A UNIVERSITY ALLIANCE *report*

The way we'll work:

Labour market trends and preparing for the hourglass

UNIVERSITY ALLIANCE

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Key findings

1. Since the early 1990s sustained growth in high wage, analytical, non-routine jobs; an expansion of manual, lower wage jobs; and a contraction of routine, middle wage jobs has led to a 'hollowing out' of the labour market in developed economies. **This creates an hourglass-shaped labour market.**
2. The strongest observed employment growth has been in the three occupation groups with the highest density of graduates, together accounting for three quarters of growth between 2000 and 2010.
3. Advances in technology are driving the hourglass effect and transforming work – what we do and how we do it.
    - Employment growth has been linked to the complementary effect of technology on occupations involving analytical, problem solving and complex communication activities: typically graduate attributes.
    - The observed reduction in the employment share of middle wage jobs is linked to the substitution of technology for routine tasks, highly concentrated in occupations in the middle of the earnings distribution.
4. Other factors also work together to increase the hourglass shape of the labour market, including globalisation, offshoring, shifts in consumer demand and changing national demographics.
5. **A rich and growing supply of graduates is needed to support an hourglass-shaped economy.** The proportion of our working population at graduate-level will influence the nation's productivity, pattern of economic growth and ability to meet the needs of business, individuals and the wider society.
6. According to the four labour market signals that we considered, the UK is not presenting evidence of having too many graduates. Graduate vacancies continue to grow, jobs in 'graduate dense' occupations are an increasing proportion of the total workforce and there is still a significant graduate premium.
7. In an hourglass-shaped economy effective progression routes through to high level qualifications and professional development are essential in order to tackle rising inequality and to ensure that people do not get trapped at the bottom of the employment market.
8. Our global competitors are continuing to invest heavily in expanding higher education despite their own budget deficits. In contrast, England has had to reduce the number of places available at university to control expenditure. To equip the population to find continuing opportunities in the hourglass labour market and to meet the growing need for graduate attributes, **we must continue to seek ways to increase investment (public and private) in universities.**

Executive summary

9. It is popularly believed that 'there are too many graduates' in the UK[1]. Whilst this view is not one shared by our international competitors, it has stubborn resilience in this country. This report presents the evidence surrounding this issue. An evidence-based approach is essential because getting this right has huge implications for the direction government policy should take as well as for individuals and the wider economy.

10. Seeking to increase the proportion of the UK workforce educated to degree level or above would be a waste of public (and, increasingly, private) funds if there really are 'too many graduates'. Equally, strategies to increase other forms of education or training to encourage moves straight into the workforce at the expense of higher education could be a disservice to individuals and the economy if the occupations that are growing and thriving would benefit from, and provide meaningful work for, many more graduates than we currently have.

11. In this report we draw on the large body of evidence demonstrating the hourglass shape of labour markets in developed economies and the factors driving the observed changes. We look at the implications of these developments on society and the economy and make recommendations of how higher education policy could respond to meet the challenges, and capitalise on the opportunities, an hourglass-shaped economy presents.

i. The nature of work has changed and so have our skills needs:

- The hourglass is the result of sustained growth in high wage, abstract, non-routine jobs; an expansion of manual, lower wage jobs; and a contraction of routine, middle wage jobs that has led to a 'hollowing out' of the labour market.
- Technology has transformed work – what we do and how we do it. The observed reduction in the employment share of middle wage jobs is linked to the replacement effect technology has on workers performing on routine tasks, highly concentrated in occupations in the middle of the earnings distribution.The labour market in the UK is becoming increasingly polarised. Nearly half of all jobs in the UK fall into the top three occupation categories highlighting the importance of analytical, strategic and complex communication capabilities to the UK economy.

1 A significant number of economic evidence reports refer to the UK. In terms of higher education (HE) policy, we are referring to the English HE system but it is recognised that there is similar pressure on places in Scotland, Wales and Northern Ireland.

ii. A rich supply of graduates is increasingly critical in an hourglass-shaped economy:

- Despite already making up nearly half of all jobs in the UK, managerial, professional, associate professional and technical occupations accounted for three quarters of employment growth between 2000 and 2010.
- More than half of the 20 job types that grew fastest between 2001 and 2009 were in occupations where the majority have post-A-level qualifications. At the other end of the spectrum more than half of the jobs that declined the fastest during this period were in occupations where the majority of people are qualified to level 2 (GCSE A*-C and equivalent) or below.
- Technological change has not only affected the employment share of occupations but has had an effect on the task content within occupations. This has had an impact on the concept of a graduate job.
- The economic crisis has accelerated existing trends. Employment in professional occupations continued to grow whilst the largest job losses were in routine manual and non-manual occupations.
- Postgraduates are also in demand in an hourglass-shaped economy. Despite a huge increase in supply of postgraduates, the wage differential compared to those holding undergraduate degrees has increased from around five per cent to over ten per cent between 1996 and 2011.

iii. Rising inequality is not inevitable in an hourglass-shaped economy

- Data from the British Household Panel Survey shows that around a third of those who were in the bottom decile of earners in 2001 were still there in 2008, with around 60 per cent still in the bottom three deciles. Those with no qualifications were significantly more likely to remain at the bottom of the distribution.
- Not all levels of education and training are equally beneficial. Research looking at the employment destinations of workers displaced from routine occupations found that higher qualifications increased the probability of upward mobility; and lower qualifications decreased the probability of moving up.
- Just as popular opinion holds that we have too many graduates, there is a widely held assumption that we need more apprentices in the UK but this should also be tested against evidence provided by future labour market projections. At present, the quality of and benefits from apprenticeships vary greatly. The Government needs to consider how limited public investment can be most effectively targeted considering the reducing employment share for this group of occupations in the UK.
- In an hourglass-shaped economy effective progression routes are essential. There needs to be a focus on providing meaningful retraining and

development opportunities as well as robust in-work and in-education progression routes, including rethinking corporate strategies and models of work organisation.

iv. Responding to the hourglass: international comparisons

- Our global competitors have recognised that human capital is the primary indicator of future economic growth and they have acted on this to their advantage. In the US, President Obama has stated that "higher education is not a luxury - it's an economic imperative".
- In 2000, the UK was third amongst top industrialised nations in terms of the proportion of young people graduating. In 2008 we had fallen to fifteenth position because competitor countries have been investing at a faster rate than us. Our position is likely to fall further following tighter restrictions on student numbers – we will have 15,000 fewer higher education places in September 2012 compared to the previous year and around 25,000 fewer places in English universities[2].
- We have to consider carefully the consequences of continuing to move down this ranking in terms of our international competitiveness and our ability to meet the needs of an increasingly hourglass-shaped economy. In times of austerity it is essential that investment in education is effectively targeted to meet the future need of our economy and society.

Moving beyond the language of 'skills'

This report draws heavily on literature that describes the labour market and the population in terms of 'skill level'. The labour market is commonly described in terms of high, medium or low skill occupations; however, this language is becoming increasingly outdated in a complex and dynamic labour market. 'Skill' relates to the specific proficiency, facility, or dexterity that is acquired or developed through training or experience and bears no relation to the type of activity or occupation in question. In the case of graduates it is often more appropriate to describe a set of attributes rather than skill level. We have, where possible, used other terms, describing occupations according to typology of task or using the approximation of high, middle and low wage occupations.

2 The January 2012 Grant Letter to HEFCE confirmed that 10,000 modernisation fund student numbers will not be consolidated and an additional 5,000 student numbers have been removed to reduce the risk of over spend resulting in 15,000 fewer HE places. Of the 20,000 Core and Margin numbers top sliced from the sector (the vast majority of which have come out of HE numbers in universities) around 10,000 have been allocated to universities and 10,000 to FE Colleges. The result is a further reduction of around 10,000 university places and a total of around 25,000 fewer places in English universities in 2012-13 compared with the previous year.

Meeting the hourglass challenge in the UK: policy recommendations

12. The hourglass shape of the UK labour market is increasing the need for the attributes and capabilities that graduates bring to the workforce. Economic indicators looking at the levels of graduate saturation have not been exceeded. This adds to the weight of economic evidence for increasing the number of graduates in the UK.

