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The Value of Skills: An Evidence Review

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Analysis › Understanding › Insight › Advice

The Value of Skills: An Evidence Review

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Foreword

The UK Commission for Employment and Skills aims to raise UK prosperity and opportunity by improving employment and skills levels across the UK, benefitting individuals, employers, government and society. The UK Commission provides independent advice to the highest levels of the UK Government and Devolved Administrations on how improved employment and skills systems, participation and attainment can help the UK become a world class leader in productivity, in employment and in having a fair and inclusive society.

Research and policy analysis plays a fundamental role in the work of the UK Commission and is central to its advisory function. In fulfilling this role, the Research and Policy Directorate of the UK Commission is charged with delivering a number of the core activities of the UK Commission and has a crucial role to play in:

- Assessing progress towards making the UK a world-class leader in employment and skills by 2020
- Advising Ministers on the strategies and policies needed to increase employment, skills and productivity
- Examining how employment and skills services can be improved to increase employment retention and progression, skills and productivities
- Promoting employer investment in people and the better use of skills.

We produce research of the highest quality to provide an authoritative evidence base; we review best practice and offer policy innovations to the system; we undertake international benchmarking and analysis and we draw on panels of experts, in the UK and internationally, to inform our analysis.

Sharing the findings of our research and policy analysis and engaging with our audience is very important to the UK Commission. Our Evidence Reports are our chief means of reporting our detailed analytical work. Our other products include summaries of these reports; Briefing Papers; Thinkpieces and seminars. All our outputs are accessible in the Research and Policy pages at http://www.ukces.org.uk/our-work/research-and-policy.

This report is the 22nd in the UK Commission's Evidence Report series. It seeks to provide a comprehensive and organised review of the available evidence on the value of skills acquisition for the economy as a whole; for organisations; and for individuals. It also draws attention to the wider benefits of skills.

We hope you find this report useful and informative. It is an important component of the evidence we need to inform our on-going policy advice to achieve a more prosperous and inclusive society.

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1 Introduction

This report aims to provide valuable evidence to support the UK Commission in its strategic priorities for 2009-14 and to provide for our partners, stakeholders and sponsors a digest and resource on this crucial issue.

The UK Commission has set out five priorities for the next five years as the first steps towards achieving our 2020 Ambition of becoming World Class in skills, jobs and productivity by 2020 (Spilsbury and Campbell, 2009):

- To create a clear and integrated strategy for economic transformation and renewal, capable of sustaining the UK through periods of recession, recovery and growth and that aligns policies and practices in industrial strategy, employment and skills in order to achieve that transformation.
- To support effective economic development in cities and local communities built on industrial and labour market strengths and opportunities, and maximising the skills of the local working age population.
- To develop more agile and responsive skills and employment provision capable of anticipating and meeting employers' evolving skills and job requirements.
- To transform individual aspiration and skills into a World Class workforce maximising the motivation and opportunity for all people to develop and exploit their talents and skills for personal and professional success.
- To build employer ambition and capacity to be World Class, capable of competing globally in the high skills, knowledge driven economy, and optimising the talent and skills of their people.

The evidence on the value of skills is also critical to informing and supporting Governments, and their agencies, policies and actions to raise individual aspiration and employer ambition. This report will, we hope, also be of interest to employers' bodies and representatives; those that advise both young people and adults on careers and learning choices; providers of education and training including schools, colleges and universities; Government researchers and policy analysts; and all those with an interest in vocational education and training and the role that skills can play in building a more prosperous and inclusive society.

The explicit intention of this report is to review the evidence on the extent to which skills pay for the individual, for firms and collectively for the UK. Skills are one key dimension of UK prosperity and with ongoing technological changes, including information and communication technologies; globalisation and changing patterns of competitive advantage; the increasing quality standards expected by consumers; and the need to further improve the quality of public and private services; the importance of skills to economic success is likely to increase further in the years ahead. There may also be wider, often non financial benefits for individuals and society, which, though difficult to measure are important to the achievement of a more equitable, cohesive society. A stable and cohesive society may in turn be important to securing economic prosperity (Wilkinson and Pickett, 2009).

This report is published as part of the UK Commission's Evidence Report series. The purpose of these is to bring together in one place a substantive review of the evidence to act as a resource for researchers and policy makers. To this end this report will present evidence on the benefit of skills, skills acquisition and utilisation to various desirable outcomes such as productivity, earnings and employment along with wider, less tangible or indirect outcomes such as enhanced social equality.

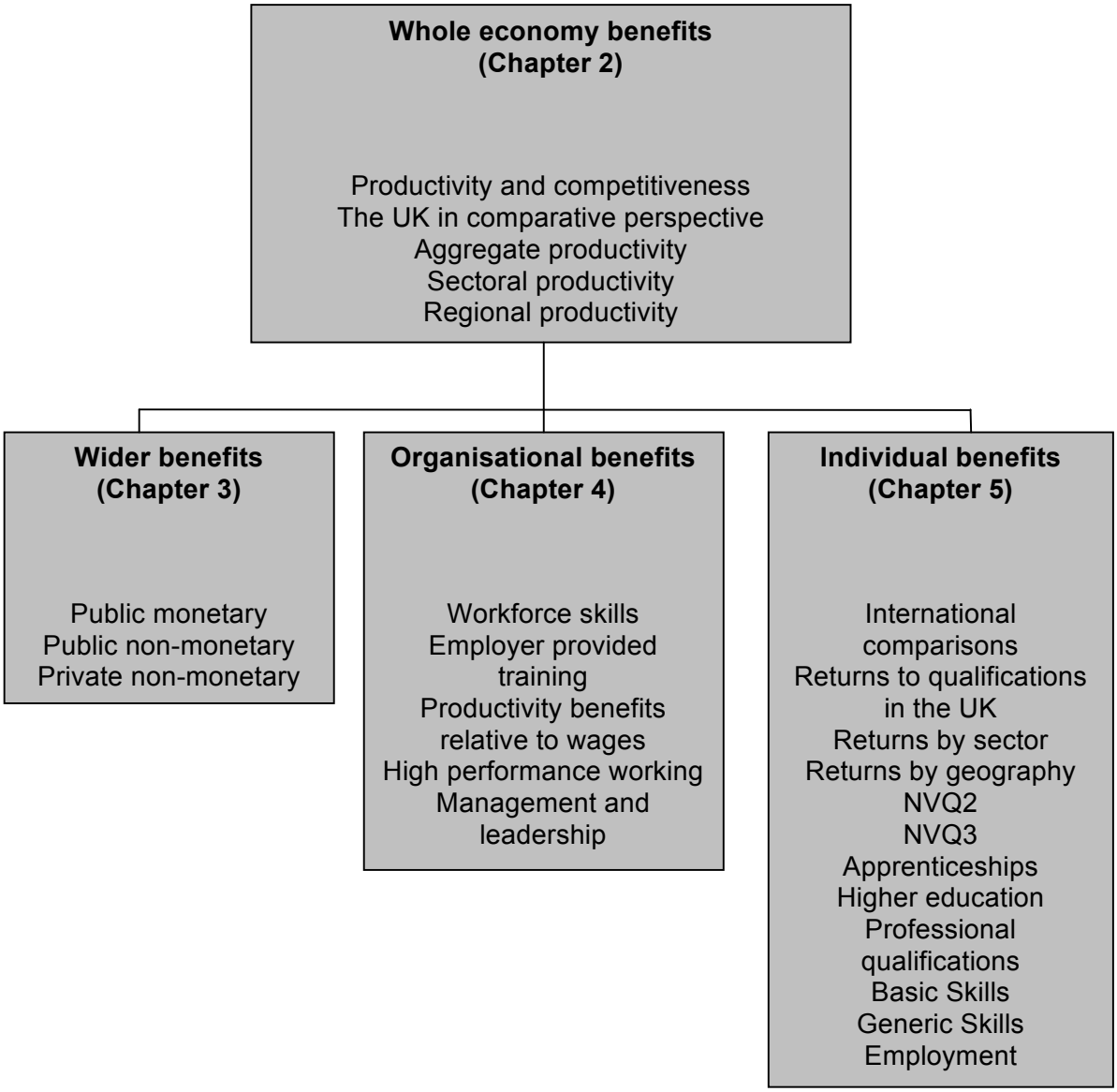
A further UK Commission Evidence Report is complementary to this report (McIntosh, 2009) and is reviewing in more detail the literature on the return to intermediate vocational qualifications.

It should be noted that throughout the report qualifications are often used as a proxy for skills. Of course qualifications do not, and cannot, capture all aspects of skills development and, moreover, skills acquisition is not solely achieved through formally accredited qualifications. Qualifications are, however, an extremely important means of skills acquisition, a mechanism for further skills progression and a key criterion in much employer recruitment.

1.1 Structure of the report

The report consists of four main sections which aim to cover the various dimensions of the benefits that skills can deliver to different constituents (see Figure 1). The review first sets out the evidence on the value of skills to the economy before, in the next section, examining wider benefits of skills. Section four examines the value of skills to organisations, before assessing the value of skills to individuals in section five. Finally in section six we make some concluding remarks.

Figure 1: The structure of the report



1.2 Why is it important to know about the value of skills?

Does acquiring skills add value? Do they provide benefits to the individuals and organisations that are investing in them? Is investing in skills worthwhile? Do they offer a 'return' to people? Does the economy benefit and if we spend more on skills acquisition, what will it be worth? If Governments spend resources on skills, how is this likely to impact on jobs, on productivity, or on people's earnings? Which skills are most useful to employers and individuals? These are the kind of questions that providing evidence on the value of skills can help us answer.

The authors' overall assessment is that skills are very valuable indeed but that evidence enables us to take a more sophisticated and nuanced view on the benefits, the conditions under which these can be maximised and when the benefits are less substantial. Precisely because it would seem that skills can be so valuable in helping us to secure a more prosperous and inclusive society, we need to know, and we need more people and organisations to know, about their value. This review of the available evidence seeks to draw the material together in one place to make access to it easier and more widespread. The review is dominated by evidence from the UK and US because the value of skills is more similar in these countries than others such some European countries and especially developing countries.

- Knowing more about the value of skills can help us in a range of more specific ways too: The evidence can provide 'signals' to all those involved in skills development – individuals choosing which skills to acquire; schools, colleges, universities and other training providers; employers; public agencies who fund or influence provision. All these should know about the broad range of evidence available to help them make more informed decisions about skills development.
- The evidence can be used by information, advice and guidance services to help inform the choices and decisions open to individuals both as young people and adults.
- The evidence can inform policy makers who are developing policy, establishing priorities and allocating public resources. It may help to increase efficiency, effectiveness and impact of public expenditure by informing policy development. The evidence:
    - Helps inform the 'economic' case for skills; support proposals to sustain, develop or retain funding, whether public or private, employer or individual, or priorities attached to skills development in the local, regional, national or European arenas.
    - Can be utilised in marketing, communications and campaign materials which seek to convince individuals and employers of the 'business case for skills for skills'
    - Has value in informing the strategy and business planning of education and training providers, and funding and development agencies amongst others.

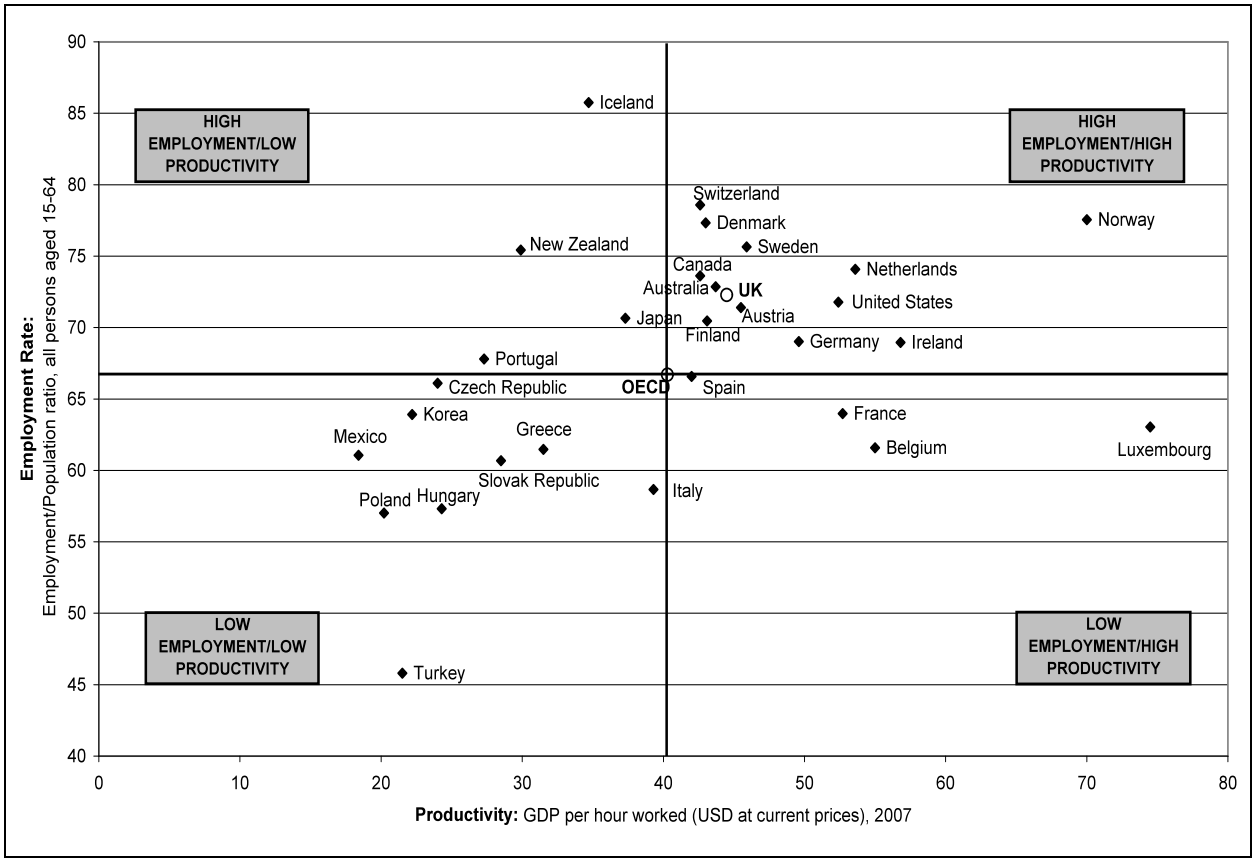
Skills are increasingly important. They will help us, as individuals, as organisations and as a society to both adapt to change and help drive that change. They are crucial to unlocking our potential and preparing ourselves for a challenging but exciting future. Knowing more about the prosperity they can help create will hopefully encourage us all to take the skills agenda even more seriously. But in doing so, it is necessary to ground our thinking and action in the evidence base that is available on the value of skills.

2 The Value of Skills to the Economy

2.1 What evidence is there on the relationship between skills and national economic performance?

The UK's prosperity ultimately depends on two things, firstly, the number of people employed and, secondly the value of what those workers produce. The UK's relative international position is illustrated in Figure 2. It positions the UK in terms of its employment rate and level of productivity and shows the UK performing above the OECD average for employment and productivity. On this data the UK is placed 10th of 30 OECD countries for its employment rate and 11th for its level of productivity. Although this performance positions the UK in the most desirable (top right) quadrant of Figure 2 its performance is exceeded by countries such as the USA, Germany, Sweden, Norway and the Netherlands. The UK's ambition must therefore be to move further into this quadrant if we are to secure and sustain our future prosperity.

Figure 2: Productivity and employment in the OECD countries



Source: Spilsbury and Campbell (2009), Chart 1.1, page 22

There is also an overall positive relationship between employment and productivity.

Whilst higher employment rates contribute to productivity, in the long term it is the growth in average labour productivity (ALP) that provides the foundation for growth in real incomes and living standards. A standard definition of ALP is average output per worker or per hour worked. As Paul Krugman (1994) said, 'productivity isn't everything, but in the long run it is almost everything'. Policy-makers are therefore rightly concerned with how the UK compares with other nations on measures of labour productivity.

It is notable that recent estimates of both the levels *and* growth rates of productivity reach the following conclusions:

- Labour productivity *growth* in the UK has outpaced France and Germany in recent years and has compared favourably with the US at a time of rapid acceleration in US productivity growth
- In spite of this comparatively rapid growth in UK labour productivity, average *levels* of labour productivity in the UK are still well below those in the US and France and (to a lesser extent) below those in Germany

For example, recent estimates from the Office of National Statistics (ONS) show a clear reduction between 1992-2007 in the gaps between the UK and these other countries in terms of GDP per worker-hour. However, levels in the UK still remain about 13-14% lower than in the other three countries in 2007.

Alternative estimates for the 1995-2004 period constructed using sector-specific purchasing power parity (PPP) exchange rates, rather than the whole-economy PPP exchange rate used by ONS estimates, also show the UK comparing well in terms of recent productivity growth rates but poorly in terms of productivity levels. They point to a US lead over the UK in market sectors as high as 36% in 2004 while productivity in France was 20% above the UK level. However, the same estimates suggest that productivity in German market sectors was only 7% higher than in the UK (Mason, *et al*., 2008).[1]

Productivity is driven by several inputs and it is useful to identify the relative contribution of skills. Competition, enterprise, innovation, investment in physical capital and skills all drive productivity performance (HMT, 2007).

[1] As noted, the NIESR estimates (Mason *et al*, 2008) use sector-specific PPP exchange rates rather than the GDP PPP exchange rates used by ONS. Another important difference is that Mason *et al* use constant PPPs (estimated for 2002 and then updated and backdated using sectoral price deflators for each European country relative to the US). By contrast, the ONS estimates are based on current PPPs. Both approaches have advantages and disadvantages. An argument for preferring constant PPPs for estimates of productivity growth rates is that the underlying price deflators are explicitly designed to capture changes through time. A disadvantage of constant PPPs is that the weights employed to aggregate prices up to total market economy level do not vary through time, in contrast to current PPPs where the basket of goods and services that is priced changes annually.

In a survey of studies using multivariate regression techniques, Sianesi and Van Reenen (2003) conclude that the evidence supports positive effects of skills on economic performance at country level. The use of such methods allows the studies to account better for the complementarities that exist between skills and other production inputs. Examples of such complementarities include the role of skills in adopting new technologies and the role of skills, knowledge transfer and innovation.

The potential links between skills and innovation are important including the role of skilled workers in transfer of knowledge between firms, sectors and countries, whether through collaboration on R&D and technical problem-solving by firms involved in supply-chains (Lundvall, 1992) or the mobility of highly-qualified engineers and scientists between firms (Mason *et al*., 2004). Furthermore, in order for firms in each country to identify and make effective use of knowledge, ideas and technologies generated elsewhere, what is required is 'absorptive capacity' which may be created through the development or acquisition of high levels of workforce skills (Griffith *et al*, 2004). Thus skills may help to stimulate productivity growth via their effects on innovation but these effects may take some time to unfold.

Underlying and assisting the development of this absorptive capacity is the ability and skills of the workforce that firms have to draw upon. The stock of skills inevitably sets limits on how much firms can develop this capacity and also how much they will need to invest in skills relative to similar firms in other countries in order to achieve similar levels of skills.

Increasing the stock of skills is then critical to achieving greater international competitiveness. The OECD recognise it as a significant explanation for observable differences in economic growth and this has been reiterated through recent policy emphasis (Leitch Review of Skills, 2006; BERR, 2009; BIS, 2009).

The Leitch Review estimated the economic impact of the increased skills levels of the UK workforce in recent years and of achieving the Leitch 'targets' by 2020. The qualifications improvement over the last 10 years was estimated to have raised achieved GDP by between £30 and £50 billion over the period. This was achieved through a 2% point increase in GVA per worker and around 200,000 additional jobs.

The Leitch 'dividend' from reaching the proposed 2020 targets (targets that were adopted by the UK Government for England in 2007) was estimated, conservatively, at a minimum of £80 billion over 30 years, through a combination of i) a 5% increase in the rate of productivity growth (equivalent to a 3% point increase in GVA per worker or 0.2% per annum up to 2020) which amounts to around £1800 per worker, and ii) a 10% increase in the rate of employment growth, amounting to around 200,000 jobs.

2.2 Studies of the value of skills at national level

As we have seen one contribution to this performance is a country's stock of skills or human capital when compared to its competitor countries. Several pieces of evidence usually based on cross country growth regressions, support this notion and illustrate the size of the contribution.

The classic study is Barro (1991; 1997) which showed in the period 1965-90 a 1% point increase in secondary level enrolment rates is associated with a 3% point increase in the per capita GDP growth rate. Englander and Germany (1994) show that increases in the secondary education enrolment rate in the period 1960-85 in the OECD countries added 0.6% points to annual productivity growth. Indeed, in each decade educational attainment was found to be one of only three variables which had a robust correlation with productivity growth.

Bassini and Scarpett (2001) in their study of 21 OECD countries over the period 1921-1998, investigated the determinants of economic growth using panel data and found 'a positive and significant impact of human capital accumulation on output per capita growth'. They found that on average one additional year of education (as proxied by the number of years in formal education) is associated with a long run impact on output of 6%. de la Fuente and Ciccone (2002) find that across all the OECD countries over the period 1960-1990 a 1% increase in the human capital stock is associated with a 0.27% increase in GDP.

A major review of the macroeconomic literature by Sianesi and Van Reenen (2003) also finds that such an increase in education has an impact of between 3% and 6% on the level of output and of over 1% on the growth rate. The impact is greatest for higher levels of education as several studies suggest that while primary and secondary education skills are related to growth in developing countries, tertiary education skills are most important for growth in OECD countries (Blundell *et al*., 1999 citing Gemmell, 1995 and 1996, and Manikw, Romer and Weil, 1992). Jenkins (reported in Blundell, 1999) suggests that for the UK a 1% increase in the proportion of workers with higher qualifications raised output over the period 1971-92 by between 0.42% and 0.63% per annum.

However, despite many countries focusing on either basic skills or high skills, a recent study suggests a balanced investment in skills may be more effective. Hanushek and Woessmann (2009, p. 28) "find evidence that both providing broad basic education – education for all – *and* pushing significant number to very high achievement levels have economic payoffs".

A landmark study of 14 OECD countries finds a 1% point increase in the school enrolment rates tends to generate economic growth of up 3% points; an additional year of secondary level education for the population as a whole would have the impact of raising economic growth by an additional 1% point per year; and a 1% increase in literacy scores (based on the International Adult Literacy Survey (IALS)) relative to the international average is associated with an estimated 2.5% relative rise in labour productivity and a 1.5% rise in GDP per head. Moreover, in those countries where the scores improved fastest across the generations, productivity growth was much faster than average, while in those with the slowest increase in scores, productivity growth was slowest (Coulombe *et al*., 2004).

More recently, in a study for the European Commission, Canton (2008), estimated that an increase of one year in the average education level of the labour force is associated with an increase in labour productivity of 7-10% in the short term and 11-15% in the long run.

The Leitch Review (2006; 2005) provides a valuable high level summary of the potential economic benefits to the UK of raising its skill levels. The Leitch Review estimated the potential economic impact of growing skills at different levels. If the UK were to up-skill an additional 3.5 million adults (on top of delivering the then current ambitions) by 2020 at each qualification level indicated (i.e. low, intermediate and high skills), the economic impact could be of the order shown in Table 1. Not only does this give an indication of the potential substantial impact of raising skills levels (indeed achieving the Leitch targets would halve the number of years it could take to 'catch-up' with the US and EU, compared to the then existing ambitions), it shows the differential impact (and public cost) of improvements in different levels of skill. The differential impacts on productivity and employment are also of interest, with the productivity gains being largely associated with increasing intermediate and especially high level skills, and the employment effects being especially associated with improving skills at the lower level (see Leitch, 2005; Chart 4.5).

Table 1: The economic impact of improving the UK's qualifications profile 2005-2020

	Low skills	Intermediate skills	High skills	Adult basic skills	Young people basic skills
Productivity (%)[1]	3.2	3.5	4.4	0.5	0.5
Employment (000s)[2]	375 -425	350-400	335-385	75-105	65-95
Net benefit (bn)[3]	£85-105	£105-125	£125-145	£50-70	£60-80
Annual cost (bn)	£1.5	£3	£9	£0.8	£0.2

Notes: 1. Output per worker in 2020 above what it would otherwise be. 2. Employment level in 2020 above current level. 3 Over the whole period.
Source: Adapted from Leitch (2005) ch4.

A study for the OECD (2001) provides evidence on the relationship between skills and economic growth at the regional level across the then 15 EU states. A correlation analysis between three measures of educational attainment and GDP per capita across the 180 regions show significant correlations, especially at Levels 2 and 3.

Wages are commonly taken as an indirect measure of productivity and therefore the value of human capital and labour to a firm, as higher wages usually reflect higher productivity/value to the organisation. Training undertaken by a worker should add to their stock of human capital and raise productivity when this learning is applied within the firm. It should also result in an increase in their as wages they are rewarded for their higher productivity levels.

However, the use of wages to proxy productivity may underestimate the impact of human capital. In their review of the evidence of returns to education and training for the individual, firm and the economy Blundell *et al*. (1999, p. 13) conclude that "not all the productivity gains resulting from training are compensated through a corresponding increase in individual remuneration, so that investment in training remains profitable for firms".

This point is demonstrated empirically by Dearden, Reed and Van Reenen (2000). Using a panel of British industries over the period 1983 to 1996 they show that the use of wages fails capture the full impact of human capital accumulation through training. Taking the mean proportion of workers trained in an industry (10%) Dearden *et al*., show that increasing the proportion of workers receiving training in Britain by 5 percentage points (to 15%) results in a 4 percentage point increase in value added per worker compared to only a 1.5% rise in the cost of wages for the firm. This suggests that literature using wage gains as indicator of productivity gain may well underestimate the impact of skills acquisition on productivity.

To gain some sense of the potential scale of the impact of skills on GDP, a 4% rise in value added per worker is equivalent to an additional £40 billion on UK GDP. This is equivalent to around 40% of all income tax revenue or 80% of all spending on education. Using more modest figures, just 1% more workers (c. 300,000) participating in training could increase productivity by 0.8%, equivalent to adding around £8 billion to GDP: £200 for each and every worker as well as £2 billion added to the bottom line of UK plc. It is important to acknowledge that raising the training rate may take a long time. The 5 percentage points increase used by Dearden *et al*. (2000) was simulated over a significant period of time (1983-1996).

The approach of using panel data to estimate the impact of training on productivity was replicated in Germany by Zwick (2002) who found smaller figures of a 1% rise in the training rate creating an increase in productivity of 0.3% compared to Dearden, Reed and Van Reenen's (2006[2]) equivalent of 0.6%.

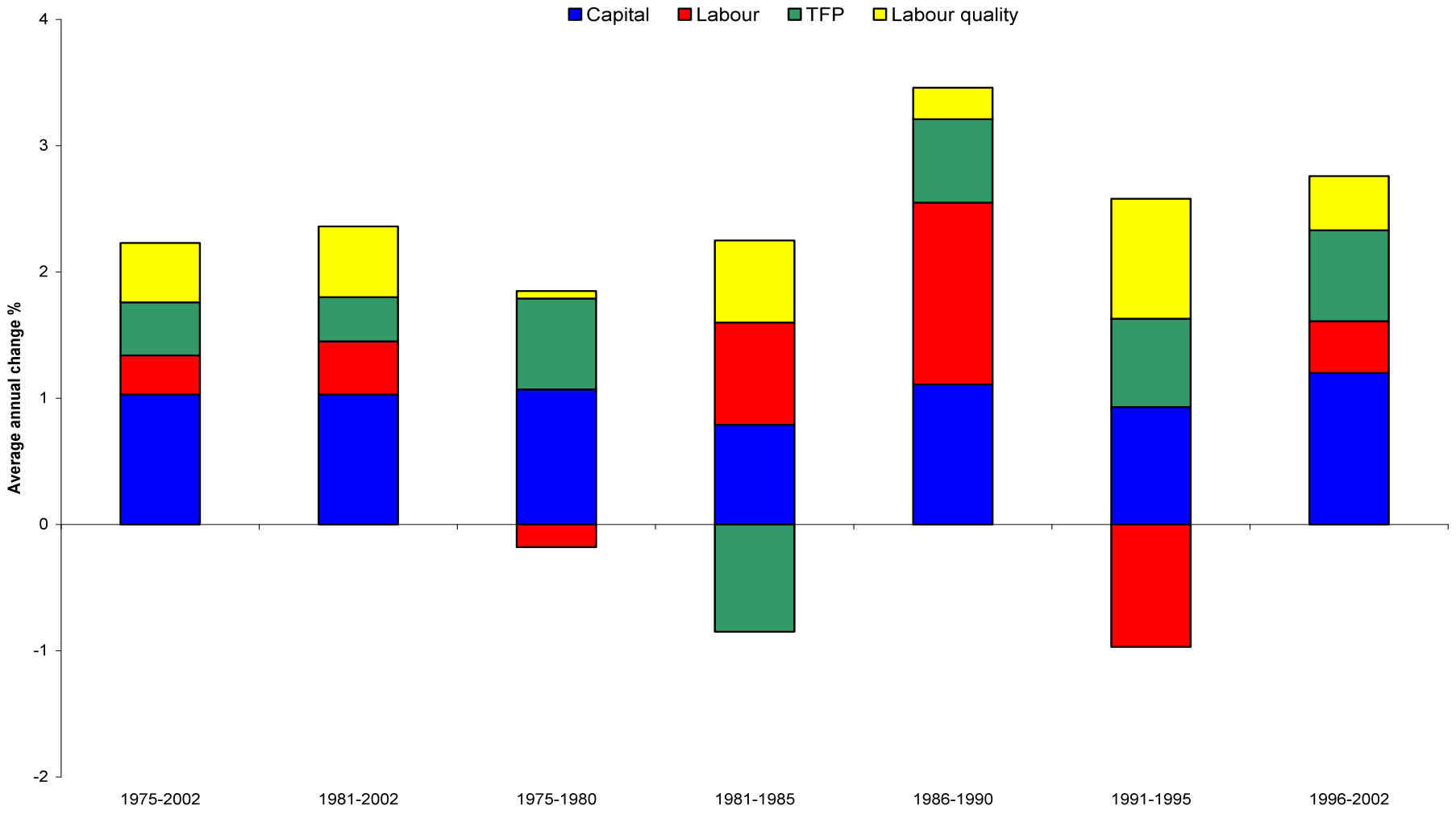
Increasing the level of training provided to the workforce can bring substantial benefits to the UK economy and is one way in which the UK can close the productivity gap with its competitor countries. O'Mahoney and De Boer (2002) demonstrate around one fifth of the UK's productivity gap with the US is associated with the relatively poor skills of UK workers. If UK workers had similar skill levels to their counterparts in these competitor countries the UK's national income would be significantly higher.

Indicating the potential rewards to be gained from raising the UK's skills levels, a Bank of England working paper (Bell *et al*., 2005) demonstrated that one fifth of the annual growth in the UK economy over the 1975-2002 period was due to improvements in workforce skills (see Figure 3). Similarly, Sianesi and Van Reenen (2002) have estimated that in the US, investments in human and physical capital account for 83 per cent of the productivity growth between 1948 and 1986. As the report of the Leitch Review of Skills (2006, p. 30) states, "improving skills more quickly than in the past can increase this contribution and increase economic growth". It is, however, critical to note that the UK's competitor countries are increasing their stock of human capital too and in some cases much more quickly than the UK (OECD, 2008b).

[2] This paper is a later version of Dearden, Reed and van Reenan (2000) and is presented here to enable comparison with Zwick (2002).

Innovation is a key driver of productivity (HM Treasury, 2007). In the long term the relationship between skills and innovation is a dynamic one. The skills of the workforce and management will help determine the innovation that takes place, which will then help determine the changed demand for skills in the firm, which will influence the innovation that takes place and so on (Tether *et al*., 2005).

Figure 3: Contribution to productivity growth



Source: Bell et al. (2005)

One means of identifying the contribution of skills to the economy is to use 'growth accounting' methods to decompose cross-country differences in relative productivity levels (e.g. value added per worker or per hour worked into three components):

- The proportion explained by differences in relative physical capital-intensity,
- The proportion explained by differences in relative labour quality (skills), and
- A residual component, multi-factor productivity (MFP), which captures, among other things, cross-country differences in the efficiency with which inputs are utilised.

Growth accounting studies suggest a positive but more limited impact of skills on productivity. Jorgenson *et al*. (2005) found that in a comparison of productivity growth in the US, UK, France and Germany between 1980-2001, the measured contributions of labour quality growth were considerably smaller than the combined contributions of growth in ICT (information and communications technology) and non-ICT capital deepening on both sides of the Atlantic.

Similarly, decomposing the gaps in productivity between the UK and other countries in 2004 finds that physical capital stocks per hour worked account for the largest shares of the UK-US, UK-France and UK-German productivity gaps (see Table 2). Multi-factor productivity / total factor productivity, accounts for a large proportion of the productivity gap between the UK and the US (though it has a smaller impact on the UK-France gap and a negative role in explaining the productivity gap between the UK and Germany[3]). Inter-country differences in skills account for only about 2 percentage points of the productivity gaps in all three bilateral comparisons.

Table 2: Decomposition of relative labour productivity levels in total market sectors (a), UK, US, France and Germany, 2004

	US	France	Germany
Relative Average ALP levels (value added per hour worked) – Index numbers: UK=100	136	120	107
Estimated contributions to ALP gaps (percentage points):			
Physical capital	18	14	22
Workforce skills	2	2	2
MFP	16	4	-17

Note: (a): 'Total market sectors' is here defined to exclude public administration, education and health and also real estate and residential buildings.
Source: Mason *et al*., (2008)

[3] The negative MFP contribution in the UK-German comparison suggests that, while Germany benefits relative to the UK from its accumulated advantages in capital stocks and skills, the UK gains from more efficient use of its capital equipment and skilled labour. However, the UK still pays a penalty in ALP terms for having accumulated relatively low levels of physical capital and skills over time.

Other studies, however, find that human capital / workforce skills account for a much larger proportion of productivity gaps and growth. O'Mahoney and de Boer (2002) find that skills account for 20-22% of the US/UK productivity gap. Hall and Jones (1999) in their study of 128 countries find that human capital (as proxied by educational attainment accounts for 22% of output per worker in both the countries with the highest levels of output per worker *and* in those with the lowest.

This limited contribution of skill differences may reflect well-known difficulties in measuring skills. Indeed, in many research studies skills are proxied by highly aggregate measures such as years of schooling or formal qualifications which have the strong disadvantage of ignoring much of the training provided and skills acquired in the workplace without formal certification. For example, Coulombe *et al.* (2004) found that the measure of years of schooling grossly underestimates the impacts of human capital on growth and productivity, compared to more direct measures e.g. literacy.

A second reason why skills may appear relatively less important is that efforts to improve skill supplies by increasing the stock of formal qualifications may not necessarily be successful in meeting the skill needs of employers if they are not at the required level, or of the required type, or do not contain the skills sets required to meet employers' skills needs. In this sense, relatively low wage and/or employment returns to individuals imply that the qualifications concerned are not 'economically valuable' i.e. they do not enhance productivity significantly.

For example, as we will see later, the relatively low wage returns to many lower-level vocational qualifications in the UK suggest that these qualifications are not always associated with improved productivity of the individuals concerned (McIntosh, 2009; Dickerson and Vignoles, 2007; Jenkins, Greenwood and Vignoles, 2007).

A third reason for the apparent modest impact of skills on productivity differentials is that the respective contributions of each production input are evaluated separately without regard to potential complementarities between skills and other production inputs. For example, certain countries may well benefit from relatively high levels of physical capital-intensity but skilled labour is clearly a prerequisite for the selection, installation, operation and improvement of physical capital equipment. Indeed, skills may well make an important contribution to multi-factor productivity, that being the efficiency with which physical and human capital are combined and utilised.

The economic return of qualifications to the economy is significant and exemplified by higher education qualifications. PricewaterhouseCoopers (2005) estimated that the exchequer costs to educate the average graduate is £21,000. However, the value to the state in terms of tax and national insurance alone derived from the individual's lifetime earnings received from a degree, is approximately £93,000. This provides a rate of return to the state of up to 13%.

Extending participation in education by raising the age to which learning is compulsory has also been shown to deliver benefits to the economy. In November 2008 the Education and Skills Bill was passed in to law in England, establishing the requirement for all young people to participate in education or training until their 18th birthday. This requirement can be fulfilled in several ways for example:

- Full time education at school or college
- Work based learning through an apprenticeship
- Part-time education or training, if they are employed, self-employed or volunteering for more than 20 hours a week.

With substantial evidence around the benefits of additional skills and years of learning there are significant potential benefits to be had for individuals and society alike. With this is mind, one study has estimated the overall benefit of the 2008 Education and Skills Act to be around £2.4 billion[4] for each cohort of young people who remain in education and training to the age of 18 (Hunt and McIntosh, 2007). The benefits generated by men staying on were estimated to be £1,408 million and for women £1,018 million in aggregate. These estimate capture the additional productivity indicated by increased wages and higher likelihoods of employment but does not take in to account wider benefits such as reduced crime, improved health. The variation between genders is likely to be caused by their respective wage levels and employment patterns (i.e. the gendered nature of sectoral employment and part-time/ full-time working).

