costs. Some of these problems could be circumvented by a different analytical approach using econometric analysis. However, RIF funding was subsumed into the RDA single pot budgets in April 2002: in the absence of policy stability we are unable to evaluate programme effectiveness.

Independent econometric work on the effect of a broad range of innovation support policies in the UK has recently been carried out by the Centre for Research into Business Activity (Criscuolo & Haskel 2002). Their results suggest that financial support for *process* innovation does work via the acquisition of innovation related capital goods, but that diffusion policy (for example, the dissemination of best practice related to innovation) does not. Their results also suggest that public financial support has no effect on levels of *product* innovation, but

that diffusion policies do. They do not investigate the costs or benefits of these programmes, but we can safely assume that those which have no statistically significant effects are not good value for money. There is a pressing need for more of this sort of research to evaluate specific innovation related policies.

Competition policy is also likely to have an effect on levels of innovative activity. Influential early work by Schumpeter (1942) suggested that innovation may be positively related to market power, putting forward a range of arguments including the importance of economies of scale in carrying out R&D; greater availability of finance for risky projects; and the ability of such firms to appropriate a greater share of the total benefits of their innovative activities. More recent empirical work has tended to suggest that whilst larger firms do tend to perform a disproportionately high quantity of R&D, competition is in fact a valuable spur to innovation (Griffith 2000). Picking winners, even if these are to be technologies rather than specific companies, has never worked for the UK.

UK firms may choose to carry out their R&D activities within or outside the UK, and foreign firms also carry out some of their R&D activities within the UK. There are likely to be benefits to the UK economy from all of these: research carried out by UK firms abroad may be able to make use of expertise not available in the UK and transfer this to the home company. Workers performing R&D within foreign firms located in the UK may transfer knowledge to domestic companies, and there are likely to be benefits for domestic firms working with foreign research programmes. There is some evidence that R&D by foreign firms actually has more impact on domestic productivity growth than R&D by domestic firms. In a long term cross country study Guellec and van Pottelberghe (2001) find that a one per cent increase in foreign R&D generates 0.46 per cent TFP growth: more than three times the effect of domestic business R&D expenditure in this study. At present we cannot be sure about the appropriate policy response to these considerations, and this is an important area for further investigation.

Innovation: conclusion

UK science policy and UK innovation policy should be clearly distinguished. We are very supportive of the higher levels of science spending that have been announced in recent years. However it is neither appropriate to describe this as support for business innovation, nor should we confuse the legitimate objectives of publicly funded scientific research with business support. This is not to say that the two cannot sometimes support each other, but this will not always be the case and it is dangerous to assume that they usually will.

We are also supportive of the R&D tax credit, for which we see good theoretical reasons and a good chance of success. However, we have seen that there are severe data problems in the area of innovation: the use of output measures such as patents and trademarks is relatively recent development; we are only just beginning to understand the pattern of UK innovation spending in the 1990s; and we do not have detailed R&D data at the sub-sectoral level more recent than 2000. At the same time there are good reasons to believe that the rate of innovative activity may change relatively slowly, both in response to external factors such as the exchange rate and in response to policy measures. The combination of these issues means that it is hazardous to judge the impact of recent policy interventions. Once again, a period of micro policy stability and rigorous evaluation is called for. The DTI's Innovation Review, due in the latter half of 2003, should take a very tough line on the evaluation of programmes of innovation support.

Enterprise

Enterprise is a widely misunderstood concept. It can be most generally considered as the process by which the factors of production such as labour and capital are brought together to generate output. Enterprise is thus another contributor to productivity growth. In this general sense enterprise is as relevant to large businesses as it is to start ups, and enterprise policy would include all measures designed improve the capacity of managers and employees to create value out their available resources. However, enterprise policy is often associated specifically with small businesses, and 'entrepreneurs' are often associated specifically with starting new ventures. There is considerable evidence that too much support for 'enterprise' is aimed at relatively unproductive start ups with a very high failure rate (Adams, Robinson and Vigor 2003 forthcoming). However, here we will consider enterprise in its wider sense. One aspect of enterprise in this wider sense is the process by which resources are brought together in new firms or projects. Another aspect of enterprise is the rapid adoption of innovative and effective management techniques sometimes described as 'best practice'.