    Recommendation one: it is essential that in the longer term we continue to explore how total growth of the higher education sector can be achieved despite current restrictions on Government expenditure.

    Recommendation two: public investment in intermediate-level training needs to be refocused and targeted in light of changing patterns of employment.

    Recommendation three: HEFCE should identify and monitor a set of key labour market indicators regarding the supply and demand of graduates in order to advise Government on the projected equilibrium point to ensure optimum investment levels are reached and maintained.

    Recommendation four: universities should continue proactively to seek ways of offering alternative, fully supported, entry routes into higher education as another means of increasing the total number of student places.

13. In an hourglass-shaped economy effective progression routes are essential.

    Recommendation five: there needs to be a focus on providing meaningful retraining and development opportunities as well as robust in-work and in-education progression routes – particularly for those displaced from intermediate-level, routine occupations.

14. Ensuring that progression through to postgraduate study is a viable option for all is an economic and social imperative.

    Recommendation six: Government and universities need to work together to identify ways of providing essential financial support for those postgraduate students that are not supported by an employer. In the short-term, the Government should confirm that it will continue to support the provision of Professional and Career Development Loans (PCDLs) and take action to encourage more banks to offer PCDLs to increase provision and encourage more competitive loan terms.

15. Technological change has not only affected the employment share of occupations but has had an effect on the task content within occupations.

Recommendation seven: universities should continue to consider the impact of technology on graduate destinations to ensure that university graduates are equipped with the analytical, problem solving, complex communication and other attributes they will need.

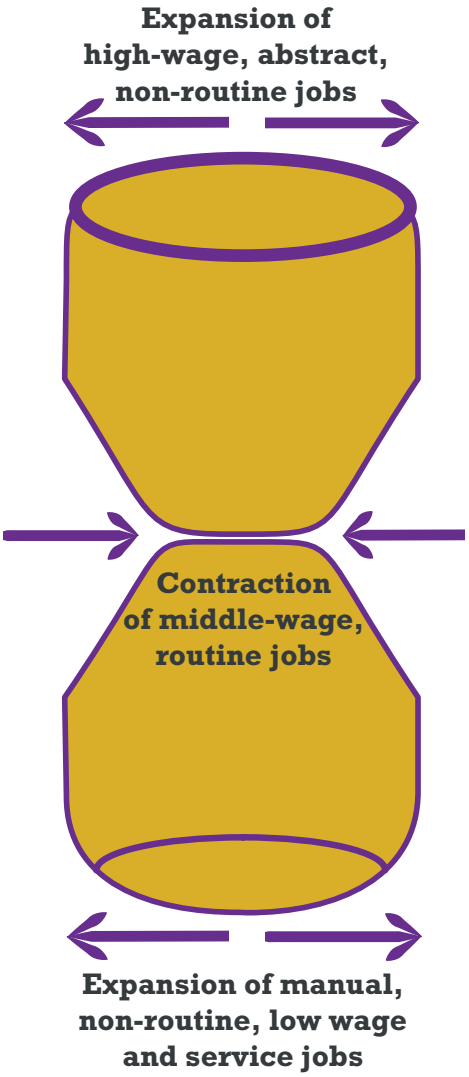
Recommendation eight: the university sector should take a lead in setting out the vision for where it needs to position itself to respond to these challenges and meet the needs of society and the economy in the future. University Alliance has launched university_vision to bring together thought leaders from across the sector, business and government to focus on solutions and outcomes, identifying how the sector can drive its own policy agenda; serve society and the economy; and seek out new and innovative ways to anticipate, approach and tackle the challenges of the future, including how to meet the demands of an increasingly hourglass-shaped economy.

Section 1. The nature of work has changed and so have labour market needs

What is the 'hourglass'?

16. In the UK, the US and across Europe there have been broadly similar shifts in the shape of the labour market. Since the early 1990s these developed countries have experienced labour market polarisation – a disproportionate increase in high-paid and low-paid employment[3]. Sustained growth in high wage, abstract, non-routine jobs; an expansion of manual, lower wage jobs; and a contraction of routine, middle wage jobs has led to a 'hollowing out' of the labour market. Essentially creating an hourglass-shaped labour market.

Figure 1: the 'hourglass'



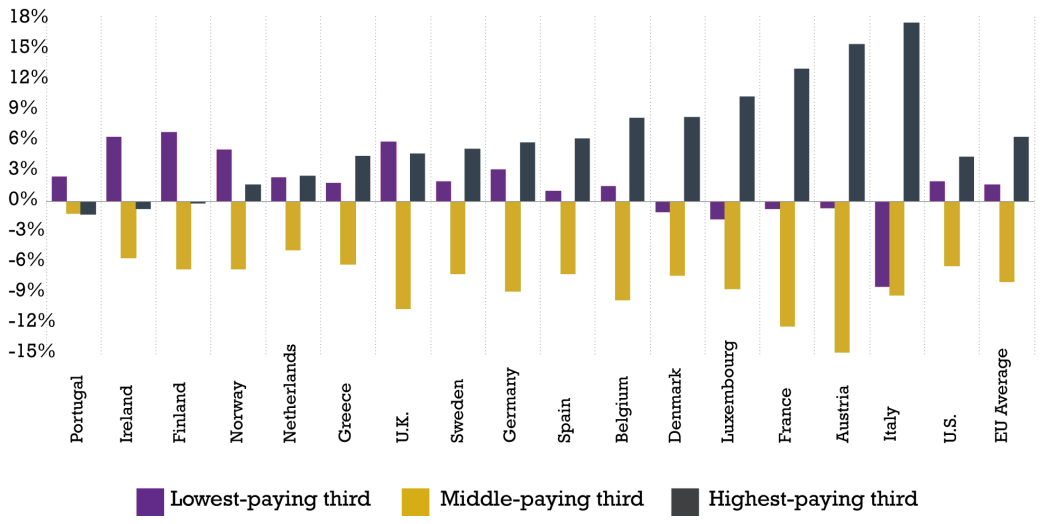
3 CEDEFOP (2011) Labour-market polarisation and elementary occupations in Europe

Technology has transformed work – what we do and how we do it

17. From the invention of the wheel, to the car and the computer, technological advances have always driven changes in how we work and the type of work we do. In the post-war decades technological changes, such as the mechanisation of manufacturing processes, prompted job displacement from lower to higher skilled jobs. The overall effect of technology was to push the labour market upwards. Jobs were removed from the lower end of the spectrum and replaced at the top[4]. This phenomenon has been described as skills-biased technological change[5].

18. By splitting the labour market into thirds – of high, middle and low income jobs – and tracking changes in employment share over time, a different picture emerges. Evidence suggests that in recent decades, there has been a fundamental change in how technological advances affect the labour market in advanced economies. Figure 2, showing changes in employment share between 1993 and 2006 across 16 European countries and the US, clearly demonstrates the dramatic reduction in middle wage employment over that period. A reduction in middle wage employment is seen across all 17 countries. The comparability of these changes across this group of developed nations indicates that there are common drivers contributing to the reduction in employment share of middle wage occupations. Additionally, as the changes are not uniform, it is evident that the observed patterns are the result of a complex set of drivers and cannot be explained by a single factor.

Figure 2: percentage change in employment share (1993-2006)[6]



4 Plunkett J, Resolution Foundation (2011) Growth without gain?
5 Katz, Lawrence and Autor (1999) Changes in the wage structure and earnings inequality
6 Autor D (2010) Job Polarisation of job opportunities in the US labour market

Technology has made some jobs obsolete

19. Technological improvements can lead to new products, services and markets, raise national income, improve productivity and increase demand for labour. It is important to recognise that the observed increases in productivity and total employment levels are not the result of equal increases across occupations. "Technology made businesses more efficient, but also made some jobs obsolete"[7] was how President Obama succinctly described this effect in his 2012 State of the Union address.

