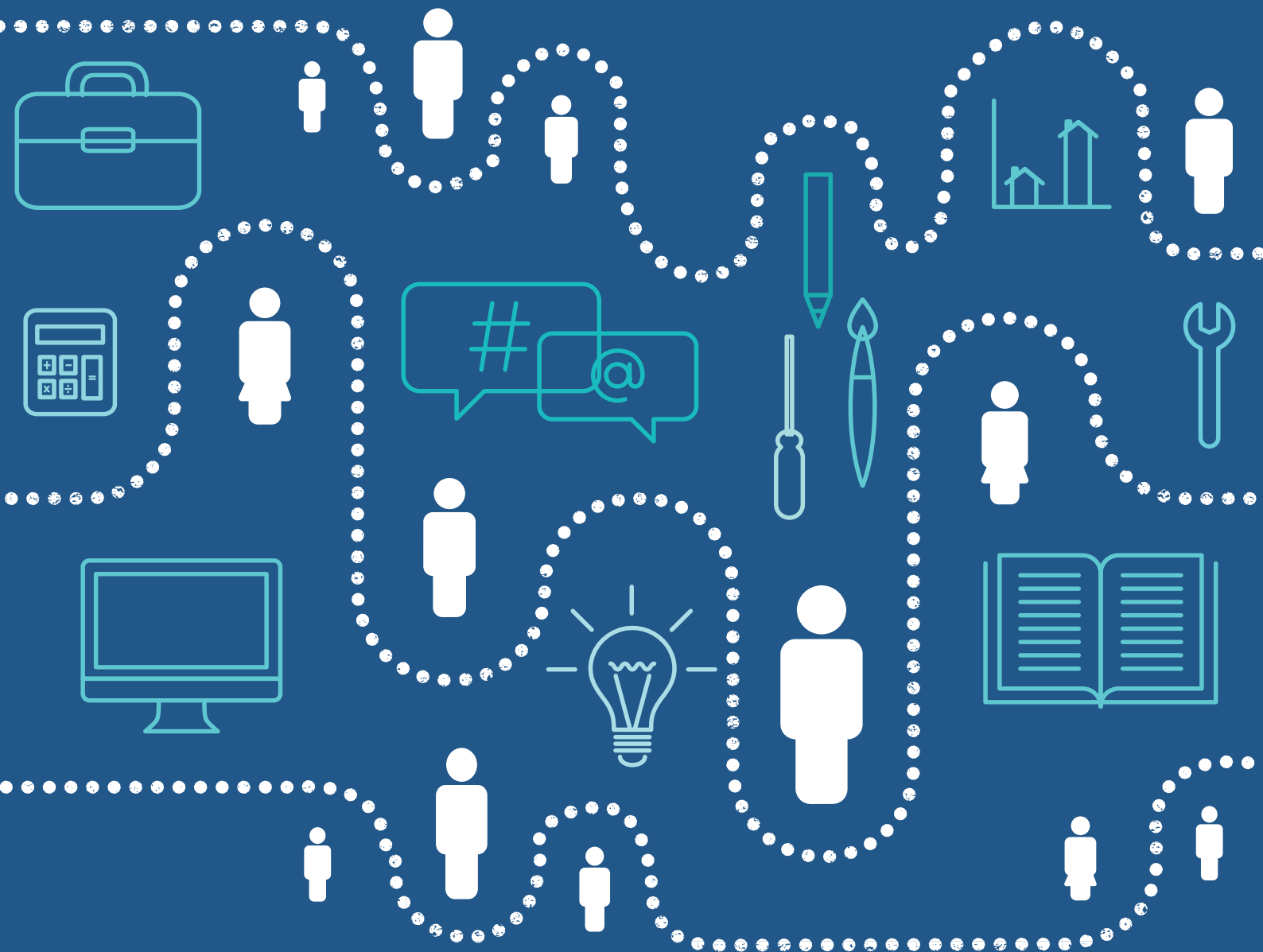




Government
Office for Science

Foresight

Future of Skills & Lifelong Learning



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Foreword



Improving our skills base is critical to increasing prosperity in the UK, as well as delivering considerable benefits to society as a whole.

Developing our skills is not just an aspiration, but with a changing job market is essential. This means not just raising the level of qualifications. It's getting the right mix of abilities, technical knowledge demanded by the workplace and skills to use those abilities and knowledge. It's about changing attitudes to learning across our lifetime and realising the positive benefits this brings.

