



Department for Business, Innovation & Skills
Department for Education

**RICHARD REVIEW OF APPRENTICESHIPS
CALL FOR EVIDENCE BACKGROUND**

JUNE 2012

Our changing economy and the role of apprenticeships

By Ken Warwick

Introduction

On 11 June 2012, the Government launched the Richard Review of Apprenticeships. The purpose of the review is to ask fundamental questions about the future direction of apprenticeships: why should we continue with them; what purpose do they serve - to employers, individuals and the wider economy; and therefore what constitutes good quality?

In order to provide context for the review, this short paper looks forward to how the economy may evolve as the recovery takes hold and growth resumes a more 'normal' path. Will this mean a return to the knowledge-driven economy, which invests in human capital, or has the experience of the financial and economic crisis changed the way we see the long-term outlook for the shape of the economy and the prospects for employment and the need for skills? What does that imply for the future of vocational education and training - and therefore what part should good quality apprenticeships play in that? For example, how should learning keep pace with changing demands in technology and scientific knowledge (at one end of the scale)? Will there be a demand for new learning techniques? How do we ensure people are not left behind, particularly in the later stages of their careers or if making late and significant changes in their career path? How do we ensure progressive career structures in a world where the bonds between individual and employer are weaker than in the past?

This paper will not attempt to answer all these questions. It will focus on how our economy is likely to evolve over the next ten years and the implications for skills demand, skills policy in general and apprenticeships in particular. The goal is to provide some pointers to possible developments and a framework for thinking about how external factors may affect demand for and provision of apprenticeships. Another companion piece, also intended as a guide to the Review process and the consultation exercise that will accompany it, is a summary of the economic evidence on the contribution apprenticeships make to economic growth.

In thinking about the likely evolution of the economy, there is no escaping the fact that the UK is going through a difficult economic transition. The financial and economic crisis has thrown the economy off course and led some to question whether the previous rate of trend growth can be regained. In the dislocation that has followed the crisis, some longer term trends have been obscured and some new ones are emerging. A great deal of work has been undertaken already on the future landscape for skills and the drivers of change, most notably the horizon scanning exercise undertaken for the 2010 National Strategic Skills Audit (UKCES, 2010). In this paper, we will ask how the economic and financial crisis and subsequent recession affects these drivers and the likely long-run evolution of the economy and the implications for skills demand and apprenticeships.

Plan of paper

The paper starts by reviewing the macroeconomic context and medium-term growth prospects over the next 5-10 years as the economy emerges from recession, and the need for rebalancing the economy along several dimensions. It then moves to a consideration of the main factors that will determine how the employment and skills landscape will evolve in the longer term. This has already been extensively studied¹. The UKCES (2010) study identified 23 significant drivers grouped under seven headings. Taking account of this and others Futures studies, the paper will consider five:

1. Global shifts in the balance of power
2. Technology and the knowledge economy
3. Demographic and social change – migration, population ageing and the changing nature of work
4. Growing inequality
5. Global challenges – climate change, resource scarcity, health and aid

In each section, some thoughts are offered on the underlying driver, whether and how it is changed by the crisis and the implications for skills needs and apprenticeships. The paper concludes with an overview of what this might mean for the sectoral balance of the economy and some reflections on the overall implications for the Review.

The macroeconomic context

Vince Cable often compares the dislocation to the UK economy that followed the bankruptcy of Lehman Brothers and the near collapse of the UK banking system as the economic equivalent of a heart attack. Following the financial crisis, the world economy contracted in 2009, an extremely rare occurrence. The UK economy suffered a decline of 7.3 per cent in its GDP from peak to trough, the sharpest drop in output seen since the 1930s.

Few, if anyone, anticipated the financial crisis, still less its nature or severity. To illustrate, John Kay (2012) quotes Tim Geithner, US Secretary for the Treasury, speaking in September 2006:

“We are now in the midst of another wave of innovation in Finance. The changes now under way are most dramatic in the rapid growth in instruments for risk transfer and risk management, the increased role played by non-bank financial institutions in capital markets around the world and the much greater integration of national financial systems.

These developments provide substantial benefits to the financial system. Financial

¹ In addition to the UKCES (2010) study, BIS (2010a) also reviews the main drivers of skills demand in the longer term. BIS (2010b) reviews prospects for economic growth in the UK and the longer term drivers of economic performance. McKinsey (2010) and Bisson et al (2010) describe the global forces that they consider will shape and restructure the world economy for the foreseeable future.

institutions are able to measure and manage risk much more effectively. Risks are spread more widely, across a more diverse group of financial institutions, within and across countries. These changes have contributed to a substantial improvement in the financial strength of the core financial intermediaries and in the overall flexibility and resilience of the financial system.”

The quotation testifies to the perils of economic forecasting, or even qualitative assessments of how established trends will shape our economic future. In the event, the forces shaping the finance industry were of course far from benign and the ensuing financial crisis continues to cast a long shadow over economic prospects. Assessments of potential output in nearly every industrialised country have been revised down by the IMF. Compared with the pre-crisis trend growth in the UK, the Bank of England calculate that the economy has suffered a cumulative loss of output of £540 billion, equivalent to 39 per cent of pre-crisis GDP. Extrapolating forward, the cumulative output loss, relative to trend, could almost quadruple to £2 trillion.

In the aftermath of the crisis, countries around the world embarked on a massive fiscal and monetary stimulus in an attempt to revive their flagging economies. With the help of this treatment, and the continued resilience of growth the emerging market economies and others who escaped the brunt of the crisis, the world and UK economy recovered somewhat in 2010. World output rose by 5.3 per cent and the UK economy expanded by 2.1 per cent. However, global growth weakened again in 2011, reflecting supply disruptions after the Japanese earthquake and tsunami, renewed uncertainty about the euro area, tension in the Middle East and North Africa and the slow recovery of consumer spending and investment in the United States. In the UK, growth weakened too, from 2.1 per cent to 0.7 per cent and the data available for GDP in Q1 2012 suggests that the UK has again experienced two successive quarters of falling output, a return to recession. The economy has effectively been flat for the last 18 months and output in the UK remains below its pre-crisis peak, by 4-5 per cent.

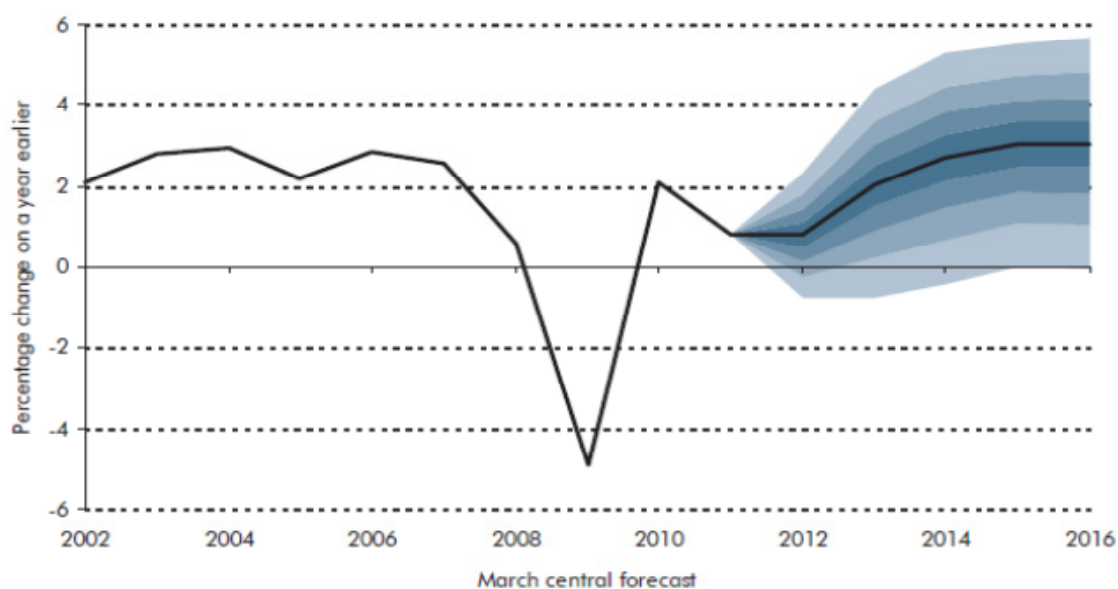
The Office of Budget Responsibility, established in 2010 to provide economic forecasts for the Government and an independent and authoritative analysis of the UK’s public finances, expect that output growth will remain weak in 2012, at about the same rate as 2011 (Table 1)². Inflation is expected to fall back during the year and to return to the Bank of England’s target of 2 per cent in 2013, but the positive influence of falling inflation is offset by the effect of uncertainty over the euro area outlook and tighter credit conditions feeding through to the wider economy. Assuming recovery in the euro area, the OBR expect growth to strengthen during 2013 and 2014, reaching 3 per cent in 2015 and 2016. There is however a great deal of uncertainty attaching to these growth forecasts, as the OBR’s ‘fan chart’ shows (Chart 1.1).