20. 'Task-biased technological change' was first put forward by researchers looking into the cause of increased demand for graduates in the US workforce that followed the rapid adoption of computer-based technologies. Rather than defining jobs by 'skill level', this model helpfully distinguishes occupations according to a typology of task: routine, non-routine, manual, analytic, cognitive and interactive. A task is a unit of work activity that produces output (goods and services) whereas a skill describes the capabilities the worker has for performing various tasks[8].

21. Technology is likely to have a substitutionary effect on workers in occupations made up of cognitive and manual activities that can be accomplished by following a set of explicit rules, termed 'routine tasks'. By contrast, technology will have a complementary effect on occupations involving analytical, problem solving and complex communication activities, termed 'non-routine tasks'[9].

22. Unlike the industrial and technological revolutions of the 18th and 19th centuries that saw factory workers and other low wage labourers substituted by machines, most of the routine, 'automatable' jobs are now clustered around the middle of the earnings-distribution, in administrative office based work and in skilled manufacturing[10]. The observed reduction in the employment share of middle wage jobs (as seen in figure 2) is linked to the substitutionary effect of technology on routine tasks, highly concentrated in occupations in the middle of the earnings distribution[11].

23. Many jobs at the low end of the wage spectrum are difficult to automate as they need someone physically present. At the other end of the spectrum, jobs made up of non-routine, analytical tasks, including managerial and professional occupations, are largely performed by highly educated, highly paid workers. These occupations have not only proved relatively immune to

7 Obama B (2012) State of the Union Address
8 Acemoglu and Autor (2010) Skills, tasks and technologies: implications for employment and earnings
9 Autor et al. (2003) The skill content of recent technological change: an empirical exploration
10 Goos and Manning (2007) Lousy and lovely jobs: the rising polarization of work in Britain
11 TBTC has been tested in a number of studies internationally and task bias has been found to explain changes in national labour markets: François Rycx (2001) Task-biased changes of employment and remuneration: the case of occupation; Adermon and Gustavsson (2011) Job polarization and task-biased technological change: Sweden, 1975-2005

automation but have instead seen a large growth in employment share across developed economies in the last three decades[12].

Other drivers have accentuated the hourglass shape

24. There are a number of other factors that are contributing to the increasingly polarised labour market in the UK, many of which are enabled or driven by technological change. These include globalisation, offshoring, shifts in consumer demand and changing national demographics.

Globalisation and off shoring contribute to reduction in share of routine jobs in the UK

25. Communities and nations are increasingly interconnected and dependent on one another. Increased globalisation has resulted in increased trade, more complex supply chains and has made a greater variety of business models possible. This affects the nature of competitive advantage. Britain has become less competitive in the low specification product and services markets, which are now frequently moved offshore where labour, office space and components are less expensive. Instead, Britain's competitive edge is in high value products, processes and services based around information and knowledge content[13 14]. These factors act in concert with (and are often enabled by) technological change to further hollow out the labour market. They also act to increase the demand for, and value of, workers able to design, analyse, monitor and manage complex international networks. This is reflected in the shifts observed in the structure of the labour market[15].

Changes in national demographics and lifestyles contribute to the increase in service occupations

26. Personal service and care occupations have greatly increased in employment share, with this trend expected to continue. Technological change has had seemingly little impact on the employment share of this group of occupations. In the UK these occupations constituted five per cent of total employment share in 1990; by 2020 this is expected to rise to over nine per cent. There are a number of drivers that have contributed to the robust growth in these occupations.

27. Income disparity in the UK is high and growing. The wealthiest 20 per cent of society are seven times richer than the poorest 20 per cent[16]. This wage-gap has been gradually increasing and is likely to be a contributing factor to the increase in service occupations at the lower end of the wage spectrum.

12 UKCES (2011) Working Futures 2007-2017
13 Ibid
14 Technology Strategy Board (2008) High Value Manufacturing
15 Sissons P, The Work Foundation (2011) The hourglass and the escalator
16 Wilkinson R and Pickett K (2009) The spirit level

Changing lifestyles of high income families contribute to the increase in demand for some service occupations, particularly those in personal care, driving up their employment share[17].Demographic changes will also play a large part. The UK has an ageing population. Over the last 25 years the percentage of the population aged 65 and over increased from 15 per cent in 1985 to 17 per cent in 2010; an increase of 1.7 million. By 2035, nearly a quarter of the population is projected to be aged 65 and over[18]. By 2040, one in ten will be over 75[19]. Also, as more women continue to enter the workforce and family structures continue to change, the demand for childcare and other related personal services is set to increase[20]. As a result, the increase in personal service occupations, including care of the young, the sick and the elderly, is likely to continue.

28. Demographic changes will also play a large part. The UK has an ageing population. Over the last 25 years the percentage of the population aged 65 and over increased from 15 per cent in 1985 to 17 per cent in 2010; an increase of 1.7 million. By 2035, nearly a quarter of the population is projected to be aged 65 and over. By 2040, one in ten will be over 75. Also, as more women continue to enter the workforce and family structures continue to change, the demand for childcare and other related personal services is set to increase. As a result, the increase in personal service occupations, including care of the young, the sick and the elderly, is likely to continue.

29. These occupations make up an important part of the economy and will be increasingly important in the future for the reasons discussed above. However, the large increase in employment share observed for these occupations should be understood in the context of the greater expansion and extent of employment in other areas (for example, professional occupations will make up 21 per cent of total employment in 2020).

The labour market in the UK is increasingly polarised

30. Nearly half of all jobs in the UK fall into the top three occupation categories highlighting the importance of analytical, strategic and complex communication capabilities to the UK economy[21]. Figure 3 plots the changes in employment levels for each occupation group (for SOC2010 groupings see Annexe A). The most significant increases in employment across all three decades are in the top three occupation groups. To date we have seen growth in personal service occupations and a reduction in other groups. This is continuing the trend seen in the preceding decade and a similar pattern of employment change has also

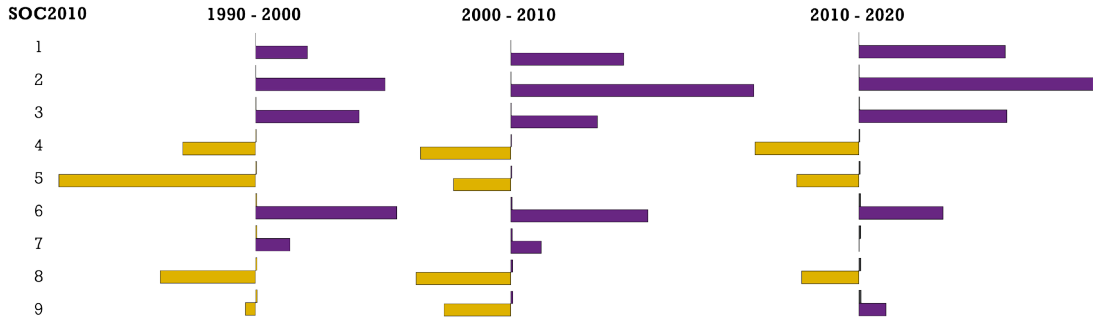
17 Kampelmann and Rycx (2011) Task-biased changes of employment and remuneration: the case of occupations
18 Office of National Statistics
19 Plunkett J, Resolution foundation (2011) Growth without gain?
20 Sissons P, The Work Foundation (2011) The hourglass and the escalator
21 According to Institute of Employment Research estimates, in 2010 46% of all jobs in England were in the top three occupation groups of managers and senior officials, professional occupations and associate professional and technical occupations.

been forecast to 2020 which together will act to accentuate the hourglass shape of the UK labour market[22].