Previous attempts at calculating the benefit for the individual of raising the school leaving age have resulted in an additional wage premium of 15% (Harmon and Walker, 1995), although some consider this to be too high (Blundell *et al*., 1999) with an estimate of 5-10% being more realistic. Additional time in education is also shown to benefit most those from disadvantaged backgrounds (Krueger and Lindahl, 2000).

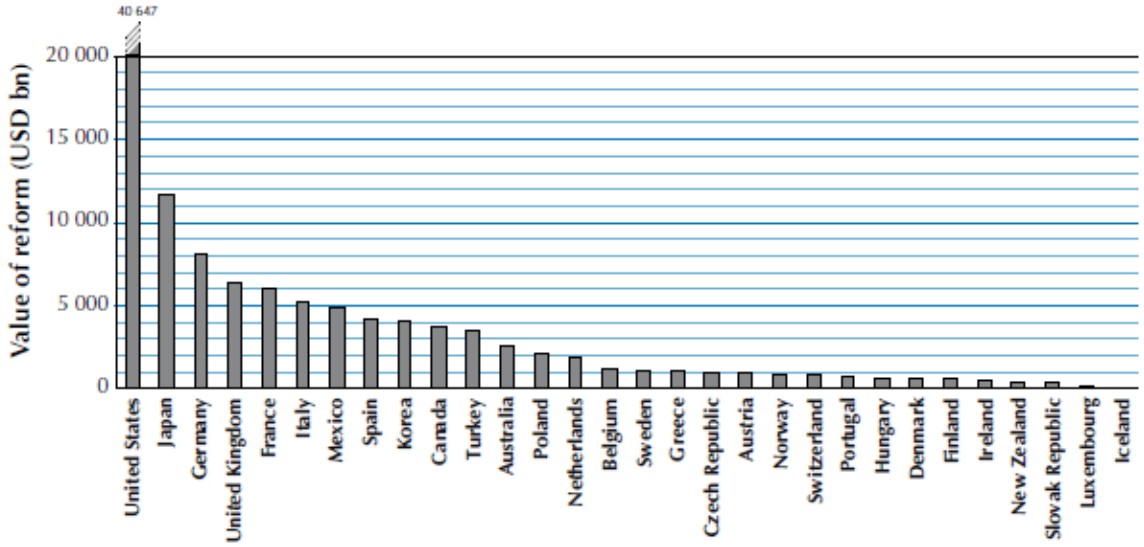
[4] A range of benefits from £0.3 billion to £5.4 billion were calculated which would require a particular combination of adverse or beneficial factors in order to be achieved and are therefore less likely to be realised than figures closer to the central estimate of £2.4 billion.

Whilst additional years of education have been shown to have an economic benefit there is still a significant minority of individuals that leave school with inadequate basic skills costing the economy in terms of lost productivity, firm performance and individuals' earnings. These individuals are unlikely to gain the full benefit of additional years of learning because they lack the fundamental skills to succeed in education.

This emphasises the need for high quality learning outcomes rather than length of education, something which the OECD (2010) has echoed recently when highlighting the economic benefits of raising the skills of young people. Using results of the Programme for International Student Assessment (PISA) which measures the knowledge and skills of 15 year olds in disciplines of reading, problem solving, and mathematics and science, the OECD has modeled the economic gains to be achieved from higher PISA scores.

If all OECD countries raised their PISA scores by 25 points over the next 20 years (which is less than the most rapidly improving education system in the OECD achieved between 2000-6; Poland) then OECD GDP would increase by US$115 trillion during the life time of those born in 2010. The economic gain available to each OECD country of achieving such a rise is shown in Figure 4. At over US$6 billion the estimated value of the gain available to the UK is the fourth largest of all OECD countries.

Figure 4: The present value of improving PISA scores in each country by 25 points



Source: OECD (2010)

Notes: Discounted value of future increase in GDP until 2009 due to reforms that improve student performance in each country by 25 points on PISA, or by one quarter standard deviation, expressed in billion US$

Using other benchmarks such as bringing the PISA scores of all other countries up to the standard of Finland, the OECD's best performing education system in PISA, would create gains of US$260 trillion for OECD GDP over the lifetime of those born in 2010. For the UK this scenario would create more than an additional US$7,000 billion of GDP. Alternatively, if all other countries achieved the minimum standard for the OECD (a PISA score of 400) OECD GDP would benefit by US$200 trillion and the UK's GDP by more than US$6,000 billion.

Such results indicate that "relatively small improvements in the skills of a nation's labour force can have very large impacts on future well being. Moreover, the gains, put in terms of GDP, far outstrip today's value of the short-run business-cycle management" (OECD, 2010, p. 6).

The *Leitch Review of Skills* (2006) estimated in 2005 that just less than 85% of the working age population in the UK possessed functional literacy and 79% possessed functional numeracy skills. Consequently, 15% and 21% of the working age population lacked sufficient literacy and numeracy to function effectively in everyday life[5].

Both the Moser (1999) and Leitch reports identified the need to address the poor state of basic skills by setting targets for the stock of basic skills among the working age population. Moser set a target of 90% of the working age population achieving Level 1 Literacy and 70% achieving Level 1 numeracy by 2010. Leitch set a target of 95% of the working age population possessing both functional numeracy and literacy skills by 2020.

In 2008 functional literacy was estimated to have increased to 86% of the UK's working age population and functional numeracy was estimated to have increased to 81% (Spilsbury and Campbell, 2009)[6]. Whilst the proportion of those without basic skills is slowly declining this is not happening fast enough and is holding back the economy, business and individuals. The effects on business and individuals are explored in sections 4.3 and 5.14 respectively but research by Bynner *et al*. (2001) reveals the extent to which a lack of basic skills in the workforce is constraining the economy.

Assuming that the Moser targets are achieved, Bynner *et al*. (2001) estimate the economic impact for the Exchequer in terms of additional employment, earnings and the reduced burden on the welfare state in the form of benefit payments. These are shown separately for numeracy and literacy in Table 3.

[5] The UK uses 5 Levels to measure basic skills Entry Level 1-3 and Level 1-2. Functional literacy is defined as Level 1 English. This is equivalent to GCSE English Grade G. Functional numeracy is defined as Basic Skills Entry Level 3 Mathematics which is less demanding than GCSE Mathematics Grade G. For more information see Ananiadou *et al*., (2003).

[6] These estimates will be updated in Ambition 2020: World Class Skills and Jobs for the UK, the 2010 Report. This will be published by the UK Commission in July 2010.

Table 3: The estimated employment and economic impact of achieving the Moser (1999) basic skills targets for 2010

	Employment	Earnings (£bn)	Net gain over benefits (£bn)
Numeracy	100,300	7.27	2.54
Literacy	45,200	1	0.44

Source Bynner *et al*., (2001) based on 1999 prices.

Achieving the numeracy target generates higher estimated benefits across all the measures although literacy is fundamental to the achievement of higher numeracy skills. Among those with low basic skills it is the lowest educated groups that benefit most in terms of increased employment and earnings.

For the purpose of illustration Bynner *et al*. also provided estimates of the economic impacts that could be expected in 2000 if poor basic skills had been completely eliminated by that time (see Table 4). If poor levels of numeracy were corrected then additional earnings of £12.54 billion are estimated along with an increase in employment of 200,600. As well as benefiting the worker, higher earnings and employment benefit the public finances through tax, national insurance and higher consumer spending. These benefits were calculated to be just over £5 billion which equates to £383.00 per person that previously had poor basic numeracy.

Assuming all poor levels of literacy were corrected, increased earnings of £4 billion were estimated with additional employment of 180,700. The impact on government finances would be £1.73 billion equivalent to £373 per previously unskilled person whose deficient basic literacy skills were corrected. Taking a longer term view Table 4 also provides an estimate of the benefits that could be expected in 2037 if all basic skills were corrected in 2000.

Table 4: The economic benefit of eradicating poor basic skills in 2000

	Numeracy	Literacy
2000		
Additional earnings (£bn)	12.54	4.01
Additional employment	200,600	180,700
Net increase in Government receipts (£bn)	5.07	1.73
Net increase in Government receipts per poor skilled person (£)	382.99	373.17
2037		
Additional earnings	156.75	51.67
Additional employment	N/A	N/A
Net increase in Government receipts (£bn)	58.87	21.44
Net increase in Government receipts per poorly skilled person (£)	4,447.11	4,624.72

Source: Bynner *et al*., (2001) at 1999 prices. Tables 10, 11, 12 and 13.

These figures serve to illustrate the value of good literacy and numeracy skills and that the presence of inadequate basic skills is constraining the performance of the UK economy through lost employment, spending and tax revenues.

Dickerson (2009) provides insight into the contribution of job content in productivity differences between countries. Comparing Scotland to the rest of the UK, he finds that jobs in Scotland are characterised by lower skills content than the UK average. Although most differences are small and in many cases not statistically significant, there are some large negative differences which are statistically robust. Most notable is the lower computing skills content in jobs in Scotland. Workers in Scotland are 10% less likely to report the use of computers is essential in their jobs, or that they used computers in a complex or advanced manner, or that the internet was important for their job than the average UK worker. In addition workers also report lower use of number and literacy skills on average and also for the same type of skills at a higher level. Dickerson goes on to show that the sectoral or occupational composition of employment is not the driver for this difference, instead it is the lower skills content of jobs.

There is also some evidence of the value of skills to local economies. A study for the National Skills Task Force (Campbell *et al*., 1999; Campbell, 2002) provided evidence of the substantial geographical variations in skill levels across England before examining the relationship between these variations and a range of indicators of local economic performance. Overall there is a close association between a range of measures of local skills in the form of the proportion of the workforce qualified to various levels and patterns of employment growth, economic growth, earnings and deprivation.

Galinado-Reuda and Haskel (2005) also find that the level of educational attainment of the local workforce has an impact on company productivity in the locality. Using linked Annual Business Inquiry and National Employer Skills Survey data, they found that firms located in areas with higher skills levels had higher productivity.

2.3 Conclusion

So far the value of skills to national economic performance has been the focus of this review. Whilst measurement difficulties mean that the contribution of skills may be small relative to other productivity drivers such as investment in physical capital, numerous studies indicate that the stock of skills, however measured (years of schooling, school enrollment rates, the proportion receiving training in the workforce and the adequacy of basic skills), has a strong link with national economic performance, wealth and prosperity. Indeed, the evidence presented shows that the potential economic gain from raising skill levels is huge.

This is why the four UK nations have the ambition to become world class in productivity, employment and skills by 2020. This means being amongst the top 8 OECD countries for each. This goal is vital in a rapidly developing World where there are increasing competitive pressures internationally due to the effects of globalisation, ongoing technological developments, and changes in consumer demand. This sets enormous challenges and opportunities to which we must respond if future economic success is to be secured. In the 21st century our most important natural resource is our people, and ensuring we can develop their skills and knowledge to optimise business investment and to secure competitive advantage on the international stage. With the UK now emerging from the largest global financial crisis and deepest international downturn for almost a century this has placed even more importance on achieving our goal and securing World class productivity, employment and skills.

The concern for policy makers in the UK comes about from the realisation that in a globalised market place for goods and services the UK is lagging behind other countries in the growth and indeed level of its skills base at all levels of qualification. With the unambiguous link of skills to national competitiveness and the significant economic gains to be achieved by raising skill levels of a nation's labour force, this is a very worrying trend.

After focusing on the national economic impact of skills it seems pertinent to acknowledge some of the wider and more amorphous benefits of skills before returning to focus on the financial and economic performance benefits of skills at the level of the organisation and individual.

3 The wider benefits of skills

Skills policy places a considerable emphasis on the economic value of skills and a growing concern with the outcomes and impact of education and training. The role of skills, education and training in helping countries to respond to globalisation and growing international competition, to helping firms compete, be more profitable and productive in the modern market place, and in helping individuals to gain and remain in employment and to raise their earning potential have all led skills to be seen as an important driver of productivity.

However, skills acquisition may have important, wider, non-economic, wider social outcomes. This was recognised by government in the 1970s (DfES, 1973) and again recently by the Leitch Review of Skills (Leitch, 2006, Ch1) and the UK Government in a joint paper with the Swedish and German governments (HM Treasury, 2008). Attention to the importance of these benefits has resulted in the establishment of the Centre for Research on the Wider Benefits of Learning which has produced a range of valuable papers, in particular a synthesis of the existing evidence (Feinstein *et al*., 2008). It is to these benefits that the report now turns.

The OECD (2007) distinguishes four categories of the benefits of learning as presented in Table 5. The economic and social outcomes of learning are closely interconnected and it is important to acknowledge that they are by no means independent of each other. Each type can impact on or create other types of outcome as the OECD (2007b, p. 43) illustrates:

> ...education can reduce poverty (a private monetary benefit but with social implications). The stress of poverty has been linked to increased illness, disease, and unhealthy behaviours ([cited in] Feinstein *et al*., 2006). From this perspective, a private monetary return can lead to reduced public expenditure on health care.

To this one can add that the reduced health care costs enable public money to be spent on other social objectives. Private outcomes can therefore be the route through which public outcomes and social objectives are achieved. While they accrue initially to individuals they can eventually affect others' living conditions, well being and prosperity creating society wide benefits.

Recently in the UK, the Marmot Review (2010) highlighted these issues as it drew attention to a substantial body of evidence linking skills and employment to health outcomes, in particular the impact on health inequalities of educational attainment, parental skill levels, job status and unemployment.

Table 5: Wider benefits of learning

	Private	Public
Monetary	Earnings Income and wealth Productivity and profitability	Tax revenues Employment Health costs Reduced crime
Non-monetary	Health status Life satisfaction Reduced crime Individual well being	Social capital Social cohesion Social trust Well functioning democracy Political stability Child poverty

Source: OECD (2007)

Evidence on the private monetary benefits of learning (the top left hand box in Table 5) is presented later in this report. In this section of the report we deal both with the public monetary benefits of skills and then with the private and public non-monetary benefits.

Despite recognition of the importance of the wider benefits of learning by professionals and policy makers the evidence base is smaller and less developed than that for the economic benefits. It is, however, developing and growing (Field, 2009). Two of the inherent problems of creating an evidence base on the wider benefits of skills are measurement and establishing causality, although the latter is shared, to a lesser extent, by the literature on private monetary benefits.

By their nature the non-monetary benefits of skills are difficult to quantify and value. It is also difficult to isolate the influence of skills to identify anything more than a relationship of association and where effects are observed they are often small (Field, 2009).

Consequently public non-monetary benefits in particular such as democratic functioning, social cohesion and social trust are proxied in many studies by private non-monetary outcomes of voting rates, crime rates, and assessments of trust in others, organisations and society's institutions.

3.1 Public monetary benefits

Collectively, non-monetary private benefits received by the individual can generate public monetary benefits for society.

Several studies have identified improved mental health and life satisfaction as an outcome of education for the individual (Oswald and Powdthavee, 2007; Oreopoulos, 2003). The potential public monetary impact of improved mental health through higher levels of educations is estimated by Feinstein *et al*. (2008). If 10% of women in the UK who have no qualifications were to gain a Level 1 qualification (equivalent to GCSE grades D-G) the reduction in depression associated with this could create savings of up to £34 million a year. Educating women with no qualifications to at least a Level 2 could reduce their risk of depression at age 42 by 4 percentage points from 26% to 22%, (a reduction of 15%). With the cost of depression in Britain amounting to £9 billion each year Chevalier and Feinstein (2006) estimate educating this target group to Level 2 could lead to £200 million of savings a year (at 2002 prices). This would be in addition to the private returns to qualifications in terms of employment and earnings.

Sabetes and Feinstein (2006) have estimated the effect of 100,000 additional female enrolments in adult education on cervical cancer. They suggest that such a number of enrolments would result in 1,900 to 2,200 additional cervical screenings each year which, based on current proportions of those screened, would result in 116 to 134 cancers being prevented for every 100,000 women in adult learning. Similarly, between 61 and 213 cancers could be prevented for every 100,000 women who quit smoking because of their additional education (Feinstein *et al*., 2008).

A cross sectional survey in the Netherlands (Groot and Maassen van den Bink, 2007) found a strong relationship between education and health. A year of education was reported to increase the health state of men by 0.6% and of women by 0.3%. Using the average value of GDP per capita the return from education to GDP ranges between 2.5-5.8% for men and 1.3-2.8% for women.

Crime is another public policy area where skills development can be seen to contribute to exchequer savings. Individuals with low or no qualifications are more likely to be persistent offenders and in the case of men, the better qualified they are the less likely they are to commit crime (Feinstein *et al*., 2008). Graduates are least likely to commit crimes. Feinstein *et al*. highlight some of the potential cost savings from reduced crime to be made from higher levels of education. A 1% point increase in the working age population with qualifications equivalent to Level 2 could reduce the cost of crime by up to £320 million per year. If this 1% then went on to achieve Level 3 or equivalent qualifications and a further 1% who previously had no qualifications gained Level 2 qualifications then the cost of crime could fall by £500 million. Furthermore, Feinstein *et al*. estimate that £1 billion pounds per year could be saved in reduced crime costs through a 16 percentage point increase in those educated to degree level.

Focusing on property crime the possible economic savings that could result from crime reduction achieved through rises in education levels is estimated by Machin *et al.* (2010). They calculate a one percentage point reduction in the proportion of individuals in the labour force without qualifications would create net social benefits worth between £87 and £32 million. It is argued that additional time spent in education negatively affects crime through increased income levels, reduced time to commit crime, increased risk aversion, and greater patience to wait for deferred rewards.

The economic effect of raising basic skill levels in the working age population was highlighted earlier and included increased employment, higher government receipts through taxes and lower expenditure on welfare provision. If poor basic skills were able to be eradicated, Bynner *et al*. (2001) calculated that government revenues would be boosted by just under £7 billion per annum (at 2000 prices).

3.2 Public non-monetary benefits

Attempts have been made to express in monetary terms the extent of non-monetary benefits. One example of this is child poverty.

In households in England and Wales where no one is employed, 80% of children are poor. Of all poor children, half are found in families receiving income support or job seekers allowance (Sabates, 2008 citing Bradshaw, 2003). Given the role of skills and qualifications in increasing earnings and employment chances it is evident that they have a role to play in reducing child poverty.

Work for the Joseph Rowntree Foundation (Dickerson and Lindley, 2008) has estimated the contribution higher skills could make to reduced levels of child poverty in by 2020. The impact of achieving the Leitch 2020 World Class Skills Ambition, would be to reduce child poverty by between two and five percent. If the upper estimate is taken this would contribute almost one third of the Government's target of reducing poverty by 17%.

The possession of higher skills is associated with a lower risk of poverty for the holder. Crucially, however, Dickerson and Lindley point out that the extent to which disadvantaged groups can benefit from up-skilling is influenced by whether employers respond to the increased availability of skills by redesigning jobs to make use of them. Reducing child poverty would clearly have knock-on effects later in life as child poverty is associated with higher school quit rates, being convicted of crime, poor behaviour while at school and low educational attainment.

Strong evidence on the value of parents' level of education is found in a study by Meschi *et al*., (2008). They investigate the Inter-generational effects of basic skills and find that parents with higher basic skills have children who perform better in cognitive achievement tests. This leads the authors to conclude that parents' basic skills have a causal impact on their children's cognitive skills rather than simply being associated with improved achievement. More broadly, Sabates (2008) notes that most studies investigating inter-generational effects of learning provide evidence to show that parents' education (as measured by highest qualification held) has a positive association with their children's school performance.

A range of public non-monetary benefits of education are estimated by McMahon (2008). He focuses on those benefits of education that accrue to wider society and future generations. These include the development of civic institutions such as law, democracy, human rights, political stability, reduced poverty, welfare, crime and prisons costs, improved health, social capital. He estimates, for example, that a 1% point rate increase in the enrolment rate for undergraduate degree programmes creates $27,726 worth of benefits to society (at 2007 prices). Despite attempts to value the civic and social engagement benefits of education there is by no means universal agreement that this is always a realistic exercise (OECD, 2007b).

3.3 Private non-monetary

In the 1960s there was concern that children from low income families were not succeeding as well as they might. A pioneering, longitudinal study, the *High/Scope Perry Preschool Project* (High Scope Educational Research Foundation, 2008), was established in the United States to uncover how far a pre-school education could make a long-term difference to children's wellbeing.

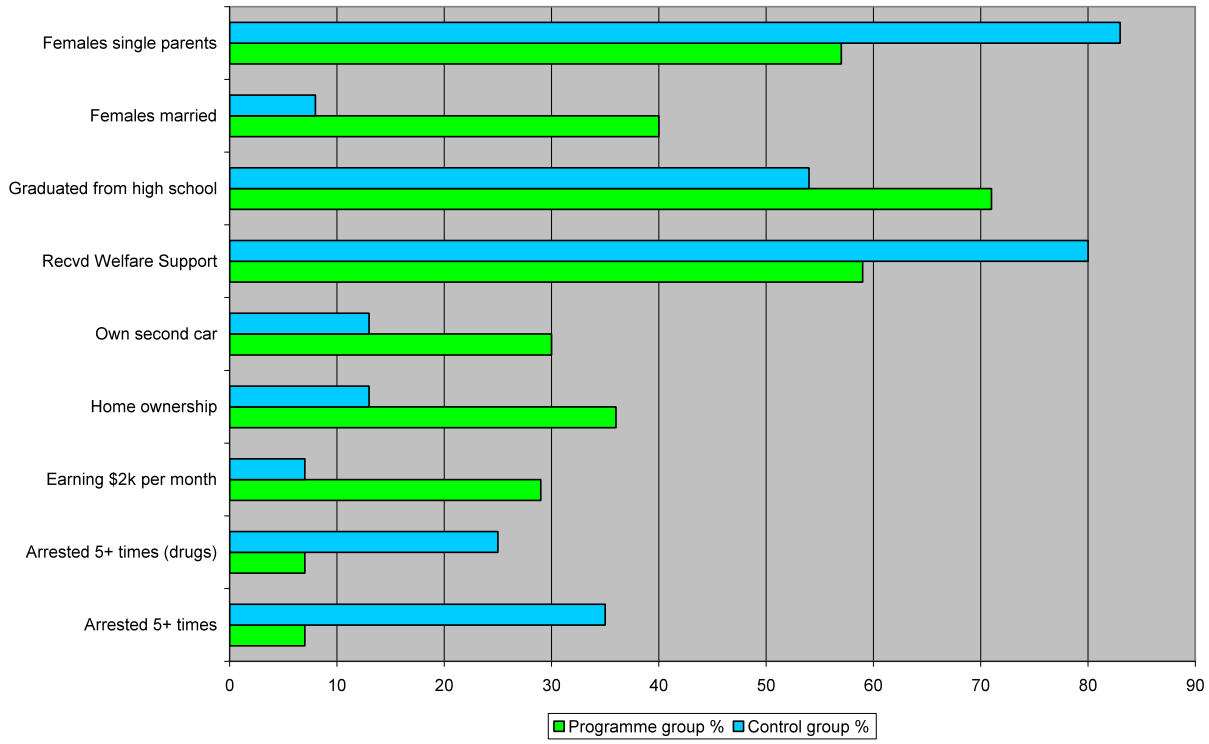
This research examined the lives of 123 African Americans aged 3 from low income families, who were at high risk of failing school in the 1960s. Fifty eight participated in the High/Scope pre-school programme and 65 similar children were assigned to a control group.

The project has monitored their achievement, motivation and social behaviour to the age of 41. The research shows that such a programme can produce lasting benefits for children, families and society. Analysis at age 27 in the study provided the following findings presented in Figure 5.

- Incidence of crime. Only 7% of adults who had participated in the Perry Preschool program had been arrested five or more times, compared with 35% of those who had not participated in a preschool program. The comparable figures for drug related arrests were 7% and 25%.
- Earnings and economic status. Adults in the program group were four times more likely (29%) to earn $2,000 or more per month than were adults in the no-program group (7%). Almost three times as many (36%) owned their own homes aged 27, compared to those in the no-program group (13%). As adults, 59% of those in the program group had received welfare assistance or other social services at some time, compared to 80% of those in the no-program group.
- Educational attainment. Seventy-one percent of those in the program group graduated from regular or adult high schools or received General Education Development certification, compared with 54% of those in the no-program group. Earlier in the study, the preschool program group had significantly higher average achievement scores at age 14 and literacy scores at age 19.
- Marriage and single parenthood. Forty percent of women in the program group were married at the time of the age 27 interview, compared to 8% of those in the no-program group; and 57% of women in the program group were single parents, compared to 83% of those in the no-program group.

- Cost benefit. At age 27 evaluation showed that every public dollar spent on the programme saved $7.16 in public expenditure. By age 40 this had increased to over $17 for every dollar spent.

Figure 5: Outcomes of the High/Scope Perry Pre School Study at age 27



Source: High Scope Educational Research Foundation (2008)

McMahon (2008) has quantified the non financial impact of (degree level) education in the US on the holder's own social and individual well being[7].To do this he summarises the findings from other studies into specific dimensions of overall social and individual well being such as longevity of life, health, child health and development, benefits to spouses, happiness, and consumption and energy use. He finds that for each year after graduation a degree is worth $38,080 in individual and social well being (2007 prices). The estimate is consistent with other studies adopting a similar in approach (Grossman 1997, 2006).

[7] These are termed private non market benefits as opposed to private market benefits which include rates of return to qualifications.

When at work, low qualified workers (proxied by low level occupations) tend to experience adverse working conditions[8] more than other occupational groups (Lyly-Yrjänäinen, 2008). Plant, Machine Operators and Assemblers, and Craft and Related Trades are the two most affected occupational groups. Exposure to such conditions clearly puts low qualified workers at greater risk of experiencing a negative impact on their health.

A substantial review of the evidence on the relationship between education and health is provided by Feinstein *et al*. (2006). Table 6 summarises their findings but it is sufficient to note here there is extensive evidence to show the positive effect of additional years of schooling on several indicators of adult and child health, health behaviours (e.g. diet, smoking, obesity and exercise) and use of health services.

[8] The four most commonly reported adverse working conditions according to Lyly-Yrjänäinen (2008) are vibrations, loud noise, high temperatures and smoke.

Table 6: The Impact of education on health: An assessment of the evidence

Outcome	Strength of effects	Evidence
Adult health		
Mortality	Substantial	Reasonably strong evidence of large effects of years of schooling
Physical health	Substantial	Overall, robust effects of years of schooling on various dimensions of physical health
Functional ability during adulthood	Contradictory	Robust but mixed findings
Adult depression	Substantial	Reasonably good evidence of the effect of achieving level 2 or equivalent qualifications
Life satisfaction and happiness	Small	No robust evidence
Self rated health	Substantial	Robust evidence on the causal effects of years of schooling
Child health		
Child mortality	Substantial	Robust evidence of effects of parental years of schooling
Child anthropometric measures at birth	Substantial	Robust evidence of effects of parental years of schooling
Health behaviours		
Smoking	Substantial	Good evidence for effects of education at University or college level
Alcohol consumption	Uncertain	The causality of this relationship is yet to be tested robustly
Obesity	Substantial	Robust evidence of causal effect of years of education
Fruit and vegetable intake	Uncertain	Positive education gradient but lack of data constrains the estimation of causality
Physical activity	Substantial	Clear associational evidence but causality not established.
Use of illicit drugs	Uncertain	Strength and nature of educational effects on illegal drug use remain uncertain
Teenage parenthood	Contradictory	Causality not established
Health service use		
Use of primary health care	Contradictory	Associational evidence is mixed and the subject lacks studies investigating causality
Use of specialist care	Substantial	Clear associational evidence of higher service use by those with more education
Hospitalisations	Substantial	Robust evidence suggests more years of school reduce hospitalisations
Use of emergency services	Small	Poor evidence on effects of education
Use of social health care	Substantial	Robust evidence of the causal effects of years of schooling
Managing chronic health conditions	Substantial	Clear associational evidence but causality not established

OECD (2007) adapted from Feinstein *et al*. (2006)

International research has consistently found people with higher levels of education live longer (Feinstein *et al*., 2008). It is important to acknowledge that this can also be influenced by social status but research indicates that an additional year of schooling reduced the probability of dying between 1970 and 1980 by up to 3.6 percentage points for those born between 1914 and 1939 in the United States (Lleras-Muney, 2005). In terms of life expectancy her findings indicate that for people born in 1960 an additional year of education raised life expectancy at age 35 by up to 1.7 years.

Not only are more educated people likely to live longer but their health during their life is likely to be better. Adams (2002) found that for individuals born in the United States between 1931 and 1941 an additional year of education improved the probability of good health from 81% to 84.4% for men and from 70.5% to 84.3% for women. Wilberforce (2005) found that individuals educated to Level 2 or below are 75% more likely to smoke at age 30 and, on average, have a body mass index 3% higher than a similar individual with a degree level or higher qualification.

Regardless of whether it leads to a qualification, adult learning seems to combat depression (Field, 2009). This may be achieved through learning leading to an increase in an individual's social and civic activity. In his review of literature on adult well being and happiness Field (2009) concludes that learning can enhance social capital by helping to develop social competences, extending social networks and promoting shared norms and tolerance of others. He cites a study of 600 literacy and numeracy learners in Scotland which showed significant increases in the proportion going out regularly; greater clarity about future intentions on community involvement; and a rise in the number who could identify someone to turn to for help (Tett and Maclachlan, 2007).

In Britain, adult learning has been linked to improved well-being, optimism, self efficacy and self-rated health. Using a cohort from 1958 to identify the impact of adult learning on health between the ages of 33 and 42, Feinstein and Hammond (2004) found learning improved life satisfaction and exercise taken along with reducing the likelihood of smoking.

The effect of a mother's education on birth outcomes is such that an increase in a mother's education of one year was found to reduce the probability of low birth weight 0.5% and reduce the chances of premature birth by a similar percentage (Currie and Moretti, 2002).

Those not in employment, education or training (NEET) are more likely to be without qualifications; to be in a job without training; to be unemployed; to have a criminal record; to be depressed or in poor health, than those who are participating in work or education (Social Exclusion Unit, 1999, based on the 1970 British Cohort Survey). Being NEET at age 16-18 is the single strongest predictor of being unemployed at age 21 (Blanden *et al*., 2006). The cost implications of this for productivity and the public purse are considerable. The average cost of being NEET is estimated to be £97,000 per person over their lifetime (DCSF, 2002; at 2000/01 prices) in terms of lost productivity and the impact on public spending.

A Strategy Unit discussion paper on social mobility highlights the wider value of skills at different life stages. At age 16 school qualifications are estimated to explain 20% of intergenerational mobility (Blanden *et al*., 2006). A further 20% of intergenerational mobility is estimated to be attributable to qualifications gained post 16. Clearly the two are not independent with qualifications and training post 16 being influenced by performance at age 16.

The effect of lifelong learning on occupationally based social status is examined by Blanden *et al*., (2009; 2010). They used multiple longitudinal datasets to investigate different aspects of the intra-generational mobility in the UK. Higher social status often brings with it higher income but there are also wider benefits such as improved mental and physical health, reduced likelihood of unemployment, job satisfaction, better promotion prospects, improved life-chances for the individual and for their children and greater levels of civic behaviour. Therefore the question of whether lifelong learning can help an individual achieve social mobility is an important one. They find:

- Gaining a new highest qualification later in life improves social status. The greatest increase in social status (12% on the CAMSIS[9] scale) is observed for those individuals acquiring their first academic qualification at Level 4 later in life. However, learning that does not result in a formally accredited qualification is unlikely to achieve social mobility.
- Older workers are less likely to undertake lifelong learning and also less likely to benefit from it in terms of status, compared to younger learners.
- Ethnic minorities as a whole tend to secure smaller gains in status compared to whites when making large jumps in qualification attainment, for example when moving from no qualifications to a degree.

[9] The Cambridge Social Interaction and Stratification (CAMSIS) scale uses occupational groups as its basic units and is at the core of a project to create an international comparative assessment of the structures of social interaction and stratification across a number of countries. Further information is available from: http://www.camsis.stir.ac.uk/

- Job related training was also shown to be related to upward social mobility and was greatest for those that undertook training later in life with the explicit purpose of increasing their skills for their current job.
- The benefits of lifelong learning are likely to be evident in terms of social status before improved earnings.
- Gains in social status are similar for men and women (10% on the CAMSIS scale) but women experience these benefits approximately 1 year after lifelong learning whereas men can expect social status benefits 2 years after lifelong learning.

Blanden *et al*., conclude that their study offers support for the notion that lifelong learning leads to upward occupational social mobility but the size of the effects vary by the level and type of education and training undertaken, the purpose of the training and the sector in which it was undertaken.

It would seem that education and training post 16 is therefore a valuable means to improving an individual's life chances and gaining social mobility. With half the working age population of 2020 already aged over 25, opportunities for training and education delivered through work take on additional importance as for many workers it is a key means of securing social mobility, improved life chances, progression to better jobs and enhanced earnings (DWP/DIUS, 2007).

Preston and Green (2003) found that participation in adult learning is associated with increased civic participation and healthier living, better life satisfaction and reduced use of health services. Moreover, these benefits are greater for educationally disadvantaged adults. Unwin *et al*., (2004) found that amongst the relatively thin literature on the wider benefits of vocational qualifications there was evidence to suggest that their attainment is beneficial to the holder's self confidence.

3.4 Conclusion

This section has outlined the wider social, financial and non financial benefits of learning and education using the OECD's broad categorisation. Learning can improve an individual's mental and physical health and longevity of life; money spent keeping pupils in education or training reduces crime and saves the community and state money. Learning also has strong intergenerational effects such as reduced poverty and better health. Improved skills and abilities at a young age lead to a greater likelihood of higher achievement, increased stability and reduced likelihood of chaotic lives. In aggregate learning can help to create a strong and

stable society through the development of and adherence to civic institutions such as law and democracy.

The OECD concludes (2007b, p121):

> …the evidence presented makes a strong case for the positive role of education. In some respects, the evidence is strong enough for a causal relationship to be accepted on any reasonable standard. Education affects people's lives, directly and indirectly. Overall, more education is likely to improve their physical and mental health, and their capacity and motivation to participate in civic and social life. It contributes effectively to cost containment in public services – in other words, as an investment it saves money, enabling people to look after themselves better and to make more effective use of public services. More positively, it generates or maintains well being, contributes to the quality of life and strengthens democracy. These are hardly negligible effects. Education helps some individuals and some groups more than others, and in doing so may make those others worse off... But overall this is a very positive balance sheet, if not always easy to read.

The report now returns to the economic benefits of skills and training with a particular focus on benefits for the organisation.

4 The value of skills to organisations

What evidence is there on the relationship between skills and organisational performance? The organisation is the 'site' at which skills are recruited, employed and applied and is therefore the economic unit whose collective performance directly affects productivity levels.

The discussion considers, first, the evidence linking the stock of skills in an organisation's workforce to the organisation's performance. Secondly the role and benefits of employer provided training to the firm are presented. This includes a discussion of the different types of training provided and the organisation's approach to training provision including Apprenticeships.

How training impacts on organisational performance relative to wages is also considered. This is of interest as there is sometimes a belief that it is the employees that gain most from their training rather than the organisation. This is particularly the case when employees are trained but then leave for a new job or are poached by another employer. The evidence on whether poaching is a significant problem is considered here too.

Securing and developing more highly skilled workers is a necessary but not sufficient to raise organisational performance. These skills have to be utilised effectively in order to generate and enhance organisational performance. The discussion therefore moves on to consider the role of 'high performance working practices' in using and applying the skills of employees more effectively in the workplace and then more specifically the role of management and leadership in this. The section ends by looking at the cost of low skills and the impact of skills shortages on performance.

Overall studies have identified a positive association between highly skilled workforce and organizational performance. Despite this, there remain concerns about whether the strength of the link is overstated (Huselid, 1995; Fleetwood and Hesketh, 2006) and there are methodological concerns too (Guest *et al.,* 2003; Wall and Wood, 2005; Abdel Wahab, 2008).

4.1 Workforce skills

For an organisation to perform effectively it must have, inter alia, a sufficient and appropriate stock of skills within its workforce to support its business activities. The match between the tasks of a job and the ability of its holder will be influenced by the organisation's overall strategy, nature of business, technology and the way work is organised. The literature

shows that a high stock of qualifications in an organisation's workforce supports the more effective achievement of an organisation's goals.

In his work with 4 sectors in the UK (Plastics processing, Printing, Logistics and Insurance), Mason (2005) found that 'high value added' companies were, on average, better equipped in terms of their stocks of skills than other firms in the same sector. The activities of high value added companies were more skill intensive than other firms. Overall, Mason concludes that "high levels of skill and knowledge are indeed prerequisites for success in high value added production" (2005, p. 131).

Galinado-Rueda and Haskel (2005) conclude that increasing the level of skills in a firm, regardless of sector, raises company productivity. What is more, they found the higher the qualification level the more robust and positive its impact on firm productivity. More precisely it was the male, full time workers that tended to be more productive (although with substantial sectoral variation).

Haskel and Hawkes (2003) and Haskel *et al*. (2003) both demonstrate that the 'top performing' firms hire workers with, on average, higher levels of skills. In the first instance top performing manufacturing firms hired workers with at least one extra qualification level compared to lesser performers. The additional skills supported innovation in the top performing firms and more sophisticated production processes leading to higher quality products. In the latter case Haskel *et al*. demonstrated that more productive companies in the UK had workforces with on average two years additional schooling than less productive firms. Lynch and Black (1995) found in the US that an extra year of education raised productivity by between 4.9 and 8.5 per cent in the manufacturing sector and between 5.9 and 12.7 per cent in services.