² The OBR’s projections were published before the Office for National Statistics revised the figure for GDP growth in 2011 to 0.7 per cent from the earlier estimate of 0.8 per cent.

Table 1: Summary of OBR central forecast

	Percentage change on a year earlier, unless otherwise stated						
	Outturn	Forecast ¹					
	2010	2011	2012	2013	2014	2015	2016
Output at constant market prices							
Gross domestic product (GDP)	2.1	0.8	0.8	2.0	2.7	3.0	3.0
GDP Level (2010 =100)	100	100.8	101.6	103.6	106.4	109.7	113.0
Expenditure components of GDP at constant market prices							
Household consumption	1.2	-0.8	0.5	1.3	2.3	3.0	3.0
Business investment	-2.1	0.2	0.7	6.4	8.9	10.2	10.1
General government consumption	1.5	0.3	0.5	-1.1	-2.1	-2.8	-2.7
General government investment	7.8	-13.0	-5.0	-3.6	0.1	0.4	-1.4
Net trade (contribution to growth, % pts)	-0.5	1.2	0.4	0.5	0.3	0.2	0.1
Inflation							
CPI	3.3	4.5	2.8	1.9	1.9	2.0	2.0
Labour market							
Employment (millions)	29.0	29.2	29.1	29.2	29.4	29.7	30.0
Average earnings	2.4	1.2	2.6	3.1	4.3	4.5	4.5
ILO unemployment (% rate)	7.9	8.1	8.7	8.6	8.0	7.2	6.3
Claimant count (millions)	1.50	1.50	1.70	1.60	1.50	1.40	1.20
Output gap (%)	-3.1	-2.7	-2.6	-2.5	-2.1	-1.3	-0.5

Chart 1.1: GDP fan chart

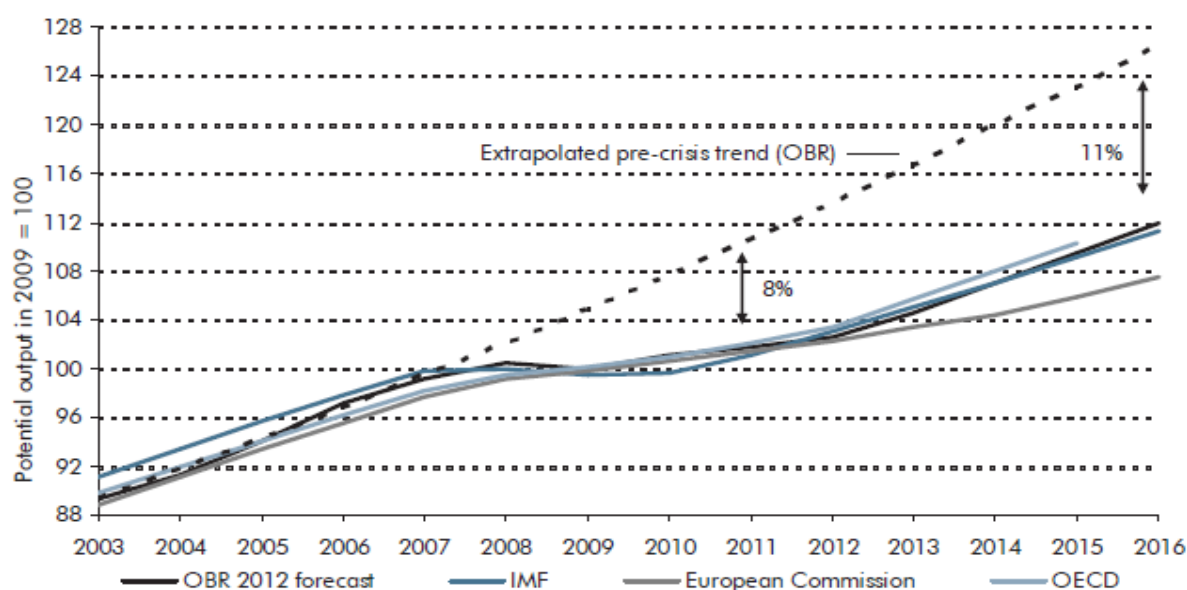


Source: ONS, OBR

Growth in the OBR forecast is driven by net trade and by business investment as global prospects improve and business takes advantage of the opportunities afforded by sterling's depreciation and relatively strong balance sheets. Those businesses that rely on external financing, however, may continue to find it difficult to finance expansion, and consumers are expected to reduce their debt levels before household consumption growth returns to more normal levels. Given the over-riding need to reduce public debt from unsustainably high levels, the growth of Government expenditure will inevitably also be restrained over the period.

The medium-term forecast for GDP growth beyond the next 12-18 months depends on the view taken on the growth of 'potential output' (the amount the economy could produce if available resources were fully employed) and the speed with which the 'output gap' (the amount of spare capacity) is closed. It is now widely accepted that the crisis has affected the economy's longer term potential through a temporary slowing of the potential growth rate but the OBR assume that, longer term, potential output growth returns to its previous rate, which they estimate to be 2.3 per cent. However there is much uncertainty about how much capacity has been lost and a range of possible outcomes for the trend of potential output (Chart 3.4), with the OBR being slightly more optimistic than the IMF or European Commission estimates. Even on the OBR assumption, potential output in 2016 will be 11 per cent lower than was projected before the crisis hit.

Chart 3.4: Projections of potential output^{5,6}



Source: OBR; IMF World Economic Outlook, September 2011; European Commission European Economic Forecast, Autumn 2011; OECD Economic Outlook No.90, November 2011.

While the recovery in the economy foreseen by OBR, and most other forecasters, is slow by past standards, there are a number of reasons why the process may take some time. One is that historical experience suggests that recovery from recessions associated with financial crises take longer (Reinhart and Rogoff, 2009). The UK economy is also particularly exposed to the financial sector, UK consumers had amassed high levels of debt and the budget deficit and public debt had

reached levels that necessitated urgent fiscal tightening. In addition, the continued weakness in the euro area, which accounts for 47 per cent of UK exports of goods, is a further factor slowing the UK recovery. The UK Government is seeking to strengthen long-term growth prospects through the implementation of a Plan for Growth (HM Treasury and BIS, 2011) and a series of Growth Reviews designed to remove barriers in areas where there are prospects for improved growth³.

By the end of 2016, the OBR forecast still implies that there will be some spare capacity in the economy, amounting to 0.5 per cent of GDP, allowing growth to continue in excess of its trend level for one more year. Assuming growth then reverts in 2018 to its trend rate of 2.3 per cent per annum, then the UK economy over the next 10 years will grow by a cumulative 28.9 per cent, though the margin of error around this figure is considerable. The OBR stresses in particular that developments in the euro area remain highly uncertain, with continuing sovereign debt problems and signs of financial fragility creating a major risk for the forecast.

What do these short and medium-term growth forecasts imply for the labour market? The OBR expects unemployment to peak at 8.7 per cent (ILO basis) at the end of 2012, corresponding to a claimant count of 1.68 million, falling to 1.14 million by the beginning of 2017. The OBR judge the long-term rate of unemployment⁴ to be 5.35 per cent. Over the six-year period from the start of 2011, employment is expected to rise by around one million, comprising an increase in market sector employment of around 1.7 million, offset by a reduction in general government employment of around 730,000. As unemployment falls and productivity performance improves, the OBR expect a gradual rise in average earnings growth from its currently subdued rates to a more normal level of 4.5 per cent in the medium term (Table 1).

Implications

The current fragility in the macroeconomic environment affect mainly the short-term outlook rather than the longer term horizon over which planning and policy for skills development and apprenticeship training take place. But, as we have seen, shorter term developments may also have long run consequences. The nature of the crisis is thought to have resulted in a permanent loss of output amounting to 11 per cent of GDP compared with past expectations, with consequent impacts on the level of output, the structure of the economy and the composition of final demand.