Figure 3: changes in employment levels have accentuated the hourglass shape

Net change in employment levels (000s)

	SOC2010 Description	1990-2000	2000-2010	2010-2020
1	Managers, directors and senior officials	256	476	544
2	Professional occupations	639	1023	869
3	Associate professional and technical	511	365	550
4	Administrative and secretarial	-359	-380	-386
5	Skilled trades occupations	-969	-241	-231
6	Caring, Leisure and other service	696	577	313
7	Sales and Customer service	170	129	2
8	Process, plant and machine operatives	-470	-399	-213
9	Elementary occupations	-50	-281	101
	Total	**424**	**1269**	**1549**



31. One of the differences forecast for the decade up to 2020 is a reversal of the observed decline in elementary occupations (SOC 9) that was observed up to 2010. An increase in employment share of elementary occupations is to be expected considering jobs in this category are largely made up of manual tasks. They require interpersonal and environmental adaptability which are difficult to automate or outsource. So, for now, these occupations such as cleaners, security guards and hospital porters, need to be performed in person[23]. Occupations made up largely of routine cognitive (SOC groups 4 and 5) and routine manual (SOC group 8) tasks, for example bank clerks and secretaries, ship builders and plumbers and bus drivers and scaffolders respectively, are forecast to continue to decline. There will still be employment openings

22 UKCES (2011) Working Futures 2010-2020
23 Autor (2010) Polarization of job opportunities in the US labour market

in these occupations due to replacement demand but new job growth is not forecast in these areas[24].

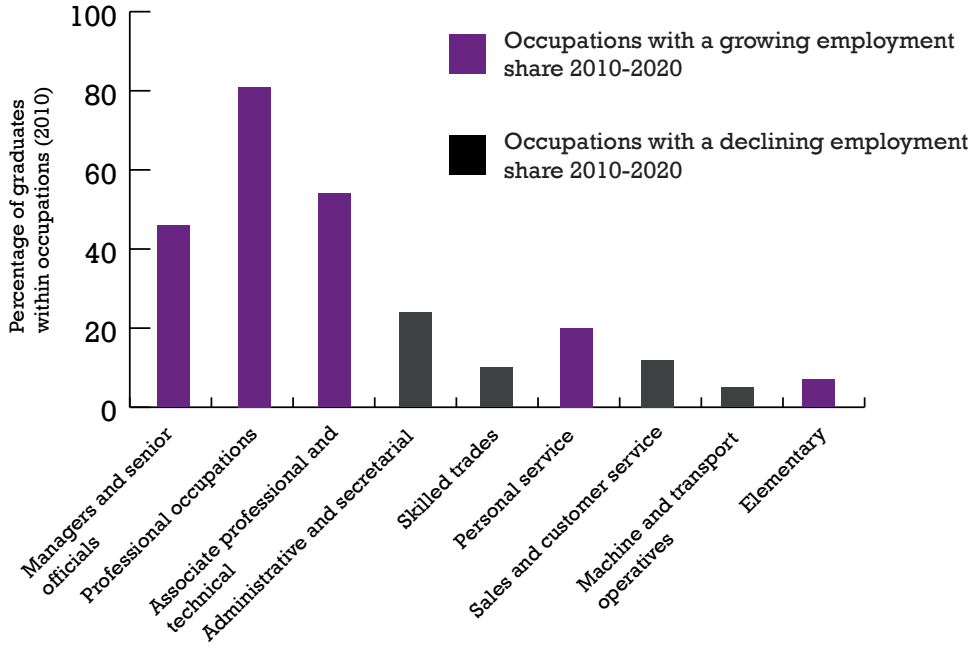
24 UKCES (2011) Working Futures 2010-2020

Section 2. A rich and growing supply of graduates is increasingly critical in an hourglass-shaped economy

Graduate jobs in the modern economy

32. Despite already making up nearly half of all jobs in the UK, managerial, professional, associate professional and technical occupations accounted for three quarters of employment growth between 2000 and 2010, with professional occupations accounting for the majority of the increase[25]. The classification of professional occupations moves far beyond the traditional understanding of the term to include, for example, engineers, architects, IT business analysts and web design professionals. The rapid employment growth in these areas is very significant considering that over 80 per cent of workers in professional occupations are educated to degree level or above (see figure 4)[26].

Figure 4: Occupations growing in employment share are those with high proportions of graduates[27]



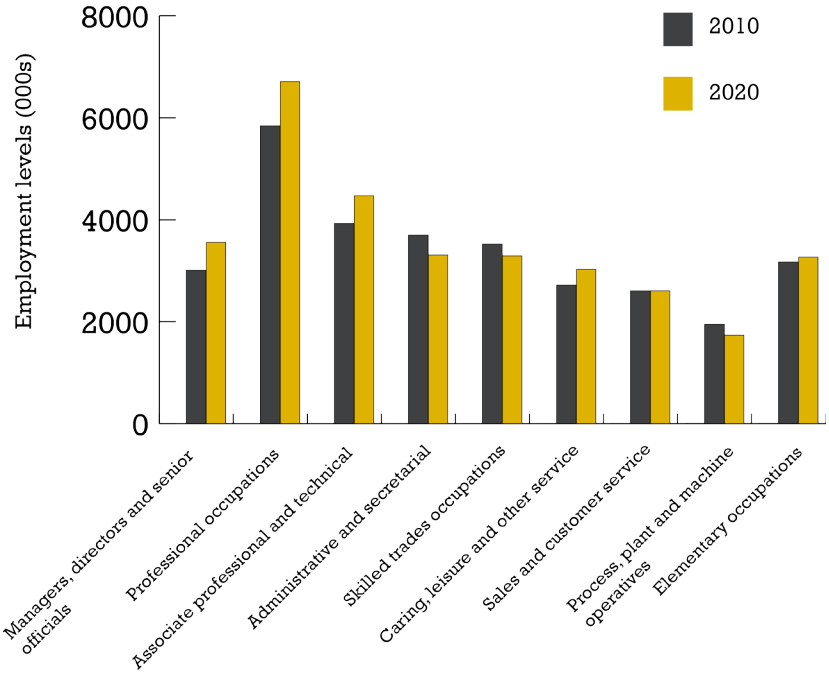
33. A graduate contributes between 20 and 48 per cent greater productivity to the labour market than employees holding lesser qualifications[28]. In a survey of high growth businesses one of the priorities highlighted was investing in a skilled and creative workforce to enable innovative, high growth businesses to

25 UKCES (2011) Working Futures 2010-2020
26 Labour Force Survey, 2010 data
27 Ibid
28 Universities Scotland (2009) What was/what next?

thrive[29]. The proportion of our working population educated to degree level will affect the nation's productivity, pattern of economic growth and ability to meet the needs of business, individuals and society.

34. More than half of the 20 jobs that grew fastest between 2001 and 2009 were in occupations where the majority have post-A-level qualifications. At the other end of the spectrum, more than half of the jobs that declined the fastest during this period were in occupations where the majority of people are qualified to level 2 (GCSE A*-C and equivalent) or below[30]. Figure 4 plots the percentage of workers in each occupational group that hold a graduate level qualification. Strongest observed growth has been in the three occupation groups with the highest density of graduates. Looking at employment level changes to 2020, growth in occupations with high levels of graduates is expected to exceed all other categories (see figure 5).

Figure 5: Growth and declines in employment levels will act to accentuate the hourglass shape of labour market[31]



There is still a shortage of graduates, not saturation

35. It is popularly believed that 'there are too many graduates' in the UK. However, looking at the evidence, we can demonstrate that the UK economy is not

29 Nesta (2011) Vital growth
30 UKCES (2010) Skills for Jobs: Today and tomorrow
31 UKCES (2011) Working Futures 2010-2020

presenting any of the labour market signals that would suggest this is the case[32]. Graduate vacancies continue to grow[33], jobs in high skill areas are an increasing proportion of the total workforce and there is still a significant graduate premium. Despite the rapid expansion in the number of graduates in recent years, the graduate employment rates have been maintained and the earnings premium for university graduates remains high.

36. Andreas Schleicher at the OECD considered the question of whether we have too many graduates in the labour market and whether we need more graduates. He concluded that the most reliable method of answering this question is to look at the labour market incentives that will act as an indicator of whether the UK has reached saturation in the supply of graduates to the labour market[34]. This report considers the four indicators that Schleicher identified but there are other measures that could be considered. We recommend that further work is undertaken in this area to identify and agree a set of labour market indicators that will allow HEFCE to monitor the supply and demand of graduates and offer reliable, independent advice to Government on this critical issue.