In its wider sense, enterprise has a clear role in driving up total factor productivity. However, as in the case of innovation, it is impossible to precisely quantify the contribution of enterprise because its diffuse nature means that it is not susceptible to the growth accounting methodology. Measuring enterprise is even more difficult than measuring innovation, as there are fewer obvious inputs or outputs: observing business start up rates only provides information about one aspect of enterprise, and probably not the one most relevant to UK manufacturers. The DTI's manufacturing strategy implicitly recognises this: whilst enterprise with a distinct small business focus is one of the five Treasury drivers of productivity, the DTI focuses on 'best practice' among manufacturers, which is a more appropriate application of this concept in the context of the sector.

Best practice

'Best practice' is another term with many interpretations, and it is used by different people in different ways. Sometimes this is simply a matter of context: best practice in supply chain management is likely to be quite different from best practice in relation to customer service. Sometimes views of what constitutes best practice will vary for technical reasons, and we would expect the consensus understanding of many issues to develop over time. More problematically, there are cases where disagreements about what constitutes 'best practice' are actually political disagreements. Despite the significantly improved industrial relations climate of recent years, we can still expect trades unions and employers to have different views about what constitutes 'best practice' in relation to many employment related matters.

To some degree 'best practice' must remain a portmanteau term, with different meanings in different contexts. However, it should never be used simply as a tag to give an air of authority to one set of views on an issue. The definition we will adopt here, and it is not the only possible definition, is that best practice constitutes the techniques and methods of organisation that enable an individual firm to achieve its corporate objectives most effectively. Best practice tools are generalised techniques and methods that may be adopted by different firms, and their application involves a wide range of activities by those firms, from reductions in technical inefficiency to more effective strategic planning, but all with the central objective of improving the firm's success measured by its own corporate goals. 'Fit for the future' and the Manufacturing Advisory Service are two government sponsored best practice initiatives which appear to adopt this understanding: they are focused on improving firm performance rather than on other valid public policy goals. This seems to be a sensible approach.

'Fit for the future' identifies a range of issues relevant to firm performance including leadership, people, customer service, supply chain, performance measurement and process improvement. Other initiatives tend to identify a similar set of issues, and there are numerous institutes and organisations playing a role in the diffusion of best practice in individual areas, such as the Design Council and the Chartered Institute of Personnel and Development. A common understanding across all of these varied bodies is that organisations can, if they apply enough corporate effort, improve their performance through the adoption of the right techniques. This immediately begs the question of why, if information about best practice is valuable to individual firms, private firms do not supply this information for profit and what the government's role is in relation to its provision.

The theoretical argument for government to at least *fund* the provision of corporate best practice advice and information is that these are to some extent public goods. One firm's adoption of a particular technique does not mean there is any less of that technique to go around for other firms. In addition, it is hard to exclude non-paying firms from acquiring generic information, and therefore private firms will find it difficult to profit from providing it. There are many private providers of best practice advice such as the major management consultancy companies, but these tend to deliver a relatively bespoke service to avoid the problem of non-excludability referred to above. There are thus likely to be significant gains from publicly funded best practice resources, which is not to say that such services should be directly *provided* by public sector bodies. The provision of best practice advice in partnership with the many existing professional and industry associations appears to be the right way forward, and has been a feature of recent government initiatives in this area.

There are other arguments for the public funding of best practice initiatives. A firm's adoption of new techniques has similarities to both investment and training. As with an investment in capital, the firm will invest resources in considering and then adopting a new practice in the expectation of an adequate return in terms of improved corporate performance. On the one hand, firms may lack sufficient information about the potential benefits of adopting best practice: this may justify government funded promotion of these benefits. On the other hand, firms may not be able to retain all the benefits of the changes they implement: staff may leave the company taking their knowledge and experience with them to another firm. In this case, the fact that the wider benefits outweigh the private benefits may justify direct government subsidy to increase the quantity of best practice initiatives undertaken.