It is possible too that there will be some rise in the natural rate of unemployment. The OBR forecast does not assume any increase but they acknowledge the risk. Higher unemployment generally erodes skills and reduces employability, so that temporary rises can have long-term scarring effects (hysteresis). Some comfort can be drawn from the fact that long-term unemployment has risen relatively little in the latest recession. But youth unemployment is a particular problem - the unemployment rate among those aged 18-24 has risen by around eight percentage points since the start of 2008, compared to an increase in the aggregate rate of just over three percentage points.

³ For more detail and a progress report on implementation, see http://www.hm-treasury.gov.uk/ukecon_growth_index.htm

⁴ Technically, the Non-Accelerating Inflation Rate of Unemployment, or NAIRU.

There is a potential role here for vocational education to overcome the ‘scarring’ effects of the recession – to re-skill or up-skill young workers in particular, leading to more sustainable employment.

Some employers may be cautious about training expenditures during a period of austerity and slow growth, whereas others may see it as an opportunity to invest in their staff. The existing empirical evidence on the relationship between apprenticeships, initial workplace training and economic downturns evidence suggests (Brunello, 2009) that the ratio of apprentices to employees tends to be (mildly) pro-cyclical and so to decline during a recession. However, when broader measures of training are considered, excluding apprenticeships, the weight of the evidence suggests training expenditure increases in a recession. This may be because firms have incentives to train incumbents during a downturn at the same time as reducing the recruitment and training of young employees.⁵

The macroeconomic environment remains difficult in the short run, as the economy continues the process of recovery from the shock it suffered in 2008-09. The fragility of the euro area economies at the present time is a major risk to the forecast and could affect the medium-term outlook as well. But most forecasters expect the UK economy to be growing at above trend levels by 2014 and the medium-term outlook is for a return to an underlying growth rate of about 2.3 per cent in the second half of the decade. Assuming that the economy returns to a path of steady growth, the remainder of the paper asks how the balance of the economy will evolve and reviews the longer term global trends shaping our economic future.

A Question of Balance

A feature of the current debate on the future of the UK economy is the frequently expressed need to “rebalance” the economy. The decade up to 2007, though characterised by steady growth in output and productivity, had seen the emergence of growing imbalances in the UK economy, owing to increasing reliance on debt-financed consumer and Government spending and on the rapid growth of the financial sector, particularly in London and the South East. If growth over the next few years is to be sustainable, the economy needs to achieve a better balance in a number of dimensions: the fiscal position, the composition of internal demand, the external balance of payments, the regional distribution of economic activity and finally the sectoral structure of the economy. Each of these is considered in turn.

Fiscal Balance (spending and tax)

By 2009/10, the persistent gap between spending and revenue in the pre-crisis years, combined with the loss of revenues caused by the credit crisis and the stimulus measures introduced by the previous Government, had led public sector net borrowing to reach a post-war peak of 11.3 per cent of GDP, the highest in the G7. Public sector debt rose rapidly, reaching 67 per cent of GDP in

⁵This is supported by evidence from the latest UK Employer Skills Survey. Although the data for England suggests that there has been a real decline of 1.8 per cent in training expenditure since 2009, spending per person trained has not declined in real terms. So whilst fewer people are being trained, the intensity of training for those who are being trained has not suffered.

2011/12, well above recent historical experience. Between 1997 and 2007, government consumption increased from 18 to 21 per cent of GDP.

The Coalition Government, on taking office in May 2010, put decisive action on the fiscal deficit the at the centre of its economic agenda, introducing an Emergency Budget which set out a medium-term plan to put the public finances on a sustainable footing, build business confidence and provide a spur for a private sector-led recovery. The Coalition Government set itself two fiscal targets:

- to balance the cyclically-adjusted current budget by the end of a rolling, five-year period, which is now 2011/12 – 2016/17; and
- to see public sector net debt falling as a share of GDP in 2015-16.

The latest OBR forecasts suggest that the Government has a greater than 50 per cent chance of hitting both targets. The OBR also assesses that, by the end of 2011–12, almost 40 per cent of the annual fiscal consolidation planned for the 201 Spending Review period will have been achieved.

Internal balance (consumption and saving)

By 2008, the household saving ratio in the UK had fallen to the lowest level since the 1950s and household debt had risen to 100 per cent of GDP, as households borrowed to purchase increasingly expensive property. Debt levels by companies reached 110 per cent of GDP by 2008. It became clear that private sector consumption had been growing at unsustainable rates, fuelled by debt.

Looking ahead, private consumption is expected to grow more slowly relative to UK GDP, as households repair their balance sheets by reducing net borrowing; and businesses engage in stock-building. The Government is looking for private investment and net exports to be the main stimulus in the forecast period and this is confirmed by the OBR forecast.

External balance (imports and exports)

Although not excessive by international or historical standards, the UK's current account deficit in the balance of payments rose to 3.2 per cent of GDP by 2010. In the circumstances, it is clear that a successful recovery will require some rebalancing between domestic and external demand with net trade making a more positive contribution to annual GDP growth than it has done in the recent past.

It will be challenging to have an export-led recovery, due to weak growth in Europe, UK's main trading partner. However, growth in other markets and the depreciation of sterling seen since 2007, which has reduced UK relative unit labour costs and improved competitiveness, is also expected to assist in rebalancing the economy away from domestic spending towards net exports, and this is reflected in the OBR forecast.

Regional balance

Even though the UK had experienced steady growth in the pre-crisis period, growth was unevenly spread, with little evidence of convergence between regions in terms of earnings, employment and skills base. During the period 2002-08 the gap in gross value added (GVA) per head widened between London and the other regions. Most regions experienced slower average annual growth in

GVA per head than in the 1990-2002 period. London was the exception to this trend, with its average annual growth in GVA per head slightly faster during the later period.

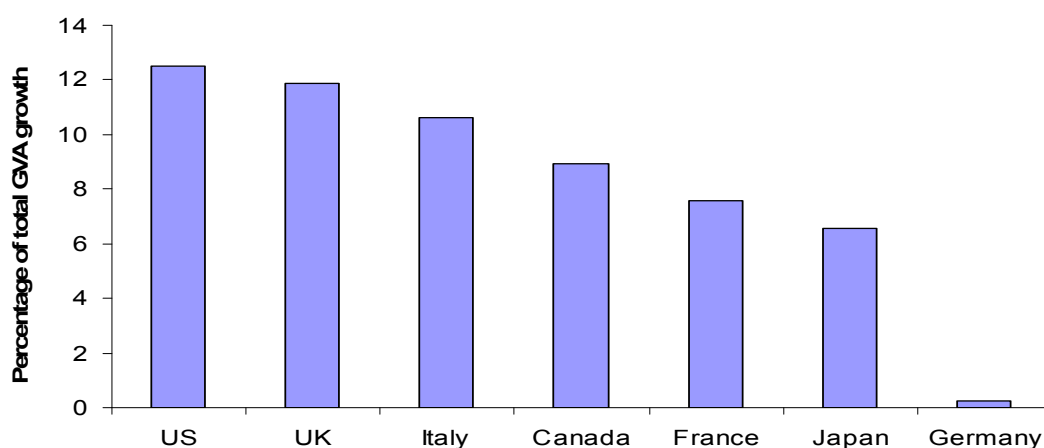
In terms of income levels, significant regional disparities remain. Workers and firms earn 46 per cent more in London and the surrounding regions than the rest of England, with London workers earning more than twice the level seen in the North East. These differences reflect long-term regional trends that may be difficult to reverse. The Government has however introduced a number of initiatives, including Local Enterprise Partnerships, new Enterprise Zones and a £1.4 billion Regional Growth Fund, aimed at improving regional economic performance and the regional balance.

Sectoral balance

In common with other advanced economies the UK has experienced a shift away from manufacturing towards services over the last two decades. However, prior to the crisis, UK growth became increasingly skewed towards the financial services sector. Amongst the major advanced economies, only the US saw financial services account for a larger proportion of overall growth in the economy in the ten years leading up to the crisis (Chart 3).

Financial intermediation in the UK grew faster than growth in the UK economy as a whole and faster than any other G7 country. This was increasingly driven by unsustainable growth in the debts of the UK banking and financial intermediation sectors.⁶

Chart 3: Financial Services contribution to GVA growth (1997-2007)



Source: BIS calculations from OECD STAN database

⁶ Financial corporations' total debt doubled between 2000 and 2008, rising from 126 per cent to 240 per cent of GDP. By 2008, UK financial corporations' indebtedness was the highest in the G7.