37. Schleicher's first indicator was labour market value: if there was an over-supply of graduates, you would see a reduction in the labour market advantage of graduates. Schleicher demonstrated that there had been no decline – indeed, quite the opposite had occurred. The labour market advantage of graduates has increased through the expansion and growth of the higher education system in the UK and across nearly all OECD countries.

> *These private and social benefits exist in all OECD countries and with the recent massification and expansion of access to higher education in many countries, including the UK, the levels of these benefits have generally been enhance*[35].

38. The net present value (NPV)[36] for graduates in the UK is not only one of the highest across OECD countries but it is still increasing in terms of the increased earnings advantage and employment advantage over non-graduates. This indicator showed no sign of an over-supply of graduates.

39. Sleicher's second indicator was the proportion of graduates in non-graduate jobs. This provided evidence for the important consideration of whether

32 Schleicher A (2010) Is the sky the limit to educational improvement?, UUK Annual Conference, September 2010, OECD and UUK, Cranfield
33 Universities Scotland (2009) What was/what next?
34 Schleicher A (2010) Is the sky the limit to educational improvement?, UUK Annual Conference, September 2010, OECD and UUK, Cranfield
35 Dill DD (2011) Higher Education as a public good: critical perspectives, assuring the public good in higher education: essential framework conditions and academic values
36 The net present value (NPV) of a graduate is calculated by comparing the costs (fee, loss of earning during study, additional tax over a lifetime and additional social contributions) to the benefits (additional earnings over a lifetime and employment advantage (lower risk of unemployment)) of going to university. The NPV of going to university in the UK is one of the highest in the OECD and is increasing.

expansion is just demand-fuelled consumption from individuals (see the "tyranny of numbers" theory[37]) or whether increasing the number of graduates is genuinely increasing economic productivity[38]. Schleicher demonstrated that "under-employment" in the UK is below the natural level of around 25 per cent of graduates[39]. With more than three-quarters of all graduates in graduate level employment, he concluded that this indicator was not yet demonstrating a saturation of graduates to the labour market.

40. Sleicher's third indicator to consider was displacement – whether graduates are doing jobs that would have previously have been classified as non-graduate and undertaken by non-graduates. Again, Schleicher found no evidence of this in the UK with graduate level job growth accommodating graduates.

41. Recent evidence from the US and the UK demonstrates that there is a shortage, not surplus, of graduate attributes and capabilities:

> *These challenges are two-fold. The first is that for some decades now, the U.S. labour market has experienced increased demand for skilled workers. During times like the 1950s and 1960s, a rising level of educational attainment kept up with this rising demand for skill. But since the late 1970s and early 1980s, the rise in U.S. education levels has not kept up with the rising demand for skilled workers, and the slowdown in educational attainment has been particularly severe for males. The result has been a sharp rise in the inequality of wages*[40].

42. Evidence also demonstrates that the majority of graduates are in jobs requiring graduate attributes, such as critical analysis, problem solving and complex communication, and that new jobs are likely to be at graduate level or higher. A longitudinal study of the early labour market experiences of recent graduates, focussing on the graduate class of '99, found that over 80 per cent of the respondents appeared to be in 'graduate-level' jobs and that an undergraduate degree had been necessary to access most of the new graduate jobs[41].

43. Finally, Sleicher considered the cost of labour as a fourth indicator. If employers are unwilling to pay high prices for graduates in comparison to non-graduates, this is a sure sign of saturation of supply. Again, Schleicher found

37 Wolf A (2002) Does education matter? Myths about education and economic growth
38 Universities Scotland (2009) What was/what next?
39 The 'natural level' of under-employment is based on the level of under-employment observed across all OECD countries. Due to personal, career and lifestyle choices, it should be expected to have a certain percentage of graduates in non-graduate roles. OECD data demonstrates that the majority of countries observed had up to or around 25% of graduates in non-graduate jobs at any time. If the percentage went significantly above 25%, this would provide a clear market signal that the market was saturated. Anything around or below 25% of graduates in non-graduate jobs does not indicate an over-supply of graduates into the economy.
40 Autor D (2010) The polarisation of job opportunities in the US labor market: implications for employment and earnings
41 Purcell K et al (2005) The class of '99: a study of the early labour market experiences of recent graduates

no evidence of this in the UK, where the price employers are prepared to pay for graduates is high.

44. These labour market indicators provide clear evidence available about whether or not there is an over-supply of graduates to the labour market. An agreed set of indicators should be identified and reviewed on a regular basis so that once the labour market value of a degree (NPV) starts declining, the "under-employment" of graduates goes much beyond 25 per cent, there is evidence of displacement and the price employers are willing to pay for graduates goes down, the Government knows to slow down the growth of higher education.

Advances in technology are changing the shape of 'graduate jobs'

45. As doctors, lawyers and research scientists were followed by software programmers, journalists and teachers in the 1960s, so the range of occupations that are covered by undergraduate degrees has continued to expand. Jobs that in the past would not have been considered graduate jobs, now have increasing proportions of graduates in their ranks. Technological change has not only affected the employment share of occupations but has also had an effect on the task content within occupations[42]. This has had an impact on the concept of a graduate job.

46. There has been much written about the observed link between adoption of computer-based technologies and the rise in demand for graduates within the workforce. Looking at data on task input from 1960 to 1998, Autor et al found that within industries, occupations and education groups, computerisation was associated with reduced labour input of routine manual and routine cognitive tasks and increased labour input of non-routine cognitive tasks. Computer technology has been found to complement workers performing non-routine tasks that require flexibility, creativity, analytical and problem solving capabilities and complex communications[43]. The productivity of workers in jobs requiring these capabilities has increased as time previously spent on routine tasks can be directed towards other tasks. This has contributed to a shift in the capability profile required within many occupations and increased the demand for graduates.

42 Kampelmann and Rycx (2011) Task-biased changes of employment and remuneration: the case of occupations
43 Autor et al (2003) The skill content of recent technological change: an empirical exploration

47. Recent research reclassifies graduate jobs in the context of the current market. It divides them into four categories (see figure 6)[44].

Figure 6: Reclassified graduate jobs

Traditional graduate jobs	Established professions for which the route has historically been via a degree (e.g. solicitors, research scientists, architects). They typically require the post-holder to be an expert in a very specific area.
Modern graduate jobs	Newer professions where an undergraduate degree became the normal route of entry around the last significant period of higher education expansion in the 1960s (e.g. software programmers, journalists, primary school teachers). They require the post-holders to be 'experts', but also often to have more strategic or interactive responsibility than a traditional graduate job.
New graduate jobs	New areas that are now being covered by undergraduate degrees (e.g. marketing, therapists and many forms of engineer). They typically require a higher level of strategic responsibility or ability to interact with others and there is less need for them to be an expert in a topic.
Niche graduate jobs	Occupations where the majority do not have degrees, but where there are specialist niche areas where post holders do tend to have them (e.g. nursing, specialist electrical engineers and graphic designers). Often they require a combination of skills, such as managerial and expert skills, but equally often the need is for an 'all-rounder' with a range of abilities.

The economic crisis has accelerated existing trends

48. Evidence suggests that the economic crisis and period of recession that followed has not disrupted this trend[45]. Employment in professional occupations continued to grow while the largest job losses were in routine manual and non-manual occupations[46]. Those with university degrees suffered far fewer job losses during this period than those who left school without qualifications[47]. Also, occupations with a high proportion of graduates were less affected by job losses and have instead grown in employment share. The exception is personal service occupations group which has a lower

44 HECSU (2004) Seven years on: graduate careers in a changing labour market
45 Autor et al (2003) The skill content of recent technological change: an empirical exploration
46 Sissons P, The Work Foundation (2011) The hourglass and the escalator
47 OECD (2011) Education at a Glance

proportion of graduates but has grown in employment share[48]. This is in line with observed trends across the EU, the US and other developed economies and in line with the drivers described earlier.

49. Put simply, the occupations that have grown most, that are expected to expand in future and that were least affected by redundancies during the recession are also the occupations with the highest proportion of graduates.