Griffith (1999) reported that foreign owned plants in the UK car industry have a substantial labour productivity advantage over UK owned plants but that almost all of this is explained by superior capital and skills inputs. Furthermore Griffith and Simpson (2000) showed that this holds more generally across a broad range of manufacturing industries.

An important contribution to our understanding of the role of workforce skills in organisational performance was made by the National Institute for Economic and Social Research (NIESR). The so called 'matched plant studies' in the 1980s and 1990s compare organisations in the UK with other countries in Europe and/or the US within the same sector. Chemicals and engineering, kitchen furniture industry, retailing, commercial banking, clothing manufacture, hotels, vehicle component manufacturing, food manufacturing sectors have all been investigated. A review of the studies is provided by Keep, Mayhew and Corney (2002).

Collectively the matched plant studies show the extent to which workforce skills can explain differences in productivity, accounting for other factors such as investment in capital, maintenance practices and also quality of output. The studies generally found a clear positive relationship between skills and productivity, particularly at the intermediate skill level and for management skills. They show that gaps in labour productivity of up to 60% exist between the UK companies and their competitors in Europe and the US as a result of lower workforce skill levels in the UK.

There is evidence that the productivity and performance effects of higher skills are not merely retained by the individual or firm to which they belong but that other individuals or firms that work or exist alongside them also benefit (Galinado-Rueda and Haskel, 2005; Heuermann *et al*., 2009). Firms which are based in 'better educated' local areas (either in terms of workers or residents) receive a productivity boost because of the greater exposure to more efficient ways of working, better interactions, informal learning and exchange of information. In essence, proximity to qualified individuals can increase the acquisition of skills and facilitate diffusion of knowledge thereby creating a human capital externality.

This effect was observed for both manufacturing and service based firms by Galinado-Rueda and Haskel (2005). They found that find that a manufacturing firm located in an area where 40% of the population holds a Level 4 qualification output will be nearly 14% higher than in an area where 30% of the population is educated to the same Level. However, there were broad sectoral variations to this finding.

Besides the transfer of knowledge enabled by being in the right place, Heuermann *et al*. (2009), in their review of the literature on human capital externalities, find that a more educated workforce leads to an increase in physical capital investment in a firm. Workers with low human capital in the firm may still enjoy a productivity increase through working with an increased stock of physical capital.

So the stock of skills or human capital is an important resource which needs to be present in a firm's workforce if it is to prosper and achieve higher levels of performance. There is also an enhancement to firm performance to be gained from being located in areas where high skills, or the 'right' skills are found.

However, the available human capital in an organisation needs to be deployed and managed to support the firm's competitive strategy and this is something we discuss in sections 4.7 and 4.8. First we discuss the benefits to the firm of skills acquisition, specifically training provided by the employer, as a means to raising the stock of skills.

4.2 The benefits of employer provided training

As we have seen the stock of skills in a firm is often measured by qualifications and years of education undertaken. This captures only accredited and qualification based learning typically delivered prior to entering the workplace. It therefore ignores training provided by the employer that may not be qualification based or accredited. Such work based learning is often specific to the firm's context and the employee's role meaning that it is more closely tailored to the needs of the workplace and therefore likely to be of greater benefit to the firm.

We begin by outlining the benefits of training as a whole without considering the variations in its nature, level and means of delivery. The discussion then moves on to review some of these differences and their impact on firm performance.

Across the OECD countries, employer provided or sponsored training is the single most important source of post-compulsory education and training for the working age population[10]. Relative to this governments play a modest role in financing post compulsory education and training (Hansson, 2008).

One of the key means of examining the impact of skills on organisational performance is to examine firm survival. This was investigated by Collier *et al*. (2005; 2007). They found that non-training establishments are almost twice as likely to close as those that do provide training, all other things being equal. This takes account of important influences on firms' behaviour such as their size, sector and age. The failure rate of companies that did not train their staff was, over a six year period, 27% compared to 11% for companies that did train their staff. The gap was particularly marked in manufacturing, construction and hospitality.

Work by Dearden *et al.* (2000) shows that an increase of five percentage points in the proportion of workers trained in an industry would raise value added per worker by four per cent. Their updated work (2006) estimates that an increase of 1% point is associated with an increase in value added per worker of 0.6% and an increase in wages of around 0.3%. Similarly, increasing the number of training days[11] per employee by 1% was found to increase productivity by 3% (Barrett and O'Connell, 2001). Amongst large Italian enterprises Brunello (2004) found an increase of 10% in the average number of training hours per head increased value added productivity by 1.3%.

[10] Differences are apparent for men and women with women consistently receiving higher levels of job related training in the period 2002-8 in the UK according to the labour force survey (UK Commission Employment and Skills, 2009).

[11] Training which provided broad skills and knowledge

A large but somewhat dated study from France (Carriou and Jeger, 1997) used repeated cross-sectional data from 10,000 firms employing 50 or more staff in the period 1986-92. The availability of comprehensive company training data collected through the more regulated training system in France, enabled the researchers to calculate costs and value accurately. They found that a 1% increase in training expenditure delivered a 2% increase in value added.

Few studies have considered evidence the impact of training on productivity at the firm level. Konings and Vanormelingen (2010) do just that using a panel of 170,000 Belgian manufacturing and non manufacturing firms for the period 1997-2006. They find that the productivity of a trained worker is, on average, 23% higher than an untrained worker and that wages for those receiving training increase by 12%. Similar to Dearden *et al*. (2000) then, Konings and Vanormelingen find that productivity gains from training are approximately twice the gain in wages received by employees. Moreover, increasing the share of trained workers in a firm by 10 percentage points would increase the firms value added by 4.6%.

A range of recent studies (e.g. Abdel-Wahab *et al*., 2008; Ashton *et al*., 2009; Ashton and Sung, 2006; Sung *et al*., 2008) argue training needs to be effectively targeted and focused on business needs identified in organisational strategies, for it to achieve maximum impact and business benefit:

> By building training and skills development into business systems and daily practice, it becomes an effective and impactful way to avoid business problems, raise standards and increase competitive advantage (Sung *et al*., 2008).

If training is not aligned with organisational strategies in this way then the return on investment is likely to be lower they argue.

It may be the case that not all workers are identified to receive training but even those omitted can expect to be positively affected by the provision of training to other workers. By working alongside trained workers, untrained employees benefit through the transfer of knowledge and skills. The basis of this argument can be found in the literature on human capital externalities which shows that workers not receiving training may receive increased earnings through spill-over effects from working alongside co-workers that have received training or the investments in physical capital that are often associated with a more highly skilled workforce in a firm (Heuermann *et al*., 2009).

The interaction of employees in the workplace is therefore important in realising the productivity benefits of training. This, in turn, highlights the importance of job design in providing the opportunity for workers to apply the skills and knowledge acquired through training and in facilitating the transfer of knowledge and skills between employees thereby contributing to higher worker and business performance (c.f. Bevan and Cowling, 2007).

Greenhalgh (2002) reviews UK and a number of other French studies concluding that work related training is associated with raised net output, greater return on assets and enhanced propensity to innovate as well as higher wages.

A survey of large manufacturing firms in Portugal between 1995 and 1999 (Almeida and Carneiro, 2005) estimated that return on investments in human capital by firms providing training to be 24% on average. Such high returns to training indicate that employer provided training is a sound and prudent investment for firms and in turn the wider economy and led the authors to suggest that human capital investment is of equal value to investment in physical capital.

They also estimate the effect of training on productivity and find that the effects are high. An increase of *training per employee* by ten hours per year leads to an increase in productivity of 0.6%.

Bassi and McMurrer (1998) found that companies in the US that invested more heavily in training perceived themselves to be more successful and profitable and, more importantly, they also found that "returns on investment in employee training are consistently 'super normal'. This suggests that there is a general under investment in human capital; the average firm tends to invest less than the efficient amount in its people" (2006, p. 101).

Similarly, a study by the American Bankers Association (2004, cited in Bassi and McMurrer, 2006) found that financial institutions with higher than average training expenditures per employee had better performance than the competitor institutions on measures of return on assets, return on equity, net income per employee, total assets per employee and stock return.

Relying on managers' subjective views captured by the Workplace Employment Relations Survey (WERS) to elicit the impact of training on company performance, Sloane *et al*. (2007) conclude that training has a significant impact on productivity and financial performance. When Sloane *et al.* initially used objective financial data from the survey to analyse this they did not find support for managers' perceptions. However, managers perceptions were confirmed when increased levels of education were substituted for training in the analysis. This may reflect the fact that it takes time for the full impact and benefits of investment in training to materialise. Also levels of education, although a proxy for skills, constitute greater aggregations of skill acquisition than more incremental activity which tends to be a feature of employer provided training.

A study of the benefits of training in the Food and Drink Manufacturing sector (Sung *et al*., 2008) describes the strength and range of benefits available to employers. Employers in the sector report that they receive a great deal of benefit from providing training to their employees although benefits vary by size of company, with larger ones more likely to report improved productivity, staff retention, and increased innovation. Size however, was less important in respect of product quality, growth and profitability. Around half of employers said that the benefits were seen in terms of creating quality products, productivity and staff retention. Nationally, around one fifth of employers say that training has the most impact on productivity (Winterbotham and Carter, 2006) and they also report extensive evidence of managers' perceptions of the positive impact of training on productivity, and staff retention.

Sung *et al*. (2008) also noted that varying 'skills profiles' of different enterprises yielded different benefits reported by employers. A workforce which had a high percentage of workers with degrees brought a greater propensity to innovate. A high proportion of intermediate qualifications created greater productivity, potential for growth, enhanced capability, profitability and innovation. Workplaces with highly trained management delivered perceived benefits of improved overall competence and technical skills.

Evaluations in England of the experience of Train to Gain report a range of benefits. These include: raised employee performance, increased competitiveness of the firm, improved productivity which allowed additional investment in equipment, improved safety at work and, greater client confidence in employees (Ofsted, 2008).

In terms of the benefits received by employees, 90% of employers reported observed benefits of improved competence, teamwork and job satisfaction which ultimately benefit the firm. Most firms, however, do not formally evaluate the impact of the training they provide making a thorough assessment of the benefits difficult (Sung *et al.*, 2008).

Investigating the link between training and employee job satisfaction, Sloane *et al*. (2007) and Jones *et al*. (2008) use data from three sources (2001 Skills Survey, the British Household Panel Survey and the Workplace Employment Relations Survey) and conclude that, overall, certain types of training can improve levels of job satisfaction. In one instance (BHPS) it was only training to improve skills which impacted positively on job satisfaction and it was in workplaces that allowed these skills to be actually used that were more likely to have workers that were more satisfied (Sloane *et al*., 2007, p. 68). In turn, higher satisfaction was found to reduce absenteeism and quit rates in the business (Sloane *et al*., 2007; Haskel *et al*., 1994 in Bassi and McMurrer, 2006). Sloane *et al*. (2007) also found that training has a significant positive effect on firm productivity and financial performance.

Having established the benefits to the firm of employer provided training in broad terms we continue in the next section to elaborate on the benefits of on and off-the-job training, nuancing by sector and type of skills where possible. However, before moving on it is worth noting recent analysis of trends in the provision of employer provided training.

Mason and Bishop's (2010) analysis of Labour Force Survey data reveals that across the workforce average levels of job-related training have declined through much of the 2000s and have now returned to 1993 levels. Training rates at lower levels of qualification and in older age groups remain in absolute terms well below those for respectively highly qualified and younger employees but there has clearly been some narrowing of the gap in training rates between low and highly-qualified employees. However, this narrowing of the gap has been achieved at the cost of the highly-qualified as training rates for low-qualified workers have tended to remain steady or even increase during the 2000s in spite of the overall decline in training provision. By the end of the period 1993-2009 average training rates for younger age groups holding graduate and NVQ4 level qualifications were significantly lower than in the mid 1990s. This is likely to reflect the widening dispersion of salaries and career prospects of the expanded supply of young graduates who are entering jobs for which training is less likely to be provided.

The narrowing of the gap has therefore been achieved by what Mason and Bishop call a 'leveling down' of training and they point out that whilst such trends may benefit social inclusion they threaten the achievement of the potential gains in national economic competitiveness and performance we identified in section two.

4.3 The nature and type of training

So far, training has been considered as a uniform and homogeneous influence on firm performance. But it is important to recognise that the benefits of training will vary according to the nature, level and quality of training and skills delivered and the means of delivery.

In respect to the type of training delivered, a note of caution is offered by the OECD that, although the UK has comparatively high training rates, the training provided is too often short term and generic. So selecting appropriate, job related training is essential if the bottom line is to benefit. Several studies serve to illustrate this point.

The overall approach to learning by an organisation has been demonstrated to link with its performance. Spicer and Sadler-Smith (2006) developed a learning orientation scale to capture the role of training and learning in the development of an organisation. Low order organisational learning provides training that responds to organisational contingencies in its internal and external environment and allows the organisation to improve its current approach to production and business. Higher order learning is more likely to result in existing practices and routines being questioned and replaced as a result of innovation to achieve more effective production.

Amongst the sample of small and medium sized manufacturing firms, those with a high order learning orientation were more likely to demonstrate higher performance evinced by financial and non financial measures. Therefore, training that encourages workers to think holistically and more radically about business and production processes enables organisations to be more adaptive and flexible in meeting the shifting competitive demands of the market.

Returning to Collier *et al.*'s (2005; 2007) studies of firm survival, it is interesting to note that they found the volume of off-the-job training provided did not significantly affect a firm's chances of survival. The most likely reason for this according to Collier *et al*. is that managers in the firms providing training have become better attuned to judging the optimal level of training for their organisation. In contrast it may be that managers in firms that provide no off-the-job training have given little if any thought to the benefits of training. This again indicates the importance of management and leadership skills with respect to training and also supports earlier suggestions (Adel-Wahab, 2008; Sung *et al*., 2008; Ashton *et al*., 2009) that for it to be most effective, training requirements and opportunities should be identified in such a way to support organisational strategies.

Importantly, Sloane *et al*. point out that self-funded training had a negative effect on job satisfaction and any training provided by the employer had little impact on job satisfaction and performance unless workers were given the opportunity to apply the skills they had acquired. Similarly, Haskel *et al*. (1994 in Bassi and McMurrer, 2006) found that employee retention was linked to the opportunity to engage in learning and development and to the opportunity to apply that learning.

Again, this highlights the importance of job design and matching (that is where employee skills and abilities are matched to the demands of their job) but according to a study by the Work Foundation (2007) the UK has the lowest level of job matching in the EU. Skill mismatches and the impact of skill shortages are the focus of Section 4.9.

There are suggestions in the literature that whether training is delivered on or off-the job, makes a difference to the benefits derived by the organisation. If wages are taken as an indirect measure of an employee's productivity and their value to the organisation, then the wage returns received by a worker from engaging in employer provided training, both on and off-the-job, can be taken to represent a lower bound of the productivity gains to the organisation. This approach is taken by Blundell *et al*., (1996).

For men and women Blundell *et al*., report the wage returns from having undertaken off-the-job employer provided training with their current employer are approximately double that for on-the-job training. For men the returns to off-the-job training are estimated at 6.6% compared to 3.6% for on-the-job training. For women the respective figures are 9.6% and 4.8%. This would suggest that the benefits returned to the employer of providing off-the-job training to employees are greater than for on-the-job training. This may reflect the nature of the training that it is possible to deliver through each mode of delivery.

Furthermore the benefits seem to vary by sector. In manufacturing, greater productivity appears to be achieved through off-the-job training. In the service sector though, how the training is delivered is less important than its content. For example training in information and communications technology was reported as being most effective at delivering productivity gains (Lynch and Black, 1995; Barrett and O'Connell, 2001).

Basic skills are another important dimension of training. However, we know relatively little about the effectiveness of basic skills training provided by employers because of a lack of robust assessments of its value (Wolf *et al*., 2009; Ananiadou *et al*., 2003). Subjective assessments have been provided (Bassi, 1994; Pearson, 1996; Bloom *et al*., 1997) that cite benefits of increased quality, greater time per task efficiency, more accurate work and reduced waste, improved safety record, enhanced capacity for on-the-job training and quicker implementation of skills acquired through training generally, better team performance, and more harmonious labour relations.

One method of estimating the impact of basic skills is to calculate the annual costs to employers of poor basic skills (ALBSU, 1993). For firms with more than 50 employees the average annual cost was £166,000 in 1993 prices (Ananiadou *et al*., (2003) convert this to 2002 prices to give £208,000). For small organisations of 51-100 the cost was £86,000 (£108,000) and for large organisations it was £500,000 (£626,000). Given the dated nature of these estimates, and the continued scarcity of basic skills indicated by the wage premiums available (see Chapter 5), such figures are likely to remain significant today.

The impact of government sponsored programmes to enhance individuals' basic skills in the UK was evaluated by Wolf *et al*. (2009). Few employers expressed the need to address basic skills gaps as a motivation for engaging with the programmes. Instead, more general outcomes such as raising staff motivation and general staff development were prioritised. The major actual outcome was increased confidence among staff although small but positive changes in literacy skills were noted. Other than this there was "no clear evidence that the workplace basic skills initiative led to significant improvements in basic skills" (Wolf *et al*., 2009, p. 30).

Moreover, Wolf *et al* (2009, p. 36) state that "while course participation could and did affect learning trajectories, it is workplace experiences, not limited classroom exposure, which appeared to embed and boost literacy skills most powerfully". This serves to highlight the importance of raising employer demand for skills and good job design to ensuring skills are utilised in the workplace and that training positively affects firm performance.

4.4 Apprenticeships

Offering an alternative to the 'academic' route to skilled work, the Apprenticeship route also offers an attractive proposition for employers. For example, the Government has launched Modern[12] and Advanced Apprenticeship programmes in England with Modern being offered at NVQ Level 2 equivalent and Advanced being offered at NVQ Level 3 equivalent. These apprenticeships exist in parallel to the traditional apprenticeships which are wholly funded by employers compared to Modern and Advance versions which attract state funding.

Apprenticeships involve on and off-the-job training with most having a contract of employment with a sponsoring firm. Apprentices work in that firm while receiving training from the employer themselves, learning providers and colleges of further education.

Apprentices are currently exempt from the national minimum wage but on 1st October 2010 a national minimum wage of £2.50 per hour will come into force for Apprentices aged under 19 or those aged 19 and over if in the first year of an Apprenticeship. The full impact of this on the behaviour of employers is unclear but some, notably those who use the exemption to pay lower wages, have suggested they may need to reduce the number of apprenticeships they offer or stop their apprenticeship scheme entirely. Employers not using the current exemption were generally supportive of a national minimum wage (Lawton and Norris, 2010).

The benefits of apprenticeships to firms highlighted by the literature can be grouped into the following components.

- Effects on business performance

Business performance is improved through the use of apprenticeships by their contribution to and enhancement of the firms competitiveness, profitability, productivity and quality of its products and/or services (Bashford, 2006; Hogarth and Hasluck, 2003). Employers offering Apprenticeships report that the content of the training provided is directly relevant to the job the Apprentice will eventually fill (Hogarth *et al*., 2005). With the current demand for apprentice places very high firms are able to select the most able from a large pool of applicants (McIntosh, 2006) which further enhances the impact of an Apprentice. One of the most significant benefits to the firm of an Apprenticeship is that of strategically investing in the organisation's future workforce.

[12] After 2004 the term Apprenticeship was adopted in favour of Modern Apprenticeship. Advanced Apprenticeship continues to be used. These titles are used from here in.

- Impacts, organisational values, behaviours and culture

Employers report that apprentices are often more motivated (Bashford, 2006) and that these more motivate employees are more likely to adopt the values, behaviours and culture of the firm (Fuller and Unwin, 2004). Apprentices demonstrating the value and behaviour of an organisation are more likely to be retained by a firm helping to reduce labour turnover and associate recruitment costs. (Hogarth *et al*., 2005; Hogarth and Hasluck, 2003; Ryan *et al*., 2006). Philips (2007) gives the example of BT where 1000 of the 100,000 workforce work as apprentices. The head of the apprenticeship scheme highlights one of the key benefits of the scheme being able to use "the enthusiasm and desire of someone at the very beginning of their career to get them to behave and perform at the standard the company need them to perform."

- Relevance of skills and reduced skills shortages and gaps

The advantage of 'home grown' talent means that the firm is able to create the skilled workers it requires for success thereby reducing skill shortages and gaps that it would otherwise have to fill through other means (Bashford, 2006; Fuller and Unwin, 2004). This is particularly advantageous in sectors where, traditionally, there is a high turnover of labour. Young people are willing to remain with an organisation to gain accreditation and often to receive a substantial pay increase upon completion of their Apprenticeship. Hogarth *et al*., (2005) provide the example of Honda which reports nearly all of its Apprentices remain with the company once qualified. Using the construction industry as an example MacGregor (2007) argues that apprentices offer a firm skilled, safe workers who understand the need of the client base and work to standards. It can also help with succession planning.

In some sectors where the turnover of Apprentices is high, such as Social Care, Construction and Local Government, many employers still see the value in providing Apprenticeships because it is seen as helping to maintain the wider pool of trained labour that is shared by the sector. It is expected that some Apprentices who leave the organisation which provided their training will eventually return to work for the same organisation at some point in the future (Hogarth *et al*., 2005).

- Social responsibility

Offering apprenticeships sends a signal that the company is committed to training and local employment, and values its workforce (Bashford, 2006; Fuller and Unwin, 2004; MacGregor, 2007). This can aid recruitment and retention.

- Reduced costs

Besides the likelihood of reduced recruitment costs highlighted above, Hogarth and Hasluck, (2003) suggest the net costs of apprenticeships are often lower than those of training non-apprentices. Furthermore the higher productivity of apprentices allows employers to recoup much of the cost involved in apprenticeships.

- Help to redress an aging workforce.

With an aging workforce in many sectors apprenticeships provide a means to replacing skilled workers who will exit the workforce over the coming years (Fuller and Unwin, 2004). Recruiting apprentices is less costly than traditional routes, offers higher staff retention and creates employees with shared organisational values. As such, apprentices are individuals who could fill jobs at a range of levels in the organisation in the future providing there is the opportunity for structured career development (Hogarth *et al*., 2005). In some sectors they can also help to access non-traditional sources of labour which in turn gives business benefits.

In summary, the benefits of Apprenticeships are numerous and extend beyond organisational performance to include others which help an organisation to function more effectively such addressing labour supply problems and embedding organisational values and behaviours more deeply among the workforce. The next Chapter will also consider wage returns to individuals. In short, the evidence shows that Apprenticeships offer superior returns to the same level, thus demonstrating their worth to employers.

4.5 The productivity benefits of training compared with wages

The central rationale for training is that it makes employees in an organisation more productive and effective in the workplace. There is some debate about who benefits most from the training: employers who gain from increased productivity and profitability, or the employee who is rewarded by higher wages for their ability to perform their tasks better or their capacity to do more work.

Training provided by the employer has a cost and naturally the cost will vary with the type and level of training delivered. When providing training the employer may incur charges for the training delivered, the employee's wages and lost productivity while being trained.

Of course not all training will incur such costs but there is an often held perception by some employers that it is workers who benefit primarily from employer provided training and not the business because of the costs involved. This perception may be particularly strong if the training leads to a formally recognised qualification as it may be perceived to aid worker mobility and reduce retention. In Chapter 5 (Individuals) we demonstrate that qualifications and work related training generally provide good rewards for employees, not least in terms of enhanced wages but the evidence reviewed here relates to the benefits that accrue to the firm.

We drew attention to evidence above (Dearden *et al*., 2000; 2006; Konings and Vanormelingen, 2010) which demonstrates that the effects of training on wages are about half the size of the effects on industrial or firm productivity.

However, such estimates may be conservative given results from other studies summarised in Table 7 below. They draw similar conclusions: that productivity gains made by firms providing training to their employees outweigh the wage enhancement received by employees. The studies in Table 7 suggest the productivity effect of training available to employers is up to 5 times that captured by employees in wages.

Table 7: Productivity effects of training relative to wage effects

Study	Country	Productivity effects relative to wages
Barron *et al*., (1999)	USA	2 times
Groot (1999)	Netherlands	4-5 times
Dearden *et al*., (2000)	UK	2 times
Conti (2005)	Italy	3-4 times
Ballott *et al*., (2004)	France	3.5 times
Ballot *et al*., (2004)	Sweden	3 times
Konings and Vanormelingen (2010)	Belgium	2 times

Source: Hansson (2008) with Konings and Vanormelingen (2010) added by the authors.

For example, Groot found that average productivity growth following training was found to be 16% while average wage growth was 3.3%. Thus wage growth is less than a quarter to one fifth of productivity growth. The difference in productivity between trained and non trained workers was 8%. In France and Sweden, Ballot (2004) observed impacts on firm productivity of 3-3.5 times greater than wages. Workers captured 30% and 35% of all returns to training respectively.

Cosh *et al*., (2003) report that half the businesses in their sample felt that the training they had provided increased their profit margins and three quarters felt that it had improved their labour productivity.

To conclude this section it is clear that the majority of the benefit from training provided to employees accrues to employers and this seems to hold regardless of whether the training is general or firm specific. Relative to employers, workers only received 20-50% of the returns to training (Hansson, 2008; Bishop, 1994). Training is therefore a good investment for employers.

Whilst the literature suggests that employer provided training raises an employee's commitment to the organisation providing or contributing to the cost of that training, the employer may perceive a risk that the employee is likely to leave for another employer after receiving training. This is the subject of the next section which aims to establish empirically whether this is the case.

Poaching of newly trained staff is sometimes thought to be a deterrent to employers providing training. Although evidence exists which supports the notion that training increases the mobility of labour (Brunello and de Paola, 2004; OECD, 2004a), earlier reviews of evidence (Green *et al*., 2000; Goux and Maurin, 2000) suggested this not to be the case when research findings are considered in total. Hansson (2008) noted earlier that most employer provided training is general or transferable in nature which would not be the case if poaching were a significant problem. Equally this could be employers' response to the increasing demand for more skilled workers.

Based on a review of the US and UK literature in the late nineties, Green (1997) reported that training was not a large influence on the likelihood of staff leaving the firm compared to other factors determining mobility. What is more, where training did exert an influence it mostly discouraged staff from leaving through increased motivation and commitment, although they acknowledge that self funded training and general training were associated with higher mobility relative to firm financed and firm specific training.

The Workplace Employment Relations Survey in the UK was used by Dex and Smith (2001) to demonstrate this effect. Employees with five or more training days in the previous year were found to be significantly more committed to their organisation than those with less than five, regardless of sector.

Bassanini *et al*., (2005) found that training patterns in firms exhibit counter-cyclical patterns to economic conditions. Companies appear to train their employees more when the opportunity cost of training is low and reduce training when competition for labour is high. Using training in this way can clearly act as a cushion against redundancies. Hansson notes that Bassanini *et al*'s findings are supported at an industry and organisational level respectively by Dearden *et al*., (2000) and Bartel, (1994).

It was acknowledged earlier that enhancing the level of skills in the workplace through education and training is only one part of the leverage needed to achieve greater organisational performance. The management and application of those skills in such way as to secure improved performance from the now more highly skilled employees is also necessary. High performance working and the role of management and leadership respectively are therefore the focus of the final two sections of this chapter.

4.6 High performance working

High performance working (HPW) has been the focus of a major UK Commission project on Skills Utilisation. The project has involved several strands of work but underpinning it is a synthesis of the literature on HPW summarising its definitions, benefits, how it works and the extent of its adoption in the UK. This section summarises the impact of HPW on organisational performance but a deeper exploration of the HPW literature is available in Belt and Giles (2009). A range of explanations of HPW are offered below.

- High Performance Working (HPW) practices [are those] which actively engage employees in shaping their own working environment and becoming self-directed learners' (Cabinet Office, 2001: 24).

- High performance working practices consist of new ways of organising work, rewarding performance and involving employees in the decision-making process in the workplace' (Ashton and Sung, 2002: 1).

- The High Performance Workplace encourages the development of workers' skills and taps into their emotional capital and tacit knowledge in order to enhance organisational performance' (EEF/CIPD, 2003: 8).

- High performance work practices promote high levels of adaptability, flexibility and involvement and enable people at all levels within organisations to participate in the development of processes, products and services. They involve the promotion of teamworking, and learning and practices that move away from the tradition of "command and control", to achieve constant incremental improvement and step changes in performance' (Wales Management Council, 2005: 7).

- High performance workplaces or organisations have been described in various ways, but there is a general emphasis on engaged and empowered workforces, and on high quality goods and services' (Tamkin *et al*, 2005: 12).

- High performance working is a distinctive approach to managing people at work that raises productivity while also improving the well-being of employees' (Guest, 2006a: 3).

- The combination of skill and use of skill involves what is commonly known as "high performance working" (HPW) – people management practices that enable staff to work smarter rather than harder' (Philpott, 2006, p. 158).

A substantial amount of the literature on the interface between HPW, human resource management (HRM) and organisational performance has focused specifically on the impacts on organisational performance. There is now a considerable body of research that indicates that introducing HPW is associated with economic benefits in terms of a range of company metrics. This evidence shows in particular that organisations that adopt an integrated range of HPW practices are likely to perform better on a range of key indicators. It is the implementation of sets of practices that is predominantly associated with performance improvements rather than the individual practices in themselves. Research has also demonstrated that employers in a range of sectors could benefit from the introduction of integrated HRM systems or HPW (see Hughes, 2008).

The following are key findings on the links between HPW and organisational performance, from studies carried out within the UK:

- In a study for (the then) Institute of Personnel and Development, Patterson and colleagues showed that almost a fifth of the variance in productivity and profitability between firms could be attributed to HRM practices (Patterson *et al*, 2007).

- In a study on the aerospace sector Thompson (2000) found that both the number of HRM practices adopted, and the percentage of the workforce covered are key differentiating factors in terms of performance. This research also found evidence of a clear link between HRM, sales and added-value per employee.

- A study by Guest *et al*., (2003) found that those companies that deploy a greater range of HRM practices can double the profit per employee compared to those implementing relatively few. Furthermore, they can reduce their labour turnover rates by half.

- Bevan *et al.,* (2004) identified three types of HRM practices that had a major impact on productivity: flexible working practices (17% of all organisations), high training commitment (15%) and improving communication channels between staff and management (8%).

- Research by Tamkin *et al.,* (2008) found that a 10 per cent increase in business investment in HRM, training and management practices equated on average to:

  - An increase in gross profits per employee of between £1,139 and £1,284.
  - An increase in profit margins per employee of between 1.19 per cent and 3.66 per cent (i.e. the ratio of profit over sales).
  - A 0.09 per cent increase in sales growth per employee.
  - A 3.1 per cent increase in the probability of achieving sales from new technology.

- A recent study by Stripe *et al.,* (2009) found a positive and statistically significant relationship between the implementation of HPW and company profitability in small firms, in particular using the ratio of firm sales to the number of employees.
- Tamkin *et al.,* (2008) also identified a positive relationship between Investors in People (IiP)[13] accreditation and business performance due to a relationship between IiP and intensity of HRM practice. In addition Bourne *et al*., (2008) found a relationship between adopting IiP (and the associated practices embedded within the Standard), and better firm performance, both in financial and non-financial terms. Quantifying the financial benefits of IiP, Cowling (2008) calculates that IiP accredited organisations create additional gross profits per employee of £94 on average. He also estimates the average gain in profit if those organisations currently without IiP were to be accredited at over £176 per employee. Interestingly then, those organisations without IiP accreditation actually stand to gain more than those that have it. The fact that IiP accredited organisations generate higher profit per employee all else being equal is not the result of higher performing organisations self selecting into IiP according to Cowling. Instead, he suggests organisations derive from IiP a performance enhancement resulting in higher profits per employee.

Studies in the US have also identified a range of performance benefits:

- Huselid[14] produced a summary of studies conducted between 1995 and 2003 that shows that out of over 158 studies, 91 found positive effects, 12 reported mixed results, 13 found weak or partial supports and 4 negative results (the remainder were either not available or not applicable).

[13] Investors in People is a standard which aims to help organisations to achieve success and improvements in performance through better strategic direction, management and development of their employees – see: http://www.investorsinpeople.co.uk/Pages/Home.aspx

[14] http://www.markhuselid.com/articles.html.

- Becker *et al*., (1997) found strong support for positive links between the existence and operation of HPW systems within firms and financial performance, in particular shareholder value, but more generally employee productivity. They calculated that a 35 per cent improvement in the quality of strategy implementation resulted in a similar percentage increase in shareholder value.
- A study of 750 large, publicly traded firms found that those organisations with the best HRM practices provided returns to shareholders that were three times greater than those with weak HRM practices (Pfau and Kay, 2002).
- Boselie *et al.,* (2005) in a review of the literature on HRM and organisational performance internationally over the last 10 years conclude that training has a positive impact on product quality, product development, market share and sales growth; and higher investment in training results in lower staff turnover.

Using case studies from manufacturing, education and financial services, Bassi and McMurrer (2007) demonstrate that organisations with a higher level of human capital management (HCM) achieve higher performance. An organisation's Human Capital Management is assessed across 23 HR practices that fall into five broad categories of Leadership, Employee Engagement, Knowledge Accessibility, Workforce Optimisation and learning capacity. More information on the 23 practices can be found in Table 11.

The manufacturing case study organisation reported its sales offices with the largest improvement in HCM score in the previous year had sales growth in the following year of between 60 and 130% higher than other offices that had declines or smaller improvements in HCM scores. Further analysis revealed that of the 23 HCM practices used to score each case study, executive and supervisory skills (Leadership), information sharing (Knowledge Accessibility) and innovation (Learning Capacity) were most closely associated with high performance. Using this information the firm was able to take action to across its 300 sites to improve its average HCM score resulting in improved sales growth rates.

Table 8: Human Capital Drivers

	HCM Drivers				
	Leadership Practices	**Employee Engagement**	**Knowledge Access-ibility**	**Workforce Optimization**	**Learning Capacity**
HCM Practices	*Communication* Managements' communication is open and effective	*Job design* Work is well organized and taps employees' skills	*Availability* Job related information and training are readily available	*Processes* Work processes are well defined and training is effective	*Innovation* New ideas are welcome
	Inclusiveness Management collaborates with employees and invites input	*Commitment* Jobs are secure, employees are recognized and advancement is possible	*Collaboration* Teamwork is encouraged and enabled	*Conditions* Working conditions support high performance	*Training* Training is practical and supports organization-al goals
	Supervisory skills Managers eliminate barrier, provide feedback and inspire confidence	*Time* Workload allows employees to do jobs well and enables good work/life balance	*Information sharing* Best practices are shared and improved	*Accountability* High performance is expected and rewarded	*Development* Employees have formal career development plans
	Executive skills Senior executives eliminate barriers, provide feedback and inspire confidence	*Systems* Employee engagement is continually evaluated.	*Systems* Collection systems make information easily available	*Hiring* Hires are chosen on the basis of skill; new hires complete a thorough orientation	*Value and support* Leaders demonstrate that learning is valued
	Systems Leadership-development and transition systems are effective				

Source: Bassi and McMurrer (2007)

A similar analysis was also applied to the company's manufacturing plants. Those plants demonstrating high HCM scores reported accident rates 10-30% lower the following year than those plants with lower HCM scores. In this instance the key HCM practices were found to be supervisory skills (Leadership), information sharing (Knowledge Accessibility) and employee skill development (Learning). Analysis of this kind allowed the company to develop targeted training to improve the safety record of those poor performing plants.

Fewer studies have focused on the benefit of skills to service industries but Bassi and McMurrer also tested their HCM tool with schools. They found that students who attended schools with high HCM scores (particularly in employee learning culture and work design) performed better than their peers in State achievement tests when controlling for socioeconomic status. Furthermore, 'teaching to standards' (a bespoke set of HCM measures developed for the schools study) had a lower correlation with student achievement than any of the other five HCM measures. Bassi and McMurrer conclude that schools' adherence to and emphasis of the importance of teaching standards has less impact on student performance than each school's learning and work culture and its ability to reinforce and retain talent. Their finding challenged the existing logic in the schools.

In a small sample of financial services firms those with higher HCM scores tended to have higher stock market returns the following year. Those with lower scores achieved lower stock market returns (Bassi and McMurrer, 2007).

Whilst there is considerable evidence that highlights the positive association between HPW systems and the financial performance of organisations, the literature also suggests that HPW is linked to other beneficial outcomes for organisations, which come about as a result of improvements for employees. There are links between HPW higher levels of skills, greater opportunities for innovation and creativity, greater task discretion, and higher job satisfaction and employee motivation, which can all result in greater employee involvement, commitment and lower labour turnover (see for example Barber *et al*., 1999; CIPD/EFF, 2003; Sung and Ashton, 2005; Michie and Sheehan, 1999; Shipton *et al*., 2005; Appelbaum *et al*., 2000). The key point here is that the benefits for employees are crucial in gaining the high levels of trust and discretionary effort which are crucial to achieving high performance. This aspect is discussed in more detail in Belt and Giles (2009).

The evidence that points to the beneficial links between HPW and organisational performance, as well as to the links between HPW and employee job satisfaction and commitment is substantial. However, it is important to recognise that there has been some criticism around the effects of HPW. Much of this has been made on methodological grounds (Purcell and Kinnie, 2007; Boselie *et al*., 2005), in particular the need to establish causality, and also around the issue of work intensification for employees (Ashton and Sung, 2002; Danford *et al*., 2005; Ramsay *et al*, 2000). Again a deeper exploration of these issues is presented in Belt and Giles (2009). Such limitations aside, it is worth noting that even critics of HPW (e.g. Wall and Wood, 2005) acknowledge that the evidence of its benefits are nevertheless 'promising'. It is therefore surprising to learn that the adoption of HPW practices is low and estimated to be no more than a third of all UK firms at best (UK Commission, 2008).