The impact of the crisis was initially to exacerbate these imbalances. The UK manufacturing sector suffered a 14 per cent decline in output over the course of the recession, partly due to the collapse in world trade whereas UK service sector output was less adversely affected, falling by 4.4 per cent. However, manufacturing performance has subsequently improved and the shake-out in the financial services sector is still under way. Looking ahead, it is likely that we will see a reduced contribution to growth from the financial services sector and an increased contribution from the manufacturing sector, particularly in advanced manufacturing and “manu-services”. Personal services (education, health, hotels and catering), which have experienced strong employment growth, and business services, an often under-appreciated success story, are also likely to make strong contributions to growth.

Of course, existing sectoral strengths and weaknesses are likely to be affected in the future by global and domestic forces and this will be considered in more detail below. As highlighted in a recent NESTA report (Shanmugalingam et al, 2010), there is no clear definition of the ‘right’ sectoral balance. Currently, the UK does not appear to be unusually specialised within a narrow range of sectors, and there is a wide measure of agreement that it is beneficial to have a diversified economy to improve resilience and flexibility.

Implications

The expectation that the economy will become more balanced in the years ahead may change the mix of skills required of workers and apprentices. With the pressing need for fiscal consolidation, some public sector activities may be squeezed. Skills relevant to exporting will be prized. Investment is set to be a more important driver of growth, and as recent Government initiatives to increase infrastructure investment come to fruition, there will be demand for skills in construction, engineering, design and project management. If the regional balance of economy improves, there may be changes in the location but not necessarily the sectoral composition of skill needs.

Perhaps most difficult is the question of sectoral balance. It seems likely that there will be some improvement in prospects in the manufacturing sector, one of the traditional sources of apprenticeships, but a wider range of skills may also be required as manufacturers look to exploit export markets and increase the service component of their offer. Growth in the business services sector is also likely to remain strong as well as personal services such as health and care services and hotels and catering. Service sectors have witnessed particularly rapid growth in apprenticeships in recent years. Looking ahead, there will be a shift towards more knowledge-intensive activities between and within sectors and a need for a wider range of cognitive and non-cognitive skills. Other factors shaping the sectoral balance of apprenticeship and skill needs will be considered in the remainder of this paper.

Against this macroeconomic background, we turn to the five global drivers that will shape our economy and consider the impact that the economic and financial crisis has had on each and the implications for the employment and skills landscape in the longer term:

1. The rise of China and other Emerging Markets

The first of the global drivers shaping the economic landscape in the years ahead is the continued process of globalisation and the rapid growth seen in China, India and other major emerging markets. Although by now a well established phenomenon, it is striking how much the growth of emerging markets and developing countries has accelerated in recent times (Table 2). A gap of only one percentage point in 1994-2001 rose to five percentage points in 2002-09 and the medium-term outlook suggests a gap of close to four percentage points persisting up to 2017.

Table 2: Global GDP Growth (per cent per annum)

	World Real GDP	Advanced economies	Emerging & developing economies
1994-2001	3.5	3.1	4.2
2002-2009	3.6	1.4	6.4
2009	-0.6	-3.6	2.8
2010	5.3	3.2	7.5
2011	3.9	1.6	6.2
2012	3.5	1.4	5.7
2013	4.1	2.0	6.0
2010-2013	4.2	2.1	6.4
2014-2017	4.5	2.6	6.3

Source: IMF World Economic Outlook, April 2012

With these growth rates, the coming decade will be the first in 200 years that emerging market countries will contribute more to world growth than the developed nations (Bisson et al, 2010). Although the advanced economies still account for the majority of UK exports, there has been a marked decline in their share in the face of more rapid growth in UK exports to emerging economies.

The sheer size of these markets (by 2030 China and India will have a billion middle class consumers) will create new business opportunities. China and India's share of world car ownership, for example, is expected to increase from less than five per cent in 2005 to 33 per cent in 2050, more than all of the advanced economies combined (Chamon et al, 2008). Spending on other consumer durables and on services such as recreation, health care, education and transport and communications may also be expected to grow as a share of household budgets in developing countries as their incomes rise.

The growing integration of emerging markets in the world economy is also changing production structures. Global value chains have developed as firms off-shore significant parts of their production activity to emerging markets, making the global economy more interconnected. The

result has been the creation of a “global grid”⁷ made up of complex flows of capital, goods, services, information and people, challenging traditional notions of competitiveness, spawning new business models and accelerating the pace of innovation.

The **impact of the economic and financial crisis** has, if anything, been to intensify shifts in the balance of economic power and the growing importance of emerging markets. As Table 2 shows, growth in emerging and developing economies faltered in 2009 but quickly regained pre-crisis levels, whereas developed economies have continued to struggle with low growth. The crisis may have temporarily interrupted the trend towards greater connectedness, but trade flows quickly bounced back and the signs are that global integration is now on an upward trend again. The further disruption to global supply chains caused by the Japanese earthquake in March 2011 and floods in Thailand later the same year has however prompted some rethinking about global value chains and in some cases a decision to diversify sources or shorten supply chains to reduce risk and volatility.

What are the **implications** of the growing importance of emerging markets for the future economic landscape in the UK? Although the growing competition from China and other emerging markets poses challenges, there are also opportunities in terms of new demand for products in which the UK has comparative advantage and new opportunities for productivity improvement and value creation through the use of new business models.

Despite fears that the downside of this will be a loss of jobs in developing countries, research shows that international trade has little, if any, effect on the total level of employment. It can, however, generate important differential effects on industries and categories of jobs. In combination with technological progress, the development of global value chains may have an impact on the number of low and medium-skilled workers in manufacturing industries. China and India in particular are also increasingly competing in the upstream part of the value chain and becoming important players in the innovation landscape in their own right. It is likely that these trends will continue, posing a challenge to low and medium-skill occupations in manufacturing and other sectors producing traded goods and services. In turn, this will call for investment in new and higher-level skills and put an increased premium on knowledge work.

2. Growing importance of knowledge and other forms of intangible capital

Innovation has long been and may be expected to continue to be the major driver of rising living standards in advanced economies such as the UK. Preliminary estimates for several OECD countries show that firms now invest as much in intangible assets related to innovation (R&D, software, firm-specific skills, organisational know-how and branding) as they invest in traditional physical capital such as machinery, equipment and buildings. Over the period 2000-07, it has been estimated that investment in innovation accounted for some two thirds of the growth of labour productivity in the

⁷ Bisson et al (2010)

UK⁸. And the latest OECD research suggests that countries and businesses who invest in intangibles tend to perform more strongly (OECD, 2010).

The importance of investment in knowledge has long been recognised:

“Science, technology and industry policies should be formulated to maximise performance and well-being in “*knowledge-based economies*” – economies which are directly based on the production, distribution and use of knowledge and information. This is reflected in the trend in OECD economies towards growth in high-technology investments, high-technology industries, more highly-skilled labour and associated productivity gains.”
(OECD, 1996)

Since that was written in 1996, trends in technology have continued apace with developments in communications, consumer electronics, IT and biotech changing the way we do business, whether by creating new opportunities in advanced manufacturing and knowledge-based services or by enabling new business models - for example by supporting outsourcing, off-shoring and international marketing in a more globally connected economy. Technology is also changing the way we live and work – including through e-commerce, teleconferencing and working from home and on the move.

The **impact of the economic and financial crisis** may have obscured some of these longer term trends, as labour productivity has in many cases fallen during the recession and budgets for investment in technology and innovation have come under pressure in times of austerity. Business innovation expenditures are generally pro-cyclical and Governments have been focused on other priorities. However, many Governments have recognised the importance of a long-term commitment to innovation and many of the stimulus packages introduced in response to the crisis included measures to boost technology and innovation (OECD, 2010). In the UK, the Government has introduced a number of measures to boost science, technology and innovation, for example by protecting the Science Budget in cash terms in the 2010 Spending Review, increasing the small firms R&D tax credit and investing in Catapult Centres, a new national network of technology and innovation centres to act as a bridge between academia and business and to support the commercialisation of new technologies (BIS, 2011).

One of the clear **implications** of these trends is that technology skills will still be at a premium. Human ingenuity and entrepreneurial spirit are the essence of innovation, and the education and training system needs to foster the development of these traits and empower people to innovate. As the economy becomes more complex and the challenge in innovation-intensive activities from emerging markets grows, education and training systems, including the apprenticeship programme, must equip people with the foundations to learn and develop the broad range of skills needed for all forms of innovation.

⁸ NESTA (2009). The contribution of innovation is assessed as the direct contribution from measured investment in intangible assets, plus a residual which captures the broader benefits of investing in technological advances and improved processes, including spillover benefits (total factor productivity).