Postgraduates are also in demand in an hourglass-shaped economy

50. By 2011, 31 per cent of the adult workforce in the UK had a degree, up from just six per cent in 1980. Applying standard economic principles; if supply goes up, price should go down. However, since 1980 the graduate/non-graduate earning differentials have dramatically increased. This suggests that demand for graduates outstrips current supply. Similarly, recent years have seen large increases in the proportion of the total workforce with postgraduate education. In 1996 around four per cent of the workforce had a postgraduate degree. By 2011 this had increased to around 10 per cent[49]. Despite this increase in supply of postgraduates, the wage differential compared to those holding undergraduate degrees has increased from around five per cent to over 10 per cent[50] in the same period[51]. Evidence indicates that changes in the labour market have increased labour market demand for postgraduates in line with supply.

51. At present, postgraduate students do not have access to fee loans or maintenance loans. Whilst it might be possible to design a postgraduate loan system that is cost neutral to Treasury in the longer term (e.g. by reducing the income threshold for repayment[52]), it is difficult to imagine this Government accepting the increase in public borrowing to cover the up-front cost. Extending progressive, income-contingent loans to certain categories of self-funded postgraduate students is of critical importance but is not likely to be resolved in the short-term future.

52. For existing postgraduate students on full-time, part-time or distance courses Professional and Career Development Loans (PCDLs) are still available. Up to 80 per cent of course fees can be borrowed to a maximum of £10,000 and the Skills Funding Agency cover the interest payments for the duration of the course making it affordable for postgraduates while studying. However, Barclays are the only bank that still offers PCDLs and the uptake of these loans remains low with only around 1,750 being taken up by postgraduates in 2008/9[53]. Government needs to confirm that it will continue to support this

48 Universities UK (2011) Driving economic growth
49 Labour Force Survey (1996-2011)
50 Ibid
51 Lindley and Machin (2011) Postgraduate education and rising wage inequality, CEP Discussion Paper 1075
52 Tim Leunig (2011) Mastering postgraduate funding
53 1994 Group (2012) The Postgraduate Crisis

scheme and take action to encourage other banks to offer PCDLs to increase provision and encourage more competitive loan terms. Postgraduates should also be able to access good information, advice and guidance regarding PCDLs and other financial support available.

Section 3. Rising inequality is not inevitable in an hourglass-shaped economy

53. There has been much concern about the lack of growth in the economy and much effort concentrated on how to drive growth to the benefit of the economy and society. It may sound surprising, therefore, that senior economic figures at the 2012 World Economic Forum have said that combating growing inequality should now be the priority for leaders after the economic crisis, tackling excessive pay, poverty and unemployment. For the UK, a country with high levels of wage inequality, growing child poverty and low social mobility, reducing inequality should be a great concern. But what about growth? A recent publication from the International Monetary Fund found that longer spells of growth are strongly associated with greater equality in the income distribution. The report suggests that over the long term, focussing on tackling inequality may bring significant longer term benefits to growth[54].

Higher Education has a vital role to play in tackling inequality

54. Supported by historical evidence and data, Goldin and Katz assert that human capital is a central determinant of economic growth and that investments in human capital can play a major equalising role, reducing inequality and increasing opportunity across society[55]. Higher education, therefore, has a major role to play in tackling inequality and achieving sustainable growth. Models looking at technological change have indicated that technologies will "tend to become biased in favour of factors that are becoming more abundant and/or more profitable to use[56]." This suggests that an increase in the availability of more educated workers could adjust the direction of technological change to demand more of those attributes in the market. A flexible and responsive education system could not only benefit those who go on to work in higher level occupations but also increase the capabilities of workers performing lower level tasks and drive the direction of technological change to complement the capabilities available. Individuals and the economy would benefit from a growing number of workers with the education and capability to make use of any new technologies[57].

55. In the US, college graduates are earning 70 per cent more than high school graduates, an earnings premium that has increased dramatically since 1970 despite the expansion of participation in higher education[58]. The earnings premium of UK graduates remains high, with recent findings suggesting the

54 IMF Staff discussion note (2011) Inequality and Unsustainable growth: 2 sides of the same coin?
55 Goldin and Katz (2011) The race between education and technology
56 Acemoglu and Autor (2012) What does human capital do? A review of Goldin and Katz's The race between education and technology
57 Ibid
58 McMahon WW (2009) Higher learning, greater good: the private and social benefits of higher education, Johns Hopkins University Press, Baltimore

average graduate is likely to earn nearly £600,000 (in today's money) more over their working life than someone who leaves school at 18 and does not go on to further study[59]. In addition to the potential financial benefits of higher education, and of a degree in particular[60], there is much evidence around the wider benefits for the individual including improved health and wellbeing[61]. Even considering the extent an individual is likely to benefit from higher education, it is still estimated that around half of the total benefit is public[62]. It is well documented that these sorts of calculations of average public and private benefit are not an exact science. What is clear is that making higher education more widely available would not only increase the number and range of individuals able to benefit directly from higher education but would also derive greater public benefit, contributing to reducing inequality, in turn contributing to sustainable and shared growth[63].

In an hourglass-shaped economy effective progression routes are essential

56. One of the potentially damaging aspects of an hourglass-shaped economy is polarisation of opportunity and reduced social and earnings mobility. Data from the British Household Panel Survey show that around a third of those who were in the bottom decile of earners in 2001 were still there in 2008, with around 60 per cent still in the bottom three deciles. Those with no qualifications were significantly more likely to remain at the bottom of the distribution[64]. This is not only damaging to the individuals concerned but to communities, businesses and the wider economy. A stagnant labour market may remove opportunities for those seeking entry level positions, reduce productivity and could contribute to underutilisation of labour force capabilities. There needs to be a focus on providing meaningful retraining and development opportunities as well as robust in-work and in-education progression routes, including rethinking around corporate strategies and models of work organisation[65].

Not all levels of education and training are equally beneficial

57. As routine occupations decline in employment share, many workers will be displaced with the UK economy becoming increasingly hourglass-shaped. Is there a way of shifting the balance so that more jobs displaced from the middle-paying third of occupations are replaced in the highest paying third? Is there something our international neighbours are doing that the UK is not?

59 Skandia (2012) First steps to wealth
60 Nomis, ONS Data for 2010, http://www.nomisweb.co.uk/published/stories/story.asp?id=13
61 New economics foundation, Universities UK report (2011) Degrees of value: how universities benefit society
62 McMahon WW (2009) Higher learning, greater good
63 Berg and Ostry (2011) Equality and Efficiency: is there a trade-off between the two or do they go hand in hand?
64 Sissons P, The Work Foundation (2011) The hourglass and the escalator
65 Wright J and Sissons P, The Work Foundation (2012) The skills dilemma

Ensuring that displaced workers and those seeking to progress within or between occupations are able to move into similar level or higher level work in other sectors becomes increasingly important. Facilitating upward mobility for individuals is a key concern for Government[66]. Gathering evidence to determine what factors within their control contribute toward this end should, therefore, also be a priority.

58. Research looking at the employment destinations of workers displaced from routine occupations found that academic qualifications have a predictable effect on upward mobility into professional, managerial and intermediate occupations: higher qualifications increase the probability of upward mobility; and lower qualifications decrease the probability of moving up. However, the effects of different levels of academic and vocational qualifications suggest that not all qualifications aid displaced routine workers seeking to progress[67]. In particular, qualifications at level 3 (A level or advanced apprenticeship equivalent) or below did not significantly improve the probability of upward mobility compared with lower qualifications.

Quality of, and benefits from, apprenticeships vary greatly

59. Just as popular opinion holds that we have too many graduates, there is a widely held assumption that we need more apprentices and 'more plumbers' in the UK. Again, it is important to test these assumptions against the evidence of the hourglass projection and other labour market indicators. Evidence indicates that the returns to intermediate apprenticeships have declined over time, with the wage premium reducing from 18 per cent in 2004 to seven per cent in 2010[68]. Also, as figure 3 shows, the persistent reduction in employment share of SOC 5 (skilled trade occupations) is forecast to continue to 2020. The number of newly created jobs in these occupations will be small but it must be remembered that the majority of employment opportunities are due to replacement demand. As a result we still need a robust, high quality apprenticeship and training system to meet these specific skill needs. The Government needs to consider how this investment can be most effectively targeted considering the reducing employment share for this group of occupations in the UK. This has implications for the importance of providing retraining opportunities and clear progression routes.