This report sets out some of the challenges the UK faces if we want to keep benefiting from better skills. Both literacy and numeracy improvements are needed as well as matching the right skills with the right jobs. A huge amount has been achieved in a short space of time. Three million high quality apprenticeships will be delivered by 2020. Local communities will be empowered to find approaches that work best for their specific needs. Different approaches through lifelong learning pilots will make sure we understand better how to make sure that becomes a reality. It will take time to see this come to fruition but determined and focused joint working will take us to this goal.

Getting our skills right is just one side of the coin. Opportunities to use those skills is the other. A strong UK economy developing new opportunities guided by the Industrial Strategy will make sure that those building the right skills will have rewarding jobs. By working together, we will see another step-change.

THE RT HON ANNE MILTON MP

Preface



While the UK currently has one of the highest rates of employment in developed nations, we are entering a period when the age structure of the UK population is changing significantly and global technological advances are disrupting some jobs and occupations while creating others.

In this context our skills for employment will be crucial in improving UK productivity, staying resilient and thriving in an uncertain future. Moreover, for the individual, better skills enable freedom of opportunity, provide people with the tools to adapt to a changing world and promote social mobility, inclusion and wellbeing. Changes to skills policy now will affect people's working lives for the next 50 years.



This report focuses on five challenges that, if addressed, would pave the way to a future where continued learning would be a new way of life; driving inclusive growth and enabling higher living standards. The evidence we have gathered to understand the implications for skills and lifelong learning policy have already started to filter through government, including DfE and BEIS. However, our findings point towards the need for a concerted effort not only from government, but also employers and individuals.

During this project, we have considered evidence from a wide range of sources, through commissioning working papers and expert meetings, and bringing policy, academia and industry together to develop new ideas. We are grateful to the experts who have been involved. This report brings together the evidence that will help policy makers develop the policies needed to adapt to the increasing need to keep learning throughout our lives.

Improving individuals' skill levels can, however, count for little if other parts of the economic fabric of the nation – business investment, innovation, and infrastructure – do not keep pace. The fact that skills policy is to be a pillar of the forthcoming UK Industrial Strategy is of great importance in this respect as it will mean that the responses to the five challenges set out in this report can inform, and be informed by, this much wider endeavour.

**SIR MARK WALPORT
& DR TIM LEUNIG**

Executive Summary

Skills and knowledge together comprise a nation's human capital on which the economy and society depend. For employers, they are critical for productivity and, for the individual, a significant determinant of wages and wellbeing.

The UK labour market is in a prolonged period of change. Globalisation has increased competition for UK companies and workers in some sectors and created new markets and opportunities for others. Automation of increasingly sophisticated tasks, particularly using artificial intelligence, could displace many jobs while creating demand for others. Self-employment and the gig economy are increasingly common. At the same time, there are large and persistent regional disparities in economic performance reflecting the asymmetric distribution of skills across the country. The UK population, while still growing, is ageing, reducing the ratio of workers to retirees so that productivity will need to rise if output and living standards are to be maintained. Those entering the labour market now can expect to work longer and may need to change careers more frequently. Economic security will not come from having a job for life but from having the ability to maintain and renew the right skills through lifelong learning.

Skills can be acquired through primary, secondary and tertiary education, through training, self-directed learning and experience of the workplace or everyday life. They include skills recognised via academic and other qualifications as well as organisational and life skills. This report reviews the evidence for how well the UK is performing in terms of ensuring that we, individually and collectively, have the skills needed for the economy and society to thrive now and in the future. It identifies five important challenges:

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- 1. Young adults in the UK have relatively poor literacy and numeracy and there are signs that we are falling further behind international competitors.** Literacy and numeracy are the bedrock on which much else is built. Seven OECD countries have numeracy scores equal to or higher than the UK for all age groups, and the number of countries increases considerably if the UK's high-performing 60-65 age group is excluded. Literacy for UK 16-19 year-olds is ahead of only Chile and Turkey among a group of 24 (mostly OECD) countries.

Literacy and numeracy performance varies between UK regions, with London and the South East achieving the highest scores (considered in more detail in Challenge 4). There is also evidence of intergenerational effects, with poor parental attainment reflected in the educational outcomes of the child. Breaking out of this cycle may require interventions that target both the parent and child, for example family learning programmes. Improvements to literacy and numeracy continue beyond school and higher education into the early years of work, suggesting that workplace environments play an important role in developing these skills.