Vocational education and training must play a role by helping firms to adapt production processes and adopt new technology and to make connections across different areas of technology and science. Lifelong learning to encourage adaptability and up-skilling will be important. Sectorally, advanced manufacturing and knowledge-intensive business services may be areas of growth where the UK has the expertise to take advantage of new technology, provided skills are constantly upgraded. These are demanding requirements but if advanced economies do not set their sights high, they leave themselves vulnerable to lower-cost or higher-quality competition from abroad.

3. Demographic and social change

The third long-term global force shaping the evolution of the economy in the years ahead is demographic and social change, notably the ageing of the population, migration flows and changes in the nature of work, in particular the rise in non-standard ways of working.

The UK is forecast to see its demographic profile shift towards an older population as a result of declining fertility rates and increasing life expectancy and the progress of the post war baby boom generation. The proportion of the population over the age of 60 will increase from 22.7 per cent in 2010 to 26.2 per cent in 2025 and the average age will rise from 40.1 to 41.6 (Table 3). The impact on the dependency ratio (number of dependants per person of working age) will be more or less offset by the rise in the women's state pension age to 65 by 2025.

Table 3: UK Population projections to 2025

	2010		2015		2020		2025	
	thousands	per cent	thousands	per cent	thousands	per cent	thousands	per cent
0-14	10,514	17.4	11,131	17.7	11,854	18.2	12,085	17.9
15-29	12,091	20.0	12,247	19.5	11,820	18.1	11,844	17.6
30-44	12,357	20.4	12,177	19.4	12,806	19.6	13,654	20.2
45-59	11,787	19.5	12,652	20.1	12,790	19.6	12,155	18.0
60-74	8,927	14.8	9,453	15.0	10,056	15.4	10,618	15.7
75 & over	4,788	7.9	5,256	8.4	5,937	9.1	7,096	10.5
All ages	60,463	100.0	62,917	100.0	65,263	100.0	67,452	100.0
Mean age	40.1		40.4		41.0		41.6	
Median age	39.7		40.0		40.0		40.5	
Dependency ratio (%)								
Children		30.0		30.3		31.1		31.0
Pension age		31.7		31.2		30.6		31.4
Total		61.8		61.5		61.7		62.4

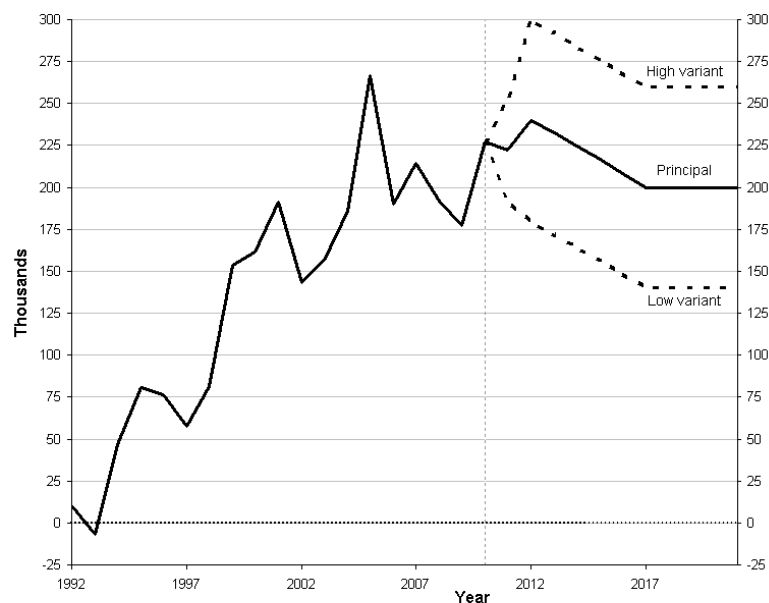
Source: ONS

The ageing population will have implications for the composition of demand but perhaps a more significant demographic issue for the skills agenda is the fact that the average age of the British workforce will increase over the next decade. The largest age band is currently workers aged 46-48; by 2020 the largest band will be 54-56. Over the next two decades, demographic factors will make it harder for employers to maintain their workforce as male post-war baby boomers reach 65 - their current retirement age - and the number of school leavers declines. There will be a drop in workforce numbers unless compensated by migration, or increased participation.

Migration is a key driver of the employment landscape, often itself determined by relative skills supply. It can be, and has been in the past, a solution to labour shortages in the UK especially for less skilled jobs. Labour is increasingly mobile, and people will travel the world to find work. Labour mobility cuts both ways: the “brain drain” of scientific and technical expertise can also be a way to attract highly skilled workers to the UK. Immigration can relieve supply bottlenecks and keep down pay rates, particularly for low-end jobs; it can also act as a relief valve in a downturn, as more recent immigrants return home. Until the early 1990s, immigration into the UK was roughly balanced by emigration. Since that time, net immigration has become the norm, although the Coalition Government has pledged to reduce it. The OBR projection of population growth is based on average inward net migration of 140,000 per annum, in line with the long-term assumption underpinning the ONS’ low migration variant population projection, but well below the peaks seen in the last decade (Chart 4).

Chart 4:

Actual and assumed total net migration, United Kingdom, 1991-92 to 2020-21



Source: Office for National Statistics

In addition to these demographic changes, the coming of the knowledge society and greater flexibility in labour markets are changing **the way people work**, with potential benefits to both the organisation and to individuals. Offshoring and outsourcing initiatives can cut costs for business but also lead to more substantive, knowledge-intensive and satisfying work for those who remain in

employment. As markets become global and competition increases, organisations need to respond flexibly and quickly to changing circumstance and there is a premium on skills that facilitate this. The nature of work in knowledge-based businesses is changing from divided, specialised and monitored to integrated, multifunctional and self-coordinated. There is also some evidence of a loosening of the bonds between individuals and the firm and a shift from 'organisational' to 'boundaryless' career structures (Huws, 2006).

Another trend in the UK labour market, long recognised as one of the most flexible in the world, is an increase in the numbers engaged in non-standard forms of employment, such as part-time or temporary working. This trend has accelerated in recent years. How much this reflects short-term fluctuations in the economy as against sustained structural change is a matter for debate. While the flexibility offered is helpful to competitiveness, it may erode incentives for employees to train or to engage with innovation in the workplace

These social and demographic trends are well established and the **impact of the crisis** may be limited. The net impact of the downturn on labour market participation could be negative in the short run, as some workers take early retirement or are discouraged from entering or re-entering the labour market. But in the longer term, the pressure on private pensions, the raising of the state pension age and the general increase in uncertainty about career prospects may encourage older workers to stay in employment longer. The reduced demand for labour in the downturn has slowed the flow of net migration as economic migrants return home. With new restrictions being introduced, previous trends are unlikely to be resumed, even in the medium term, and this is implicit in the OBR forecast. The dislocation of employment during the downturn has also probably hastened some changes in the nature of work.

These demographic and social changes will have important **implications** for skills training and apprenticeships. The ageing of the population will affect the type of product that consumers will demand, with a likely increase in the demand for leisure goods and services, health care and health products, travel and household services. This effect may also be linked to new healthcare technologies aimed at keeping older people in their home.

Although the post-war baby boomers are coming up to retirement, with pressures on household incomes and pensions, there are a number of reasons why some people may work longer. They will need the training to help them do so and employers may need to provide adult training to help them engage/reengage older workers. Government will need to encourage and support older workers to up-skill or retrain all through their working life, with implications for career progression. This challenge emphasises the importance of the life-long learning agenda and individual ambition.

There will be fewer school leavers in the decade ahead and a higher proportion of these may go on to university. There will be a loss of key skills in some technologies that boomed when the retiring generation entered the workforce.⁹ For some high-skill jobs, in specific areas, it will be

⁹ An example given in UKCES (2010) is nuclear engineering.

crucial to remain open to attracting international talent. With migration slowing, it may not however be possible to rely on migrants to fill low-skill jobs. The likely increasing need for skills in care sectors, leisure and health services may change the balance of need for apprenticeships across sectors.

Changes in the nature of work will bring a need for flexibility and non-cognitive skills. There will be increased importance attached to social and relational forms of knowledge and a shift from technical to social collaboration structures. Although technical skills will still be prized, the relative importance of soft and generic skills will increase. With less emphasis on organisational jobs, and more on “boundaryless” portfolio careers, there will be an impact on career progression. These developments will change the incentives faced by individuals and employers, for both the amount and the type of training. Individuals will value generic skills more highly, whereas employers may be reluctant to provide training in skills that make their employees even more mobile (Smits, 2007). Apprenticeship policy will need to address this dilemma.