What is the extent of the use of best practice techniques in the UK? This is a difficult issue both theoretically and empirically. As well as considering whether a firm is applying a technique, we need to consider how extensively and effectively practices are applied within firms, as this has been shown to have a strong bearing on whether they do or do not they result in improved firm outcomes (for example, Guest *et al* 2000). Most of the research in this area is based on surveys of management, and even where questions are framed to produce a quantitative response (such as, what proportion of non-managerial workers receive regular performance appraisals?) this may mask very divergent implementation practices (such as, how seriously are these appraisals taken by those concerned?) Researchers in this area are acutely aware of these problems, but the fundamental issue remains that working practices are difficult to describe quantitatively.

Recent work has been undertaken by the Engineering Employers' Federation in relation to lean manufacturing techniques and workplace initiatives in UK manufacturing firms (EEF 2002). Their survey results show that although a third of UK manufacturers use lean manufacturing across the whole of their organisation, 42 per cent do not use lean at all and have no plans to do so. In addition, although the majority of manufacturers have some initiatives in place to encourage employees to contribute to the company's goals, the uptake of practices such as employee involvement and incentive pay are used by less than half of

firms. In both lean manufacturing and workplace initiatives the survey data indicate that domestically owned manufacturing firms in the UK make less use of best practice techniques than US-owned manufacturing firms in the UK. However, these two groups may not be strictly comparable: the US-owned firms are part of multinational enterprises, whereas the UK sample includes domestic firms which may be much smaller and less sophisticated. Work by the Centre for Research Into Business Activity (Crisculo and Martin 2003) indicates that much, but not all, of the total factor productivity gap between domestic owned and US firms in the UK can be explained by this multinational effect. It would be interesting to compare the extent of best practice in domestic UK and US manufacturers and in multinational UK and US manufacturers. This is an important area for further research.

Measurement of the effect of best practice initiatives is another fraught area. There is widespread survey evidence that firms implementing initiatives believe them to be successful. It is somewhat harder to demonstrate empirically that the adoption of a specific practice leads to improved performance, for example as measured by profitability or shareholder returns. In particular, it is often difficult to know whether improved performance stems from the adoption of the technique or from some other characteristic of the firm, or indeed from characteristics that might be associated with the adoption of best practice techniques such as leadership and the capacity to accept organisational change.

This pamphlet will not investigate these extensive issues, but proceeds on the relatively cautious assumption that improvements in UK manufacturing management practice are both possible and could lead to improvements in aggregate sector performance, without asserting that current UK practice is necessarily worse than that in other comparable countries. If UK managers were systematically less effective than those in other countries we would be faced with a real puzzle as to why the market in skilled personnel apparently fails to operate effectively in this area. We also proceed on the assumption that there is a worthwhile role for government in funding and supporting best practice initiatives.

Human resources management

An area where there is a growing body of relatively robust evidence is the link between human resources management (HRM) practices and organisational performance. For example, work by Huselid (1995) demonstrates positive relationships between an index of the extent of a range of 'progressive' HRM practices and results for firm turnover, productivity and financial performance. This kind of result is echoed by a range of studies in the UK and US which demonstrate links between firm performance and the implementation of various personnel related practices (CIPD 2001 for a survey). Some of these results also suggest a direction of causality: that certain practices may result in improved performance, and it is not just the most successful organisations adopting them (for example, Black & Lynch 2001). It is fair to say that the argument in this area is no longer about whether human resource management plays a role in firm success, but about how its benign influence is maximised.

It is certainly not the case that there is a tightly defined list of specific HRM techniques that should be adopted by every firm. However, there is remarkable consistency across many UK and US studies over some of the key characteristics of what have come to be know as high performance workplace practices. These include: the importance of organisations focusing on the acquisition and development of employee skills; the development of a 'psychological contract' between employee and employer; and organisational design that allows employees a high level of autonomy. It is increasingly the case that firms are unable to instruct employees in detail how to do their jobs most effectively. High performance working practices are in part designed to address this problem by creating an environment which encourages and allows appropriate discretionary behaviour by employees.