- 2. Employers believe labour market entrants are not properly prepared for the workforce; again the UK compares poorly against other countries.** Employers are looking not only for better literacy and numeracy, relevant qualifications and/or discipline-specific training but also for more positive attitudes towards work as well as 'character' attributes. Greater collaboration between employers and education providers may help to ensure that education-leavers are equipped with the skills that are in demand.

Work placements and experience can help individuals gain the non-academic skills desired by employers. However, only around one-third of employers offer these opportunities and they are predominantly found in the South East of England. Informal learning also has a part to play, including participation in peer-to-peer learning or sports and other extra-curricular activities.

- 3. The UK has relatively large mismatches between the supply of and the demand for skills.** Skills underutilisation is particularly high in the UK, while at the same time there are shortages of some particular high-level skills. Such mismatches imply that education providers are not offering, or students are not selecting, the courses that match with employers' skills needs, and that future skill needs are not being fully anticipated. Improving the quality of and access to labour market information may be able to help address this.

- 4. Many places and sectors in the UK are in "low skills equilibrium".** A low skills equilibrium occurs when the availability of low-skilled jobs is matched by a low-skilled workforce, such that students have limited incentives to gain higher skills (or to remain in that place if they have them) and employers adapt to but are constrained by the skills supply. This is a stable equilibrium that can only be changed if supply and demand for skills are addressed together. If only the supply of skills improves, not the demand, it will create surplus and underutilisation or prompt migration to where those skills are in demand. This suggests that close partnerships between employers and providers of education and training are required to avoid mismatches, or improved infrastructure is needed to facilitate longer commuting distances.

5. Participation in formal learning declines with age. Adult learning is in overall decline and is disproportionately taken up by wealthier, more highly skilled individuals. Formal workplace training has also declined over the last 15 years. This may in part be explained by the fact that learning by adults aged 55+ has shifted from formal to 'informal' channels in the last decade or so, with higher socio-economic groups more likely to engage in such self-directed or peer-driven learning, potentially because of positive prior experience of education. While cost and lack of time are reported as common barriers to adult learning for individuals of all skill levels, individuals with no qualifications are more likely to cite attitudinal barriers including lack of confidence, lack of interest, and feeling too old to learn. However, low skilled individuals or those from poor socio-economic backgrounds and minority groups, reap the greatest rewards from learning. If the former trend persists, it suggests that older and particularly lower skilled individuals will be especially vulnerable in a future labour market that is likely to place a premium on lifelong learning.

The purpose of this report is primarily one of diagnosis to assist policy makers in identifying important areas in which to consider new or enhanced interventions. The evidence presented provides a strong argument for efforts in a range of areas, from raising literacy and numeracy standards of young people, to breaking the downward cycle of low skills and low wages and promoting a culture of lifelong learning. It is important to recognise, however, that the challenges identified are complex and interrelated, and formulating an effective policy response is not a simple task. That said, the performance seen in other countries suggests that, while it will not be straightforward, these challenges are not insurmountable.

CHAPTER 1

Skills and Lifelong Learning: UK Challenges

Skills play an important role in contributing to and sustaining a prosperous economy and an inclusive society. Improvements in skills can directly lift workers' productivity and hence boost growth, wages and consumption across the economy. This chapter considers the current economic context within which the UK labour market operates and important trends which are likely to determine the requirement for, and impact of, skills and lifelong learning over the coming decades.

KEY MESSAGES

- Skills are intrinsically linked with economic growth, productivity improvement, competitiveness, and innovation.
- Technology trends and other changes to employment patterns mean that in the future people may need to learn new skills and take different jobs more often. Skill needs are influenced by regional and sectoral dynamics including the emergence of new occupations and the decline of old ones.
- Partial/full displacement of jobs by automation increases the need for training as people adapt to new roles and even new sectors. In parallel, the ageing population is likely to result in longer working lives. However, increasing temporary, casual and self-employed work may disincentivise employer investment in training, explaining the recent decline in formal training in the UK workplace.
- Collectively these changes point to lifelong learning as the pathway for skills-driven economic growth, building on the skills that individuals have when they leave the education system, and enabling workers to adapt to changing demands for skills and manage transitions in the future.