This section has shown that the HPW practices deployed in a firm and the manner in which they are combined or bundled together can produce performance benefits for the firm and also for the employee in a variety of forms. So in addition to the stock of skills within the workforce the management, application, fostering and involvement of skilled employees stands to offer firm additional performance enhancements. The next section turns to look more specifically at the role management and leadership in firm performance.

4.7 Management and leadership

Since the 1980s, there has been a concern that, in general, management capability and the deployment of managers in the UK is relatively poor in various respects compared to competitor countries and that this has contributed to reduced productivity and inhibited economic performance across the UK.

These concerns have grown through the 1990s and beyond, alongside the growth in evidence that the demands for, and on, managers have been dramatically increasing. Such changes have been driven by a range of factors, including, innovations in business and technological developments, globalisation, market liberalisation and organisational and industrial restructuring. Management, in different, rapidly evolving contexts, requires a wide range of skills and competences. In addition, management responsibilities are broadening and a growing number of other employees are undertaking management tasks.

A key question therefore, is whether the UK has sufficient managers and leaders of high quality and whether it is sufficiently developing and deploying them to fully optimise its management potential and organisational performance. Evidence over a long period of time such as NIESR's matched plant studies (see Keep *et al*., 2002) discussed in Section 4.1, work by the LSE/McKinsey (discussed below), along with evidence in Section 1 on multi-factor productivity / total factor productivity (which some suggest is the result of the UK being poor at the conversion of inputs in to outputs i.e. management) suggest it is not.

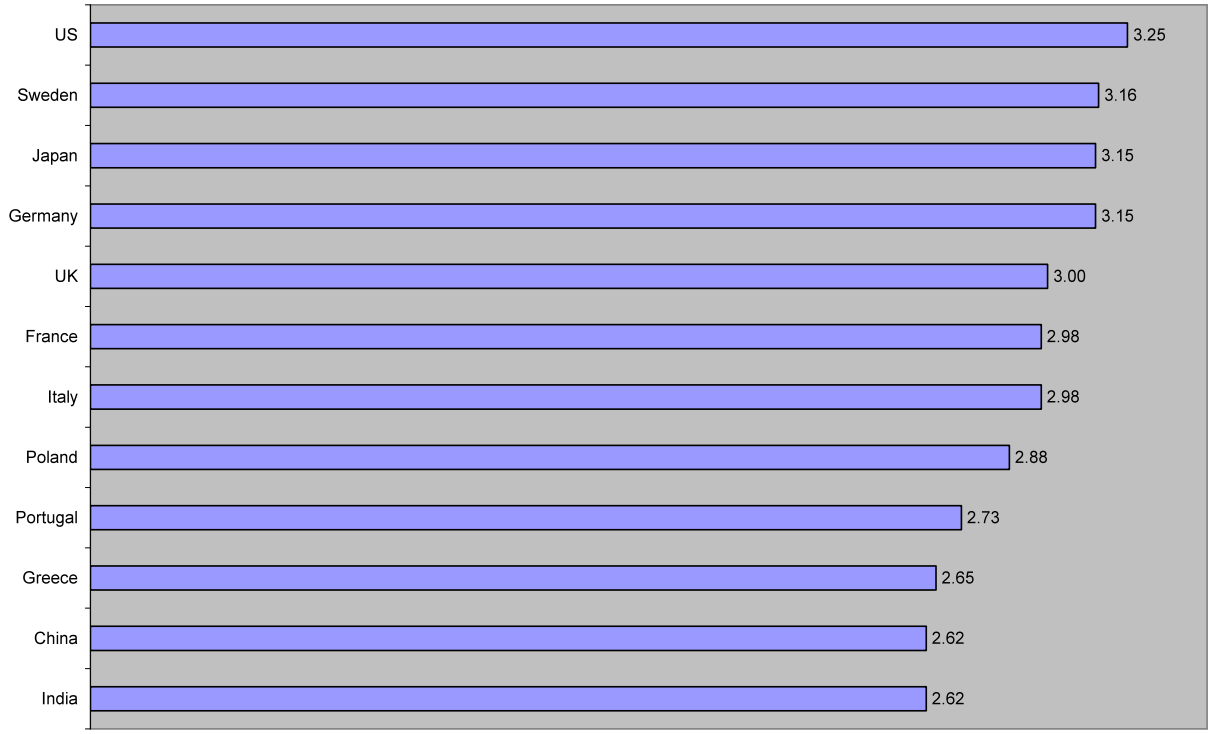
This situation is critical because there is considerable evidence that management capability brings advantages to organisations in terms of better performance and business gains. Indeed, there is very strong evidence that management is one of the most influential factors in achieving higher performance.The decisions and actions managers and leaders take are essential to shaping organisational strategies, organisational structure, working practices, training systems and strategies, investment patterns, the nature and extent of innovation and technological developments, the organisation of work and management of employees, and, not least, the design and operation of any HPW system. Whilst the basis on which these studies are conducted varies, and they deploy different measures of management capability, the overall weight of evidence emphasising the importance of management is compelling

The recent work of the LSE/McKinsey (Bloom *et al*., 2007; Mckinsey and LSE, 2009) develops and applies an approach to measuring company management practices within and between countries and enables management practices to be linked with business performance. It is clear from this work that companies that apply accepted management practices perform significantly better than those that do not. Improving management practices, in particular their take-up across a wider range of companies, is thus likely to improve both business and national economic performance.

Broadly, the same strong relationships between management practices and performance hold true across countries. Figure 6 shows the average management practice score by country, with the UK being in the 'second division' of countries studied. So important are the differences in scores between countries that a 1% point increase in management score is equivalent in impact on company performance to a 25% increase in the workforce or a 65% increase in capital investment. Management practice scores are highly correlated with productivity.

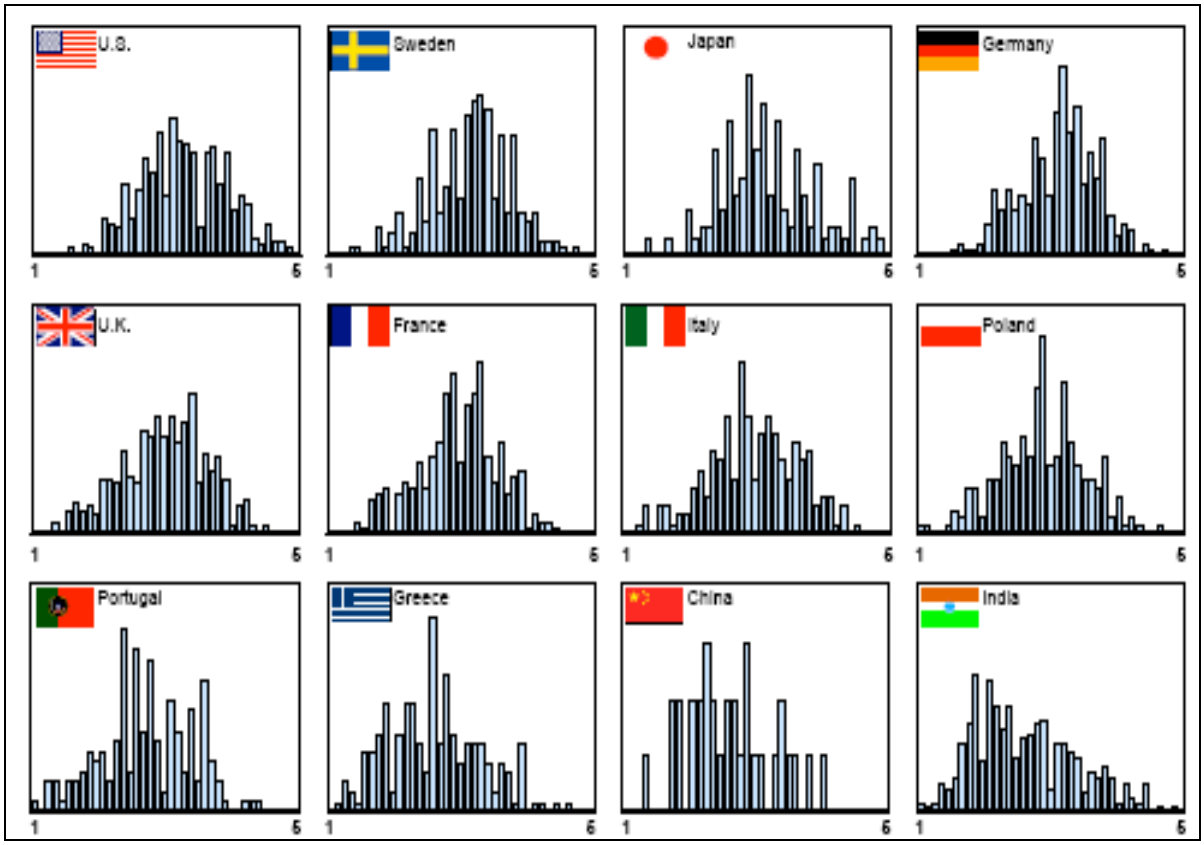
However, it is important to recognise that management practices vary much more within countries than across countries – the overall performance of most countries (including the UK) is determined not by the performance of its leading companies but by the size of the tail of poor performers (Figure 7). There is also a considerable spread within sectors and, a significantly smaller one, across different areas of the UK (McKinsey and LSE 2009).

Figure 6: Average management practice score by country



Source: Bloom *et al*., 2007

Figure 7: Distribution of firm level management practice by country

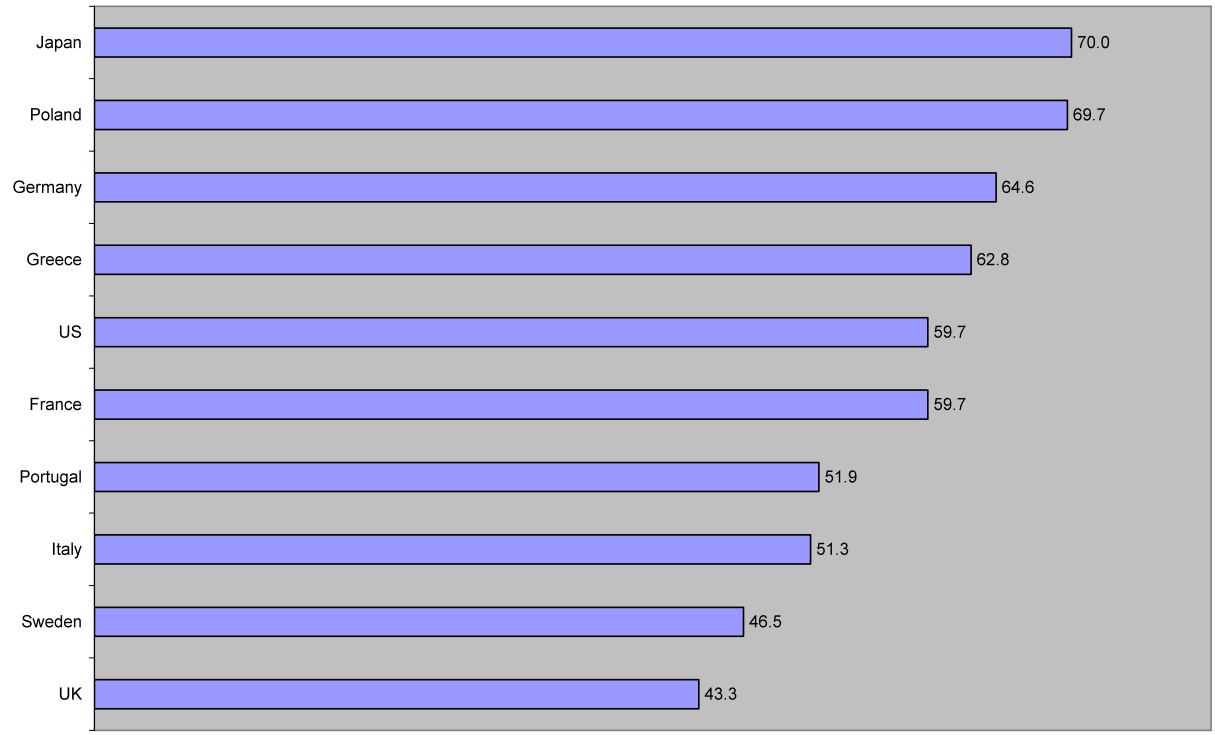


Source: Bloom *et al*., 2007

One key driver of the UK average management score is its relatively low skill levels[15]. Better managed firms have more highly educated managers but Figure 8 below shows that the UK has the lowest share of Managers with a degree of any country in the study (43%) compared to 70% in Japan and 60% in the USA.

[15] Others include ownership patterns, sector composition, labour flexibility, presence of multi-national companies, and exposure to international competition.

Figure 8: Average percentage of managers with a degree by country



Source: Bloom *et al*, 2007

The percentage of managers holding a degree in Northern Ireland (49%) and the Republic of Ireland (52%) exceeds that for Great Britain (42%). The average for all 14 countries studied is higher at 58% which means Northern Ireland, the Republic of Ireland and Great Britain (42%) are confined to the lower half of the management skills table.

Management practice scores also vary considerably by ownership type – multi-nationals appear to be 'well-run' in all countries, including the UK where their score is well above the average. The highest scores are found in firms where there are dispersed shareholders and private equity/venture ownership. Weaker scores predominate in family owned, founder owned and Government owned companies. As the UK, along with Northern Ireland and the Republic of Ireland has a relatively high proportion of family owned firms by international standards, this may well impact on the uptake of management practices.

In the UK, the sectoral spread of managers holding high level qualifications may indicate a potential issue. Table 9 shows the proportion of UK managers who hold Level 4 qualifications varies from 14 per cent in the vehicle maintenance sector to 63 per cent in Transport equipment. The public sector tends to have higher proportions of managers who have Level 4 qualifications, e.g. health and social work, Public administration and Education.

Table 9: The proportion of managers qualified to Level 4+ by sector

Sector	%
Transport equipment	63
Electricity, gas and water	63
Computer related activities	63
Health and social work	63
Public admin etc	62
Education	56
Professional and business services	55
Machinery and electrical equipment	54
Chemicals etc	54
Mining and quarrying	53
Food, drink and tobacco	47
Real estate	46
Financial services	44
Metals and metal products	44
Publishing etc	42
Post and telecoms	41
Textile and textile products	41
Other services	36
Construction	36
Wood, pulp etc	32
Transport	32
Wholesale trade	30
Agriculture	28
Other manufacturing	24
Hotels and restaurants	23
Retail trade	23
Vehicle maintenance	14

Source: SSDA (2007)

In study of management development in six European countries by Mabey and Ramirez (2004) it was found that around a quarter of the variation in organisational performance was explained by three factors: a strategic approach to HRM, a long-term, proactive and strategic approach to management development and, on the part of line managers, a belief that their employer takes management development seriously. These results hold true, irrespective of country, size, sector and growth.

But what is the wider evidence assessing the adequacy of UK management? Although levels of education and qualifications are only indicative of skills deficiencies, they have frequently been deployed in assessments of management quality and hence as a proxy for management capability. Qualification levels of managers have been increasing in recent years, which could at face value, signify growing management capability. For instance, Johnson (1999) has shown that the vast majority of SME owner-managers have no formal management qualifications and have undergone no formal management training prior to starting their businesses. This is supported by Bosworth (2002) who identified disproportionately high proportions of managers in small firms with low or no qualifications, and relatively few with high qualifications.

In their review of UK competitiveness, Porter and Ketels (2003) used a range of international indicators including managers' skills, the take up of modern management techniques, and wider business returns. Whilst management capability was not seen as the core of the UK competitiveness challenge, they did observe issues around the skills of lower and middle ranking managers in the UK, compared to its international competitors, and the slower take up and use of new management techniques.

Further international research also raises questions around management capability and differences in approaches to management development. Whilst there may be issues about the true nature of comparability across international indicators of qualifications, they highlight important differences which arguably warrant further research and analysis. For instance, Keep and Westwood (2003) based their assessments of the adequacy of UK management on broad reviews of wider business approaches and again a range of international indicators such as education and training levels of managers in different countries. In particular, they considered changes in such approaches and indicators over time, and the evidence of business benefits that have resulted. These point to relatively poor levels of education and training by UK managers (see Table 9). Furthermore, they used this, and the low evidence of business gains from a range of business approaches, such as business process re-engineering and mergers, for example, to argue that there is a lack of managerial skills in the UK.

Table 10: Training of managers in selected countries

	UK	USA	Japan	Germany	France
Average terminal educational age	19.5	22	21	21	22
Graduate (%)	49	74	78	72	61
Off-the-job training (days/year)	4	7	5.5	5.5	6
On-the-job training (days/year)	4.5	8	6.5	6.5	6

Source: Keep and Westwood (2003)

Mabey and Ramirez (2004) surveyed 700 domestically-owned organisations with more than 20 employees in Germany, Denmark, France, Spain, UK, Norway and Romania. They found that UK organisations generally spent less per year on management development than all other countries except for Romania (see Table 10). Where management development was happening in the UK, it was found to be highly dependent on externally accredited training and qualifications. Finally, UK and French organisations were significantly less likely to adopt a strategic approach to HR management and the link between HR and business strategies was less evident than in the other countries.

Table 11: Spend on management development

Country	Euros per manager (average per year)
Germany	4,438
Denmark	3,387
Norway	2,734
France	2,674
Spain	1,803
UK	1,625
Romania	424

Source: Mabey and Ramirez (2004)

The SSDA commissioned the IES (Tamkin *et al*, 2006) to study a range of aspects of management capability in 484 domestic and multinational businesses across four countries in 2006 – this included measures of: innate ability, vocational qualifications, generic qualifications, internal training, experience, management education when in post. It was found that innate ability and job experience carried the most weight in enhancing management capability, and formal qualifications were regarded as less influential. In the UK, experience was regarded as most important for UK managers, with less regard for qualifications and in-company training. HR was found to play the least strategic role in the development of managers in the UK (and the most strategic role in Norway). UK firms preferred a less formal approach and this was felt to be a significant contributory factor limiting competitive success in the UK.

In conclusion, therefore, management and leadership matters and it is of critical importance to organisational performance. Action targeted at improving management capability and skills development in the UK could have a significant effect on fostering organisational ambition, future business practices, the take up of HPW, improved skills utilisation and, ultimately, bring substantial benefits to organisational and economic performance.

4.8 Product market strategy

Analysis based on the National Employer Skills Survey (NESS) provided to the UK Commission investigates the links between establishments' product market strategies, average skill levels of their workforces and other skill-related indicators, such as skill shortages and gaps and perceived need up-skilling (Mason, forthcoming). The evidence on level of product market strategy is based on a series of questions (included for the first time in NESS, but similar to questions used in the Employer Skills Survey of 2001) which determine the level of an establishment's product market strategy by asking respondents to compare themselves to others in the same industry in respect of production volumes, price strategy, nature of product and level of innovation.

Mason's model assumes that skills are a function of product market strategy, because (i) choice of product strategy is strongly influenced by the extent of competition in the principal market and (ii) analysis of earlier surveys (particularly the Employer Skills Survey in 1999) found that new or additional skill requirements arose out of a result of a change in product market specification[16]. However, in principle, there may be a reverse causation in that an establishment's willingness, or ability, to move up-market in terms of product market strategy may also be enhanced by having a ready availability of the skills required to move up market.

[16] National Skills Task Force, *Skills for All: Research Report*; NSTF, London, Department for Education and Employment, 2000

The results of this work clearly show that:

- the level of product market strategy and average skill level within establishments are positively correlated: the higher the product market strategy, the higher the average level of skill required within the workforce;
- that the higher the product market strategy and skill level, the less likely it is that the establishment will suffer from skill gaps;
- there is some evidence that development of higher product market strategies may be constrained by skill gaps, particularly if these skill gaps involve managers; and
- the higher the product market strategy and the skill level of the workforce, the higher will be perceived future up-skilling needs.

There is clearly a need to support the achievement of higher product market strategies with higher and appropriate levels of skills if employers are to respond to encouragement to move up the value chain. Having moved up the value chain the greater attention that is required of the employer to the skills of the workforce pays dividends in that skills gaps are less likely to be perceived.

4.9 Skill mismatches

Much of the research evidence presented above links the presence of higher skills to various measures of firm performance and ultimately survival. This presupposes the effective application of skills in the workplace and that employees' skills match the demands of their current and future jobs.

The value of skills, however, can also be expressed in the 'converse': i.e. the impact on organisational performance of a lack of appropriate skills among the workforce (skill gaps or under-skilling). Alternatively, it can also be the case that employees are over qualified or over skilled for the jobs they do, i.e. their skills and abilities are underused. Both scenarios create inefficiencies in the workplace potentially damaging organisational performance through lost business, output, and additional training costs.

The UK has the lowest rate of job matching in the EU, that is, the proportion of employees whose skills match their role (Bevan and Cowling, 2007). In 2000, 80% of UK employees reported their skills were matched to their job compared to 85% on average for the EU-15. Of those whose skills were not matched to their job 11% said they were under-skilled and 9% indicated they were over qualified for their post. To some extent this is the result of the UK having more high skilled jobs than highly qualified people to fill them (Spilsbury and Campbell, 2009; OECD, 2008b). With the exception of the United States and Canada, high skilled jobs exceed the number of highly skilled people available to fill them in all OECD countries. However, the UK does not rank highly among OECD countries for the proportion of high skilled jobs that it has.

Men are more likely than women to occupy jobs that do not match their skills. Older workers are more likely to be under-skilled than younger workers who often report they occupy roles not commensurate with their skills at the beginning of their career. This is likely to be the case for graduates in particular who later find jobs to which their skills are matched. The rate of job matching varies little by sector in the UK with only a 6% difference between the highest and lowest rate.

One obvious solution to the problem of under-skilling is for the employer to provide training to the affected employees as part of an active and targeted training strategy, yet 42% of this group in the UK says they have not received training (Bevan and Cowling, 2007). Another solution might be to alter the way work is organised in the workplace. Job design can help to re-align the skills of the workforce with the needs of the organisation.

It is evident that significant under and over-skilling remains in the UK relative to other countries in the EU-15. This can impede labour utilisation and productivity growth as well as the individual's career progression, skill development and job satisfaction. Not only is the UK lagging other major European countries but they are increasing their rate of job matching faster than the UK which threatens further the UK's competitiveness.

Evidence from Felstead *et al*. (2007) reinforces that from Bevan and Cowling. Felstead *et al*.'s research compares workers' qualifications levels with the qualifications someone would need to get the job they are doing thereby revealing whether they are over or under qualified. This allows an assessment of whether the supply of and demand for skills is matched or not.

Their results show that over-qualification has risen by five percentage points between 2001 and 2006 to 40% of all workers. This means that around two in every five workers occupy jobs for which they are 'over-qualified'. Those holding qualifications at level four and above seem to be most affected as the proportion of graduates reported to be over-qualified has increased by 50% over the last 20 years, with three quarters of this increase occurring in the last five years. Just less than 15% of all workers reported they were under-qualified in 2006, down by 4% from the level in 2001. Overall, then Felstead *et al*.'s research shows that the growth in the supply of skills has outpaced the growth in demand for those skills. This is the case at all levels of skills except at the 'no qualifications' level where there is an excess of jobs for people without qualifications.

In two studies, Forth and Mason use different data sources to highlight the impact of ICT skill gaps on firm performance. The first (2004) was based on a sample of 742 companies and finds clear evidence of a significant and negative relationship between the severity of ICT skill gaps within an establishment's workforce and the establishment's sales performance. Therefore, the more prevalent gaps were in the proficiency of establishment's ICT workforce, the weaker the establishment's performance in terms of sales. This relationship becomes more significant when 51% or more of an establishment's ICT workforce are deemed to lack proficiency.

In their later study (2006) they use international benchmarking data to illustrate that the presence of ICT skill gaps has a negative and significant impact on the extent of ICT adoption within a firm and also its use. We have already seen the importance of ICT to productivity in earlier Chapters. These two studies show that ICT skill gaps can, indirectly at least, have a detrimental impact on firm performance, thereby highlighting the importance of skills to business performance generally.

The impact of skills gaps is unlikely to be uniform across a sector. Within manufacturing the presence of skills gaps has a bigger negative impact in some industries than others (Harris *et al.,* 2006). They conclude that manufacturing firms operating below full capacity and reporting skills gaps are up to half (51%) as productive as other firms. Furthermore, the presence of skills gaps largely cancels out any productivity gains achieved by moving up the value chain to produce a higher quality product.

It is evident that a lack of appropriate skills impedes organisational performance. This is manifested in lost business and output and also in the cost of trying to correct those gaps through training, assuming this is provided, although it seems that a large minority of workers who report they are under-skilled also report they receive no training. Just as having an under-skilled workforce is detrimental to performance so too is having workers whose skills exceed those demanded by their job. In the long term over-skilling is beneficial to neither party but improved job design and wider HPW practices can offer a solution.

4.10 Conclusion

The literature reviewed in this section shows unequivocally that higher level skills are essential to support higher levels of company performance regardless of sector. Perhaps most fundamentally, skills have been shown to increase chances of firm survival. However, the mere presence of skills in a firm is not sufficient by itself. Human capital must be managed and applied in way which maximises its potential and its externalities of knowledge transfer among workers within and between firms. To this end, HPW and good management and leadership are shown to provide significant performance benefits for the firm, along with other benefits for employees too. Worryingly though, the adoption of HPW across UK firms and the strength of their management is low compared to other countries.

Employer provided training is the single most important source of post-compulsory education and training for the working age population. The investments employers make in workforce training raises productivity and firm performance across a range of measures. The gains they make in productivity also outweigh the rise in wages for trained workers by 2-5 times. It is important to recognise that the benefits of training vary according to the nature, level and quality of training.

Employers also seem to value off-the-job training provided to staff more highly than training provided on the job based on the wages paid to staff undergoing each type. Combining on and off-the-job training over a longer period of time, Apprenticeships have been recognised for their business benefits including enhanced business performance, more control over skills supply and quality, reduced skills gaps and shortages, lower net training costs and helping to redress an aging workforce.

However, there is cause for concern. The OECD observe that although the UK has comparatively high training rates the training provided is all too often short term and generic in nature. Furthermore, recent evidence suggests that the provision of job-related training in the UK has dropped back to 1993 levels threatening the country's economic performance and competitiveness.

There also is concern over whether the stock of skills in the UK is appropriate to the jobs that we have in the economy. Mismatches between the two lead to inefficiencies and can cost business dearly. The growth in supply of skills has exceeded the growth in the number of jobs that require those skills. This is the case for all levels of qualification except those jobs which require no qualifications. This had led to nearly two in every five workers being over qualified for the role they occupy. The mismatch of skills to jobs in the UK is high relative to our neighbouring countries in the EU-15.

5 The value of skills to individuals

There is a substantial body of literature examining the benefits of skills, qualifications and learning to individuals, including employment, earnings, job satisfaction and health. There is considerable evidence of a positive association, and in many cases causality, between the amount and type of education, qualifications and skills held by an individual and the benefits derived.

The evidence presented here concentrates on the 'economic' returns to qualifications and finds that, overall, higher qualifications and skills attract higher returns in terms of wages. The wages that firms are prepared to pay to workers also provide an indication of their contribution to the business i.e. their labour productivity.

The levels and types of qualifications as well as sectoral and spatial differences are also considered, along with the age at which they are acquired and the mode of acquisition. Attention is also given to the value of basic and generic skills. We begin, however, with the link between poor educational attainment, low skills and low pay.

5.1 The cost of low skills

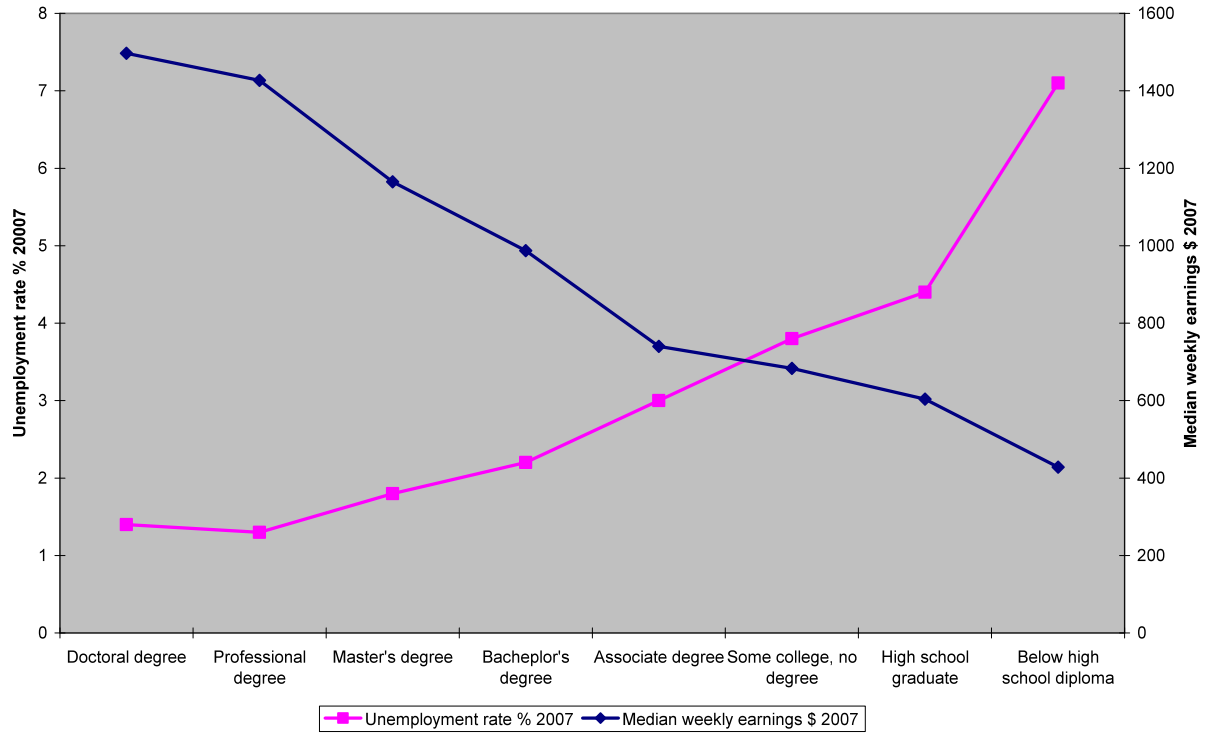
Low levels of skills increase the likelihood of low pay and unemployment. The number of people earning low levels of pay[17] in the UK is substantial; more than a fifth of all employees or 5.3 million people are considered to be low paid. These workers are at greater risk of poverty than those who are not low paid (Lawton, 2009).

The causes of low pay are complex but include the qualifications held by the individual along with the job they do and the sector they work in. Numerous studies and research summaries highlight the link between greater levels of education and vocational training and the reduced probability of unemployment, low pay and increased labour market participation (Descy and Tessaring, 2005; Hansson, 2008). There are several pieces of evidence which give a very clear signal that the absence of skills can result in low pay and potentially poverty.

Evidence from the Bureau of Labor Statistics (2008) in the United States shows clearly that the more highly qualified an individual is the less likely they are to be unemployed and the more likely they are to be earning more (see Figure 9).

[17] Low pay is defined here as 60% or less of the median, full-time, adult earnings.

Figure 9: Educational attainment, unemployment and earnings

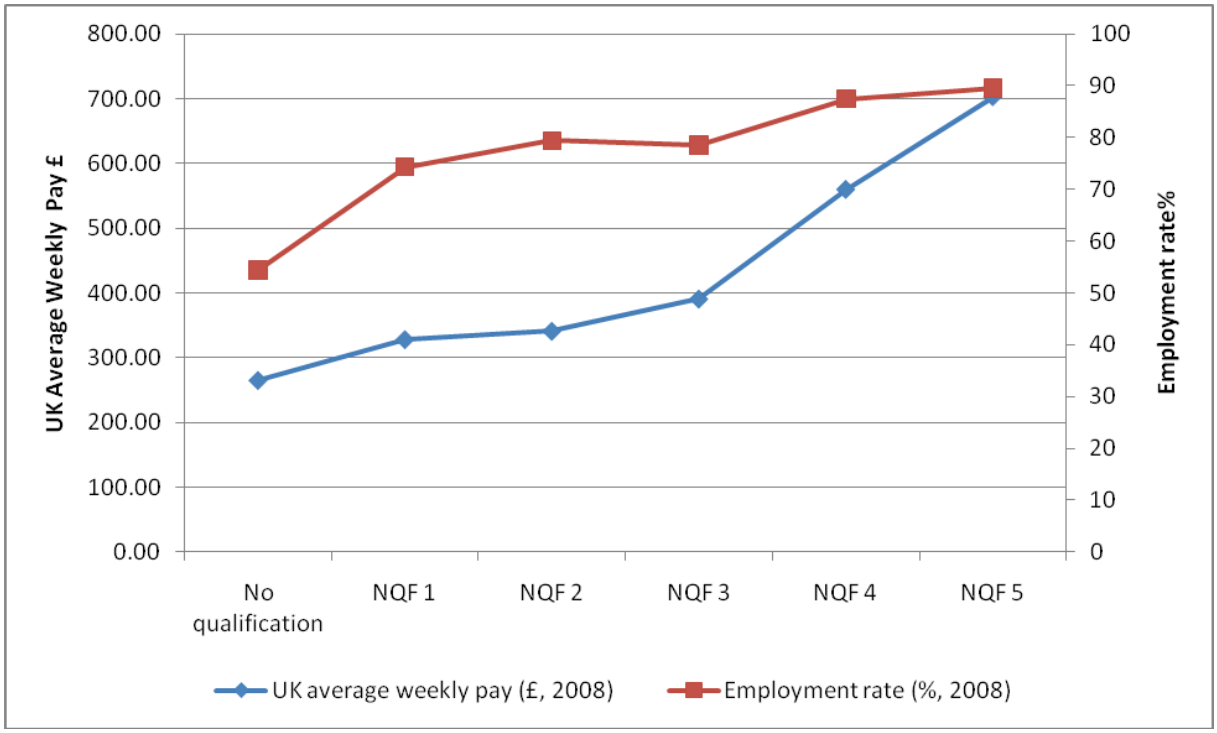


Source: Bureau of Labor Statistics 2008 (www.bls.gov.uk/emp/emptab7.htm)

The median weekly earnings of those holding a Bachelor's degree ($987) are more than twice that of those holding qualifications below a high school diploma ($428). The two highest qualified groups (Doctoral and Professional degrees) have the lowest unemployment rate (1.4%) and the highest weekly earnings of nearly $1,500. The unemployment rate for the lowest qualified group holding qualifications below a high school diploma is just over seven percent, the highest of all the groups. For those holding a Bachelor's degree the unemployment rate is just over two percent and average weekly earnings are just less than $1000 per week.

The same message is presented in Figure 10 for the UK; low skills reduce the likelihood of being employed and, when employed, attract much lower earnings. For those without qualifications in the labour market the employment rate is just under 40% less than the highest qualified group and their average salary is nearly £450 less per week.

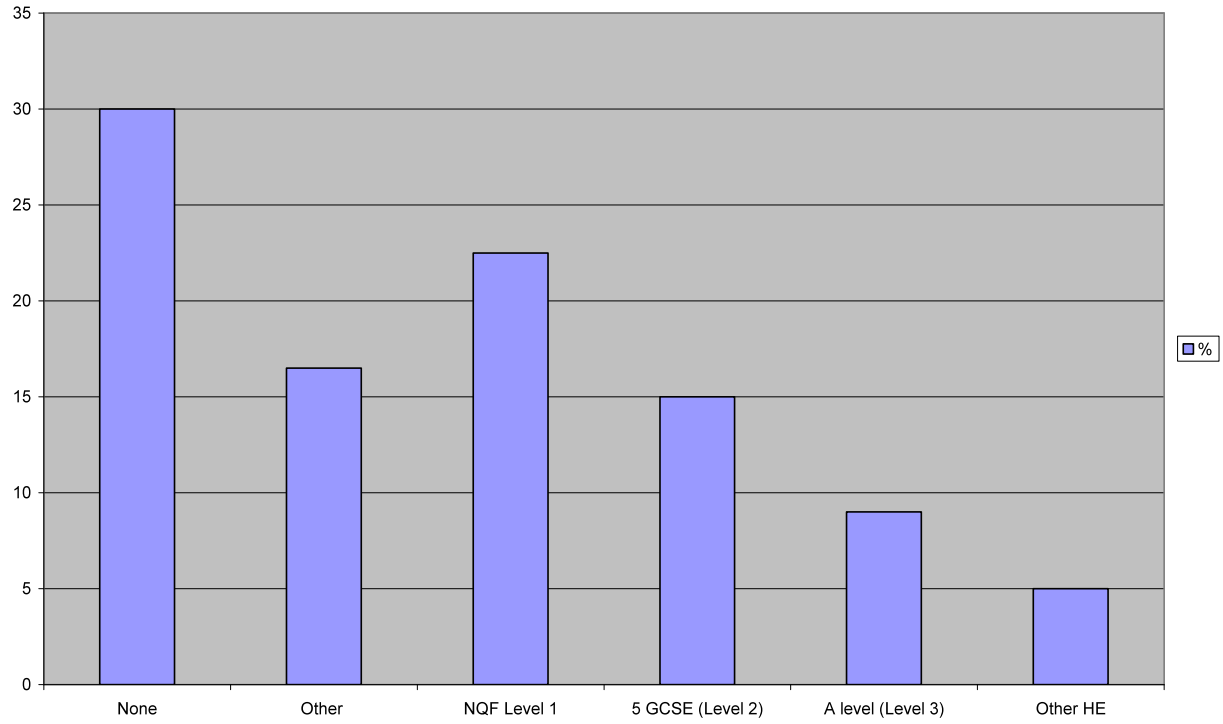
Figure 10: Average weekly pay and employment rate by qualification level



Source: LFS (2008) in UK Employment and Skills Almanac 2009 (UK Commission for Employment and Skills, 2009).