One aspect of high performance working practices is effective employee representation and consultation. Recent work on US manufacturing firms suggests that plants which recognise unions and have adopted practices such as joint decision-making and performance related pay performed significantly better than otherwise similar non-unionised plants (Black and Lynch 2001). Their key results are reproduced in table 3.10. The explanation of this pattern may be that employees are reassured by the presence of the union that their interests will be protected despite the introduction of new working practices, and thus co-operate better with the reforms. Recent work by the EEF (2002) indicates that 'attitudes to change' are by far the most important barrier to the adoption of workplace initiatives, and this is congruent with the relative success of unionised firms in making such practices productive.

table 3.10 The interaction of unions with high-performance working practices

	High-performance working practices	*No high-performance working practices*
Unionised plant	113.5	90
Non-unionised plant	104.5	100

note high performance working practices = all of: benchmarking; total quality management (TQM); profit sharing for non-managerial workers; 50 per cent of workers meeting on a regular basis.

source Black & Lynch (2001)

Having said this, there are still vigorous disagreements over the issue of whether trade unions themselves make a positive difference to firm performance. Whilst it is generally acknowledged that employee *involvement* builds valuable relationships of trust, there is disagreement over whether this should be *direct* involvement of employees in workplace decisions, *indirect* involvement through mechanisms such as trades unions, or a mixture of the two. The 'business case' for formal representative mechanisms is two fold. Firstly, the presence of unions is associated with higher overall levels of employee involvement (Coats 2001), which are associated with improved performance. Secondly, if unions provide employees with the security that their interests are being represented, then they may improve employee buy-in to workplace decisions and initiatives. Work by organisations such as CIPD has emphasised the importance from a business perspective of employees feeling that they are fairly treated: it is reasonable to believe that unions have a part to play in that process. At the same time it is important to note that there is no proven 'one size fits all' approach to this issue. The DTI partnership fund has a potentially useful role in supporting the development of employee involvement mechanisms, but has experienced relatively low demand from firms and employee representatives and could usefully be revisited with these considerations in mind.

Sector Skills Councils to Sector Councils

Our earlier discussion of skills concluded that government action to increase the level of education and training should build on the existing incentive mechanisms by which firms and individuals choose to train. There is an important role for government in ensuring that education and training providers, for example further education institutions, are sufficiently flexible to meet the needs of employers and individuals. However, at the firm level the appropriate government role is not 'predict the requirements of the industry/region/locality and provide' but rather to help firms adopt best practice in planning their own personnel and training needs. This implies that government efforts to address skills issues at the firm level should be set within the context of business support.

The recent withdrawal of funding from National Training Organisations and establishment of Sector Skills Councils may be welcomed for a number of reasons. It was heralded by government as a mechanism for making post-compulsory training and learning more responsive to employer requirements. However, this reform does not go far enough. Sector Skills Councils could fulfil their existing objectives more effectively, and could play an important role in the rationalisation of other aspects of business support, if they became

Sector Councils whose key role was assisting firms to plan for and meet their business needs more widely, including their skills needs.

It is important to emphasise that this would not mean going back to the drawing board for Sector Skills Councils, which are of course still in their infancy. Many of the roles and characteristics of Sector Councils would be similar to those of Sector Skills Councils. They would continue to develop evidence of effective employer skills strategies and promote these, and they would also generate skills demand by supporting the workforce development process of employers. They would continue to make links between employers and training providers, and would play a role in informing individuals about the market for skills. There would be no reason to change from the current model of the organisations being run and owned by employers. However, Sector Councils would be business support networks rather than planning organisations. They would not attempt to 'develop a forward looking skills and productivity agenda and action plan for the sector' and then seek to directly influence the supply of skills by provider organisations.

If Sector Councils, or indeed Sector Skills Councils, are to perform their functions effectively, then their role will involve assisting firms to plan their business needs, from which their skills needs are derived. They will thus be well placed to act as a dissemination mechanism for aspects of best practice other than those which relate solely to skills directly. Sector Councils should continue the model of championing best practice in a range of areas and referring firms to specialised bodies for detailed advice and assistance. The Sector Councils could carry forward the work of such initiatives as Fit for the Future at a more targeted level. It is not at all obvious why the best practice in relation to skills is promoted at the sectoral level, whilst the Manufacturing Advisory Service has been set up on a regional basis to address other best practice issues in the sector. This report focuses on the need to sensitively evaluate what works rather than proposing widespread institutional reorganisation of business support. Nevertheless, there will come a time when the structures will need to be revisited in the light of a better understanding of what does work. We hope that Sector Skills Councils, being business led and sector focused, will prove to be a valuable institution around which other functions may be organised.