1. ECONOMIC GROWTH

The skills of the workforce have been shown to be of critical importance to economic growth in both economic theory and empirical analysis (Mankiw & Romer, 1992) (Romer, 1996). Growth accounting exercises, which aim to explain the growth performance of the UK based on changes in so-called ‘factors of production’¹, typically find that around 20% of UK growth in recent decades is the result of improved skills across the workforce (BIS, 2015a, p. 7). The Confederation of British Industry (CBI) identifies primary and secondary education as the single biggest long-term driver of economic growth (CBI, 2012). Evidence suggests that even moderate improvements in educational standards and adult skills could lead to large benefits for future growth (Aghion, et al., 2013) (Hanushek & Woessmann, 2015) (Hyde & Phillipson, 2014).

2. INNOVATION AND INTERNATIONAL COMPETITION

A skilled workforce is more likely to generate, adopt and absorb innovative approaches and new technologies, and gives domestic and international firms the confidence to invest and locate businesses in the UK. In a globalised market place, a skilled workforce is an important potential source of competitive advantage, helping to boost exports (International Labour Office, 2010). Although the UK is the seventh most competitive country in the World Economic Forum’s Global Competitiveness Report 2016-2017 (Schwab, 2016, p.13), it ranks 20th for ‘Higher education (HE) and training’ and 17th for ‘Health and primary education’² in terms of competitiveness. Low skilled jobs can be vulnerable to international competition (OECD, 2012a), while high skills provide more flexibility to adapt and stay competitive.

3. THE PRODUCTIVITY CHALLENGE

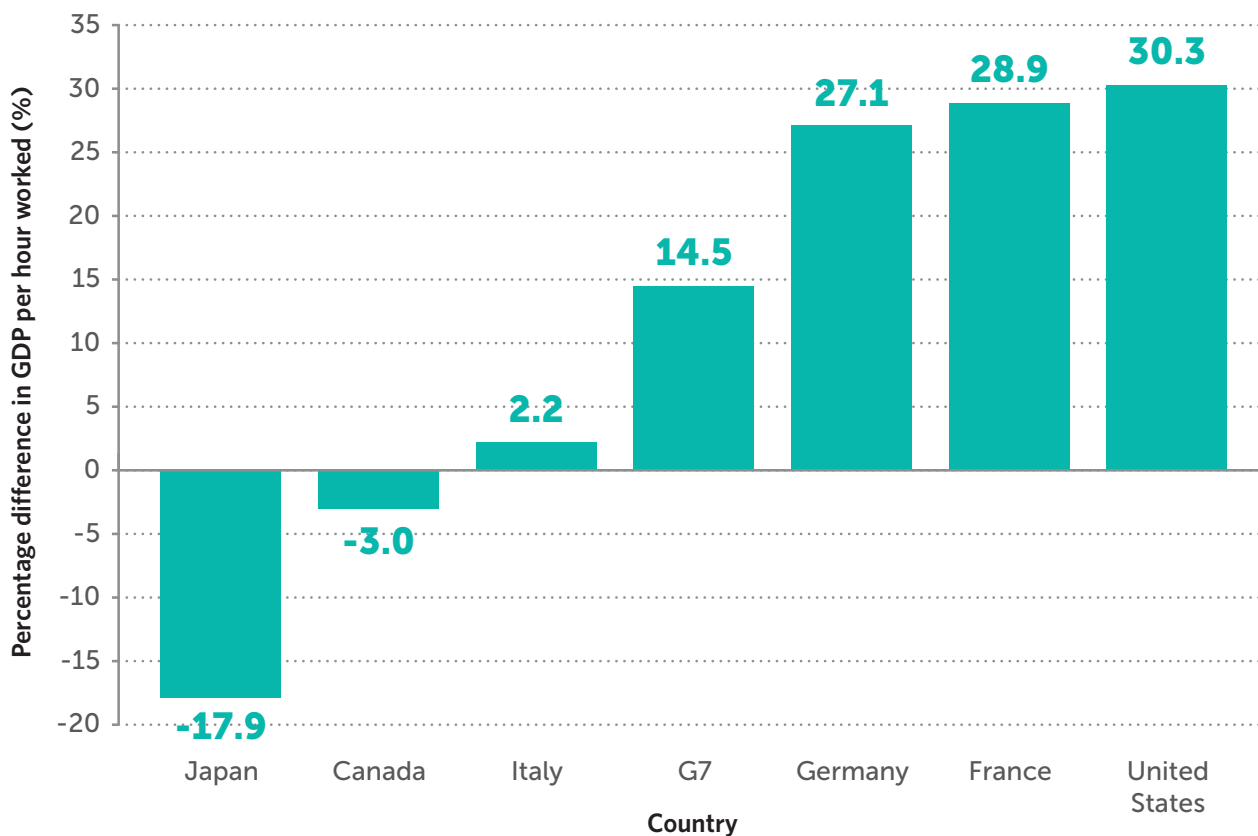
The UK currently enjoys a relatively high employment rate and lower levels of unemployment compared with many other developed economies. The overall unemployment rate in Q2 2016 was less than 5%, below the average of 6.3% for member countries of the Organisation for Economic Co-operation and Development (OECD) (OECD, 2016a). However, the UK also has lower levels of hourly labour productivity relative to many other developed economies, which has a negative effect on growth and wages (ONS, 2015a). This labour productivity gap is such that GDP per hour worked in the UK is 30% lower than that of the USA, and is significantly lower than Germany, France and the average for G7 nations (Figure 1.1). Productivity growth in the past decade has also been unprecedentedly weak across advanced economies and in the UK in particular (OECD, 2016b).