Focusing on low pay in the UK, Figure 11 gives estimates of the likelihood of being low paid at different qualification levels compared to those holding a degree as their highest qualification. Workers with no qualifications are 30% more likely to be low paid compared those holding a degree. Workers whose highest qualifications are at NQF Level 3 (A-Levels), Level 2 (5 GCSEs A-C) and Level 1 are 10%, 15% and 22% respectively more likely to be low paid than those hold a degree (Level 4).

Figure 11: Qualification levels and the probability of being low paid compared to those holding a degree.



Source: Lawton (2009)

The Cabinet Office's (2008) paper on social mobility also illustrates the much lower earning potential and progression of those with low skills. The significant disadvantage not only persists but also widens over the life course (see Figure 12).

Figure 12: Gross median annual earnings (£000s) by age for men

Source: Cabinet Office (2008)

Gender, age and health also play an important role in establishing the likelihood of low pay. In work for the Equalities and Human Rights Commission, Li *et al*., (2008) examine the role of ethnicity in low pay for males and females at high (first degree or above), medium (good GCSEs / A-levels) and low educational qualifications (below good GCSEs). A notable finding is that at low levels of qualifications male and female ethnic minority groups are often paid more than their white counterparts but as the level of qualification increases the range of hourly pay reduces and, especially for males, ethnic minorities then earn lower gross weekly pay than whites. This suggests that high qualifications have a 'leveling' effect, though a relative advantage in pay for ethnic minorities in the low qualification group becomes a relative disadvantage at high levels of qualification.

In a study of low attainers in Scotland at age 18-19[18] and their labour market outcomes at age 22-23, Howieson and Iannelli (2008) find that male low attainers earned on average £23.45 less per week than their high attaining counterparts (£147.36 and £170.81 respectively) For females the gap between high and low attainers is greater at £44.94 per week (£105.05 and £149.99 respectively). Their work also confirmed that low attainers had poorer labour market outcomes more generally:

> A smaller proportion of them were in full-time employment and they were more likely to be unemployed or in part-time employment. Considerable differences are evident in their average occupational status… Withdrawal from the labour market and from education was more common among low attainers.(p. 285-6)

Their analysis also showed that had low attainers stayed on in education the additional time would have reduced the likelihood of such effects.

Having demonstrated how low skills and qualifications have a 'cost' for their holders, attention now turns to the benefits available to those higher level skills and qualifications.

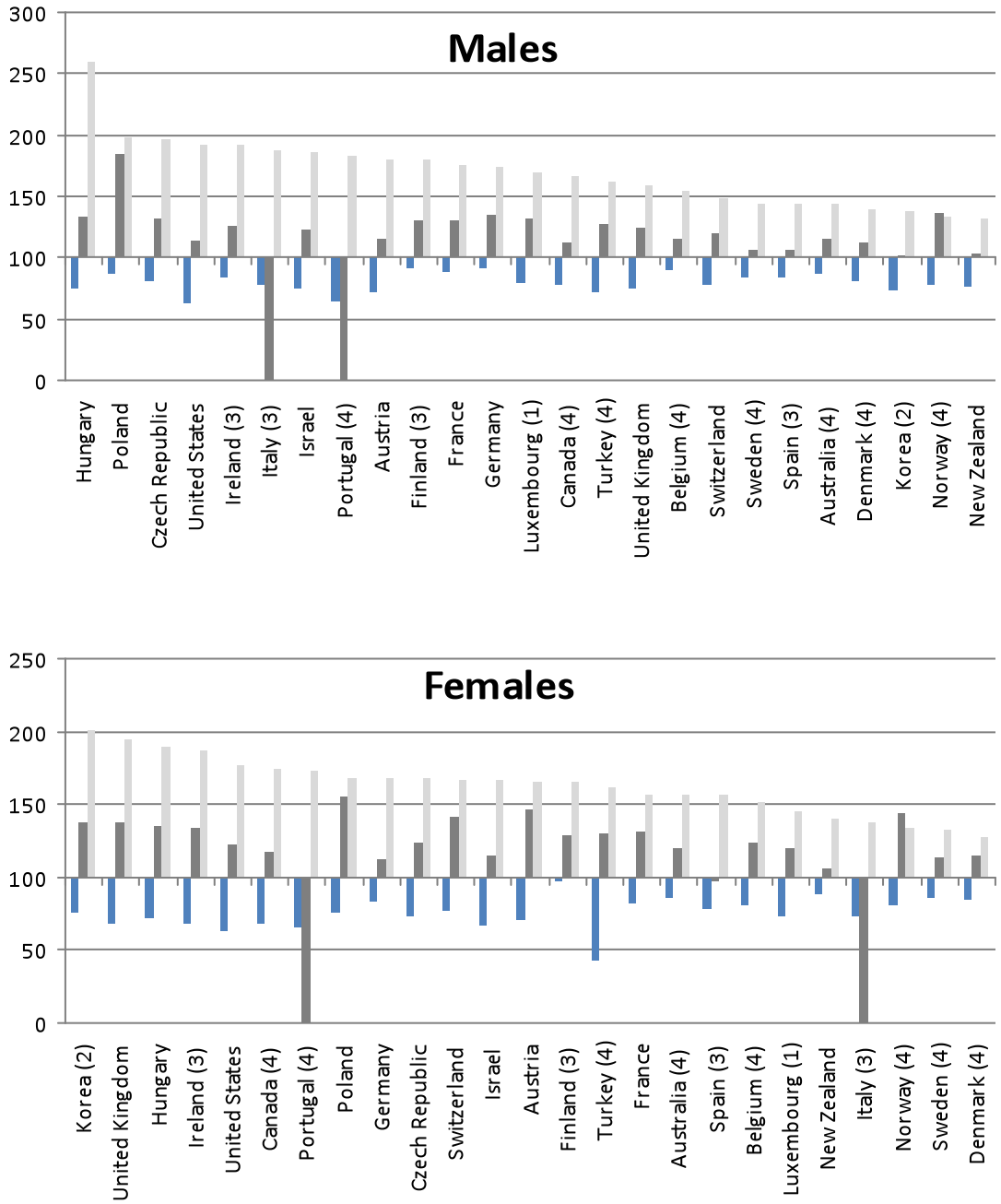
5.2 International comparisons

A comparison of the relative earnings for three broad levels of educational attainment across the 30 OECD countries is given in Figure 13. It is clear that there is considerable value attached to completing education at post secondary non-tertiary (=100 in Figure 13) and tertiary levels. Whilst the exact levels and differentials vary across country, the pattern of higher earnings being associated with higher qualification levels is consistent across countries, for men and women with few exceptions.

[18] Low attainment is defined used the OECD as being the minimum level of qualification necessary to minimise the risk of social exclusion. In the UK, this equates to a lack of GCSE passes at A-C.

Moreover, the relative earnings premium for those with tertiary education has been increasing in most OECD countries over the last decade. In Germany, Hungary, Ireland and Italy the earnings premium to tertiary education has increased substantially reflecting demand exceeding supply. Other countries (Spain and New Zealand) have seen a slight fall in relative earnings of those qualified to tertiary education levels but whether this is due to a fall in demand from employers or to a higher number of low paid jobs being taken by tertiary graduates is unclear. There is some evidence in the UK that the wage premium for graduates may be beginning to decline or widen in range after 30 years of continuous growth in the numbers qualified to degree level and above (Purcell *et al*., 2005; O'Leary and Sloane, 2005; McGuiness and Doyle, 2007).

Figure 13: Index of relative earnings from employment



Source: OECD (2008b) Table A9.1.a. (www.oecd.org/edu/eag2008).
Key
Blue = Upper secondary
Dark Grey = Tertiary type B education
Light Grey = Tertiary type A education and advance research programmes
Footnote
1 Year of reference 2002
2 Year of reference 2003
3 Year of reference 2004
4 Year of reference 2005
Countries are ranked in descending order of the relative earnings of the population with a tertiary-type A level (including advanced research programmes) of educational attainment.
Source: OECD. Table A9.1.a.

As highlighted above, both men and women with upper secondary, post secondary non-tertiary or tertiary education in the OECD receive substantial earnings advantages over and above those without upper secondary education though the benefits are greater for men in OECD countries than females, although there are exceptions, including the UK. The greater benefits accruing to men arise because women, on average, spend less time in the labour force, have a higher incidence of part-time work and experience a degree of occupational segregation.

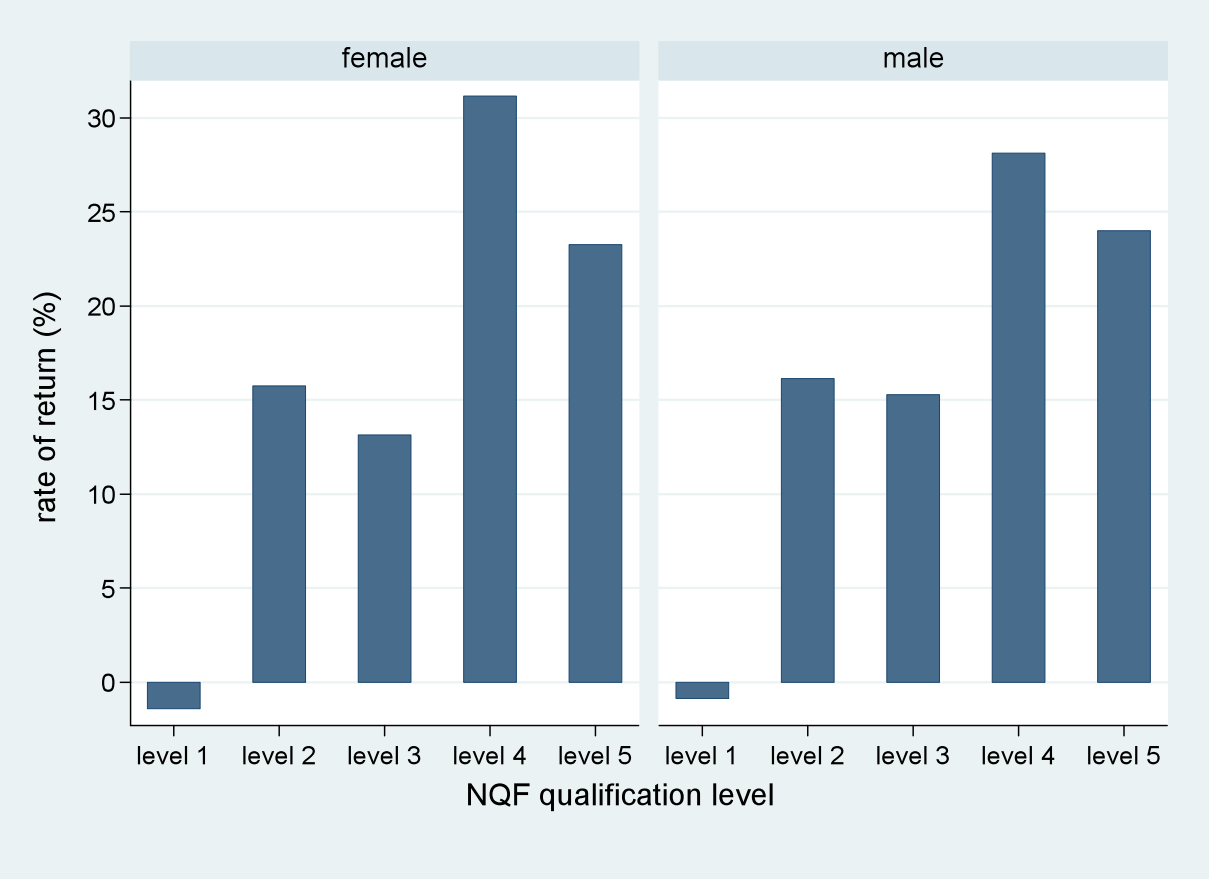
5.3 Returns to qualifications in the UK

The previous section showed that higher levels of skill or qualification are associated with higher earnings from employment and that this pattern holds generally across countries. This section considers further the pattern of earnings from different Levels of qualification in the UK. Subsequent sections continue by identifying differences associated with the type of qualification acquired (academic and vocational), sector and geography before we examine specific qualifications in more detail: NVQ Level 2, NVQ Level 3, Apprenticeships, degrees and professional qualifications. Annex 1 provides information on the allocation of qualifications to the five Scottish/National Qualification Framework (S/NQF) Levels and their distribution amongst the working age population.

It is important to distinguish in the literature between two measures of the return to qualifications; the average return and the marginal return (see Annex 2). Using pooled Labour Force Survey data for the UK for 2000-2004, Dickerson and Vignoles (2007) show the average returns to aggregate qualifications (Levels one to five) by gender. The patterns uncovered are broadly similar for men and women (see Figure 14). It should be emphasized that the average returns are 'additive' i.e. those for higher levels are additional to those at lower levels.

The results show negative returns at Level one for males and females holding qualifications at this Level compared to those holding no qualifications. Level two qualifications return a premium of around 16% to holders on average beyond that for those holding Level one qualifications. Level 3 qualifications carry, on average, a further premium of 15% for males and 13% for females. At Level 4 and above the returns rise considerably. The returns are highest for females, exceeding 31% compared to 28% for males at Level 4. Wage premiums at Level 5 are similar for both women (23%) and men (24%) and lower in magnitude than those for Level 4 but are positive, nevertheless, representing a substantial boost in earnings over the possession of a highest qualification at Level 4.

Figure 14: Average returns to aggregate qualification levels by gender



Source: Dickerson and Vignoles (2007)

5.4 Vocational and academic qualifications

These overall patterns conceal important differences. In particular, wage returns vary markedly by type of qualification, i.e. whether they are vocational or academic qualifications.

Dickerson and Vignoles (2007) report very sizeable differences in the returns to vocational and academic qualifications (see Figure 15). Negative returns are reported for vocational qualifications at Levels one and two for both men and women. It is not until Level three that wage premiums for vocational qualifications become positive and even then remain small, especially for females.

Academic qualifications on the other hand provide positive returns across all five NQF Levels, although they are small at Level 1. The negative average returns reported in Figure 14 above for overall Level 1 qualifications are driven by the negative returns to vocational qualifications at this Level compared to the positive returns to academic qualifications. The pattern of returns to overall qualifications at Levels 2-4, appears to be driven primarily by the sizeable and positive returns to academic qualifications though the returns to vocational qualifications at level 4 are also substantial. At Level 5, the returns to vocational qualifications exceed those for academic qualifications. Table 12 presents the numbers lying behind Figures 14 and 15. A more detailed discussion of the returns to vocational qualifications at NQF levels 2 and 3 (namely NVQ Level 2 and 3 which are relatively new compared to other vocational qualifications e.g. City and Guilds, RSA etc) is provided in Sections 5.7 and 5.8.

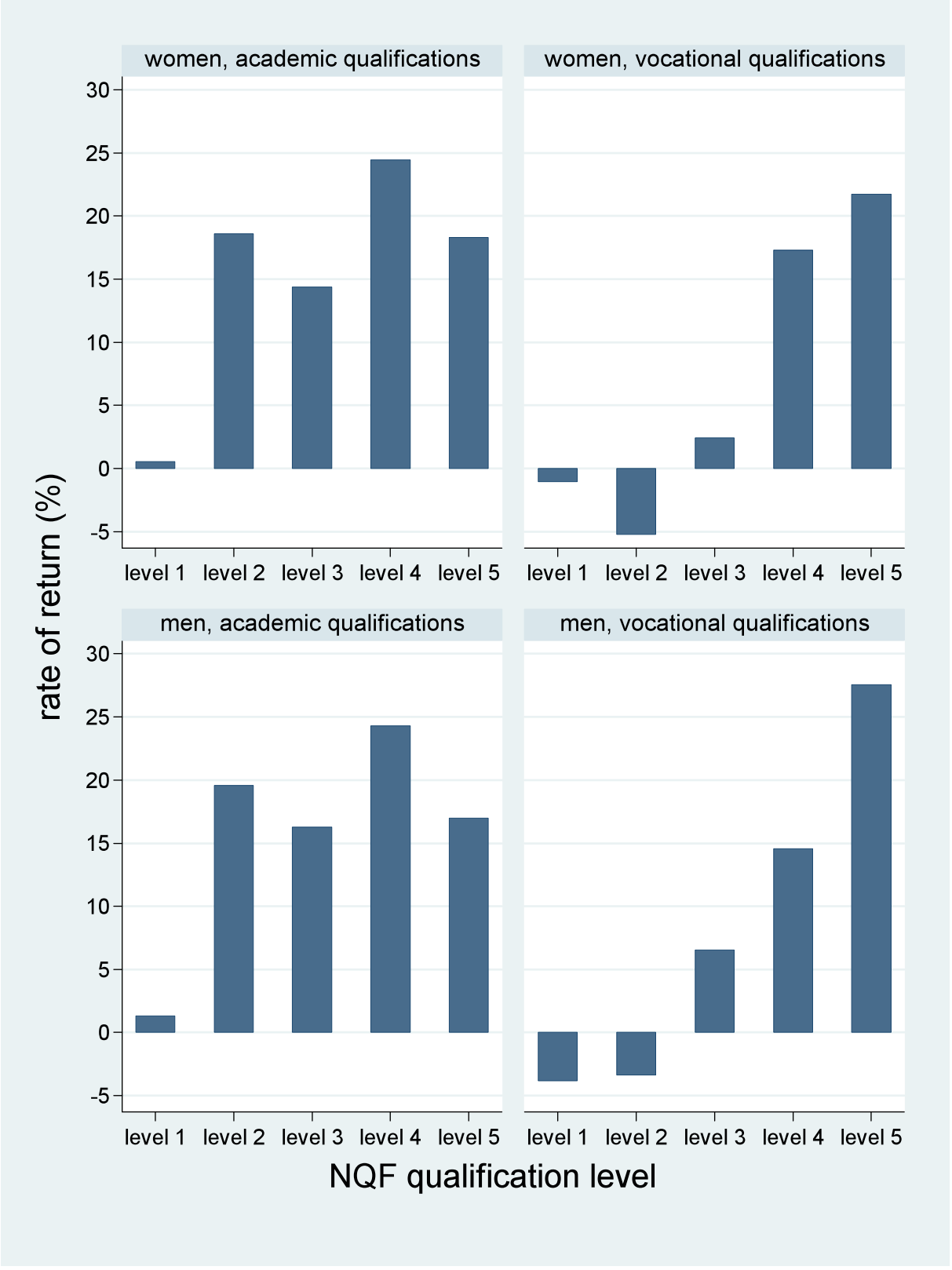
Table 12: Average aggregate and disaggregate returns by gender

	MALE			FEMALE		
	Aggregate	Disaggregate quals		Aggregate	Disaggregate quals	
NQF level:	quals	Academic	Vocational	quals	Academic	Vocational
Level1	-0.9%	1.3%	-3.8%	-1.4%	0.5%	-1.1%
Level2	16.1%	19.6%	-3.4%	15.8%	18.6%	-5.2%
Level3	15.3%	16.3%	6.5%	13.1%	14.4%	2.4%
Level4	28.1%	24.3%	14.5%	31.2%	24.4%	17.3%
Level5	24.0%	17.0%	27.6%	23.2%	18.3%	21.7%
N	69,562	69,562		44,817	44,817	
R^2	0.400	0.404		0.411	0.417	

Source: Dickerson and Vignoles (2007)
Notes to Table
1. Source: LFS 2000-2004, pooled, wave 1 observations only.
2. Sample: full-time employees of working age (men 16-64 and women 16-59 inclusive).
3. Controls are age, age squared, ethnicity (6 categories), region of work (21 categories), public sector, firm size (6 categories), apprenticeship, other qualifications; year dummies.
4. Rates of return are calculated as $\{\exp(\beta)-1\}\times 100\%$.
5. Given that indicators of all qualifications levels are included in the earnings functions, these estimated rates of return can be cumulated. Thus, for example, a woman with level 3 and level 4 qualifications can expect to earn approximately (13.1%+31.2%=) 44% more per hour than an otherwise identical women (in terms of her age, ethnicity etc) with only a level 2 qualification but no more. This cumulative calculation ignores the potential interactions among qualifications, but to the extent that higher level qualifications are frequently only obtained after lower and intermediate level pre-requisites are completed, this illustrative computation is probably not inappropriate.

Despite offering lower returns the role of relatively low and intermediate vocational qualifications in assisting individuals into work or helping them remain in the labour market and to progress to achieve higher levels of qualifications in the future should not be underestimated. This theme is taken up in Section 5.15.

Figure 15: Average returns to disaggregate qualification levels by gender



Source: Dickerson and Vignoles (2007)

There are a number of other bases on which the returns to qualifications differ including, sector, geography, type of qualification, mode and age of acquisition. These are considered in sections that follow, starting with sectors. Furthermore there are sections on returns to basic skills, vocational qualifications at Levels 2 and 3, Apprenticeships, academic subjects at Level 4, generic skills, and professional qualifications.

5.5 Sectoral differences

The literature on the returns to qualifications disguises considerable differences in returns between sectors. The existence of differences in the average returns to qualifications across sectors is most comprehensively demonstrated Dickerson and Vignoles (2007) who use SSC sectors[19]. Figure 16 summarises the returns to qualifications by SSC. Annex 3 describes each SSC's coverage and provides their SIC (Standard Industrial Classification) footprint.

Beginning with **aggregate qualifications** several patterns are evident. Qualifications at Level 1 attract less favorable returns; being either negative or very small for both males and females. This is particularly the case in service based SSCs characterised by relatively high skilled workforces, for example Skills for Health, Lifelong Learning UK, e-skills UK and Financial Services where it is less common for a Level 1 qualification to be a worker's highest qualification.

Qualifications at Level 2 attract positive average returns for males and females across all SSC sectors and often to a much higher level than returns to Level 1 qualifications. Level 3 qualifications also provide positive average returns for males and females. However, in many sectors the size of return to a Level 3 qualification is lower than the return to a Level 2 qualification. For males this is mostly the case in service based sectors and for females it is most evident in primary and manufacturing sectors.

[19] Note that this report covers the 25 SSC sectors and not the whole economy. In the analysis ConstructionSkills and SummitSkills are combined. Results are therefore provided for 24 SSC sectors. A whole economy perspective is provided by Dickerson (2008) using the same data re-presented by geography.

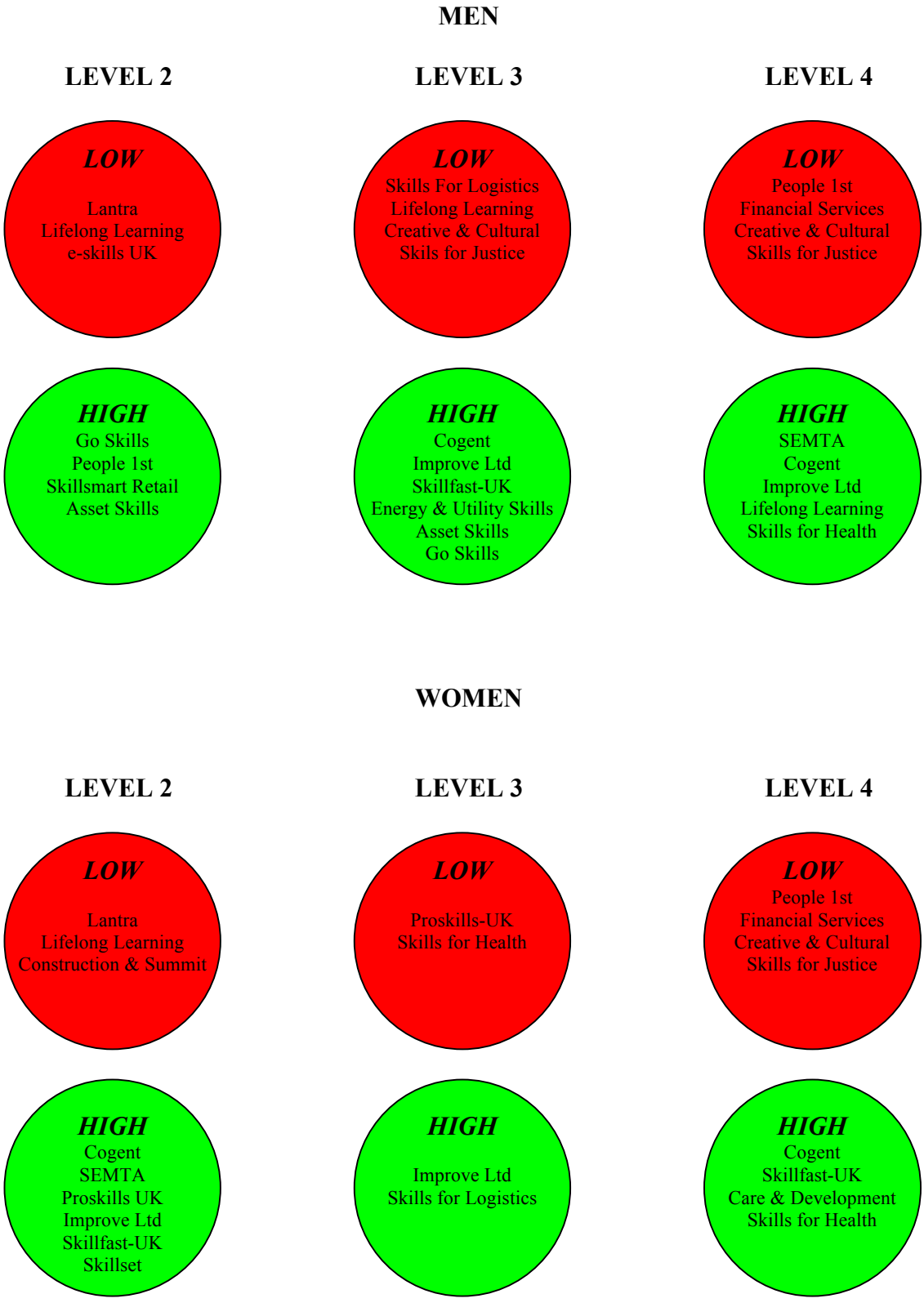
Level 4 and 5 qualifications carry a high return. There are of course differences in the premiums offered between employers across sectors. For males the return to level 4 qualifications in the Improve Ltd SSC is around 42% and just under 40% in Cogent, SEMTA and Skills for Health. By contrast in the People 1st, Skills for Justice and Creative and Cultural SSCs, the return to Level 4 fails to reach 15% for males. For females, the return to Level 4 is 56% in Skillfast-UK and more than 40% in Skills for Health and Care and Development. SSC sectors where the return to Level 4 qualifications struggles to exceed 15% for females include Energy & Utility Skills, GoSkills, Skills for Logistics, Skills for Justice, Financial Services Skills Council, People 1st and Creative and Cultural Skills.

The figures reported by Dickerson and Vignoles (2007) are premiums and do not take account of the absolute average starting rates of pay for individuals at each level of qualification or no qualification. By way of illustration, Dickerson and Vignoles (2007) report average hourly pay for men and women across the SSCs. Men are paid an average of £10 per hour or more in 16 SSC sectors but for women this is the case in 10 SSC sectors.

Notwithstanding this, it is evident that the same qualification will attract varying returns in different sectors but that within a sector the return to the same qualification can differ between males and females. This is evident from Figure 16. These diverse patterns are likely to be the result of a number of factors such as the nature of the sector, the relative employment levels of males and females, their employment status (full-time, part-time, self employed) and nature of the jobs or occupations held.

Energy & Utility Skills and Construction & SummitSkills cover traditionally male dominated industries. In the case of Energy & Utility skills women earn a lower return to qualifications at Levels 1-4. In Construction & SummitSkills, women earn a lower return to all levels of qualifications. By contrast, the Creative and Cultural Skills sector employs a much higher proportion of women who tend to receive more positive returns to all levels of qualification, except Level 4.

Figure 16: Summary of the returns to Level 2, 3 and 4 Qualifications by SSC



Source: Dickerson and Vignoles (2007)

Looking at **disaggregate qualifications** across all SSC sectors Dickerson and Vignoles discover a distinct and contrasting pattern in the returns to vocational and academic qualifications. Much higher positive returns are generally available to academic qualifications across all sectors and for men and women.

However, for vocational qualifications there is a substantial degree of variability in the returns offered to each gender across sectors. The significant and positive returns evident in the sectors when qualifications are considered in aggregate clearly reflect the returns to academic qualifications and the number of those qualifications in a sector relative to vocational qualifications.

Employers generally seem to value Level 2 academic qualifications indicated by positive returns for males and females. By contrast, the returns to vocational qualifications at that level for both men and women across the SSC sectors are almost universally negative with average returns as low as -20% for males and -17% for females. Only People 1st (5.6%) and Energy and Utility Skills (8.3%) report positive returns for males at this level. For females only Automotive Skills/IMI shows positive returns (13.4%).

Academic qualifications at Level 3 offer positive rates of return across all sectors for males and females. Four sectors offer male holders returns of 20% or more; Improve Ltd (29%), Skillfast-UK (32%), GoSkills (27%) and Asset Skills (27%). Eleven sectors offer returns to males of between 10% and 20% and eight sectors offer returns of less than 10%. Three of the latter eight sectors are dominated by public sector employers i.e. Government Skills, Lifelong Learning UK and Skills for Justice. Supply seems to be plentiful in these sectors at this Level so this may act to suppress the rates of return.

Improve Ltd and GoSkills also offer females holding Level 3 academic qualifications returns of 20% or more (28% and 20% respectively) along with LANTRA (23%) and Skills for Logistics (20%). Employers in all other sectors offer females a rate of return of between 10 and 20% on average for intermediate academic qualifications except ProSkills, e-skills UK, Government Skills, Skills for Justice, Lifelong Learning UK in which rates of less than 10% are recorded.

In terms of intermediate vocational qualifications, there is no evidence of the relatively low supply leading to high returns. Some (generally production-based) SSC sectors do offer a robust return to these qualifications. For example Cogent (15%) Improve Ltd (14%) Skillfast-UK (13%) Energy & Utility Skills (17%) and Lantra (12%[20]) all report rates of return for males in excess of 10%. Employers in the Improve Ltd and Skills for Logistics sectors offer women rates of 22% and 12% respectively. However, in 13 of the 24 SSC sectors the return to intermediate vocational qualifications for males is not significantly different from zero and indeed some (5) still offer negative returns. For females, 19 sectors offer a return not significantly different from zero with 4 sectors offering negative returns.

Demand for Level 3 vocational qualifications appears to be relatively low in most sectors with the exceptions noted. Moving to higher qualifications and in particular Level 4 academic qualifications it is evident a high rate of return is available across sectors.

- For men, in five SSC sectors, the return to a degree exceeds 30% (Cogent, Improve Ltd, Skillfast-UK, SEMTA and Skills for Health) and is equal to or below 15% in just two sectors; People 1st and Creative and Cultural Skills.
- For women, the return to a degree exceeds 30% in five SSC sectors (Improve Ltd, Skillfast-UK, SEMTA, Automotive Skills and Skills for Care and Development) and falls below 15% in four sectors (ProSkills, Energy and Utility Skills, GoSkills, Skillset and Creative and Cultural Skills)

Across all sectors the number of vocational qualifications at this level is approximately just over half that of academic qualifications. Returns tend to be less generous at this level for vocational than academic qualifications. Whilst for males, positive returns to vocational qualifications of between 8% (Asset Skills) and 25% (Energy and Utility Skills) are reported in most sectors there still remain some negative or negligible returns at this Level particularly for LANTRA (-2%), Skillfast-UK (-8%), Financial Services (0%), Skills for Justice (1%) and Creative and Cultural (-1.4%). For females, a similar spread of returns is noticeable from 9% (ConstructionSkills and SummitSkills combined in the analysis) to 28% (Skills for Health). In the Skills Health sector there are substantially more workers holding vocational qualifications compared to those holding the academic equivalent which reflects the nature of the sector and the qualifications required to work in many of its occupations.

[20] Although low base sizes are noted.

5.6 Geographical differences

Despite the wealth of literature on the returns to qualifications, there is little research that considers differences by geography. We consider two aspects to geography here; urban-rural wage differences and; the returns to qualifications in the four countries of the UK.

The literature on the urban wage premium includes a number of recent studies in European countries that reveal urban-rural wage differences (Heuermann *et al*., 2009). They confirm that average wages are higher in cities than rural areas and that the urban wage premium increases with city size. Glaeser and Maré's (2001) find that wages in metropolitan areas with more than one million inhabitants are around 36% higher than outside the area. For smaller cities the urban wage premium was found to be around 21%. Results for France (Combes *et al*., 2008) show average wages in Paris are 15% higher than other large French cities and 60% higher than rural French areas. Similar studies specific to a number of European counties are also reported by Heuermann *et al*. (2009).

Dickerson (2008) provides comparisons of the return to qualifications for each of the four UK countries and distinguishes between vocational and academic qualifications[21].

Table 13 shows average rates of return to academic and vocational qualifications by gender in the four nations of the UK. The returns are cumulative across the different Levels. For example, a man with academic qualifications in Northern Ireland at Levels 1 and 2 will, on average, earn (3.7 per cent + 31.1 per cent) = 34.8 per cent more than a similar man with without qualifications.

It is evident that academic qualifications offer men and women strong average returns at Level 2 and above in all countries of the UK. By contrast there are much smaller and negative average returns to vocational qualifications, especially at low Levels, for both men and women. Despite offering lower returns the likely value of these qualifications in assisting individuals into work or helping them remain in the labour market should not be underestimated. There may also be a skills escalator effect whereby acquisition of lower level vocational qualifications is associated with the holder going on to gain higher qualifications (Dearden *et al*., 2004; De Coulon and Vignoles, 2008).

[21] Walker and Zhou (2008) also provided disaggregated returns for vocational and academic qualifications but for Scotland only.

There are, however, a number of differences across the UK. In respect of academic qualifications for men, the return to Level 1 is higher in the Devolved Administrations, whereas the return to Level 2 is highest in England. Wales has the highest return at Level 3 but the lowest at Level 4. Scotland has the highest at Level 4 and Wales the highest at Level 5. For women, the returns at Level 2 are greatest in Northern Ireland but England, Wales and Scotland have the highest returns to Level 3. Scotland has the highest return at Level 4 and England and Northern Ireland the highest at Level 5.

In respect of vocational qualifications for men, Northern Ireland is the only part of the UK with positive returns to Level 2. It also has the highest returns at both Levels 4 and 5. For women, the highest returns at Level 4 are to be found in Wales and for Level 5 in Scotland.

Table 13: Average returns to academic and vocational qualification levels by country and gender

	Rates of Return %				
	NQF 1	**NQF 2**	**NQF 3**	**NQF 4**	**NQF 5**
Male					
Academic					
England	0.3	18.2	15.8	24.6	18.9
Wales	3.3	14.6	22.4	19.7	29.6
Scotland	2.7	12.3	13.1	33.6	20.5
N.Ireland	3.7	13.1	12.7	28.5	25.5
Vocational					
England	-4.8	-4.0	4.8	12.8	30.5
Wales	-3.3	-3.0	6.9	19.3	26.3
Scotland	-3.2	-0.4	6.4	13.3	37.2
N.Ireland	-4.4	3.6	8.9	22.7	40.9
Female					
Academic					
England	-1.3	16.2	13.8	24.9	21.8
Wales	-2.4	11.3	18.4	26.1	14.8
Scotland	2.3	10.4	18.3	35.9	12.7
N.Ireland	-0.6	18.0	12.2	31.1	19.3
Vocational					
England	-4.2	-5.8	1.5	16.9	22.2
Wales	1.0	-6.6	2.0	28.1	15.0
Scotland	-3.5	-4.6	-1.8	16.3	30.1
N.Ireland	-1.7	-6.7	2.7	17.7	15.8

Source: Dickerson (2008).

In addition to the differences between academic and vocational qualifications there are also differences in the return to different qualifications at the same Level. This is particularly the case for vocational qualifications and is associated with the range and variety of available vocational qualifications especially at intermediate Levels (Levels 2 and 3). The following sections focus specifically on National Vocational Qualifications at Level 2 and 3 respectively and draw comparisons with other vocational qualifications to illustrate the spread of returns available to holders.

5.7 NVQ Level 2

National Vocational Qualifications (NVQs) were introduced in 1987 and have since become a significant part of the UK training and development landscape. In an attempt to ensure their relevance to the work place, NVQs are designed with significant input from employers and with reference to National Occupational Standards to define what employees / potential workers must be able to do and the level of knowledge expected of them. NVQs can be gained through college, workplace learning or Government training programmes. NVQs are the most popular vocational qualification at Level 2 (see Annex 3) but nevertheless form a relatively small proportion of all qualifications held by the working age population, being held by just 6% of the

working age population (McIntosh, 2009). For many, NVQs have replaced previous occupationally specific training systems with an accredited qualification that is consistent and comparable across occupations. For others, NVQs have provided an opportunity to gain formal qualifications that hitherto would have been unavailable.