66 HM Government (2011) Opening doors, breaking barriers: a strategy for social mobility
67 Craig Holmes (2011) The route out of the routine: Where do displaced workers go? http://www.skope.ox.ac.uk/sites/default/files/WP100.pdf
68 Based on Labour Force Survey data from 2004 to 2010

60. The UK Government is in the process of greatly increasing investment in and provision of apprenticeships. In 2010/11, over 440,000 apprenticeships were started, more than double the number from 2006/7. This represents significant increases in public and employer funding. An apprentice performs paid work while receiving training towards a package (a 'framework') of vocational qualifications. The level of apprenticeships is far from uniform. Intermediate apprenticeships are designed to be the equivalent of a couple of GCSEs, advanced apprenticeships are equivalent to two A-levels and higher apprenticeships are a similar level to a Foundation Degree.

61. Furthermore, the quality of apprenticeships varies greatly[69]. One area of concern raised by the National Audit Office was that in 2010/11, 19 per cent (34,600) of apprenticeships were completed in less than six months, with three per cent (6,200) lasting less than three, when most are expected to last at least a year[70]. There is evidence pointing to the added value of completing higher apprenticeships – particularly in engineering disciplines[71] [72]. However, another concern raised was around the effect of the current rapid expansion on the quality of provision. Close monitoring of this will continue to be essential in ensuring that public and employer funding and apprentices' time are being invested well.

62. Given that progression to higher education from higher apprenticeships should be encouraged where appropriate, it is important to recognise that the existing cuts of 15,000[73] higher education places in 2012-13 will restrict these opportunities.

69 National Audit Office (2012) Adult apprenticeships
70 Ibid
71 Craig Holmes (2011) The route out of the routine: Where do displaced workers go?
72 National Audit Office (2012) Adult apprenticeships
73 The January 2012 Grant Letter to HEFCE confirmed that 10,000 modernisation fund student numbers will not be consolidated and an additional 5,000 student numbers have been removed to reduce the risk of over spend resulting in 15,000 fewer HE places. Of the 20,000 Core and Margin numbers top sliced from the sector (the vast majority of which have come out of HE numbers in universities) around 10,000 have been allocated to universities and around 10,000 to FE Colleges. The result is a further reduction of around 10,000 university places and a total of around 25,000 fewer places in English universities in 2012-13 compared with the previous year.

Section 4. Responding to the hourglass: international comparisons

Our global competitors are continuing to invest heavily in universities despite their own budget deficits

63. Other countries have recognised that human capital is the primary indicator of future economic growth and have acted on this to their advantage. The Australian Government has recognised the importance of investing in higher education with the minister for Tertiary Education saying in 2011 that "ultimately, the jobs in the economy of the future are going to require higher levels of skill and knowledge – that's why we are keen to see more Australians, both men and women, getting he benefits that a university education can offer."[74] The 2011 enrolment figures show an estimated 50,000 additional undergraduate students are enrolled at Australian universities compared to 2009. This is alongside the Government increasing investment in higher education by 50 per cent from 2007 levels despite the tight fiscal climate. In the US in a speech at the University of Michigan, President Obama stated that "Higher education is not a luxury - it's an economic imperative", calling on individual states to make higher education a higher priority in their budgets[75].

64. From a very different starting point, the Indian Government is heavily investing in higher education aiming to increase participation from 10 per cent to 30 per cent in a decade. They have increased investment by 31 per cent since 2010. In a foreword to a World Bank report, India's Minister of Human Resource Development, Dr. Kapil Sibal said, "Indian youth have demonstrated their inventiveness and energy in the past. Higher education that channels this capacity for innovation will unleash the latent potential of India's demographic dividend. India is in the process of establishing Universities for Innovation that are positioned to be at the cutting edge of research fostered through the teaching-learning process."[76]

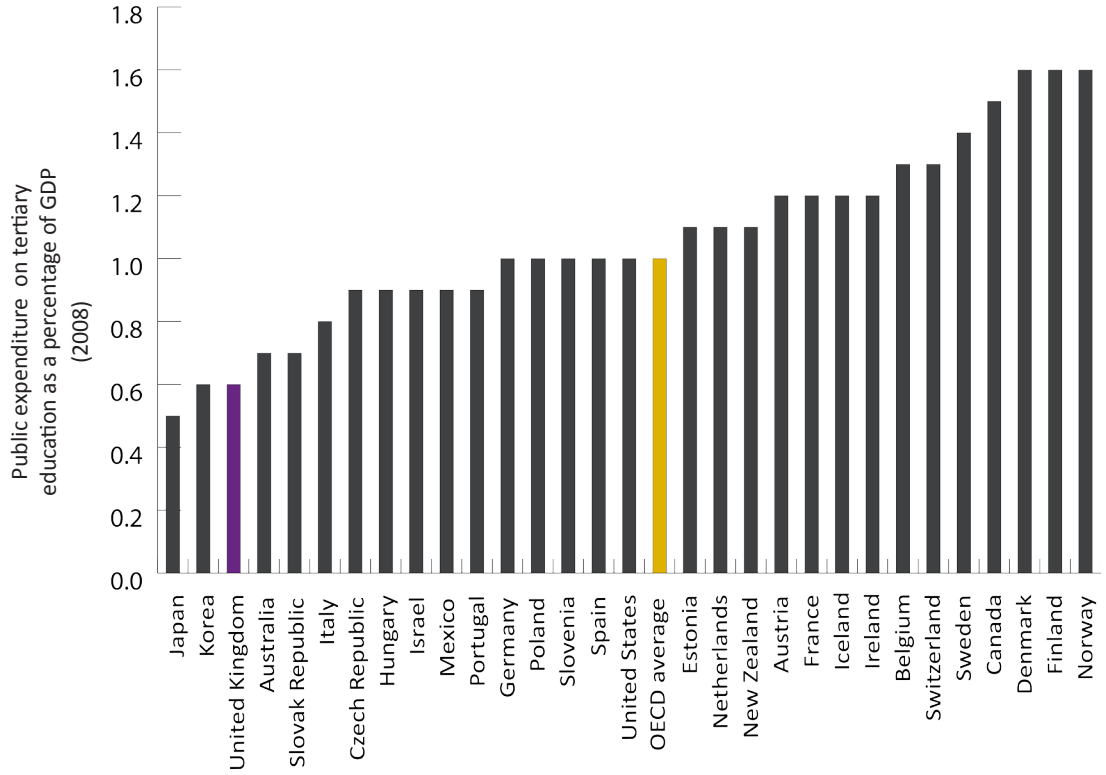
65. Closer to home, Jose Manuel Barroso, President of the European Commission has said, "we see in Europe the number of skilled jobs outnumbering the supply of students with higher education qualifications." He urged Europe to invest heavily in improving the quantity and quality of higher education if it is to meet the challenges of youth unemployment and an ageing population. To create "the jobs and ideas of tomorrow" the Commission has proposed to invest €15.2bn in education and training and €80bn in research and innovation between 2014 and 2020 – increases of 68 per cent and 46 per cent respectively

74 Evans C, Media Release 5 December 2011, http://ministers.deewr.gov.au/evans/applications-rise-barriers-university-are-removed
75 Obama B, Speech at University of Michigan, 27 January 2012
76 Altbach PG and Salmi J, World Bank report (2011) The road to academic excellence

compared with the previous seven year funding period[77]. France has also recognised the importance of investment in higher education and research. Since President Sarkozy was elected in 2007, the university budget has increased by €1bn per year, while the public research budget has increased by €80m per year. As a response to the recession, they have introduced a €35bn 'Investing in the future' investment plan of which two-thirds are being devoted to higher education and research[78].