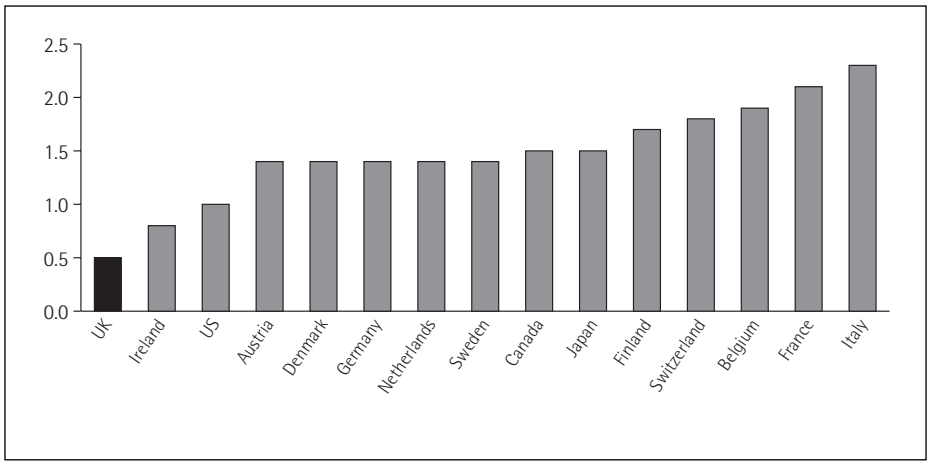
As in other areas of business support, government funding of the Sector Councils should be contingent on the demonstration of their effectiveness in delivering clear policy goals. This would involve rigorous independent evaluation with the minimum possible reliance on survey data. If Sector Councils are designed to deliver improvements in business performance then there is no justification for evaluating them by asking firms for their views: this is cheap but ineffective. Instead, firm level performance data should be used and firm involvement with Sector Councils should be tested as an explanatory variable. In the absence of a robust link, government funding should be withdrawn. It should be noted that if Sector Skills Councils are evaluated on the basis of *sector* rather than *firm* performance as is currently proposed (DfES 2001), it will be extremely difficult to resolve whether or not they are effective, as it will be difficult to establish causal links between sector performance and the actions of the institutions.

How heavily is the UK economy regulated?

It is widely understood that product market regulation and employment legislation impacts upon levels of enterprise and productivity growth (Scarpetta *et al* 2002). Does the UK have a business environment conducive to enterprise in this general sense? Perhaps the best international comparative data is produced by the OECD, which collects this information precisely because of the perceived link with productivity growth. The two key summary charts are reproduced below. It is immediately striking that on these measures the UK performs extremely strongly in terms of having a regulatory regime which is conducive to business success. On the basis of product market regulation the UK is

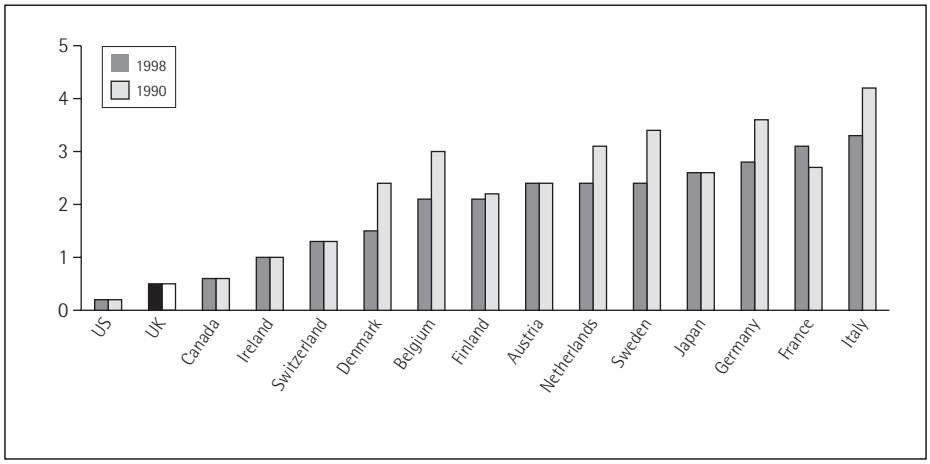
considered by the OCED to have the least burdensome regime out of all the advanced industrial economies. On the basis of employment protection legislation the UK is second only to the US, although it is notable that many other countries improved their situation over the 1990s, reducing the relative advantage of the UK in this respect. These results provide evidence against the argument that UK manufacturing suffers from an excessively burdensome regulatory regime, and especially strong evidence against the theory that the regulatory regime could help explain the sector's relatively poor performance in the late 1990s by international standards.