The advent of a new cohort of workers with very different attitudes to new technology, and in particular new forms of communication technologies and social media, may also create a demand for training which involves more peer orientation and new methods of communication and learning, both inside and outside the workplace. This will affect the way training, including apprenticeships, is delivered.

4. Growing inequality

A fourth trend shaping the future of the employment and skills landscape, and conditioning the policy response, is the growth in inequality. The UK, in common with many other advanced economies, has seen the relative gap between wages of skilled and unskilled workers increase over time, with particularly sharp increases in the share of top income earners over the last twenty years. New research published by the Institute of Fiscal Studies (Brewer et al, 2012) anticipates a continuation of this trend in the current decade. In particular, their analysis suggests that changes in the mix of job types are likely to widen inequalities in household incomes further and, consequently, cause measures of relative poverty to rise.

The twin impact of globalisation and skill-biased technological change, coupled with an increasingly global market for top talent, can impact on the returns to different levels and types of skills. The consensus view amongst economists is that skill-biased technological change, rather than trade or globalisation, is the main cause of the increasing differential (ILO and WTO, 2007).

Some commentators have also claimed that there is a “hollowing-out” of the labour market with the proportion of medium-skill jobs in the economy in decline, and being particularly vulnerable to technology or overseas competition (e.g. Goos and Manning, 2003). The evidence for this job polarisation hypothesis is mixed (BIS, 2010a). But there is agreement that manufacturing jobs have been particularly at risk in this process, with implications for the mix of skills needed and the regional balance of the economy.

The **impact of the crisis** has been to highlight and exacerbate these problems of growing inequality. Some commentators, particularly in the US, see growing inequality as a contributory factor in the catalogue of failings that led up to the crisis. A former IMF Chief Economist, Raghuram Rajan (2010) argues that huge concentration at the top of the income distribution in the US led to unsustainable choices and policies aimed at encouraging high levels of borrowing by lower and middle-income groups, through subsidies and loan guarantees in the housing sector and loose monetary policy. The crisis broke when this unsustainable process ground to a halt in 2008.

While the crisis has had uneven effects on different income groups and job types, there does not seem to be a clear impact on overall income inequality in the UK. According to an IFS study (Jin et al, 2011), income inequality in the UK remained steady over the course of the recession, though some increase is predicted in the decade ahead.

One of the **implications** of these trends is to put further pressure on Governments already wrestling with the challenge of trying to revive economic growth while dealing with the urgent need for fiscal consolidation. One of McKinsey's Five Global Forces, labelled "The Market State", acknowledges this:

"The often contradictory demands of driving economic growth and providing the necessary safety nets to maintain social stability have put governments under extraordinary pressure" (Bisson et al, 2010)

The search for wider measures of welfare, "beyond GDP", and the Coalition Government's "Big Society" initiative are part of the response to this dilemma and it is worth thinking about how apprenticeship policy can be framed in the light of wider societal goals.

Notwithstanding the pressure on public expenditure, the growth in inequality may create a need for more apprenticeship training to meet increased demand for community services, healthcare and other care services, as well as apprenticeship training in basic occupational skills for those displaced from low or medium-skilled jobs. Choices may have to be made between apprenticeship training aimed at skills upgrading to meet the challenge of new technology and overseas competition, and apprenticeship training designed as a tool for reducing inequality and promoting social mobility.

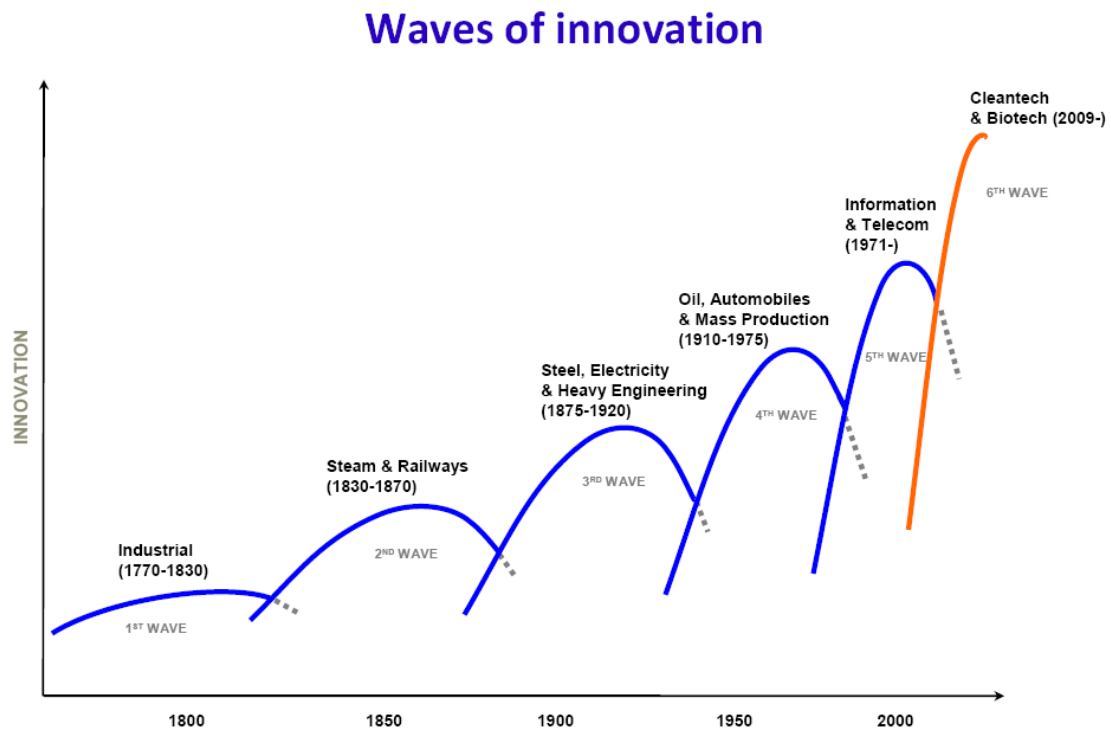
5. Global challenges

The fifth trend to consider is the need to address global societal challenges, in particular those arising from pressure on resources, but also disease control and poverty eradication. McKinsey foresee tensions rising over the next decade as a result of the rising demand for resources, constrained supplies and changing social attitudes toward environmental protection (Bisson et al, 2010).

Chief amongst these resource concerns is the need to combat climate change. Mitigation of global warming by addressing carbon dioxide emissions will require design, installation and maintenance of new forms of low-carbon energy generation and the adoption of low-carbon working practices and

improved energy efficiency throughout the economy. The needed investment in plant, equipment and innovation will create new opportunities and new demands for skills. Stern (2011) considers the possibility that this may unleash a new wave of innovation comparable to previous major waves associated with new general purpose technologies (Chart 5). The OECD has also suggested that there may be an opportunity for new sources of growth and jobs, by tapping into the innovation, investment and entrepreneurship driving the shift towards a greener economy (OECD, 2011).

Chart 5:



As world consumption of raw material continues to rise, there is a risk that resource shortages (or price rises or volatility) will emerge for commodities such as oil, food, water, phosphate and rare-earth metals. Food security is already an issue for some countries and food shortages will almost certainly recur in the next decade. As oil supplies are depleted, interruption to oil supplies and volatility in fuel prices are likely to continue. In a world of rising demand from emerging nations and finite resources, there will be a growing need to conserve and reuse resources

Other societal challenges require global action but may be more local in nature – for example many of the most devastating infectious diseases are essentially local but global action is needed to deal with them and the benefits of reducing the risk of disease spreading will be global. Further action will also be needed to address global poverty if the ambitious Millennium Development Goals are to be achieved¹⁰.

¹⁰ <http://www.un.org/millenniumgoals/>

One of the **impacts of the crisis** is a risk that policymakers may be deflected from the need to address these long-term global challenges. Some trimming of ambition is perhaps inevitable in the short run. To the extent that the crisis has permanently reduced output, some slowing in the rate of progress in addressing resource pressures may be acceptable. But policymakers must not be deflected in the longer run from addressing global societal challenges, and the process of doing so may even create opportunities for new sources of growth. The market for low-carbon goods and environmental services grew more slowly in 2009/10 than in previous years but this market is expected to resume rapid growth in the medium term.

As regards the **implications** of these trends, it can be expected that the next decade will see an increased focus on resource productivity, the emergence of substantial clean-tech industries, and regulatory initiatives, including carbon pricing, designed to promote low-carbon technology. Already there has been a pick-up in patents for low-carbon innovation and nearly every country with an industrial policy or strategy is targeting low-carbon and clean-tech as one of the sources of growth in the economy.