66. Figure 7 shows the relatively high levels of investment in tertiary education in our competitor countries.

Figure 7: Investment in tertiary education is a higher priority in our competitor countries[79]



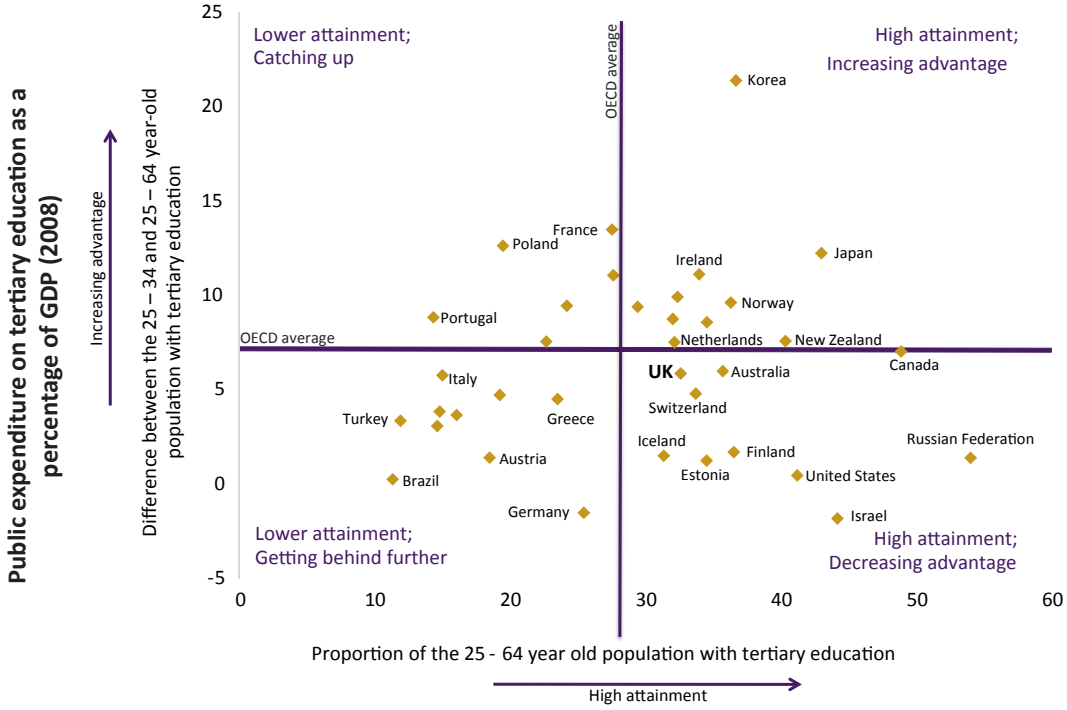
Investing now will lead to increasing advantage in the longer term

67. These countries are recognising that investing in higher education, research and science will be a key driver for the future success of their economy. Figure 8 compares current and future proportions of high-level skills across OECD countries. The current levels of attainment in the UK are slightly above the OECD average but we are firmly in the group of countries that are

77 Barroso J M, Speech on 11 November 2011
78 Sarkozy N, Speech at Palais des Congrès, Paris, 26 July 2010
79 OECD (2011) Education at a Glance

reducing their advantage in terms of our projected future skills base.Figure 8 demonstrates this by looking at the current and future stock of graduates across OECD countries. Looking at this figure we can see how differing levels of investment in tertiary education are impacting competitive advantage. Countries in the top right quadrant such as Korea and Japan have actively invested to increase their advantage by raising the proportion of their population with tertiary education. The UK has dropped to the bottom right quadrant and is in danger of losing its previous advantage.

Figure 8: Countries increasing their investment in high-level skills are increasing their advantage for future years[80]



If we stand still we will fall behind

68. While the UK Government clearly recognises the importance of situating the strategy for growth within the context of a globalised economy, the comparative actions of other countries are stark in terms of their increased investment in universities. In 2000, the UK was third amongst top industrialised nations in terms of the proportion of young people graduating. In 2008 we had fallen to fifteenth position because our competitor countries had been investing at a faster rate than us[81]. Since the onset of the economic crisis, the

80 Schleicher A (2010) Is the sky the limit to educational improvement?, UUK Annual Conference, September 2010, OECD and UUK, Cranfield
81 Aston L and Shutt L (2010) 21st Century Universities: engines of an innovation driven economy

UK has implemented 20 per cent budget cutbacks in 2010 and 2011[82]. Our position is likely to fall further following tighter restrictions on student numbers in recent years – we will have 25,000 fewer places in English universities in September 2012[83].

69. Other than Japan, most Asian countries have not cut higher education budgets, and in fact, both China and India have responded to the economic crisis by adding funds to their tertiary education spending, particularly for research and development. Further, despite economic strains, continental Western Europe has not trimmed higher education budgets significantly.

70. We have to consider carefully the consequences of continuing to move down this ranking in terms of our international competitiveness and our ability to meet the needs of an increasingly hourglass-shaped economy. As OECD Secretary General Angel Gurria has concluded: "In a global economy, it is no longer improvement by national standards alone. The best performing education systems internationally provide the benchmark for success"[84]. In times of austerity it is essential that investment in education is effectively targeted to meet the future needs of our economy and society.

82 Altbach PG and Salmi J, World Bank report (2011) The road to academic excellence
83 The January 2012 Grant Letter to HEFCE confirmed that 10,000 modernisation fund student numbers will not be consolidated and an additional 5,000 student numbers have been removed to reduce the risk of over spend. Of the 20,000 Core and Margin numbers – the vast majority of which has come out of HE numbers – around 10,000 have been allocated to universities and around 10,000 to FE Colleges. The result is a further reduction of around 10,000 university places.
84 OECD (2011) Education at a Glance

Annexe A

Standard Occupation Classification (SOC) group occupations according to skill level and content and can be used to look at trends across the UK labour market. Using these groups to look at employment share, levels of employment, proportions of qualifications held and the changes in these measures over time provides a good picture of the labour market in the UK. Meaningful international comparisons can also be made with similar groupings from other countries.

2010 SOC Group	General nature of qualifications, training and experience[85]
1. Managers, directors and senior officials[86]	A significant amount of knowledge and experience of processes and service requirements associated with efficient functioning of organisations and businesses. *E.g. chief executives, financial directors, officers in the armed forces and property managers*
2. Professional occupations	A degree or equivalent qualification, with some occupations requiring postgraduate qualifications and/or a formal period of experience-related training. *E.g. Engineers, IT business analysts, Lawyers, Doctors, Nurses and Architects*
3. Associate professional and technical occupations	An associated high-level vocational qualification, often involving a substantial period of full-time training or study. Some occupations have a degree-level qualification. *E.g. Graphic designers, paramedics, counsellors, police officers and insurance underwriters*
4. Administrative and secretarial occupations	A good standard of general education. Certain occupations will require further additional vocational training to a well-defined standard (e.g. office skills). *E.g. bank and post office clerks, office managers, receptionists and secretaries*
5. Skilled trades occupations	A substantial period of training, often provided by means of a work based training programme. *E.g. farmers, ship builders, telecommunications engineers, plumbers, chefs and tailors*
6. Caring, leisure and other service occupations[87]	A good standard of general education. Certain occupations will require further additional vocational training, often provided through work-based training. *E.g. nursery nurses, care workers, sports and leisure assistants, hairdressers and caretakers*
7. Sales and customer service occupations	A general education and a programme of work-based training related to sales procedures. *E.g. sales assistants, market traders, call centre occupations and customer service managers*
8. Process, plant and machine operatives	The knowledge and experience necessary to operate machinery, to follow procedures and perform routine tests. A period of formal training is normally involved. *E.g. bus drivers, driving instructors, sewing machinists, scaffolders and routine inspectors*
9. Elementary occupations	A minimum general level of education (acquired by the end of compulsory education). Some occupations have short periods of work-related training. *E.g. forestry workers, cleaners, security guards, waiters and hospital porters*

85 Office of National Statistics
86 This group was previously entitled Managers and senior officials (SOC 2000)
87 This group was previously entitled Personal service occupations (SOC 2000)

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