figure 3.16 OECD index of product market regulation (0 = least) 1998



source OECD/Nicoletti et al (1999)

figure 3.17 OECD employment protection legislation (0 = least)



source OECD/Nicoletti et al (1999)

The comparative data presented here refer to 1998. Has the Labour Government had a negative impact on the UK regulatory environment since then? It is possible to point to a number of high profile initiatives that may have impacted on business even if they have been introduced to achieve other perfectly legitimate and worthwhile objectives. In the area of employment legislation, Labour has introduced a minimum wage, the working time directive, modest trade union reforms and various 'family friendly' policy initiatives. It is very difficult to quantify the impact of these measures. However, one source of indirect evidence is the level of employment. We would expect inappropriately designed employment measures to cause firms to be more cautious about taking on new workers, retarding employment growth. In fact, as is well known the UK labour market at the aggregate level performed strongly over the period 1997 to 2002, with the employment rate for those of working age rising from 72.7 per cent to 74.4 per cent. There is no strong economic argument for widespread de-regulation at the expense of other important policy goals such as the promotion of rights at work and environmental sustainability. At the same time there is an economic case for maintaining a sensitively regulated environment without disproportionate costs or burdens on business.

Enterprise: conclusion

This pamphlet has addressed enterprise in the sense in which it is applicable to large as well as small businesses: as the process by which the factors of production are brought together, rather than the process by which new firms are created. That we have not identified a distinct enterprise strategy for manufacturing should come as no surprise: there was no mention of manufacturing in 'Enterprise Britain', the Treasury's November 2002 statement of enterprise policy, and there is no explicit discussion of enterprise in The Government's Manufacturing Strategy. The explanation of this may be that the best policies to promote enterprise within the manufacturing sector are likely to be macro policies: a robust competition environment and a stable macro-economic framework.

There are sound theoretical reasons for a government role in funding the dissemination of best practice, which can be considered a form of enterprise policy. There is also empirical support for the proposition that good management practice can be shared across firms and can improve corporate performance. What we lack at the moment is evidence of the link between government action and the spread of good management practice. In the absence of robust evidence about existing government initiatives it is difficult to know whether these are effective or not, and therefore whether we should be spending more or less on them. It is possible that rigorous evaluation across all existing programmes of support for investment, skills formation, innovation and enterprise policy could suggest a radically different allocation of resources.

4 conclusion

One of the themes of this pamphlet has been to distinguish between the long term and short term story about manufacturing. One key long-term trend is the process, sometimes called 'de-industrialisation', by which manufacturing gradually shrinks as a proportion of total output in the advanced economies. This is partly the result of another long-term trend: the tendency for productivity to grow more rapidly in the manufacturing sector than in the economy as a whole. The combination of the two implies that manufacturing employment in the UK will tend to fall over the long term. We should face these trends with equanimity but not complacency, as they are compatible with continued growth in manufacturing output, rising prosperity and high levels of employment in the economy as a whole. The crucial caveat is that this process should occur gradually, and as far as possible without any sudden and unwelcome shocks to regional employment, the current account of the balance of payments, and high return activities such as R&D. To a great extent this requires the continued success of the manufacturing sector.