The UK already employs 914,000 in the low-carbon and environmental goods and services sector and the sector is expected to grow by approximately 45 per cent between 2007-08 and 2014-2015. (BIS, 2011a). Renewable energy is expected to grow fastest within this, creating opportunities in construction and advanced manufacturing, but rapid growth is also expected in some service sectors, including carbon finance, energy management and energy monitoring. The UK is well placed to benefit from these trends, but will need to maintain and build its skills base, particularly in view of the pace of technological change and the global interest in the opportunities for growth and employment in this sector. The apprenticeship programme, and other forms of training, will need to be flexible enough to respond to these skills demands and others that may emerge.

Overview of implications for sectoral change

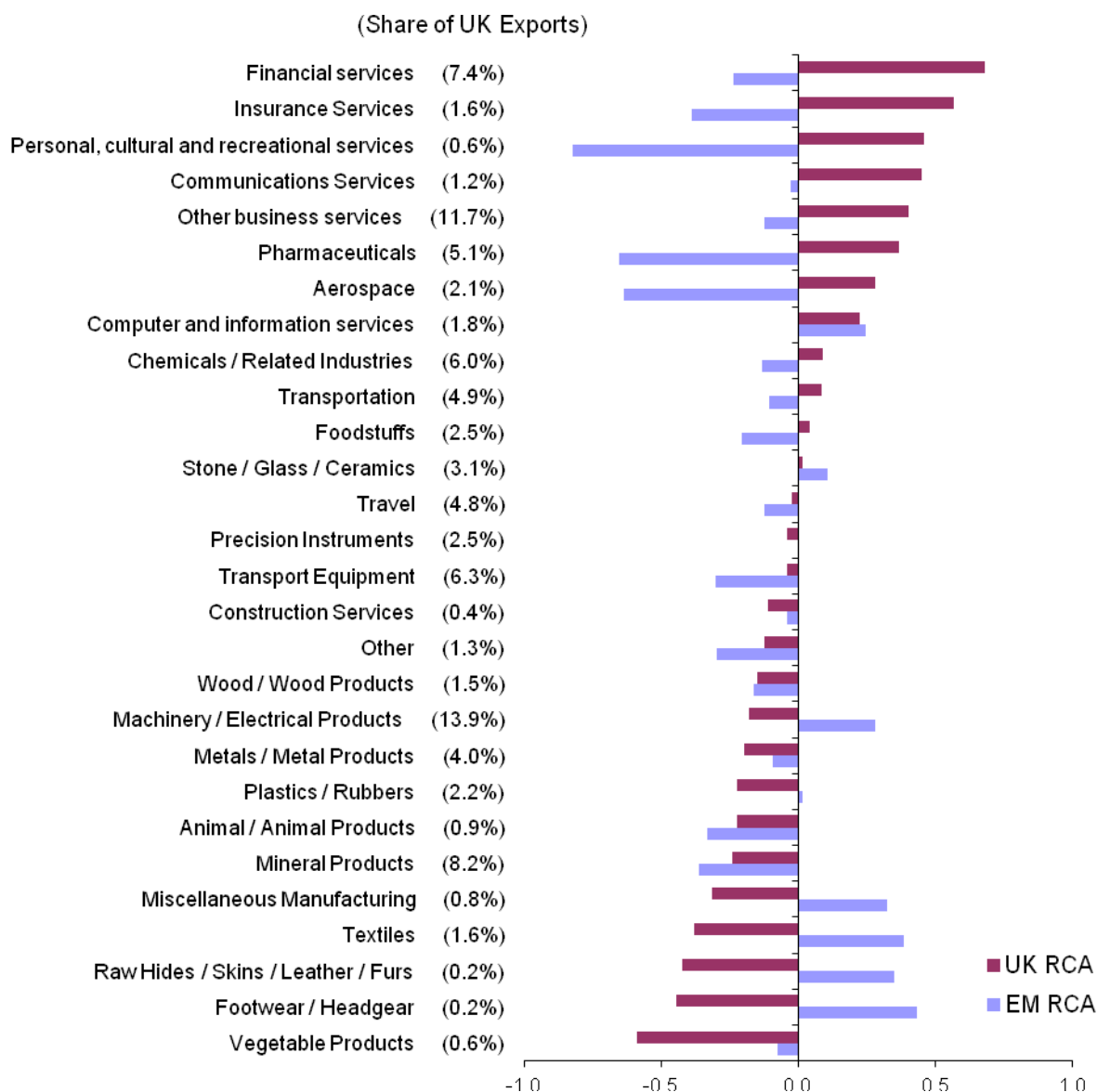
Having reviewed the drivers of change and some of their implications, what can be said about the implications for sectoral change, and therefore the likely composition of skills demand and the need for apprenticeships in the coming decades? To emphasise, this is not about the old-fashioned approach to picking winners. Too often in the past, Governments have attempted to use industrial policy to protect favoured but failing sectors or to foster national champions in areas that offered no prospect of securing competitive advantage. The impact of the crisis has been to revive interest in industrial policy and industrial strategy and to recognise that the setting out of a strategy or long-term vision may be important in itself as a means of aligning private sector efforts and Governmental priorities. Vince Cable has said that “the ‘winners’ in this sense are the skills we judge we will need for the future, and the sectors they support.”

In assessing future skills needs, policymakers need to take account of UK comparative advantage and global demand prospects and the forces shaping the global economy. The recently established UK Growth Commission has commented:

“A growth strategy requires complementary policies relentlessly focused on sectors where the UK has comparative advantage and where there is likely to be strong growth in global demand.” (Corry et al, 2011)

The Government has attempted to do this in the Plan for Growth (HM Treasury and BIS, 2011) and the underpinning economic analysis (BIS, 2010). Skills policy and apprenticeship policy can and should play a role in supporting the Growth Review process.

Chart 6: UK and Emerging Markets Revealed Comparative Advantage 2010



Source: BIS calculations based on ITC data, based on BIS (2010).

In the preceding sections, we have documented the global forces shaping the prospects for global supply and demand and therefore where the opportunities are likely to arise for growth in output and employment. We now need to put alongside this an assessment of where the UK's competitive strength lies. One of the ways of doing this is to consider where comparative advantage lies, as revealed by current trade data¹¹. Chart 6 shows that, when compared against a group of emerging economies in Asia (China, Hong Kong, India, Indonesia, Malaysia, the Philippines, Singapore and Thailand), the UK is relatively specialised in knowledge-intensive sectors such as Finance and Insurance, Business Services and Pharmaceuticals, but is relatively weaker in the higher volume, lower technology sectors such as Textiles, Metal Products and Machinery. This suggests that in principle, the UK should be well placed to weather competition from emerging economies as they are essentially competing in different sectors in global markets. However this picture, based on trade data for 2010, is only a snapshot in time and may change as emerging economies evolve.¹²

The UKCES has also used horizon scanning techniques to identify new or resurgent industries in the UK (Table 4). This exercise suggested the same emphasis on knowledge, skills and technology-intensive sectors. Services are probably under-represented on the list, not only high value business and finance-related services and the creative industries but also household, care and leisure services where growing demand and the need for face-to-face contact are likely to mean a continuing need for skills. The Commission report also recognises that new industries do not just need technological skills but need a range of other supporting skills, including multi-disciplinary skills. The skills needed change as technology moves from research to marketing and production, then to in-service use and maintenance. Increasingly even in the manufacturing sector, an increasing proportion of the value added will come from service functions, or "manu-services", re-emphasising the need for apprenticeship training not just to cover technical skills, but also design, commercial and communication skills (Levy et al, 2011).

¹¹ Revealed Comparative Advantage is often measured by a Balassa-Samuelson RCA index, which takes values from zero to infinity, with values above one indicating a relatively strong export sector, ie one with an above average share of UK exports. However the figures in the chart show RCAs in symmetric form where they are normalised around zero.

¹² See BIS (2010) for a fuller analysis, using different metrics of competitive advantage.