Despite the design features of the qualification which attempts to make holders more attractive to employers the qualification appears not to provide healthy wage returns. More widely, the relatively low and sometimes negative return to vocational qualifications at NQF Level 2 has been widely reported (McIntosh, 2009; Dickerson, 2008; Jenkins *et al*., 2007; Dearden *et al*., 2004).

However, returns to the qualification are not universally negative or low as there are some specific groups for which the qualification appears to be beneficial. However given that only a very small proportion of the working age population hold the qualification, and the instances in which it delivers a positive wage return are very specific, the absolute number of people that gain from acquiring a NVQ Level 2 is very small.

The findings from Dearden *et al*'s study in respect to NVQ Level 2 qualifications are presented in Table 14 along with the most detailed and recent study by Jenkins *et al.,* (2007). The Table shows the returns to all people holding NVQ Level 2 qualifications as their highest qualification (marginal return) as opposed to the returns for all those holding the qualification whether it be their highest or not (average return) used in the two Dickerson studies discussed above (Dickerson and Vignoles, 2007; Dickerson, 2008). The interpretation of the estimated returns in the Table is then the gain in wages that an individual from the control group could expect if they acquired a NVQ Level 2 qualification.

The returns are estimated relative to specific comparison groups to control as far as possible for unobserved differences in the characteristics of the individuals with and without the qualification (for example ethnicity, employer size, and type, ability, family background and geography). For comparison, without controlling for such variables Jenkins *et al*., (2007) estimate the marginal return to a NVQ Level 2 qualification as an individual's highest qualification to be -7% for males and -2% for females, when compared to someone without qualifications.

Table 14: Returns to vocational qualifications as highest qualifications

	Qualification	Control Group	All	Male	Female
Dearden *et al*., (2004) British Cohort Study data	NVQ2	No quals	-	3	-5
	NVQ2	L1 and below	-	-6	-4
Dearden *et al*., (2004) Labour Force Study data	NVQ2	No quals	-	0	3*
	NVQ2	L1 and below	-	-6	-1
Jenkins *et al*., (2007) Labour Force Study data	NVQ2	No quals	4*	1	5*
	NVQ2	L2 vocational and below	2*	-1	3*

Source: McIntosh (2009) Table 1
Notes: The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation.
* statistically significant at the 5% level or better
'-' indicates that the is not provided in the original paper

The results show that, in most circumstances, there is little economic reward to entice those with no or Level 1 qualifications to undertake further training and gain a NVQ Level 2. For males without qualifications, achieving a NVQ 2 as their highest qualification the return is a 3% premium at best. For those males moving from at best Level 1 qualifications to a NVQ 2, as their new highest qualification the returns are negative. The picture for females is more positive but returns are slim reaching 5% in Jenkins study compared to females with no qualifications. The comparative figure from the Labour Force Survey data in Dearden *et al*'s work is similar at 3%. However, Dearden *et al*'s use of the British Cohort Study which allows the authors to control for ethnicity, region, employer size and type, ability and family background produces a figure of -6%.

Based on these figures alone it is difficult to see why one should choose to attain a NVQ at this Level. However, there are specific instances or groups which, according to the research stand to benefit from acquisition NVQs and McIntosh (2009) reviews the circumstances in which positive returns to the qualification can be expected. He examines the mode or route of acquisition; the age at which the qualification was gained; the ability of the holder; the sector in which the holder is employed; and their occupation. Each is now discussed in turn but it is worth keeping in mind throughout the following sections that the positive returns to NVQs at Level 2 are of a smaller magnitude than returns to academic qualifications at the same Level.

5.7.1 Mode of acquisition

As far as mode of acquisition is concerned, NVQ Level 2 qualifications are most valued in the labour market when acquired through an employer. For males, compared to other males with no qualifications, an NVQ Level 2 qualification obtained with an employer is associated with 7% higher wages (Dearden *et al*, 2004). For females the equivalent is 6%. Similar but statistically insignificant results are reported by Jenkins *et al.,* (2007). No other mode of delivery (school, college or government training) is associated with a positive and statistically significant return for this qualification, for either gender. Indeed, for men, the returns from other routes are negative and statistically significant (McIntosh, 2009).

5.7.2 Age

With regard to age, longitudinal research has been employed to investigate whether returns to vocational qualifications differ by the age at which they are acquired. The findings are important because of their implications for policies incentivising those already in the workforce or of working age.

The acquisition of NVQs after leaving compulsory education has been shown overall not to offer a significant return to the holder (Jenkins *et al*., 2003; McIntosh 2009). However, using longitudinal data DeCoulon and Vignoles (2008) did find that NVQ Level 2 acquisition between the ages 26 and 34 raises an individual's *wages* by as much as 22% (25% for males and 17% for females). Whilst this is clearly beneficial it still may not be sufficient to generate an absolute wage gain over and above those with lower level qualifications or no qualifications at all. The wage gain may also only apply to the small number of NVQs gained amongst this age group, rather than all those who acquire a NVQ Level 2.

Moreover, McIntosh points out that the result has not been replicated and as it is based on a single and small cohort of individuals at one point in time should not be over-emphasised. The finding cannot therefore be generalised more widely than the sample on which the result is based. Furthermore, the period over which the wages are observed may also exert an influence as the longer the time period the harder it is to attribute any change in wages to qualification acquisition as there may be other factors at work For example in the period for which data was collected in DeCoulon and Vignoles' study the National Minimum Wage was introduced and NVQ Level 2s became mandatory for some staff in the Care sector.

The returns to lifelong learning more generally are considered in section 5.16 and to higher education in particular in section 5.11.

5.7.3 Ability

Using ability test results in the British Cohort Study (BCS), Dearden *et al*., (2004) were able to determine whether NVQ Level 2 qualifications were of more benefit to higher or lower ability individuals. Their results indicate that the qualification is of greater value to individuals of lower ability but only when compared to those of the same ability without qualifications (6% and statistically insignificant). Amongst high ability individuals, an NVQ2 is associated with statistically significantly lower earnings of -35% when compared to someone of the same ability without qualifications. With respect to the wider comparison group of people with no qualifications or Level 1 qualifications, the estimated return to an NVQ2 is negative for both low and high ability individuals (see Table 15)

Table 15: Returns to vocational qualifications as highest qualifications, by ability

	Qualification	Control Group	Low Ability	High Ability
Dearden *et al*., (2004)	NVQ2	No quals	6	-35*
	NVQ2	L1 and below	-3	-14*

Source: McIntosh (2009) Table 4
Notes: The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation. * Statistically significant at the 5% level or better.

De Coulon and Vignoles (2008) also present results for low ability individuals only, in their 'lifelong learning' analysis of qualifications specifically acquired between the ages of 26 and 34, using data from the BCS, examining the impact of acquiring an NVQ2 between these ages, on the individuals' *change* in wages. In this case, low ability was defined as scoring in the lower half of a maths test at age 10. They find that low ability women saw a 37% increase in their wages between these ages if they acquired an NVQ2, which was statistically significant (40% and statistically insignificant for men).

5.7.4 Occupation

There are number of studies that report returns to NVQ Level 2 qualifications by occupation.

Jenkins *et al*., (2007) present their full results (males and females combined) for the marginal returns to Level 2 qualifications relative to a comparison group of individuals with no qualifications (see Table 16). These disaggregated results show that positive returns to an NVQ2 are observed in several occupations: in skilled occupations (13%), personal services (9%), and for sales, machine operative and elementary occupations (all 4%). The former two are statistically significant. The interpretation of these results is that if an individual working in a

skilled occupation, for example, holds an NVQ2 as their highest qualification, he or she will earn 13% more on average relative to an individual with no qualifications who works in the same skilled occupation. This therefore provides an estimate of the likely gain in wages if one is enters a skilled manual occupation with no qualifications and then acquired an NVQ2.

Jenkins *et al.,* (2007) also present results for the marginal returns to Level 2 qualifications relative to individuals with at best Level 1 academic qualifications. The same occupations see positive and statistically significant returns to NVQ2s as was the case with the previous comparison group, though as would be expected, the estimated figures are slightly lower given the better qualified comparison group now being used. Positive and statistically significant returns to NVQ2 are found for skilled occupations (8%), personal services (5%), machine operative and elementary occupations (both 4%) and sales (3%). Disaggregating by gender (see Table 16) reveals a similar pattern of results with the new comparison groups as before, with men seeing their highest return in skilled manual occupations, while women receive their highest return in personal services.

Table 16: Returns to NVQ2 qualifications as highest qualifications, by occupation

			Jenkins *et al*., (2007)			Dearden *et al*., (2004)	
Occupation	**Qual.**	**Control group**	**All**	**Male**	**Female**	**Male**	**Female**
Admin	NVQ2	No quals	1	-6	5	-2	0
Skilled Occupations	NVQ2	No quals	13*	12*	10	-2	-3
Personal services	NVQ2	No quals	9*	-5	10*	2	5*
Sales	NVQ2	No quals	4	1	4	-21	6*
Machine operatives	NVQ2	No quals	4	5	3	7*	-4
Elementary occ's	NVQ2	No quals	4	5	4	4	-1
Admin	NVQ2	L1 and below^	-3*	-6*	-3*	-10*	-9
Skilled Occupations	NVQ2	L1 and below	8*	8*	3	-3	-4
Personal services	NVQ2	L1 and below	5*	-5	6*	-6*	4*
Sales	NVQ2	L1 and below	3*	0	3*	-9*	1
Machine operatives	NVQ2	L1 and below	4*	4*	3	5*	-1
Elementary occ's	NVQ2	L1 and below	4*	4*	3	-2	1

Source: McIntosh (2009) Table 5
Notes: The returns reported here are calculated as e^{β} 1, where, β is the estimated coefficient in the log-linear wage equation. * statistically significant at the 5% level or better. ^The Jenkins *et al*. (2004) comparison group is vocational Level 2 and below.

Similar to Jenkins *et al*, Dearden *et al*., (2004), consider qualifications held as individuals' highest qualification, relative to specific comparison groups. When compared to a group with no other qualifications, they observe positive and statistically significant returns to an NVQ2 for men in the 'plant and machine operatives' occupational classification (7%), and for women in personal services (5%) and sales (6%). With the exception of the female sales occupation (which falls considerably and becomes statistically insignificant) these estimates remain similar when the comparison group is extended to include individuals with Level 1 qualifications. These estimates are of the same order of magnitude, and in similar occupations, to those obtained by Jenkins *et al*., (2007).

5.7.5 Sectors

Relative to no qualifications the possession of a NVQ Level 2 provides positive returns in eight sectors as shown in Table 17. However, only two statistically significant results are found by Dearden *et al.,* and Jenkins *et al.,* these being 8% for females in the public, education and health sector in both studies.

When compared to a control group holding at best Level 1 academic and vocational qualifications, the pattern remains similar but with a greater number of statistically significant results, especially in the Energy and water, Construction and other services sectors.

Table 17: Returns to NVQ2 qualifications as highest qualifications, by industry

			Jenkins *et al.,* (2007)			Dearden *et al.*, (2004)	
Industry	**Qual.**	**Control group**	**All**	**Male**	**Female**	**Male**	**Female**
Energy and water	NVQ2	No quals	13	14	-8	7	0
Manufacturing	NVQ2	No quals	4	1	6	2	2
Construction	NVQ2	No quals	9	9	-5	-1	18
Distrib./hotels etc	NVQ2	No quals	-1	-5	1	-3	3
Transport and comm	NVQ2	No quals	6	9	1	4	-11
Finance	NVQ2	No quals	-5	-14	2	-7	9
Public/educ/health	NVQ2	No quals	8*	4	8*	6	8*
Other services	NVQ2	No quals	-1	-1	-3	-6	6
Energy and water	NVQ2	L1 and below	6	2	13	13*	-13
Manufacturing	NVQ2	L1 and below	1	-1	3	-2	0
Construction	NVQ2	L1 and below	9*	11*	-2	-4	-3
Distrib./hotels etc	NVQ2	L1 and below	2	0	2*	-5*	1
Transport and comm	NVQ2	L1 and below	-1	-4	1	-4	-7
Finance	NVQ2	L1 and below	-3	-11*	0	-15*	-7*
Public/educ/health	NVQ2	L1 and below	3*	-7*	4*	-9*	3*
Other services	NVQ2	L1 and below	7*	5	8*	-7	7*

Source: McIntosh (2009) Table 6.
Notes: The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation. * Statistically significant at the 5% level or better.

So whilst Dearden *et al*'s conclusion that in the majority of cases NVQ2s offer no return to their holders, there are clearly are exceptions. For example, men working in mainly manual occupations such as 'skilled manual' and 'machine operatives' or working in sectors such as construction, may receive an economic benefit if they acquire an NVQ2. Women working in personal services or sales occupations, or working in the service sector or particularly in public administration, education and health may benefit similarly and there is some suggestion that it may be of greater benefit to those of lower ability. Employer provided NVQs stand to benefit their holders.

The logical question that follows from this evidence is 'how many people are in these circumstances where acquiring a NVQ Level 2s are beneficial?' Such circumstances are clearly specific and limited to a number of individuals relative to the total number of NVQ Level 2 qualifications awarded. Of course the benefit of qualifications should not and cannot be measured only in terms of wage returns (Keep, 2009) as there are returns to employment and further learning and this point is taken up in Section 5.15.

5.8 Other Level 2 qualifications

We now consider other vocational qualifications at NQF Level 2. City and Guilds, BTEC and RSA awards all appear to offer substantial and in most cases statistically significant wage premiums for both males and females[22] (see Table 18). The returns are of a quite different order of magnitude to those for NVQs. The proportion of the working age population that holds each of these qualifications is given in Annex 3. Results for Apprenticeships are not included here as they are the subject of discussion later in this report.

Table 18: Returns to NQF Level 2 vocational qualifications as highest qualification

	Qualification	Compared to	All	Male	Female
Dearden *et al*., (2004)	BTEC Level 2	No qualifications	-	23*	14*
	BTEC Level 2	Level 1 and below	-	8*	6*
	City and Guilds Level 2	No qualifications	-	20*	5*
	City and Guilds Level 2	Level 1 and below	-	14*	3*
	RSA Level 2	No qualifications	-	9	22*
	RSA Level 2	Level 1 and below	-		18*
Jenkins *et al*., (2007)	BTEC Level 2	No qualifications	11		36*
	BTEC Level 2	Other Level 2 and below	13*	13*	13*
	City and Guilds Level 2	No qualifications	7*	5	10*
	City and Guilds Level 2	Other Level 2 and below	7*	5*	7*
	RSA Level 2	No qualifications	20*	60*	16*
	RSA Level 2	Other Level 2 and below	16*	13	17*

McIntosh (2009), Table 2.
Notes: The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation. * Statistically significant at the 5% level or better.

Clearly the role and content of NVQ Level 2 qualifications needs examining vis-á-vis other vocational qualifications at the same Level. Furthermore, given that we already know vocational qualifications pay lower than academic qualifications, level for level (with the exception of Level 5), the negative returns amount to a 'double whammy' for the holders of NVQ Level 2 qualifications. The report now turns to examine the situation for vocational qualifications at Level 3 and finds a more positive picture.

[22] Of course, on average, holders of these qualifications will be older since NVQs are held by younger people given they are newer qualifications. While these estimates do control for age in the usual manner there may be an additional age related premium that comes from experience with the use of skills embodied by these qualifications and it may be this that is being observed.

5.9 NVQ Level 3

NVQ Level 3s are held by over 5% of the working age population making them the second most common vocational qualification after NVQ Level 2s at 6% (see Annex 3). The proportion holding vocational qualifications at this Level is relatively small compared to those with academic qualifications (almost 23% of the working age population have two or more A-Levels). We will see that the wage returns to NVQ Level 3 qualifications are generally more healthy and positive compared to those at NVQ Level 2. However, the NVQ remains the qualification that returns the lowest wage premium of all vocational qualifications at this Level.

When compared to individuals without qualifications Jenkins *et al.,* (2007) find that the returns to NVQ Level 3s are positive and statistically significant at 7% for males and 5% for females (compared to -7% and -3% respectively for NVQ level 2s which are included for comparison in Table 19). However, these returns still compare unfavourably to those for other vocational qualifications at Level 3 as the Table shows. The qualification with the highest return for males at this Level is ONC/OND at 16% and for females it is the RSA at 14%. Interestingly there is a gender pattern here, with one of the highest paying qualifications for males (City and Guilds) being the lowest paying for females and vice versa for the RSA. This reflects the sector, occupation and gender specific nature of employment to which these qualifications lead. (McIntosh, 2009).

Table 19: Returns to vocational qualifications as the highest qualification (full sample)

	Qualification	All	Male	Female
Jenkins *et al.,* (2007)	BTEC Level 3	9*	9*	8*
	City and Guilds Level 3	12*	10*	0
	ONC/OND Level 3	16*	16*	7*
	RSA Level 3	10*	2	14*
	NVQ Level 3	6*	7*	5*
	NVQ Level 2	-4*	-7*	-2*

Source: McIntosh (2009) Table 10
Notes: The returns reported here are calculated as $e^{\beta} - 1$, where, β is the estimated coefficient in the log-linear wage equation. * Statistically significant at the 5% level or better.

Among men, positive marginal returns are found for NVQ Level 3 in skilled occupations (14%) and for process and machine operative occupations (15%). For women, NVQ3 yields a positive marginal return for those in process/machine jobs (18%), sales/customer (12%), personal service (12%) and administrative/secretarial occupations (5%).

Jenkins *et al*., (2007) also find that NVQ Level 3s yield a positive marginal wage return across all sectors for the combined sample of men and women. However, closer examination reveals substantial variation in the marginal return by sector and by gender. Positive marginal wage returns to NVQ3 were found for women in the following sectors: energy and water (20%), manufacturing (16%), the hotel/restaurant sector (8%), transport (7%) public administration (10%), banking (5%) and other services (19%). For men, there are significant and positive marginal wage returns to NVQ3 across all industrial sectors except banking. A very similar sectoral pattern was observed for average returns to NVQ3. It is at this level and above that the difference between marginal and average returns begins to diminish, showing much closer results for qualifications at Levels 4 and 5. (c.f. Dickerson, 2008 and Walker and Zhu, 2007) unlike for those at Level 2.

In his review of the evidence on returns to intermediate qualifications, McIntosh (2009) reports that the returns to adult acquisition of NVQ Level 3 qualifications were universally positive for both men and women (though all were statistically insignificant and small, the largest being just 6%).

On the whole, Level 3 vocational qualifications represent a reasonable return for the holder. The figures presented above also serve to illustrate the benefit to the individual of moving up the vocational qualifications ladder. However, just as at Level 2, it is the NVQ at Level 3 which remains the qualification which offers the lowest economic value to the holder. We showed too, that the returns to academic qualifications at Level 3 are even higher.

Gained later in life, Level 3 qualifications[23] on average provide a 32% and 38% increase in earnings over a 7 year period for men and women respectively (Blanden *et al*. 2010). This is equivalent to an increase of £3.52 per hour and just less than £8,000 per annum. For women the respective figures are £3.38 per hour and £5,500 per annum.

One particular course of training available at both Levels 2 and 3, which has so far not been discussed is that of Apprenticeships. These are considered next.

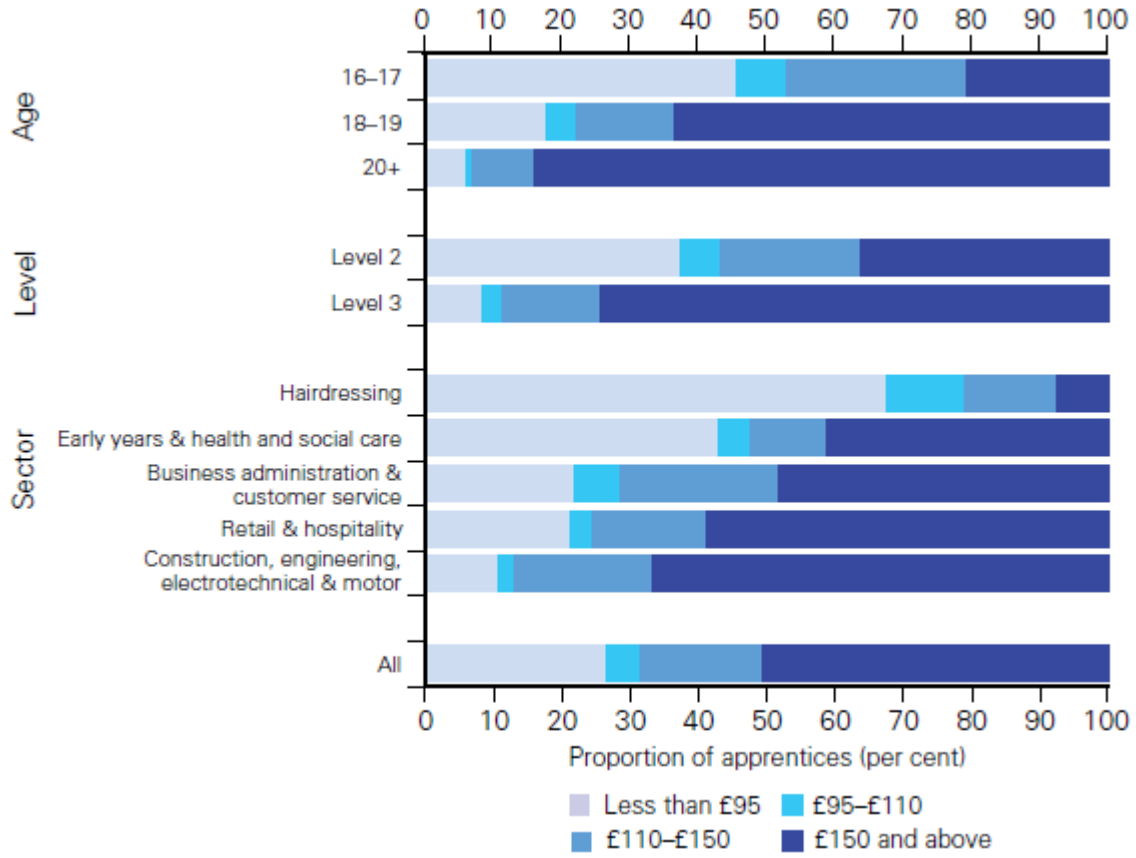
[23] Including academic and vocational qualifications

5.10 Apprenticeship and Advanced Apprenticeships

Apprenticeships are a specific type of vocational qualification and as such merit separate treatment and although Apprenticeships are available at NQF Levels 2 and 3 (Apprenticeships and Advanced Apprenticeships respectively) they are considered within this single section. The uniqueness of the qualification is reflected in the markedly different wage returns that apprenticeship qualifications attract compared to other vocational qualifications. If higher wages are taken as an indicator of productivity then it can be seen from the evidence below that employers value workers with an apprenticeship qualification more than those with other vocational qualifications at the same NQF level. There are, as ever, variations in the pattern of returns.

Fong and Phelps (2008) report findings from a survey of apprenticeship pay in England in 2007. The average net weekly wage for an apprentice was £170 but this conceals differences by sector, age, type of Apprenticeship and gender (Fong and Phelps, 2008; Lawton and Norris, 2010). Those on a Level 2 Apprenticeship earned an average £159 compared with £179 for a Level 3 Advanced apprenticeship. However, the gap in pay between levels in 2007 had narrowed to 11% from 26% in 2005. Net pay is lowest in hairdressing, averaging £109 per week, with higher wages available in retail and hospitality and Electrotechnical engineering paying the highest at £210. The gendered pattern of employment across sectors means that females are receiving lower wages with males earning on average £186 net per week and females earning less at £147 (Lawton and Norris, 2010; Fong and Phelps, 2008). However, Lawton and Norris (2010) did not find any strong gender differences in pay within sectors. Older apprentices were also likely to earn more with those aged 21 and over earning £199 per week compared to £140 for those under 18. Figure 17 illustrates how apprenticeship pay varies across sector, NQF Level and age.

Figure 17: Distribution of Apprentice Weekly Gross Pay (England, 2007)



Source: Low Pay Commission (2010)

On 1st October 2010 a national minimum wage of £2.50 per hour will come into force for Apprentices aged under 19 or those aged 19 and over if in the first year of their Apprenticeship. The full impact of this on the behaviour of employers and individuals is unclear with employers in some low paying sectors such as Hairdressing suggesting they may reduce Apprenticeship places (Lawton and Norris, 2010; Low Pay Commission, 2010).

Whilst Apprenticeship pay varies across a number of bases the evidence of benefits to the individual is substantial. In a survey of nearly 4,000 Apprentices almost all went into work on completion of their Apprenticeship or Advance Apprenticeship and average earnings increased by 44% from £10,200 before starting their Apprenticeship to £14,700 on completion (LSC, 2009). The promise of higher future earnings combined with job satisfaction and the opportunity to receive high quality training are the main benefits reported by Apprentices (Lawton and Norris, 2010).

A significant contribution is made to the literature by McIntosh (2006; 2009) in trying to estimate the value of Apprenticeships for individuals, firms and the state. He focuses on state funded Apprenticeships (Apprenticeships and Advanced Apprenticeships) rather than traditional Apprenticeships.

The research found sizeable (marginal) wage returns are available to those who complete a level 3 Apprenticeship, relative to those who hold either vocational or academic qualifications at Level 2, with wage premiums of 22% and 14% are reported for men and women respectively. Relative to a comparison group with Level 1 or 2 qualifications, those who complete a level 2 Apprenticeship earn a premium of 20% for males and 4% for females (although statistically insignificant). The finding of a 14% premium for women holding a Level 3 Apprenticeship is the most significant return for this group to be reported by the literature to date. Walker and Zhu (2007) also found positive returns to men and women holding apprenticeships compared to those holding no qualifications at all.

McIntosh points out, however, that demand for Apprenticeship places is high and far exceeds the number of places available. This places employers in the advantageous position of being able to select the most able candidates. Consequently, there may be a margin in these returns that is attributable to ability differences rather than simply the Apprenticeship training.

Over time returns to Apprenticeships have increased (McIntosh 2006). In 1996 a man holding an Apprenticeship could expect a 5% premium over a similar individual holding a NVQ Level 2 equivalent qualification. In the period 1998-2001 this advantage rose to 10% and to 21% in 2005. For women there is also an increase over time but it is less dramatic. Before 2002 the premium was essentially zero but after this time it increased to 5-7%. The increasing returns to Apprenticeships suggests two possibilities; firstly that the quality of Apprenticeship training is increasing so that the Apprenticeship skills of the young are worth more than the old (cohort effect) / or; secondly employers are valuing the qualification and associated skills more highly than ever before.

Restricting the analysis by age to look at returns for those aged 25 and under reveals that an Advanced Apprenticeship attracts an almost equal premium for men (23%) and women (22%). A Modern Apprenticeship has a similar effect (22%) for males but returns no premium for females.

As we have seen previously, wage returns vary significantly by sector and the case of Apprenticeships is no different (McIntosh, 2006). Broadly speaking returns are greater in manufacturing sectors than service services. For men there are returns of ≥ 10% to be gained from Apprenticeships in Food manufacture, Machinery manufacture and Construction. Few service sectors attract sizeable returns for men, or any that are statistically significant. One exception is that of Recreation, culture and sport where large returns of up to 42% are available for an Apprenticeship. The same qualification in Retail provides a smaller but nevertheless still sizeable return of 15%. For women the returns available are generally lower than for men, although McIntosh's research suggests high returns are likely from Modern Apprenticeships in Other business services and very high returns available in Printing.

Further insight to the value of vocational qualifications is provided by McIntosh's cost-benefit analysis which considers the public or social cost and benefits to the labour market and society as opposed to private costs and benefits to the individual. He finds that compared to the costs to all parties of delivering apprenticeships the benefit or net present value (NPV) of a modern apprenticeship over the holder's lifetime is considerable at £73,000 and £105,000 for an advanced apprenticeship. Per pound of state funding these qualifications provide, on average, a return of £16 and £17 respectively which is a much higher return than for other vocational qualifications. For example the net present value of a Level 3 NVQ is, on average, £33,894 and its return per pound of state investment is £11.55. For Level 2 NVQs the figures are £13,012 and £4.20. See Table 20.

Table 20: Cost benefit analysis of vocational qualifications

	NPV	NPV/£ of state funding
Advanced Modern Apprenticeship	£105,190	£17.12
Apprenticeship	£73,001	£16.22
NVQ 3	£33,984	£11.55
NVQ 2	£13,012	£4.20

Source: McIntosh (2006)

The House of Lords Select Committee on Economic Affairs (2007, p. 16) summarised the benefits of apprenticeships:

> Overall, the evidence on costs and benefits suggests that there is a strong economic and business case for expansion of apprenticeships, in addition to the compelling case for reducing social inequalities and deprivation associated with low skills. Apprenticeships are a prime source of intermediate skills in craft, technician and associate professional occupations, required both for economic growth and the replacement of employees with specialist skills.

The importance of apprenticeships as a source of intermediate skills for economic growth and for meeting replacement demand for skills has been re-emphasised recently in the UK Commission's report Skills for Jobs: Today and Tomorrow, National Strategic Skills Audit for England, 2010 (UK Commission, 2010).

Winkler (2006, in Rudd *et al*., 2008) suggests that, while the overall number of apprenticeships is low, employers can easily benefit from the introduction or expansion of apprenticeship training where skilled staff are difficult to recruit or where upgrading training cannot not meet the needs of the firm for vocational skills. Based on McIntosh's work on returns to apprenticeships of 18% for men and 14% for women at Level 3 he calculates that an additional 400,000 apprenticeships by 2020 could create up to £1.1 billion per year thereafter, or around £90 million per year over the years to 2020.

It is clear that both Apprenticeships and Advanced Apprenticeships pay for the individual and the state with substantial wage returns to the holder compared to other vocational qualifications. With the qualification being work-based it provides a valuable route to higher earnings for those less keen on the academic route.

The benefits to employers of Apprenticeships and Advanced Apprenticeships were identified earlier and taken together with the wage return evidence and net present value make a powerful case for expanding provision.

5.11 Higher level skills

The focus of this section is on higher education qualifications, in particular academic degrees (Level 4) and post-graduate qualifications (Level 5).

The reader will recall from work discussed earlier (Dickerson and Vignoles, 2007; Dickerson 2008) that academic qualifications at this Level deliver substantial positive wage premiums (approaching 25%) for men and women compared to a Level 3 academic qualification (2 or more A-levels). This is reinforced by Walker and Zhu (2001) who, using earlier data, report premiums of 15% and 19% for men and women compared to a Level 3 academic qualification.

Replicating Walker and Zhu's study for the Royal Society of Chemistry, PricewaterhouseCoopers (2005) found that when compared to 2 or more A-levels, a higher education degree provided additional net lifetime earnings of £129,000 on average; a premium of 23%. More recent estimates are for additional earnings of between £149,761 (Ramsey, 2008) and £160,000, a premium of 20-25% (PricewaterhouseCoopers, 2007).

The PricewaterhouseCoopers study found that Postgraduate degrees add a further £70-80,000 (gross) to these lifetime earnings and postgraduate certificates £30-40,000 (PricewaterhouseCoopers, 2007). Employment effects are also notable with individuals in possession of a higher education qualification more likely to be employed and return to employment if experiencing unemployment or having been outside the labour market (e.g. returning after a career break).

However, the value of degree subjects varies with holders of History, Linguistics, Biological Sciences and Psychology degrees earning 13-16% more than an individual with two or more A-levels, Management 24% more, Physics, Chemistry and Engineering 30-31% more and Law and Medicine 39% and 44% more respectively. For Chemistry and Physics graduates this equated to additional lifetime earnings of £185,000-190,000 over and above a similar individual with 2 or more A-levels. Ramsey (2008) found holders of a Social Studies degree earned on average 5.5% less than a similar individual holding a Mathematical Sciences degree. Table 21 provides the lifetime earnings by degree and Figure 18 presents wage premium by degree.

As one might expect the class of degree awarded has an influence on earnings but one which is less than the degree subject. The starting salary for a graduate with a first class degree is on average 18% higher than for someone with a third (Ramsey, 2008). This difference is much greater for males (27%) than females (11%). Over time, average earnings for the holder of a first class degree are 8% higher than for a similar person with a third class degree.

Graduate earnings also vary by geography and occupation in the UK (Ramsey, 2008). Earnings for those with a degree in the South of the UK are on average 11.5% more than those in the North. The average female graduate earnings in Greater London are almost 30% more than a similar female in Northern Ireland. For males the respective figure is 26%. By occupation those with a degree and working in high level occupations (Managers and Senior Officials, Professionals and Associate Professional and Technical occupations) earn on average 24% more than those occupying low level occupations (Skilled Trades, Sales and Elementary occupations). The gap in earnings for graduates in high and low level occupations is widest in Scotland and Yorkshire and The Humber and at its narrowest in Northern Ireland.

The PricewaterhouseCoopers (2005) study also provides the rate of return which takes in to account the direct and indirect costs to the individual of obtaining their degree such as tuition fees, other costs associated with study and also opportunity costs such as forgone earnings. For all degrees the rate of return is around 12%. This similar to McMahon (2008) who reports the return to a degree in the UK and US is around 14%. It is highest for Law and Management at around 17% and Lowest for History at just under 9%. The cost of studying for a degree in Medicine means that, despite higher overall lifetime earnings, the rate of return to holders is 12% - equal to the average for all degrees (see Table 21).

A similar, but earlier study conducted in Germany (Ziegele, 2003) estimated slightly lower returns (7-10 percentage points) to degrees than in the UK but a similar ordering was observed of which degree subjects attract the highest and lowest premiums.

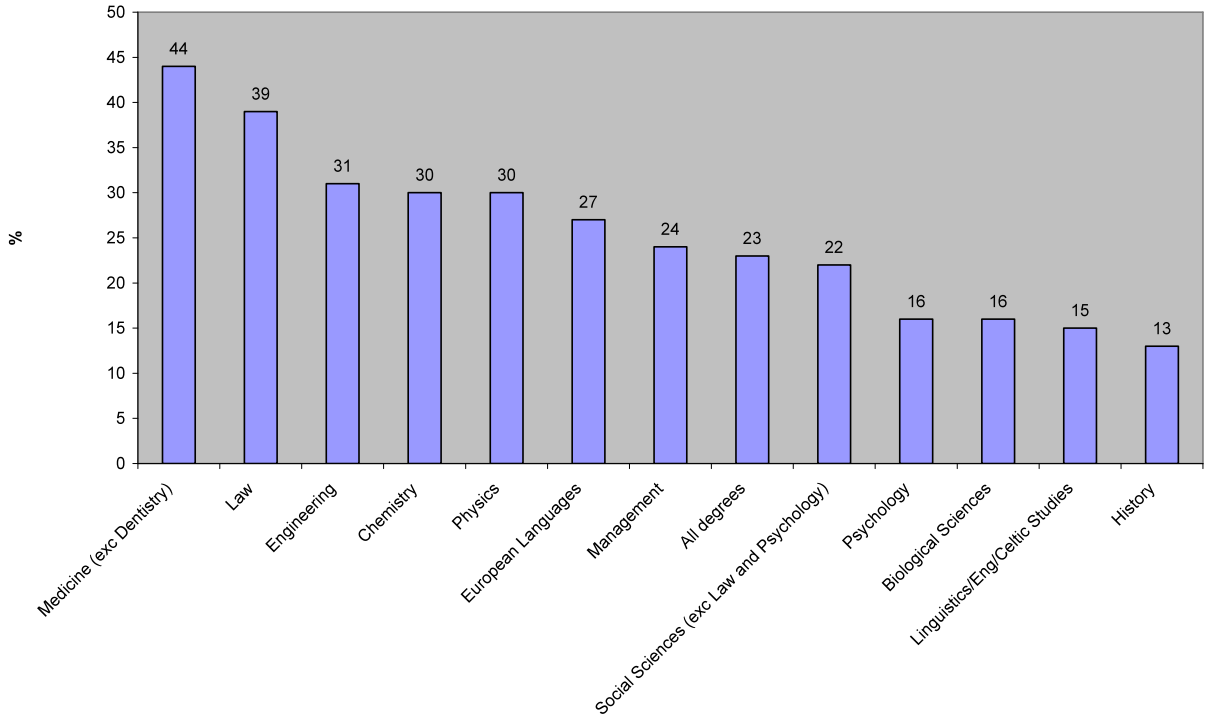
Table 21: The costs, revenues and returns associated with a higher education degrees

	Individual			Exchequer		
	Direct and Indirect Costs (£)	**Additional Discounted Net Lifetime Earnings[24] (£)**	**Rate of Return (%)**	**Subsidy (£)**	**Additional Discounted Lifetime Taxation (£)**	**Rate of return (%)**
Law	-24,026	246,367	17.2	-15,624	171,712	19.3
Management	-24,026	152,947	16.9	-15,624	107,405	19.7
Engineering	-32,809	219,971	15.5	-30,742	155,104	13.1
Chemistry	-28,037	186,307	15.0	-26,705	132,305	12.1
Physics	-26,661	188,249	14.9	-25,156	133,852	13.0
European Languages	-32,809	163,466	14.0	-21,167	177,769	16.6
Social Sciences (exc Law and Psychology)	-24,026	154,135	13.5	-15,624	109,219	16.2
Medicine (exc Dentistry)	-53,165	346,156	11.6	-78,126	255,045	7.8
Biological Sciences	-24,026	109,845	10.2	-22,762	82,135	9.5
Pyschology	-24,026	100,479	10.1	-18,682	74,079	10.9
Linguistics/English/Celtic Studies	-24,026	92,797	9.7	-15,624	68,330	12.1
History	-24,026	89,630	8.8	-15,624	65,471	10.4
All degrees (2000-4)	**-26,028**	**128,771**	**12.1**	**-21,218**	**92,718**	**12.1**

Source: PricewaterhouseCoopers (2005)

[24] Compared to a similar individual whose highest qualification is two or more A-Levels.