The recent negative experience of UK manufacturing and its short term prospects are not explained by these long term processes. The very difficult experience of the sector in the late 1990s, 2001 and 2002 is most convincingly attributed to an unfavourable sterling exchange rate from 1997 onwards. Profitability, investment and productivity are all causally related to each other and to the exchange rate. The recent correction of the rate does not represent a panacea for the sector, but if the level of sterling in mid 2003 proves durable, or if there is some further depreciation of sterling, then this offers a basis for a more positive assessment of the sector's prospects than has been possible over the last few years. We can be considerably more up-beat about manufacturing now than when work commenced on our research in early 2002.

Many of the most important policies for manufacturing industry are relevant across the whole of the economy. Macro-economic stability and a strong competition regime are necessary conditions for the success of the manufacturing sector, and the current government's performance in these respects should be applauded. However, there are some significant imbalances in the UK economy, of which the manufacturing sector's recent weakness has been one. One of these concerns the balance between the various categories of domestic expenditure. If business investment is to recover from its current levels then the rate of growth of consumer spending will have to abate. Another imbalance concerns the regional distribution of manufacturing. Here the key long term challenge is to help those regions which remain more dependent on manufacturing make a smooth transition into having a more diversified economic base.

Another theme that has emerged from our analysis is the need for a period of *micro-economic policy stability* in many areas relevant to manufacturing. In any report of this kind there is the temptation to present a 'ten point plan' listing a series of key policy changes that would assist the sector. That we have not done so is quite deliberate. We have, however, made some specific policy proposals, particularly regarding the age restrictions on Modern Apprenticeships, and regarding the provision of support for best practice via refocused Sector Councils. The detailed conclusions are drawn earlier, in the sections on skills and enterprise respectively.

Modern Apprenticeships

Current arrangements: central funding available only for those who start courses before trainee's 25th birthday.

Proposal: SSDA, DTI and DfES to prioritise working with SEMTA to develop proposals for lifting of age restrictions and provision of funding.

Sector Skills Councils

Current arrangements: develop sector skills strategies, make links between employers and training providers, plan for sector requirements and influence the supply of skills by provider organisations.

Proposal: refocus Sector Skills Councils as facilitators of best practice advice for firms, recognising that business demand for skills is derived from business needs. Remove planning role, but continue as link between employers and training providers. Route other best practice initiatives through renamed Sector Councils as they become well established.

In other areas we have been circumspect. In relation to investment, we do not see strong arguments for changing the corporate tax system. The UK arrangements are relatively advantageous by international standards, and changes would bring unwelcome uncertainty for businesses. Given the government's ambitious public spending plans, it is hard to see how reductions in corporate taxation would be possible except with counterbalancing adjustments elsewhere in the tax system, which would generate further uncertainty. Indeed, we would urge that the corporate tax system is kept under careful review so that its benefits are not eroded as a result of emerging fiscal pressures in the UK.

In the area of innovation, we are supportive of the recently developed R&D Tax Credit and would now like to see a period of stability, coupled with a recognition that there is much we still do not know about innovation and that there may be long lags between changes in innovation policy and witnessing the effects at firm level. We are also supportive of the higher level of science spending that has been pursued in recent years, although we are keen to distinguish clearly the objectives of such spending from the objectives business support.

We do not see any compelling or particularly coherent argument for a programme of extensive de-regulation of UK labour or product markets. On the other hand, we are generally wary of crude targets and compulsion on firms in relation to business decisions over issues such as investment and training.

A final, important theme throughout our work has been the need for much better evaluation of business support policy instruments, whether these are aimed at investment, skills, innovation, enterprise or any other factor contributing to business success. It is simply not possible to say with any confidence that the existing pattern of public funding is appropriate, or whether total public expenditure on business support is too low or too high. All programmes of business support should be designed with *robust* and *independent* evaluation in mind. Such evaluations should make the maximum practicable use of high quality econometric analysis. The failure of schemes to demonstrate appropriate benefits should result in their closure. Robust evaluation is not possible where schemes are substantially redesigned whilst they are underway, and is made more difficult where schemes are short and numerous. We are fully supportive of the DTI reviews of business support and innovation, and hope that they will address this important issue effectively.

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