Table 4: New or Resurgent Industries Identified in UKCES Horizon Scanning

Advanced infrastructure – smart grid and smart metering	High Value Manufacturing
Advanced manufacturing	High Value Services
Advanced Materials	Industrial biotechnology
AI	Intelligent Transport Systems
Assisted Living	Life sciences – regenerative/stratified medicine and drug development
Biomass/Bio-fuels	Low carbon technologies (aircraft)
Biosciences	Low carbon vehicles
Building retrofit low carbon	Low Impact Buildings
Carbon sequestration	Medicine and healthcare
Creative Industries	Nano-scale technologies
Cybernetics	Network Security
Desk top manufacturing	Printable electronics
Developments in health care	Quantum computing
High speed broadband	Recycling
Digitised portable communications/ entertainment	Remote sensing
Electronics, Photonics and Electrical Systems	Resource efficiency
Emerging Technologies	Robots for household/care services
Energy from waste	Secure systems
Energy Generation and Supply	Socio-technical sensor based applications
Energy recovery systems – eg CHP	Solar PV
Environmental remediation (Using new techniques)	Solar thermal
Enzymes	Synthetic biology
Flexible, as opposed to advanced, manufacturing	Ultra low carbon vehicles
Food safety/tracing/authenticity using DNA etc	Wave and tidal energy
Genetics	Wind power
Geo-engineering driven by climate change issues	

Source: UKCES (2010)

Uncertainty

In the preceding analysis, we have attempted to assess the implications of the global trends shaping the future of our economy and the implications for skills demand and apprenticeships. Any exercise in futures thinking is however fraught with uncertainty, and should be approached with a degree of caution and humility. While this paper has had the aim of provoking thinking about future trends and considered the implications of specific developments, it is nonetheless important to be prepared for a range of different outcomes:

"No one is less ready for tomorrow than the person who holds the most rigid beliefs about what tomorrow will contain." *The Visionary's Handbook*, Wacker et al (1999).

“We live in an increasingly uncertain time, and there are a number of factors that have the potential to cause disruptive change to the future UK economy. Beyond 2020 there could also be a number of truly transformational changes. It is vital that the UK skills system is able to quickly respond to changing future demands. This includes meeting the training needs of the existing workforce, up-skilling and multi-skilling, and ensuring that older workers can access new skills.” UKCES (2010).

The financial and economic crisis of 2008-09 has highlighted just how quickly the economic outlook can change and the need to be prepared for a range of outcomes. Indeed its impact lives on, as the danger of further disruption in financial markets in the euro area or in other parts of the world is one of the biggest downside risks to the short to medium-term outlook. Other macroeconomic risks include heightened geo-political uncertainty, which could trigger a sharp increase in the price of oil, or a period of disinflationary pressure, especially in parts of the euro area. At the sectoral level, the evolution of the sectoral balance of the economy is also subject to uncertainties over the pace of technological change and the strength of overseas competition.

Decisions on apprenticeship policy and skills training cannot be made in a vacuum and have to anticipate future skills needs. Therefore it is helpful to have a sense of likely future developments. At the same time, it will be important to test policy proposals against a range of scenarios, to plan and design policy to promote adaptability and flexibility and to ensure that individuals have the skills and flexibility themselves to adapt to unexpected changes in circumstances.

Summary and Conclusions

This review of the current macroeconomic context and the longer term trends suggests that, while the 2008-09 economic and financial crisis has had some profound effects, it has not fundamentally changed the underlying forces shaping the evolution of the knowledge economy. The Review of Apprenticeships Standards will have to take account of the problems created by slow growth and continuing macroeconomic uncertainty, but it should also plan ahead for a future where the needs of the knowledge economy are once again at the forefront of the skills agenda.

Looking first at the broad macroeconomic context, as we emerge from the recession, there is a potential need to re-train those whose skills have become out-dated or atrophied during long periods of unemployment or inactivity. There is also a particular concern over youth unemployment and other young adults not in education, employment or training (NEETs) who will need to be brought into the workforce as the economy recovers. Both for those seeking to re-skill and those seeking a pathway into work for the first time, apprenticeships and other forms of vocational education have a potential role to play. By overcoming the ‘scarring’ effects of the downturn, apprenticeships can help improve both economic and social outcomes.

We can also expect to see some rebalancing of the economy as the recovery takes hold. In the decade leading up to the economic and financial crisis, the sectors which had contributed most to job growth included: business services, health and social work, education, real estate, computers,

and personal, community and social services¹³. Many manufacturing sectors, the retail sector, primary industries and transport and distribution saw a reduction in their employment share over the same period. Looking forward, the number of jobs in the public sector and the financial sector is expected to fall, with growth in employment (and therefore the demand for skills) in construction, engineering, design, and business and personal services. The share of jobs in manufacturing, given the faster pace of trend productivity growth in that sector, may continue to fall, though possibly at a slower pace.¹⁴

Turning to the five global forces shaping the economy, the **growth of emerging economies** will create demand for new products and services in areas where the UK has comparative advantage. The analysis in Chart 6 suggests that advanced manufacturing and knowledge-intensive business services may be areas of growth. The UK has the expertise to take advantage of new technology in these areas and apprenticeships have a role to play in maintaining the flow of skills.

The **growing importance of knowledge** will raise the demand for human ingenuity and entrepreneurship, and there is a need for apprenticeships and other vocational learning to help develop these skills. Some of this is about acquiring up-to-date specialised skills in a field of knowledge or practice. But a dilemma for education and training policy is that routine cognitive skills that consist simply of reproducing subject matter are the easiest skills to digitise, automate, and outsource. The OECD Skills Strategy (OECD, 2012) therefore emphasises that if education and training, including apprenticeships, are to serve the needs of the 21st century, then:

- **knowledge** needs to be more relevant, and a better balance struck between the conceptual and practical, suggesting a particular role for on-the-job training such as apprenticeships;
- **higher order skills**, such as the “Four C’s” of creativity, critical thinking, communication and collaboration, are essential for absorbing knowledge;
- **character traits**, both performance-related (adaptability, persistence, resilience) and moral (integrity, justice, empathy and ethics) need to be shaped both at school in the workplace to help individuals to be active and responsible citizens;
- **meta-layer skills**, such as learning to learn, building expertise, fostering creativity and making connections across disciplines, are becoming more important in a world of growing complexity.

The development of these characteristics will also help in absorbing the impact of **social and demographic change**, including changes in the nature of work, changes in working patterns and shifts towards part-time and temporary working, and the need for greater flexibility and adaptability. The ageing of the population will also change the composition of demand for products and services (towards the likes of leisure goods and services as well as healthcare) and is likely to increase the need for up-skilling and re-skilling of older workers. This is in line with the recent trend of apprenticeship programmes having grown most rapidly at ages 25+ but – as we have seen – there is also likely to be a need for apprenticeship training as a route for getting 18-24 year-old NEETs back

¹³ BIS (2010b), Figure 2, p. 9

¹⁴ These trends are in line with scenario analysis of sectoral rebalancing in UKCES (2011), Figure 6.9, p.102.

into sustainable employment. Apprenticeship policy may therefore have to respond to growing need at both ends of the age distribution.

Related to this, apprenticeships and vocational training can also play a role in addressing the challenge of **growing inequality**. By providing an alternative to higher education and a 'second chance' for those who have not achieved at school, apprenticeships can help act as a means of improving social mobility. In helping individuals develop relevant skills appropriate to their ability, they can also help address the problems of regional imbalance.

Finally, the response to **global challenges**, such as the move towards a greener, low-carbon economy, will also shape what employers need from the apprenticeship system, with a likely increase in demand for skills in the low carbon and environmental goods and services sector, both in manufacturing and construction and in the environmental services such as energy monitoring and management.

Although consideration of the macroeconomic context and long-term drivers can give some clues to the future skills landscape, it is inherently difficult to predict future demands for skills. Scenario analysis can shed further light, but it is important that the apprenticeship programme (and indeed any learning) remains flexible and able to respond rapidly to changing demands. It is not a case of 'picking winners', but understanding the skills which will be important to supporting economic growth and building resilience. The Government's role in shaping the demand for skills is especially important if, as some believe, there is a danger of the UK being caught in a 'low skills equilibrium' relative to competitors such as Germany, France and the US. On this view, vocational training and apprenticeship policies can play a key role in moving production up the value added chain, closing the productivity gap and enhancing economic growth.

Of course, the contribution that apprenticeships can make should not be over-stated. The challenges posed by the short-term macroeconomic turbulence and the longer-term forces shaping the economy are substantial and call for a response across a wide range of policy areas. This is recognised in the Government's Growth Strategy and in its wider social and economic agenda. Apprenticeship policy is one aspect of this strategy, and needs to be considered alongside other education and skills policies, as well as investment in skills by individuals and by employers. Contributions to the Review of Apprenticeship Standards, and the conclusions it comes to, need to be shaped in the light of our changing economy as it emerges from the downturn and resumes a path of knowledge-based growth.

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