Figure 18: Percentage hourly earnings premium associated with different degree subjects compared to 2 or more A-levels.



Source: PricewaterhouseCoopers (2005)

Higher education has been under increasing pressure to ensure that its graduates are 'work ready' and in possession of the skills knowledge attitudes and commercial understanding that will enable new graduates to a contribution to organisational objectives soon after starting employment. Indeed Mason *et al*., (2006) cite earlier studies of engineering and science related employers that value appropriate work experience and commercial understanding because employees with this kind of experience are able to become more productive and more quickly.

Making use of data gathered from 34 departments across 8 UK Universities in 2001 and First Destination Survey data from 2000, Mason *et al*., (2006) illustrate the impact of higher education employability skills provision on graduates' ability to secure employment six months after graduation. It was found that structured work experience during degree courses has highly positive effects and appears to predominate over other approaches seeking to develop employability skills in graduates such as the teaching and assessment of such skills by University departments. Whilst the teaching and assessment of employability skills by departments was positively related to finding graduate quality employment the relationship was much weaker.

Employer involvement in course design was also found to exert a strong and positive influence on the likelihood of gaining graduate-level jobs. A one unit change in the level of employer involvement in course design and delivery is associated with a 29% increase in the probability of graduates being employed in a graduate level job (Mason *et al*., 2006). Therefore, exposing students to employer priorities and decision making during their courses has positive effects on the future probability of finding graduate quality employment and that employability skills are probably best learned in the workplace rather than the classroom. This finding is supported by previous studies (Mason *et al*., cite McKnight, 2002) which find the effects of employability training can have a long lasting effect, returning a premium of 4.6% three and a half years after graduation.

There is debate over how the premium available to graduates may be changing. According to Dearden *et al*., (2005) and McIntosh (2004) average graduate premiums have been affected little by the expansion of higher education with McIntosh reporting the graduate premium achieved across all age groups in the period 1996-2002 ranged between 21% and 26%. This indicates that returns to higher education have not diminished despite the rapid expansion of graduate numbers that took place in the 1990s. Instead there has been a growing demand for high skilled individuals in the economy.

Evidence from Machin (2003) takes a longer term view and supports this argument. In 1975 men qualified to at least degree level were earning 40% more than men with intermediate levels of qualification (equivalent to A-levels). By 1998 this difference had grown to 48% despite the fact that the proportion of men holding degrees had nearly tripled from 6% to 16%. If the increasing numbers of degree holders were not required in the workplace then the pay premium enjoyed by graduates would have diminished. Instead the opposite seems to have occurred in this period.

However, the argument that graduate wage premiums are demonstrating resilience despite increasing supply is not supported universally (Purcell *et al.,* 2005; O'Leary and Sloane, 2005; McGuiness and Bennett, 2007). Comparing the earnings in 2003/4 of those graduating in 1999 to the earnings in 1998/99 of those graduating in 1995, Purcell *et al.,* (2007) were able to provide an assessment of how the earnings premium for a degree has changed. After adjusting for wage inflation and the longer time spent working by the 1999 graduates, average graduate earnings grew by 20% between the two cohorts (1995 and 1999). This is compared to average earnings growth for the UK of 25%. This would suggest graduate earnings growth is not keeping pace with that of the rest of the workforce. However, without further longitudinal analysis, Purcell *et al*. acknowledge it is difficult to tell whether this is a developing trend or whether these are circumstances particular to the 1999 cohort.

It is possible that more graduates are finding it hard to enter graduate-level jobs when they enter the labour market and therefore spend time working in non-graduate roles thereby widening the dispersion of graduate earnings and slowing the growth in average earnings (Bevan and Cowling, 2007; Felstead *et al*. 2007; Green and Zhu, 2007). Support is provided for this notion by considering only those graduates managing to secure graduate level jobs on leaving university. For this group the dispersion of returns shows no sign of widening (Green and Zhu, 2007) but for those in non-graduate jobs concerns exist about the under utilisation of their skills and their early labour market experiences.

Whilst it will be interesting and important to track the returns available to graduates in the future to monitor the under utilisation of graduate labour, a university degree still stands to deliver significant and positive additional earnings over the holder's lifetime compared to someone without a degree. It is therefore one of the best paying qualifications and what is more the return is higher in the UK than many other countries. Fundamentally this provides reassurance again that higher level skills deliver greater economic benefits for their holders.

There is some variation by socio-economic background to note within the returns to a degree. Dearden *et al*., (2005) reported premiums 4-5% higher from a degree obtained by men from lower socio-economic backgrounds than for men on average. Socio-economic group did not have the same effect for women. When non-traditional qualifications or entry routes[25] to a degree are taken into account, as opposed to two or more A-levels, the benefit of a degree increases. Additional, gross life time earnings rise by almost £10,000 (PwC, 2007). For those acquiring higher level qualifications later in life, the time over which enhanced earnings are received is shorter. Nevertheless, mature students still gain sizeable returns to higher education.

[25] For example, GCSE or O-level qualifications, HE qualifications below degree level, professional qualifications, access courses or accredited prior learning.

With lifelong learning in mind, the age at which a qualification is acquired also affects the return available to the holder as we have seen in the earlier section on NVQ Level 2s. To illustrate this further and with specific regard to higher education the OECD (2008b) reports the returns to a degree acquired at age 40 in the UK for an individual who bears the costs of education and foregoes earnings while studying is 11.4% and 14.9% for males and females respectively. Whilst these returns may be lower than for younger graduates leaving University in their early twenties they are not insignificant. For comparison the spread of returns across the 30 OECD countries ranges from 6.5% for males in New Zealand to 28.2% for females in Belgium. Thus the acquisition of higher education qualifications mid career in any country of the OECD will be of benefit to the holder.

Blanden *et al*. (2010) provide further evidence of this for Britain. They find that the effect on earnings of gaining a Level 4 or 5 academic qualification through lifelong learning is substantial but can take time to emerge. On average, men increase their annual earnings by nearly £8,000 (equivalent to £3.49 per hour) or 32% after seven years. Women increase their earnings by just less than £3,900 per annum (equivalent to £2.38) or 28% over the same length of time.

Dorsett *et al*. (2010) report that for men moving from a level 3 qualification to level 4 (either vocational or academic) through lifelong learning a wage premium is available of just over 12% at age 25 and nearly 14% at age 40. In each case, the wage premium or effect accounts for 9% and the remainder is the enhancement to the likelihood of being in employment. Importantly, they found that when a man undertakes lifelong at level four but already has a highest qualification at this level then total effect is much lower and made up almost exclusively of the wage effect. Consequently, there is little benefit to the chances of being in employment. And this is the same whether the additional qualification is attained at age 25 or 40.

The discussion now moves to consider briefly the value of professional qualifications. These are typically vocational qualifications at Levels four and five.

5.12 Professional qualifications

Being a member of a professional body and holding a professional qualification can bring an estimated lifetime benefit of £152,000 to an individual compared to those without professional qualifications. This is the conclusion of Chapman *et al*.'s 2008[26] study into the economic impact of Professional Management Organisations. The estimated lifetime benefit comprises of £81,000 derived from membership and £71,000 from the qualification.

The wage premium varies by age and gender. For males the premium for possessing a professional qualification is highest at the age of 60-64 whereas the premium for being a member of a professional body is greatest ten years earlier. For females, premiums are greatest earlier in their career with 17% for a professional qualification at age 45-49 and 35%for membership at age 40-44 years.

5.13 The benefits of employer provided training to the individual

Evidence pointing to the benefits of employer financed, job related training is substantial and convincing (Hansson, 2008). Some go as far to state that formal, employer provided training is always beneficial for the employee in terms of the wage premium received (Nordman and Hayward, 2006) or even the most beneficial compared to other possible sources (Konings and Vanormelingen, 2010). The position of the employer, it is argued gives them the ability to identify what training is most suited to the organisation's needs, hence those employees that undertake this training are rewarded accordingly. The more closely related training is to an employee's job the more likely they are to be rewarded and rewarded better.

[26] Eight professional bodies were considered by Chapman *et al*.; the Chartered Institute of Logistics and Transport (CILTS), Chartered Institute of Management Accountants (CIMA), Chartered Institute of Marketing (CIMA), Chartered institute of Personnel Development (CIPD), Chartered Institute for Purchasing and Supply (CIPS), Chartered Management Institute, Institute of Credit Management and the Institute of Chartered Secretaries and Administrators.

Using the European Community Household Panel, Brunello (2007) provides internationally comparable results for wage returns from employer provided training. He finds that a relatively short and single period of training (less than two weeks) undertaken by a worker can raise hourly earnings by 2% in Denmark and the UK, 4% in Italy and Finland and 10% in Portugal. If multiple episodes of training are undertaken which amount to more than two weeks then the impact may be larger. To demonstrate the relatively high return to employer provided training Brunello highlights the payoff to an additional year of education for men in different countries. The payoff ranges from 6.2% in Italy to 9.7% in Portugal (UK=9.4%). Thus, given that employer provided training bears relatively little or no cost to the worker in terms of foregone earnings or course fees and it is generally much shorter in duration it represents a very good return.

For the individual, employer provided training is beneficial as it can attract premiums of 5-10% (Blundell *et al*., 1999) indicating that employers attach a significant value to it. Employer provided training for managerial and professional occupations attracts a higher return than for low skilled occupational roles. Conversely though Blundell *et al.,* (1999) suggest those with low levels of qualifications stand to benefit substantially from training but often do not participate because of barriers such as a lack of opportunity, cost or the absence of incentives.

Only in the minority of cases does training lead to certification. The Continuing Vocational Training Survey (CVTS) reports only one third of employees in the UK received certified vocational training in 2005 (Dent and Wiseman, 2008). This puts the UK in the mid range of the 27 countries covered by the survey. In England the National Employer Skills Survey reports that only 18% of all employees received training that led to a nationally recognised qualification. From this it is evident that much employer provided, job related training takes place that is unaccredited.

Blundell *et al*., (1996) distinguish between the returns to on-the-job-training and off-the-job training. They estimated on-the-job training raises wages by 4% for men and 5% for women. For off-the-job training the returns are higher as participation is estimated to raise wages by roughly 7% for men and 10% for women.

The picture of returns to formal and informal training may be more complex still, as it is influenced by the nature of the individual's job and the nature of the skill demands it places upon them. In particular the level of computer usage, the complexity of the tasks involved in their work and the skills needed to complete the tasks all interact with the nature of training provided (formal and informal) to determine the wage premium received.

The amount of time it takes to learn to do a job competently is positively associated with the pay premium attached to the job (Felstead *et al*., 2007). Jobs needing a long period of time (more than two years learning time) attract premiums of 8% and 11% for females and males respectively over a job requiring medium lengths of training. Roles that require a short period of time to become competent (less than one month's learning time) are paid 7% and 11% less than those needing medium lengths of training. These premiums change little for males and females in managerial or supervisory positions. The implication is that the more complex a job is, indicated by the time it takes to become competent at it, then the more a worker can expect in wages.

However, the amount of time required to be spent in training prior to doing a job shows a less linear relationship with pay. Felstead *et al.,* (2007) found that having high levels of prior training (more than two years training) compared to medium levels gave lower premiums for both genders but the differences were not significant. However, females with medium levels of prior training earn almost 6% more than those who have less than a month of training or none at all to do their otherwise identical job. This difference was found to be highly significant. A similar relationship was noted for males but it was not significant.

The value of employer provided training compared to other possible sources appears to be high for the worker. Konings and Vanormelingen (2010) conclude that one week of employer provided training attracts a much larger return than an additional week of education. In their panel of firms, job related training typically lasted two weeks for those that received it, and provided a wage return of 12%. By way of comparison they cite Card (1999) as calculating that one *year* of education enhances wages by 5-15%.

There is strong evidence that skills degrade over time, negatively affecting the wage returns they attract (Blundell *et al*., 1999). Therefore skills need to be maintained and renewed if they are to retain their financial advantage for the holder. Using data from the US, Blundell *et al*., report employer provided training not only has the largest impact on earnings but its earnings effects are also the most durable, lasting for up to 13 years compared to 8-10 years for other training providers. Blundell *et al*. also report that the duration of earnings effects varies by occupation. The initial earnings effects of managerial, professional or technical training are larger but the effects of semi-skilled training are more persistent (15 years compared to a maximum of 12 for the former).

Investigations by Jenkins *et al.,* (2007) provide qualified support for the idea that qualifications (in this case NVQ level 2 and City and Guilds) gained through work yield higher returns than those gained on government sponsored training. For instance men acquiring a NVQ2 through their employer earned a marginal return of up to 8%. They point out that this is consistent with Dearden *et al*., (2004) cited earlier in the section on NVQ Level 2s. In a review of the literature on the determinants of the impacts of vocational qualifications Unwin *et al*., (2004) also noted the most successful qualifications are those which are workplace based and are targeted at or even required by a specific sector.

The evidence is clear that employees gain benefit or wage enhancement from employer provided training but additional evidence indicates that employees enhance their wage returns further when moving to a new employer. Hansson (2008) cites several studies which report enhanced returns after changing jobs (see Table 22 below).

Table 22: Comparisons of the return to training for employees

Study	Geography	Return to employee from training at provided by current employer %	Return to employee from training provided by previous employer %	Differential effect
Gerfin (2004)	Switzerland	1.1	4.9	4 times
OECD (2004)	11 EU Countries	1.2	2.6	2 times
Booth and Ryan (2002)	UK	2.4	7.5	3 times
Parent (1999)	USA	11.6	15.7	1.35 times
Lengermann (1999)	USA	4.0	8.3	2 times
Loewenstein and Speltzer (1998)	USA	2.8 4.5	14.2 11.8	5 times 3 times

Source: Hansson (2008).

Evidence from 11 European countries (OECD, 2004a) suggests that wage returns to training provided by a current employer average 1.2%. However, if an employee leaves that employer to take a new job they can realise wage effects of more than twice that at 2.7%. In the UK the wage premium of employer provided training is approximately three times larger if received from the previous employer than it would be if provided by the current employer (Booth and Ryan, 2002); in Switzerland effects can be three to four times greater (Gerfin 2004); and in the US effects of three to five times greater are reported (Loewenstein and Spletzer, 1998).

Overall, the wage returns for employees staying at the firm which provides their training are between 20% and 50% of the returns to training for those leaving for a new employer (Hansson, 2008).

Whilst substantial wage effects could be expected to encourage employees to change jobs it does not seem to exacerbate problems of poaching as Hansson (2008) notes that employers are still happy to fund general or transferable training. It would also make sense for employers to make attempts to retain their trained employees where possible.

It is known that the incidence of training is not evenly distributed and that those with higher skills are more likely to receive training; training begets training. Using the European Working Conditions Survey (Parent-Thirion, 2007), Lyly-Yrjänäinen (2008) finds that low qualified workers perceive fewer chances for career development than other workers. Of the former, 59% either disagreed or strongly disagreed with the statement 'My job offers good prospects for career advancement' compared to 43% of other workers.

The same pattern is evident by occupation. Workers in the three highest skilled occupations (Legislators, Officials and Managers (42%); Professionals (46%) and; Technical and Associate Professionals (40%) each report above average (31%) opportunities for progression and those in lower level occupations report their opportunities are more limited (5%-30%). Even if career prospects for advancement are not strong work may still offer the possibility to learn and grow. Again though, the same inequalities between high and low qualified workers are apparent with almost 20% more high qualified workers reporting such opportunities (39% vs. 58%). Access to opportunities such as training are likely pay to dividends for the individual most notably in terms of wage returns as we have seen.

In the UK the largest variations in the pattern of training received are found across age, qualification and occupation with older workers and the lower qualified less likely to receive training, either on or off-the-job (see Table 23). Higher level and Personal service occupations are more likely to receive training. The proportion of employees receiving training varies little by gender (although females are most likely to have received training in the last 13 weeks), disability, ethnicity and employment status (although full-time employees are more likely to have received training).

Table 23: The distribution of training in the UK

	England	Wales	Scotland	Northern Ireland	UK
	% receiving training in the last 13 weeks				
All	26	27	27	20	26
Age					
16-24	30	30	33	24	30
25-49	27	28	27	21	27
50-59	23	23	25	15	23
60-64	15	18	10	9	15
Gender					
Male	23	22	25	17	23
Female	28	31	28	23	28
Disability					
With disability	24	23	26	13	24
No disability	25	27	26	20	25
Ethnicity					
White	25	26	26	19	25
Non-white	26	35	35	21	27
Employment status					
Full time	27	28	28	20	27
Part time	22	24	22	17	22
Contract status					
Permanent	27	28	28	21	27
Not permanent	28	36	29	31	29
Qualification level*					
No qualifications	8	13	10	6	8
NVQ Level 1	20	18	20	20	20
NVQ Level 2	22	22	22	19	22
NVQ Level 3	25	27	23	20	25
NVQ Level 4	34	38	35	27	34
NVQ Level 5	39	41	40	30	39
Occupation					
Managers and Senior Officials	24	22	23	23	24
Professional occupations	38	43	41	27	39
Associate Professional and Technical	35	36	37	29	35
Administrative and Secretarial	21	23	22	19	22
Skilled Trades Occupations	16	17	20	13	17

Personal Service Occupations	37	39	34	26	37
Sales and Customer Service Occupations	19	25	21	18	20
Process Plant and Machine Operatives	14	17	13	10	14
Elementary Occupations	15	16	14	12	15

Source: Labour Force Survey, July –September 2008

Similar to occupation, a worker's highest qualification Level influences their chances of receiving training. Evidence from the British Skills Surveys (1997 and 2001) shows those with Level 4 or over as their highest qualification are 11% more likely to receive formal employer provided training than other workers whose highest qualification is at Level 3 (Nordman and Hayward, 2006).

Table 24 shows the direct relationship between highest Level of qualifications and the increasing probability of receiving formal training. By summing the increasing probability at each Level of qualification one can conclude that those holding qualifications at Level 4 and above are 31% more likely than a worker with no qualifications to receive formal, employer provided training.

Table 24: The probability of receiving formal training

Highest Level of Qualification	Probability of Receiving Formal Training over previous Level (%)
1	5
2	8
3	7
4 and above	11

Source: Nordman and Hayward (2006) Table A2. All figures significant at 1%.

In section 4.2 we highlighted a reduction in average levels of job related training across the UK workforce in the 2000s which is being driven by a fall in the training provided to young and highly qualified employees (Mason and Bishop, 2010). Training levels for the low-qualified have remained constant or even increased slightly during this time and although the result is a narrowing of the gap between average levels of training provided to the young and old and to the high and low-qualified, Mason and Bishop demonstrate that a substantial gaps still remains. They report that the probability of graduate males receiving training is 11 percentage points higher than it is for males with no or low qualifications and that the of males aged 16-19 years receiving training is 36 percentage points higher than it is for males aged 50-59 having controlled for qualifications, individual and establishment characteristics.

Attention is now given to skills which are not captured by the NQF levels or formally accredited. The value of basic skills (numeracy and literacy) are considered in the section immediately below and generic skills are discussed in the section which follows that.

5.14 Basic Skills

Poor literacy and numeracy skills place individuals and their employers at a disadvantage. Basic skills alone rarely deliver the skills needed for the workplace but without them employees are unable to participate in education and training which enhance labour market prospects and workplace performance (Meadows and Metcalf, 2008). Very few jobs could be performed without the use of basic skills and the demand for them, especially numeracy, seems to be rising. As such, basic skills precede and provide a foundation for the acquisition of qualifications in the NQF[27].

In 1999 the Moser report acknowledged the extent of basic skills deficiencies amongst the adult population. Approximately 20% of the adult population in England had literacy problems and 40% numeracy problems. More recently the Leitch Review of Skills (2006) identified that the UK was in the bottom half of the OECD basic skills distribution.

The National Child Development Study (NCDS) has been used by Bynner and Parsons (1997) to assess basic skills ability. As one of the major longitudinal surveys in Great Britain it repeatedly surveys a cohort of people born between 3rd and 9th March 1958. in 1995 a representative sub-sample of the cohort was used to assess their basic skills ability. Standards of numeracy were much lower than those for literacy with just under half of the sample having either low or very low levels compared to one fifth for literacy (see Table 25).

Table 25: Numeracy and literacy ability among adults

Literacy	Very Low	Low	Average	Good	n
All (%)	6	13	38	43	1711
Men (%)	5	11	37	47	799
Women (%)	7	16	39	39	912
Numeracy					
All (%)	23	25	25	27	1702
Men (%)	19	23	24	34	799
Women (%)	27	28	25	21	903

Source: Bynner and Parsons (1997) and Ananiadou *et al*., (2003)

[27] Basic skills are numeracy and literacy skills, although English language skills are sometimes included along with low level computing skills in some circumstances. Basic skills are classified as Entry Level 1, Entry Level 2, Entry Level 3 and Level 1 and Level 2. Level 1 and Level 2 equate to NQF Levels 1 and 2. For more detail see Ananiadou *et al*., (2003), page 11-12.

Of course, literacy and numeracy skills will vary by socio-demographic and behaviour variables. The Adult Literacy in Britain Survey (Carey *et al*., 1997) reported literacy tends to be greater for males, younger people, those who are employed or studying, higher occupations and those receiving higher incomes. Those receiving benefits are among the most likely to have poor levels of literacy. By sector, it is those industries which are growing fastest in terms of employment that report the highest levels of literacy (Public administration, Education, Business Services, and Health). Sectors where employment is declining report the lowest levels of literacy (Agriculture, Construction and Manufacturing). There was little difference between England and Scotland in terms of average literacy levels but levels in Wales were slightly lower.

Since the Moser report, attention has since been given to the value of basic skills in the labour market (McIntosh and Vignoles, 2001; Dearden *et al*., 2000; Dearden *et al*., 2001; Dearden *et al*., 2002; Bynner *et al*., 2001; Bynner, 2008).

A meta-review of the research using the International Adult Literacy Survey (IALS) conducted across more than 20 countries summarised the benefits of literacy skills (Johnston, 2004):

- Literacy has a persistent, positive and statistically significant association with earnings irrespective of other influences.
- Literacy influences an individual's participation in work.
- Overall, a 10 point increase in literacy scores (on a 500 point scale) gives, on average, a 1-5% increase in earnings. Of course this varies by country with 3.3% being observed in the Netherlands, 1.3% in Germany and 2.4% in New Zealand.
- This compares to the return to an additional year of education of 7-10%.
- A 1% increase in literacy scores increases wages by just less than 1% (DELNI, 2009 citing Denny *et al*., 2003).
- It was also evident that the benefit of any enhancement to literacy levels is influenced by the starting level of literacy. For example Mare and Chapple (2000) and Denny *et al*., (2000) show that increases in literacy at lower levels provide a greater increase in wages compared to the same increase at higher levels in New Zealand but in the UK increases at the mid range were most beneficial. McIntosh and Vignoles (2001) also found increases at the lower level to attract the largest returns.

Level 1 numeracy skills can attract an uplift in salary of 15-19% and for literacy it is 15% over those who have lower levels of basic skills according to Dearden *et al*., (2000; 2002). Returns to employment of level 1 numeracy and literacy skills are also reported by Dearden *et al.,* and range from a 5% greater chance of employment for numeracy skills to between 5% and 13% for literacy skills.

Recent estimates made using the British Cohort Study (De Coulon *et al*., 2007) indicate that the variation in adult literacy and numeracy explains around 10% of the variation in hourly earnings in 2004. Not only did De Coulon *et al.,* confirm that better basic skills are positively linked with earnings, they also demonstrated that the relationship is non-linear so that higher skills levels are associated with higher earnings at an increasing rate. This pattern still holds even when a number of family background variables are controlled for. When gender is also considered De Coulon *et al.,* (2007, p15) found that "although [labour market] characteristics affect male and female pay quite differently (e.g. ethnicity), men and women with better numeracy earn similar wage premiums in the labour market". De Coulon *et al*'s findings on the value and importance of basic skills are supported by Parsons and Bynner (2005) and Grinyer (2005).

There seems to be some disagreement between earlier studies of the value of basic skills and more recent evidence. The earlier studies (Mare and Chapple, 2000; Denny *et al*., 2000; McIntosh and Vignoles, 2001) indicate that benefits to raising the level of basic skills is most beneficial when the starting point is at the low or medium level. Whereas later studies (De Coulon *et al*., 2007; Parsons and Bynner, 2005; Grinyer, 2005) show that gains made at higher levels of basic skills prove more beneficial for the individual in terms of the economic return they receive.

Interestingly, the value of these skills seems to have held up over time. De Coulon *et al*., found little difference in the premium returned to basic skills held by individuals in their thirties in the 1990s and early 2000s. De Coulon *et al*., (2007) suggest this reflects the relative scarcity of such skills compared to demand despite recent increases in the supply of such skills. Furthermore, the return to basic skills in the UK is thought to be higher than in other countries (Denny *et al*., 2003; Hansen and Vignoles, 2005) suggesting that they are in demand or short supply. The study also noted a significant relationship between basics skills and the likelihood of being in employment in an individual's early thirties.

Individuals with very low levels of basic skills leave school and enter the labour market earlier than other pupils. By the age of 16, 80% of males and 70% of females with entry level 2 skills had left education often without any formal qualifications (Bynner, 2008[28]). Their labour market experience was characterised by frequent episodes of unemployment and if employed they were much more likely to be in jobs at the low end of the occupational spectrum characterised by low or unskilled work, scare opportunities for work-based training and/or promotion.

As they age the participation rate of those with low basic skills drops well below that of their peers with high levels of skill. By the age of 34 men with basic skills at entry level 2 were 20% less likely than those at level 1 to be employed (Bynner, 2008). Of all women, it was those with poor basic skills which left the labour market first to have children. Although women with higher skills followed suit later in life the gap in employment rates between those with poor and good basic skills remained.

By age 34, half of all women with basic skills at level 1 or above continued in employment compared to one fifth of women with skills at entry level 2. These trends, Bynner argues, are the result of poor educational performance founded in weak literacy and numeracy acquired at an early age.

Wider implications of poor basic skills are also evident and characterised generally by disadvantage in adult life, for example low income, poor housing and reduced life chances (Bynner, 2008). Perhaps equally notable is a lack of access or exposure to information and communications technology either at work or home. This trait is likely to severely limit labour market prospects given the rising prevalence ICT in the workplace (Bynner, 2008; Dickerson and Green, 2002; Felstead *et al*., 2007; Green *et al*., 2007). Although established early in life, Bynner acknowledges that it is possible to overcome such disadvantage and improve career prospects by acquiring basic skills and other qualifications that were missed at school. However, the likely success and benefits of policy interventions to this end in England are debated (Wolfe *et al*. 2009; Vignoles 2009; Meadows and Metcalf, 2008; Dearden *et al*., 2002; and Blanden, Draca and McIntosh, 2005).

[28] Bynner draws on the 1970 British Cohort Study which tracks individuals born in a single week in 1970 until the age of 34.

Basic skills are fundamental to an individual's engagement with and position in the labour market. The literature clearly supports this view as basic skills help to improve wages and likelihood of employment. Basic skills acquired early in life are rewarded much better than those gained in adulthood. Nevertheless, even if the employment or wage returns to basic skills gained in later life are limited the acquisition of such skills is not without value. There may be longer term benefits, as Meadows and Metcalf (2008) suggest, for example improved self esteem and confidence, and the increased likelihood of undertaking further training.

The premium attached to basic skills may indicate their relative shortage. However, attempts to raise adults' levels of basic skills in response are generally ineffective according to some commentators or at best deliver a return less than that for extra years of education (e.g. Wolf *et al*. 2009; Vignoles, 2009).

5.15 Generic Skills

Generic skills are often called transferable skills and relate less to a specific subject or technical speciality. Nevertheless the possession of such skills attracts a premium from employers indicting that they value their use in the workplace. Two forms of generic skills and their value in the labour market are singled out here for greater attention because of their high value relative to other generic skills; information and communication technology (ICT) skills, and influencing skills. Other types of generic skills such as problem solving, communication, and physical skills are considered briefly.

To elaborate further on the nature of generic skills we can turn to Felstead *et al*., (2007: p26). They state:

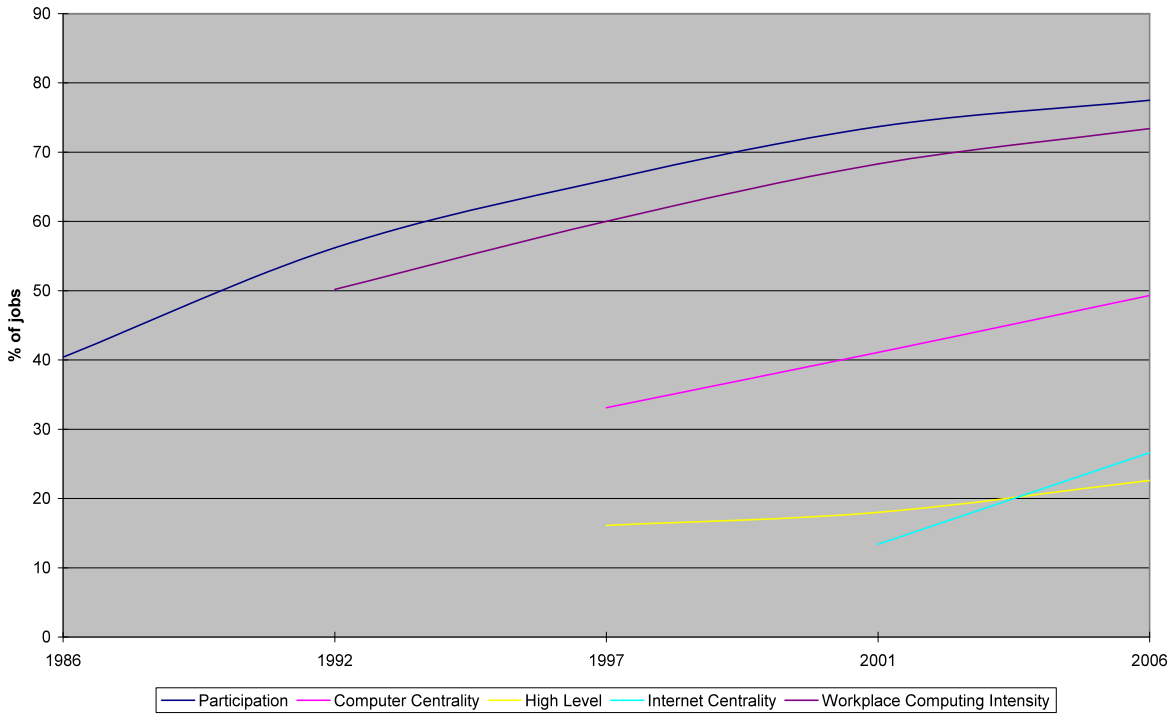
> The idea of a generic skill refers to a skill which is used across a wide range of occupations and industrial situations in contrast to occupation-specific or firms-specific skills that are needed in particular jobs. A widely cited example is that of communication which is needed in many jobs, but to differing degrees and at varying levels.

Felstead *et al*., (2007) provide the most comprehensive assessment of the importance and value of generic skills. Based on analysis of five separate but comparable surveys of Work Skills in Britain (1986, 1992, 1997, 2001, 2006) they find that most generic skills are becoming more important in the workplace over time.

In the context of the spread of new technology in the workplace, computing skills have become established as one of the most important generic skills (Dickerson and Green, 2002; Felstead *et al*., 2007; Green *et al*., 2007).

Green *et al*., (2007) suggest computing skills continued, if not increased in scarcity since the turn of the century. Figure 19 shows the spread of computer use. In the twenty years between 1986 and 2006 the proportion of jobs that expose employees to computers increased from 40% to three quarters of all jobs. For half of all jobs the use of computers was essential (computer centrality) in 2006 compared to just one third in 1997. Internet centrality has increased from 13% of all jobs to more than a quarter in 5 years (2001-2006). Complex and high level computing skills are required in fewer jobs because of their specialist nature but demand for these is increasing too. In 1997 just over one sixth (16%) of all jobs required high level computing skills but by 2006 this had risen to just under one quarter of all jobs (23%).

Figure 19: Computer use 1986 – 2006



Source: Green *et al*., (2007)

On the computing skills index ranging from simple, moderate, advance to complex the effect of a unit increase is an estimated 5.3% to 6% increase in pay for men and women respectively (Felstead *et al*., 2007). So a female in a job that requires the application of complex computer skills (Green *et al*., give the example of Computer Aided Design or Statistical Analysis Software) will on average earn 24% more than a female working in a job that requires absolutely no computing skills but is similar in all other respects. The premium associated with using computers at a simple level is 8%-9% for females and 6%-7% for males and these have remained constant over time. Given the spread of computing skills and the significant wage premiums that accrue to them relative to other generic skills this leads to the conclusion that computing skills are in high demand by employers.

Over time the premiums for simple level computer skills have remained constant. For advance computing skills, however, the premiums are much reduced of late, though still higher than those for other generic skills and lower level computing skills. For females the wage premium has fallen from 34% in 1997 to 21% in 2006 and for males it has fallen from 13% to 8% over the same period but reached a peak of 26% in 2001 (Felstead *et al*., 2007 and Green *et al*., 2007).

Influencing skills are the other generic skill for which large wage premiums are afforded. Felstead *et al*., note that roles for which influencing skills are considered as 'very important' attract a pay premium of 7% for females and 8% for males compared to roles for which they are thought to be 'fairly important'. This supports the notion that employers are willing to pay for the necessary generic skills over and above the essential broad qualifications for a job. Their importance is also confirmed over time as influencing skills have held a substantial and significant pay premium of between 5% and 7% for females and between 7% and 9% for males from 1986 to 2006.

There is strong evidence that the two generic skills most valued are complementary. For those workers with average influencing skills there is a boost to pay in computer intensive firms (where at least three quarters of the staff are using computers) compared to firms where computers are not used. This equates to around 19% for men and 8%[29] for women. Every one point increase in influencing skills yields an additional 10% pay premium for men and 4% for women in computer intensive firms. Green *et al*., (2007: p 22) conclude:

> …the interaction between computing and influence skills is a very recent phenomenon. There is indeed some evidence that the rapid diffusion of [information communication technology] in British workplaces over the last decade is placing an increasing premium on those who have been able to

[29] This premium for females is not quite significant.

> acquire the skills to utilize the new technologies; but it is predominantly those jobs that also deploy high levels of influence skills (where… the technologies are likely to be used more effectively) that are now being rewarded with a scarcity premium for computing skills.

Kirby and Riley (2006), used pooled data from the Labour Force Survey to estimate the value attributed to general and job specific skills under different intensities of ICT capital usage. They found that a rise in the intensity of ICT in a sector was associated with a rise in the value of general skills and a reduction in the value of job specific skills or experience. The authors suggested that job specific skills declined in value relative to general skills because the latter are more transferable to new technologies.

In most cases the supply of other generic skills such as planning, problem solving, communication, checking, aesthetic and emotional skills is adequate to meet employers needs although they are still valued. This is demonstrated by the positive but more modest wage premiums available (Felstead *et al*., 2007).

Whilst the demand for most generic skills is rising this is not the case for physical skills. Skills Survey data shows a negative association between physical skills and pay. Job roles where there is a substantial requirement for the use of physical skills generally pay less than jobs for which those skills are less important. Felstead *et al.,* (2007) are careful to point out that physical skills are not necessarily the cause of lower pay but are associated with or indicative of other aspects of the job that are more closely linked to lower pay and which are unobserved by the data. That is, where physical skills are particularly important workers tend not to use other skills that may be valued more highly (Dickerson and Green, 2002).

Although computer skills and their use are not the sole explanation for pay differences in the labour market it could go some way to explaining variations if the use of computers in the workplace continues to grow and the digital skills gap highlighted in section 5.13 on Basic Skills continues to widen.

Considering the generic skills required by managers and supervisors reveals, perhaps unsurprisingly, a wage premium for management skills. Felstead *et al*., (2007) find that a one point difference in the importance level of management skills is associated with an estimated 4% premium for females and 7% for males. This confers with the work of Bloom *et al*., (2007) in section 4.8 that highlights the importance and value of management and leadership skills to organisational performance.

The importance of and preference for generic skills relative to technical skills amongst firms recruiting graduates was highlighted recently by a Council for Industry and Higher education report (Archer and Davison, 2008). Literacy, numeracy and analysis and decision making were each ranked 8-10th in the top 10 most important skills by graduate recruiters by no more than 70% of employers. Communication, team-working, integrity, intellectual ability and confidence were the top five skills rated by 80% of more of employers.

So for higher level, or more specifically, graduate level jobs it could be that literacy and numeracy, analysis and decision making skills are required but are less in demand relative to communication, team-working, integrity, intellectual ability and confidence. Whilst the notion that generic skills are perhaps more desirable is broadly supported by Felstead *et al*., the exact hierarchy and categories of skill demands varies. It is likely that the generic skills required will vary according to employer, sector, the level of skills required to do the job, and the nature and spread of technology used within the firm.

To summarise this section on generic skills, it is evident that there is value in the possession and application of a wide range of such skills in the workplace. Just as basic skills are fundamental to entering and retaining employment and enhanced wage benefits, generic skills are fundamental to a worker's performance at work. Influencing skills and ICT skills are the two generic skills most in demand and attract the highest premiums of all generic skills. They are also complementary with an additional boost to pay available for those who possess influencing skills in organizations where computers are used intensively. Physical skills are the generic skill least in demand.

The premiums available to computing skills have reduced over time possibly due to increasing supply but remain substantial. Influencing skills on the other hand have attracted a consistent premium over time.

5.16 Lifelong Learning

Much as already been said about the benefits of lifelong learning to individual in previous sections on the acquisition of NVQ level 2s (section 5.7.2) and Higher Education (section 5.11). The following section also includes evidence on the benefits of lifelong learning with respect to gaining employment and further training. However, there remains evidence worth reporting which considers the benefits of lifelong learning more broadly, i.e. not focusing on one qualification type or level and considering more than just one impact such as wages or likelihood of employment.

The most recent literature on the economic value of lifelong learning reports greater benefits for individuals than earlier studies on the subject. Beginning with earlier studies, Silles (2007) used two sweeps of the National Child Development Study to investigate the relationship between adult learning and the earnings of males and found no genuine returns to additional qualifications awarded in middle adulthood (age 33-42). Ananiadou *et al*., (2003) reported from their review of the evidence that qualifications gained in adult life tended to return less than the same qualification attained by young people. The only type of adult learning to be associated with higher earnings was academic qualifications in Jenkins *et al*., (2003) study. As we have seen though the returns to higher education qualifications gained later in life are more encouraging but still lower than if the same qualification was attained earlier in life (OECD 2008b).

However, a more recent study provides detailed evidence of the financial benefits of lifelong learning (Blanden *et al*. 2010). They report that 10 years after gaining a lifelong learning qualification the hourly earnings of men and women are 20% higher than would otherwise be the case[30]. For men this means an increase of £1.90 per hour, equivalent to £4,307 per annum. For women gaining a lifelong learning qualification leads to a rise of £1.84 per hour. As women's mean earnings are lower this equates to an increase in annual earnings of £2,986. However, Blanden *et al*. did find that it can take 5 years for men and 4 years for women for the earnings impact to materialise from lifelong learning which leads to a qualification.

Using British Household Panel Survey data, Dorsett *et al*. (2010: p30) conclude that for men "lifelong learning appears to provide a one-off boost to wages growth for those in stable employment. It also influences the probability of being in work and thereby indirectly increases earnings for [those who are able to change jobs]".

However, Dorsett *et al*. make a useful distinction between those who increase the level of their highest qualification through lifelong learning (upgrading) and those who engage in lifelong learning but don't raise the level of their highest qualification (no upgrading). Whilst wage effects are reported for men who engage in lifelong learning resulting in no upgrading, employment effects are generally around zero. For those men who upgrade, wage effects are higher and the likelihood of employment is also much larger; the latter leading to a secondary boost to wages from securing long term employment. This finding applies across different ages. Dorsett *et al*. combine wage and employment effects to give total effect in Table 26.

[30] Blanden *et al*. include academic and vocational qualifications in their analysis and consider lifelong learning to commence at age 30. For more details see Blanden *et al*. (2010).

Table 26: Returns to lifelong learning for men

	Initial Attainment Level	Age 25		Age 40	
		Wage effect only %	Total effect %	Wage effect only %	Total effect %
No upgrading	0	6.0	6.0	5.8	5.6
	1	5.9	5.9	5.4	5.3
	2	5.6	5.6	4.9	4.8
	3	5.5	5.4	4.6	4.6
	4	4.7	4.7	1.8	1.6
Upgrading	0	9.3	21.0	9.0	21.7
	1	8.9	14.4	9.3	16.3
	2	8.6	12.3	8.9	14.1
	3	8.9	12.2	9.1	13.5

Source: Dorsett *et al*. (2010)

Also notable from Table 26 and highlighted by Dorsett *et al*. is the finding that the largest total effects in each group are available to those men that have achieved qualifications at level 2 and below prior to commencing lifelong learning. Again this applies regardless of age. The lowest qualified therefore stand to make the largest gains from learning later in life which has important implications from policy and how and at who messages about lifelong learning are targeted.

It is important to point out that academic and vocational qualifications are combined in Dorsett *et al*.'s analysis and we know from earlier sections of this report that the former are generally much more valuable at lowers levels. So it could be the case that the results are being driven by returns to academic learning.

So the more recent evidence indicates that lifelong learning is economically valuable and can play an important role in raising individual prosperity especially when new highest levels of qualification are achieved. However, it must be remembered that acquiring qualifications later in life reduces the time over which an individual stands to benefit economically from that qualification and the returns are at the very best no higher than if the same qualification was acquired at the earliest opportunity.

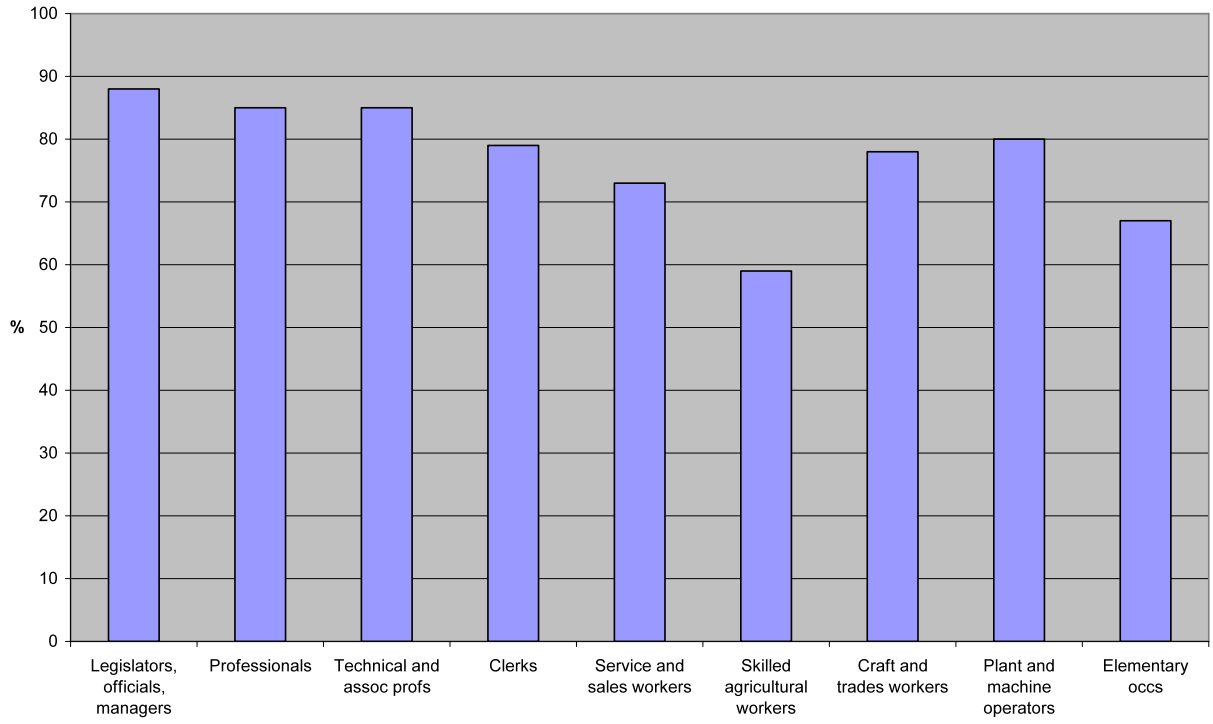
5.17 Skills and Access to Employment and Training

Beyond economic and financial benefits for the individual, the acquisition of skills gives greater access to the labour market for individuals and greater likelihood of avoiding unemployment.

We presented evidence in Section 5.1 illustrating that an individual's likelihood of experiencing unemployment is inversely related to educational attainment. Therefore higher levels of skills make it more likely that an individual will find and retain employment.

Across the European Union (EU 27), lower skilled workers and lower level occupations tend to have less security of tenure in their jobs (see Figure 20 below). On average about 80% of employees have indefinite contracts. For higher occupations such as Managers and Officials this can reach nearly 90% but for low level occupations such as agricultural workers it can be below 60% (Lyly-Yrjänäinen, 2008). The most secure of all low level occupations is that of Plant and Machine Operators as 80% of these jobs benefit from indefinite contracts. Higher level occupations tend to require higher levels of skill and qualification. So when security of contract is considered by level of education a similar pattern is evident. Of employees with high levels of education 79% have indefinite contracts compared to 73% for low qualified employees. Furthermore an employee's perception of whether they are likely to lose their job in the next 6 months increases the lower down the occupational scale they are positioned.

Figure 20: Indefinite contracts by occupation



Source: Lyly-Yrjänäinen (2008)

Machin *et al*., (2001) highlighted the positive labour market outcomes to be gained from the acquisition of skills through an individual's working life time. The full and wider benefits of training provided by one employer to a worker may out-last their period of employment with that employer and spill-over in to other employment throughout the working life of the recipient. Blundell *et al*., (1999) provide important evidence on improved prospects for promotion and reduced likelihood of redundancy for the individual. McMahon (2008) has attempted to estimate the social and private benefits of education and these were reported in Chapter 3.

In lieu of sizeable wage returns to vocational qualifications and NVQs in particular, many authors have highlighted their other benefits such as greater probability of employment and further learning. McIntosh (2004) focused on employment-related benefits from the acquisition of qualifications during adulthood. He reports that few individuals who left school without qualifications at age 16 acquired high-level qualifications during their life.

However, vocational qualifications at all levels were associated with an increase in the probability of employment for those individuals who left school without qualifications. In particular, men who left school without qualifications and acquired vocational qualifications at Level 1 during adulthood were four percentage points more likely to be employed in 2002 than men who left school without qualifications and did not acquire any further qualifications. Equivalent estimates of ten percentage points and 12 percentage points were found for men who acquired vocational qualifications at Level 2 and 3, respectively (McIntosh, 2004).

Similar trends are observed by McIntosh for women. Compared with women who left without qualifications and did not acquire any further qualifications, those who achieved Level 1, 2 and 3 vocational qualifications were respectively 16, 19 and 19 percentage points more likely to be employed in 2002.

Individuals engaged in adult learning leading to qualifications between 1991 and 2000 had a higher probability of being in employment in 2000 (Jenkins *et al*., 2003). In particular, males who were not in employment in 1991 who undertook occupational courses were 22 percentage points more likely to be in employment in 2000 than men who did not participate in adult learning. Women who were not in work in 1991 and who took vocational qualifications or occupational training were respectively 19 and 12 percentage points more likely to be in employment in 2000 than women who were not involved in adult learning. All those undertaking some form of occupational or vocational training between 1991 and 2000 were also more likely than others to participate in further training.

Jenkins (2006) investigated the benefits of adult learning for women who were unemployed in 1991 and who subsequently found employment by 2000. Adult learning was indicated by the acquisition of qualifications between the ages of 33 and 42. The acquisition of qualifications was found to heavily influence women's transition into employment between 1991 and 2000.

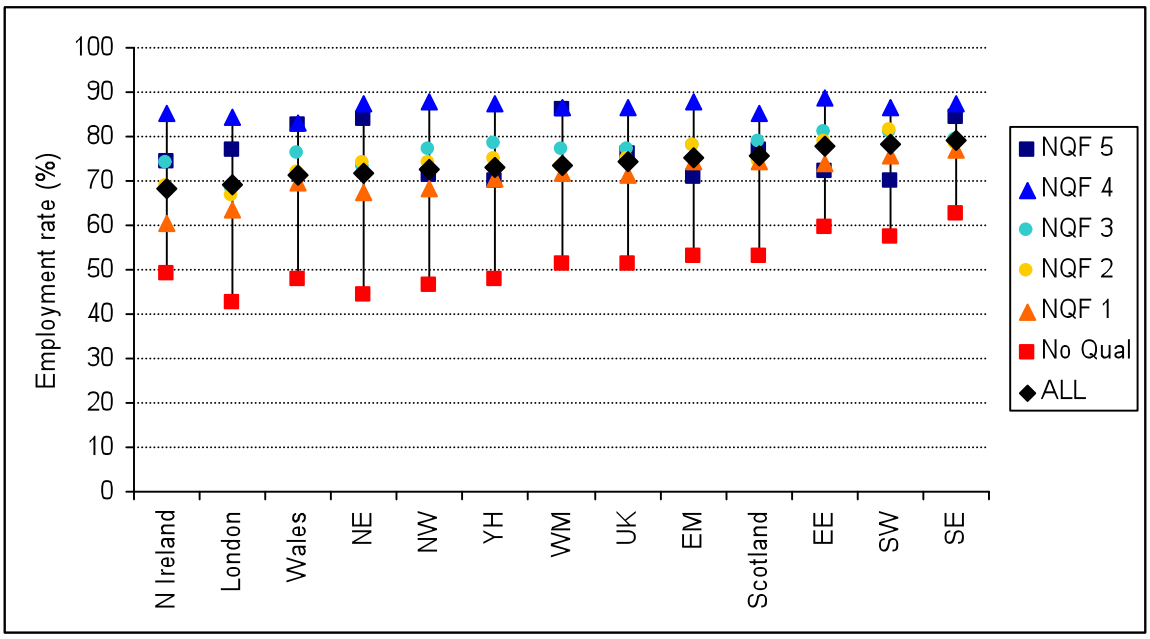
With specific reference to the acquisition of NVQ 2 qualifications De Coulon and Vignoles found that accreditation before the age of 30 increased the chances of gaining higher qualifications before age 34 by 40%. Dearden *et al*., (2004) also noted this affect more generally across holders of NVQ Level 2 qualifications. As we have seen, acquisition of higher qualifications is, on average, likely to lead to higher wage returns. Therefore the benefit of a NVQ2 should not be seen simply in terms of immediate wage returns but as increasing the potential for future returns derived from skills and qualifications acquired through further training and learning.

Considering the role of basic skills specifically, de Coulon *et al*., (2007) report an increase in basic literacy skills is associated with a 3.5 percentage points higher probability of being in employment by age 34 for women. For numeracy there was an absence of any effect. However, the opposite pattern was found for men. An increase in men's numeracy skills is associated with a two percentage points higher probability of being in employment by age 34.

Perhaps the best illustration of how skills affect employment rates is given by Green (2009). Figure 21 shows clearly that employment rates increase with qualification Levels. Also, it is salient to note here that variations in employment rates across regions and nation of the UK for those with no qualifications are more pronounced than for those with degree level qualifications (NQF 4)[31]. This pattern results from the employment opportunities available to holders of qualifications at different Levels. Green reports that highly skilled people are more likely to operate in national and international labour markets while local residents with poor skills tend to confine their lives to the local area in which they live. The differences in monetary and material resources mean people with poor skills generally tend to travel over shorter distances to work than those with higher level skills and are exposed to a more limited range of employment opportunities.

[31] There is a 20 percentage point gap between the lowest ranked and highest ranked region/nation on the employment rate for people with no qualifications, compared with a 6 percentage point gap for those with qualifications at NQF level 4 and a gap of 11 percentage points between the lowest and highest ranked region on the aggregate employment rate. At sub-regional level such differentials would be even more pronounced.

Figure 21: Employment rates in the regions and nations of the UK by qualification level



Source: Green (2009) using Felstead *et al*. (2007). Based on individuals of working age.

Li *et al*., (2008) for the Equalities and Human Rights Commission conclude that whilst inequalities remain between groups education protects ethnic minorities, women, and disabled people against disadvantage in employment and income.

5.18 Conclusion

The section has presented a wealth of evidence on the financial benefits of skills to individuals and has served to reinforce the key point of this report that skills are economically valuable. The possession and acquisition of skills and their quality has a direct relationship with an individual's earning prospects, their likelihood of gaining employment, their job tenure and their propensity for future learning which helps to create a virtuous cycle of learning and earning.

For individuals, just as with employers or organisations, the value of skills varies across level and type, sector of employment, occupation and, to a lesser extent, geography.

The pattern of higher earnings being attracted by increasing levels of qualifications is evident in the UK and also holds by gender and across countries. Furthermore, the earnings of those with tertiary education relative to those without have been rising.

It is only when academic and vocational qualifications are considered separately that differences begin to emerge. Academic qualifications provide increasingly healthy and robust wage returns with increasing levels of qualifications, albeit they start from a low base at Level one. However, vocational qualifications do not provide a substantial wage return until Level 3 after which the returns increase to a point where, at Level 5, they provide a higher return than for academic qualifications, irrespective of gender. There are, of course, exceptions and Apprenticeships are just one.

We showed earlier that Apprenticeships pay for employers and the wage returns available to those completing an Apprenticeship confirm this. Moreover, the magnitude of the wage returns relative to other vocational qualifications at the same level suggest Apprenticeships are one of the most valued vocational qualifications and that their value in the labour market has been rising. As such Apprenticeships present themselves as an essential source of intermediate vocational skills for the labour market.

Focusing on intermediate qualifications and NVQ Level 2s in particular, the evidence presented here indicates that the qualification can provide healthy returns in very specific circumstances when gained as an individual's highest qualification. Certain occupations and sectors reward the acquisition of an NQV Level 2 well and, more broadly, lower ability individuals or individuals acquiring the qualification later in life also stand to benefit from the qualification. NVQ Level 2 qualifications gained through an employer are also associated with a higher wage premium than other routes such as college or government training schemes. Outside of these specific circumstances the qualification is not accompanied by significant wage premiums. It is, however, noticeable that other Level 2 vocational qualifications reward their holders better. The returns to a NVQ Level 3 are healthier and universally positive across all sectors but differ by gender. Again though the NVQ is the qualification which attracts the lowest wage premium at Level 3.

A sectoral variation to the pattern of returns is also evident. It is evident that the same qualification, either vocational or academic will attract different returns in different sectors and also that the same qualification will provide different premiums for men and women in the same sector. Sectors with a highly educated workforce tend to pay lower premiums for lower level qualifications compared to less skilled sectors. Such a picture is created by the interaction of a number of factors such as the nature of the sector, the employment status of men and women and the nature of the roles and occupations they occupy, the need for and availability of skills in a sector.

Higher education qualifications are among the best paying of all qualifications and the return in the UK is higher than in many other countries. The wage premium for holding a degree is estimated to be almost 25% more than that for 2 or more A levels, providing additional net lifetime earnings of nearly £130,000 on average. A postgraduate degree stands to provide a further £70-80,000 of earnings. Of course there are variations by degree subject with History, Linguistics and Psychology attracting the lowest, but positive, premiums and Law and Medicine the highest premiums. Further variations were noted by class of degree, geography and occupation. Interestingly, men from low socio-economic groups or those who enter higher education through non-traditional routes stand to gain an additional small premium for their degree. There are signs that the graduate wage premium may be widening with some graduates taking longer to find graduate level jobs in today's labour market.

The possession of generic skills such as planning, problem solving, and communication skills provides positive and healthy wage benefits for individuals but there are some for which larger premiums are available. Computing skills and influencing skills seem to be much sought after by employers and even more highly rewarded when required in combination suggesting they are complementary.

Training provided by the employer stands to benefit the worker very well when compared to other training or an additional year of education because employers are able to select training to match the needs of the business. Most employer provided training is not accredited but off-the-job training provides a larger wage return than on-the-job training. The rate at which the value of employer provided training depreciates over time is also slower than that for any other form of training. However, despite a recent narrowing of the gap in participation rates between the 'have and have nots', concerns over the unequal access to employer provided training remain meaning that its benefits are not available to all.

Job tenure and likelihood of employment are linked positively and directly with skills. Higher skilled occupations are more likely to report job security and individuals with higher skills and qualifications are more likely to be in employment. The experience of vocational education and training makes further learning and training more likely later in life which, according to recent studies, can provide substantial employment and wage returns especially if new higher levels of qualification are achieved.

Overall, skills acquisition at all levels is of value to the individual in terms of boosting their earnings, their chances of employment, and the probability of undertaking further learning. Whilst low levels of skill may not boost significantly an individual's wages they can help individuals gain access to the labour market and retain employment compared to having no or lower qualifications. Continuity of employment is also important to avoiding low pay. We have seen that the likelihood of low pay and unemployment decreases as the level of education increases. Labour market outcomes for those with high skills are much more favourable.

However, all the returns literature is retrospective; it tells us what has been earned by individuals in the past with particular qualifications. This is useful as a guide to individuals making career decisions but is not always a reliable indicator of future returns and as we have seen there are suggestions that the premiums graduates can expect from their degree may be widening. This makes it important to provide regularly updated, consistent and comprehensive labour market information on wage returns. At present the evidence base on the returns to qualifications and learning, whilst large and growing is too fragmented and piecemeal.

6 Conclusion

The key thrust of the evidence presented by this report has been that skills are economically and socially valuable. Prosperity depends on employment and productivity and skills are an essential part of achieving higher levels of both. Skills are of economic value to individuals as workers, to the organisations that employ them, and to the country as a whole through greater productivity and competitiveness. There are also considerable social benefits to individuals and society which aid the development of a more equitable and better functioning society which in turn supports economic growth and performance. The economic and social impact of skills can be maximised by investing in the right skills. These are the skills which achieve business success and create opportunities for individuals. These are the skills which effectively meet the changing needs of the labour market.

At the country level the potential economic gains to be made from raising skill levels are very large indeed. However, to realise fully these benefits it is not sufficient to simply increase the UK's stock of skills. Other countries are developing their skills base and at a faster rate so the UK must grow its skills to maintain its competitive position relative to these other countries. Much larger investment is required if the UK is to better its position compared to its competitors.

The unapologetic priority therefore has to be economically valuable skills. Business must also be supported to create more jobs and the right type of jobs; those that require high and economically valuable skills. Information on the value of skills and the business case for training must be provided to individuals and employers to raise investment in skills. The evidence presented here contributes to the business case for individuals, firms and governments to investing in skills.

Higher levels of firm performance are supported by higher skill levels amongst workers. The starkest illustration of this is that training provided to the workforce increases the chances of firm survival. What is more, employers stand to benefit more from the investments they make in the skills and abilities of their employees than the employees themselves. Training is therefore a rational investment for firms but average levels of job-related training have recently dropped back to 1993 levels and access to employer provided training is unequal. To maximise the pay-off from skills, it is vital that skills are managed and applied in a way which uses them to best effect. This focuses attention on the quality of management and leadership within the firm, the way work is organised and how skills are applied and used in the workplace.

Historically, skills have paid and will continue to pay for individuals for the foreseeable future. Higher qualifications generate higher economic benefits for their holders. Education and labour market outcomes such as earnings and employment are directly related; the more education an individual has the more they are likely to earn and the more likely they are to be employed. This principle holds whether skills and qualifications are gained earlier or later in life. What is more, many of these effects are inter-generational with children benefiting from the gains made by their parents.

However, we know that not all qualifications and skills are equal in the benefit they offer for their holders. Vocational qualifications have often been seen as the poor relation to academic qualifications and their value is highly variable with some offering very healthy returns and others providing insignificant returns. This provides a challenge to those in policy about the allocation of scarce resources in support of qualifications (Keep, 2009) and also requires careful consideration by individuals of which vocational qualification to study. In general academic qualifications are the best paying qualifications, especially those from higher education, although there is evidence that the graduate premium may be weakening. In terms of training, that which is provided by the employer is economically more valuable to the employee than other sources of training and the wage benefits last longer.

The pay-off from investments in training and skill development by the individual, firm and the country take time to materialise. They are rarely instant and cannot be achieved by 'one-off' investments. Moreover, skills degrade and their value depreciates if not maintained and updated. Improving the skills of the UK is therefore a long term and continual task but one which also requires immediate and urgent action if we are to realise the potential benefits of skills to the country and remain competitive with other nations. The UK Commission's report Ambition 2020 (Spilsbury and Campbell, 2009) provides an assessment of the UK's progress towards its skills ambitions. This will be updated in July 2010.

Wide ranging and sizeable effects of skills exist and extend beyond the labour market. Skills enhance the quality of life for all in society by helping to create a safer, healthier, better functioning society to support economic growth. A workforce with poor skills not only makes their own lives poorer, it makes all of our lives poorer and a highly skilled workforce will not only make their own lives richer, it will make all of our lives richer.

Several key questions arise out of this review which are especially pertinent in the context of the recession and current levels of public sector borrowing.

- How can the impact of public funding for education and training be maximised to create the highest possible benefit for the tax payer? In the face of increased public borrowing and inevitably tighter public budgets there is an argument for investing more heavily in those qualifications which provide a higher return on investment in education and training for the public purse.
- Who should pay? Should individuals that stand to gain substantially from their qualifications and learning make a greater contribution to the cost of their learning? This raises questions of whether the balance of costs currently borne by employers for training should be shifted more towards the employee. Should opportunities for those who face limited access to learning and job-related training be subsidised further in an effort to increase social equality? This recognises the financial and social burden that low and inadequate skills place on society. Equally, to what extent should other constituents that may benefit from an individual's learning bear the costs, in particular business and public services.
- Why there is such great variation in the value of qualifications across and within qualification types? For instance between academic and vocational and within vocational qualifications at the same NQF Level? There may be a need for further research to investigate why this is and the importance of employer input to their content.
- How should individuals and firms be incentivised to engage in training and consider how best to manage and apply skills in the workplace for greater productivity? This report has started to collect evidence on the benefits of skills to build the business case for investment but how should this be used and disseminated to influence individuals and employers. There is also the need for the evidence base to be continually refreshed with updated evidence on the benefits of skills to the county, the firm and the individual. In particular there is a need for regular wage return information reported on a consistent basis to help monitor the demand for skills and qualifications and their value in the labour market. Not only is this information essential to policy makers but it allows individuals to make better informed decisions about their future. For those who provide advice and guidance it would enable them to do so confident in the knowledge they are using up-to-date and comparable information.

Appendix A: Qualifications held by the Working Age Population

	All	Male	Female
Level 5			
Higher degree	4.26	5.08	3.46
NVQ5	0.18	0.20	0.16
Level 4			
Degree (first degree or other HE)	17.81	17.41	18.20
HNC/HND/BTEC higher	4.90	6.59	3.23
RSA Higher diploma	0.08	0.01	0.14
NVQ4	0.85	0.73	0.96
Level 3			
2+ A Levels	23.30	23.18	23.42
ONC/OND/BTEC national	3.87	4.75	3.00
C&G advanced craft	3.51	6.03	1.04
RSA advanced diploma	0.13	0.03	0.23
NVQ3	5.36	4.52	6.19
Level 2			
5+ GCSEs at grade C or above	42.63	40.83	44.38
BTEC first/general diploma	0.54	0.50	0.57
C&G craft	3.66	5.83	1.51
RSA diploma	0.23	0.08	0.38
NVQ2	5.98	4.92	7.02
Level 1			
BTEC first/general certificate	0.32	0.34	0.31
C&G other/part I	5.21	7.64	2.82
RSA other	3.51	0.49	6.48
NVQ1	1.82	1.67	1.97

Source: McIntosh (2009) using Labour Force Survey 2008. All qualifications categories include 'equivalents', for example, Scottish qualifications.

Appendix B: A note on marginal and average returns to qualifications

It is important to outline the two ways in which 'returns' information has typically been reported in the literature: marginal and average returns. This note does so by drawing on McIntosh (2009) which also provides a more in depth discussion of the different econometric approaches to producing marginal and average returns.

Marginal Returns

Often referred to in the literature as the 'highest qualification' specification, the reporting of returns to qualifications on a marginal basis calculates a return to the highest qualification held by individuals. The returns are specified relative to those individuals that hold no qualifications. The interpretation of the return (%) is then the estimated difference in wages between an individual who holds this qualification as their highest, relative to an individual with no qualifications, holding constant all other characteristics controlled for in the equation.

The literature often includes separate variables for individuals' highest vocational qualification and their highest academic qualification. This is preferable, as it avoids returns to the two types of qualifications being conflated. The interpretation of the estimated result on a vocational qualification is therefore the estimated returns to that qualification relative to holding no vocational qualifications, controlling for or holding constant any academic qualifications held.

Such a 'highest qualification' specification provides us with an estimate of the marginal returns to the qualification. Note these returns are 'marginal' in the sense of a marginal learner, that is someone who has *just* reached that level of attainment, but has gone no further. They are *not* marginal returns in the sense of the change in wages from acquiring the last qualification obtained, since the result (return) measures the sum of the returns to *all* qualifications the individual has acquired, up to and including the highest. In order to obtain an estimate of the marginal return in this latter sense, one would need to subtract the returns to having one level lower as the highest qualification. For example, imagine an individual has only followed the traditional academic route, and has obtained GCSEs, A levels and a degree. The return to the degree in a 'highest qualification' specification would give an estimate of the total returns she could expect, on average, to all of these qualifications. The difference between the return to the degree and the A levels would be an estimate of the additional, i.e. marginal, returns she could expect from obtaining a degree on top of her previous qualifications. Note, however, that such a

procedure would be much less appropriate for estimating the return to vocational qualifications.

Academic qualifications are almost always studied in a strict hierarchy, thus facilitating this comparison of returns to each level of attainment. It is very difficult to undertake academic study at a particular level without having achieved at the preceding level, and also very rare to undertake academic study at a particular level having already achieved at a higher level. It is therefore reasonable to assume that individuals at a particular level of academic attainment have already attained at the preceding levels, and to assume that the order of acquisition followed the linear hierarchy. However, vocational qualifications are not necessarily acquired in this linear way, but rather often acquired when required by, and at the level required by, their job. It is therefore not always the case that a vocational qualification is adding on to a lower level of attainment, and so the return to the lower level of attainment cannot simply be subtracted to determine what a qualification at a higher level will add to earnings.

Average returns

The alternative to the 'highest qualification' specification is to include all qualifications held by individuals. The interpretation of the return to a qualification in this case is then the estimated average difference in wages between all individuals who hold that qualification, and all individuals who do not, holding constant other qualifications acquired and all other background characteristics controlled for in the equation. This specification therefore estimates the *average* returns to a qualification across all individuals who hold that qualification, whether or not they have gone on to acquire higher qualifications, and whether or not they already held qualifications at the same or even a higher level. They are therefore called *average returns*.

Note that some of the analyses estimate a specification that is a hybrid of the 'highest qualification' and 'all qualifications' specification. Such specifications only consider the treatment group to be those individuals who hold the qualification of interest as their highest qualification, but then also control for all other qualifications held below this level. The interpretation of the estimated coefficient is then the estimated difference in wages between holding and not holding the qualification of interest, but applicable only to those situations where an individual with initially low level qualifications acquires the qualification of interest as their new highest qualification.

Appendix C: Sector Skills Council definitions

SSC name	SSC description	SIC definition
Lantra Web: www.lantra.co.uk	Environmental and land-based industries	01, 02, 05.02, 85.2, 92.53
	Note: Lantra also cover industries which are small elements of other SIC codes not necessarily within their core, e.g. floristry, fencemaking, farriers	
Cogent Web: www.cogent-ssc.com	Chemicals, nuclear, oil and gas, petroleum and polymer industries	11, 23, 24.11-24.2, 24.41-24.63, 24.65,24.66, 25.13-25.24, 50.5
	Note: Cogent also cover the nuclear industry and sign making, but it is not possible to isolate these in terms of SIC.	
Proskills Web: www.proskills.co.uk	Process and manufacturing of extractives, coatings, refractories, building products, paper and print	10, 12-14, 21, 22.2, 24.3, 26.1, 26.26, 26.4-26.8, 40.3
Improve Ltd Web: www.improveltd.co.uk	Food and drink manufacturing and processing	15.11-15.91, 15.93-15.98, 51.38
Skillfast-UK Web: www.skillfast-uk.org	Apparel, footwear and textile industry	17-19, 24.7, 51.16, 51.24, 51.41, 51.42, 52.71, 93.01
SEMTA Web: www.semta.org.uk	Science, engineering and manufacturing technologies	25.11, 25.12, 27.4-28.3, 28.5-28.7, 29-35
	Note: SEMTA also cover science sectors, not exclusively defined by SIC	
Energy & Utility Skills Web: www.euskills.co.uk	Electricity, gas, waste management and water industries	37, 40.1, 40.2, 41, 51.54, 51.55, 60.3, 90
	Note: Energy and Utility Skills also have an interest in gas fitters, covered by SummitSkills SSC.	
ConstructionSkills Web: www.constructionskills.net/	Development and maintenance of the built environment	45.1, 45.2, 45.32, 45.34, 45.4, 45.5, 71.32, 74.2
	Note: A substantial proportion of construction work is sub-contracted to self-employed individuals (without employees).	
SummitSkills Web: www.summitskills.org.uk	Building services engineering (electro-technical, heating, ventilating, air conditioning, refrigeration and plumbing)	45.31, 45.33, 52.72
Automotive Skills Web: www.automotiveskills.org.uk	Retail motor industry	50.1, 50.2, 50.3, 50.4, 71.1
Skillsmart Retail Web: www.skillsmartretail.com	Retail industry	52.1-52.6
People 1st Web: www.people1st.co.uk	Hospitality, leisure, travel and tourism	55.1, 55.21, 55.23, 55.3-55.5, 63.3, 92.33, 92.71
Goskills Web: www.goskills.org	Passenger transport	60.1, 60.21-60.23, 61, 62.1, 62.2, 63.2, 80.41
Skills for Logistics Web: www.skillsforlogistics.org	Freight logistics industry	60.24, 63.1, 63.4, 64.1
	Note: Skills for Logistics also cover rail and water freight transport, for which there are no specific SIC codes.	
Financial Services Web: www.fssc.org.uk	Financial services industry	65-67

SSC name	SSC description	SIC definition
Asset Skills Web: www.assetskills.org	Property, housing, cleaning and facilities management	70, 74.7
Asset Skills (continued)	Note: Facilities Management, although as an industry is included in SIC code 70, is also an occupation employed across all industries, so is not fully represented through SIC. Some social housing management activity also falls within 85.31 Social Work activities with accommodation.	
e-skills UK Web: www.e-skills.com	IT, telecoms and contact centres	22.33, 64.2, 72, 74.86
	Note: e-skills UK covers IT & telecoms professionals across all industries. Additionally, as a fast changing sector, sector boundaries are continually changing.	
Government Skills Web: www.government-skills.gov.uk/	Central government	75.1, 75.21, 75.22, 75.25, 75.3
	Note: Most of the above SIC codes also incorporate local government. It is not possible to identify through SIC central or local government establishments.	
Skills for Justice Web: www.skillsforjustice.com	Custodial care, community justice and police	75.23, 75.24
Lifelong Learning UK Web: www.lifelonglearninguk.org	Community-based learning and development, further education, higher education, library and information services, work-based learning	80.22, 80.3, 80.42, 92.51
Skills for Health Web: www.skillsforhealth.org.uk	NHS, independent and voluntary health organisations	85.1
Skills for Care and Development email: sscadmin@skilsforcare.org.uk	Social care including children, families and young children	85.3
Skillset Web: www.skillset.org	Broadcast, film, video, interactive media and photo imaging	22.32, 24.64, 74.81, 92.1, 92.2
	Note: Photo-imaging is spread across a range of SIC codes, it is not possible to isolate the retail element. Interactive media, the largest sector in scope to Skillset, is not exclusively coded and is included within the core of e-skills UK. Additionally, self-employed people without employees represent most of the sector in areas such as film production and independent production. For these reasons, the data presented for Skillset should be interpreted with caution.	
Creative and Cultural Web: www.ccskills.org.uk	Arts, museums and galleries, heritage, crafts and design	22.14, 22.31, 36.3, 74.4, 92.31, 92.32, 92.34, 92.4, 92.52
SkillsActive Web: www.skillsactive.com	Sport and recreation, health and fitness, playwork, the outdoors and caravans.	55.22, 92.6, 93.04
	Note: SkillsActive covers sectors which form only a portion of other SIC codes.	
Non-SSC employers: Primary		05.01, 15.92, 16, 20, 22.11-22.13, 22.15, 26.21-26.25, 26.3, 27.1-27.3, 28.4, 36.1, 36.2, 36.4-36.6
Non-SSC employers: Wholesale/Retail		51.11-51.15, 51.17-51.23, 51.25-51.37, 51.39, 51.43-51.53, 51.56-51.90, 52.73, 52.74

SSC name	SSC description	SIC definition
Non-SSC employers: Business and Public services		62.3, 71.2, 71.31, 71.33, 71.34, 71.4, 73, 74.1, 74.3, 74.5, 74.6, 74.82, 74.85, 74.87, 80.10, 80.21, 91, 92.72, 93.02, 93.03, 93.05

Source: Dickerson and Vignoles (2007). Notes to Table:

1. These are the definitions used in the *Working Futures 2004-14* sectoral projections. These definitions are a 'best' fit to each SSC's core business sectors, but the extent to which this is an exact fit to the SSC varies between SSCs. In some cases, the use of the core SIC codes excludes certain elements of the SSC footprint because they are included in other areas. For more information see Table A2 in Dickerson and Vignoles (2007)
2. The SIC2003 codes highlighted are not separately identified in the LFS either because LFS does not provide the required detail or because LFS uses SIC1992 rather than SIC2003. These codes are therefore allocated differently in the analysis. Full details of this required reallocation are provided in Table A2 of Dickerson and Vignoles (2007).
3. The three categories of non-SSC employers represent those SICs codes not allocated to a SSC at the time of the study.

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