1 Investment in physical capital, technological progress, labour quantity and labour quality (skills).

2 These rankings are determined in consideration of their impact on competitiveness, and should not be confused with other international comparisons where the UK may score much higher or lower – for example the UK ranks 7th in ‘Population with Tertiary Education’ (OECD 2016). The World Economic Forum’s ‘Higher education and training’ assessment includes indicators such as: quality of management of schools; internet access in schools; local availability of specialized training services; and extent of staff training. ‘Health and primary education’ includes indicators such as infant mortality, life expectancy, quality of primary education, and primary education enrollment rate (Schwab, 2016).

FIGURE 1.1

Difference in GDP per hour worked in G7 countries compared with the UK average (%).
Data taken from OECD, 2016b.



Improving the skills of the workforce can improve labour productivity because it can allow workers to produce a greater output for a given level of input. One study looking at the UK estimated that each 1% increase in the share of the workforce with a university degree increased productivity by 0.2% to 0.5% over approximately a 20 year period, and that at least one-third of the 34% increase in labour productivity between 1994 and 2005 can be attributed to the accumulation of graduate skills in the labour force (Holland, et al., 2013, p.8). Skills and education are highlighted as the most important determinant of variations in regional productivity (CBI, 2016a). Skills are one of the key components in both the government’s productivity plan (HM Treasury, 2015) and industrial strategy (HM Government, 2017).

However, skills are not the only driver of labour productivity; innovation, enterprise, investment and competition also have an impact. The weak growth of the UK’s labour productivity in recent years has been described as a “puzzle” by the Bank of England (Bank of England, 2014). Underutilisation of skills and other skills ‘mismatches’ in the labour force are potential contributing factors to both the productivity gap and weak growth in productivity in the UK.

DEFINITION: SKILLS MISMATCH

The term 'skills mismatch' refers to a misalignment between the supply and demand for skills, which occurs when the volume and type of skills available do not match those required by employers. These mismatches result in both surpluses and shortages of particular skills (Campbell, 2016). Skills surpluses may be seen as underutilisation.

4. TECHNOLOGICAL CHANGE

Technological progress, including automation, is another major driver of productivity growth and prosperity, but one which frequently requires transitions that can disrupt the workforce. Economists argue that there has been a decrease in the demand for middle-skilled occupations – relative to high-skilled and low-skilled – because of technology replacing labour in routine tasks, for example those of cashiers and telemarketers, as well as task offshoring which itself is partially enabled by technological change (Michaels, et al., 2017) (Goos, et al., 2014). Recent analyses forecasting the automation potential of the labour market found that certain low-skilled sectors are at particular risk of partial or full displacement by technology. A McKinsey study (2017) on the potential impact of automation on the US labour market found that the existing jobs most at risk are those that involve physical activities in highly predictable and structured environments, and those that rely on data collection and data processing (Figure 1.2).

These are common to a range of sectors, but are most prevalent in sectors such as accommodation and food services, manufacturing, transportation and warehousing, and the retail trade. Jobs in management, healthcare and education services are thought to be at lower risk of displacement by automation. According to Frey and Osborne (2014), occupations involving non-routine tasks and requiring higher-level cognitive or social intelligence³, significant manual dexterity or some combination of both are typically at lower risk; however, advances in artificial intelligence may disrupt these occupations in the future.

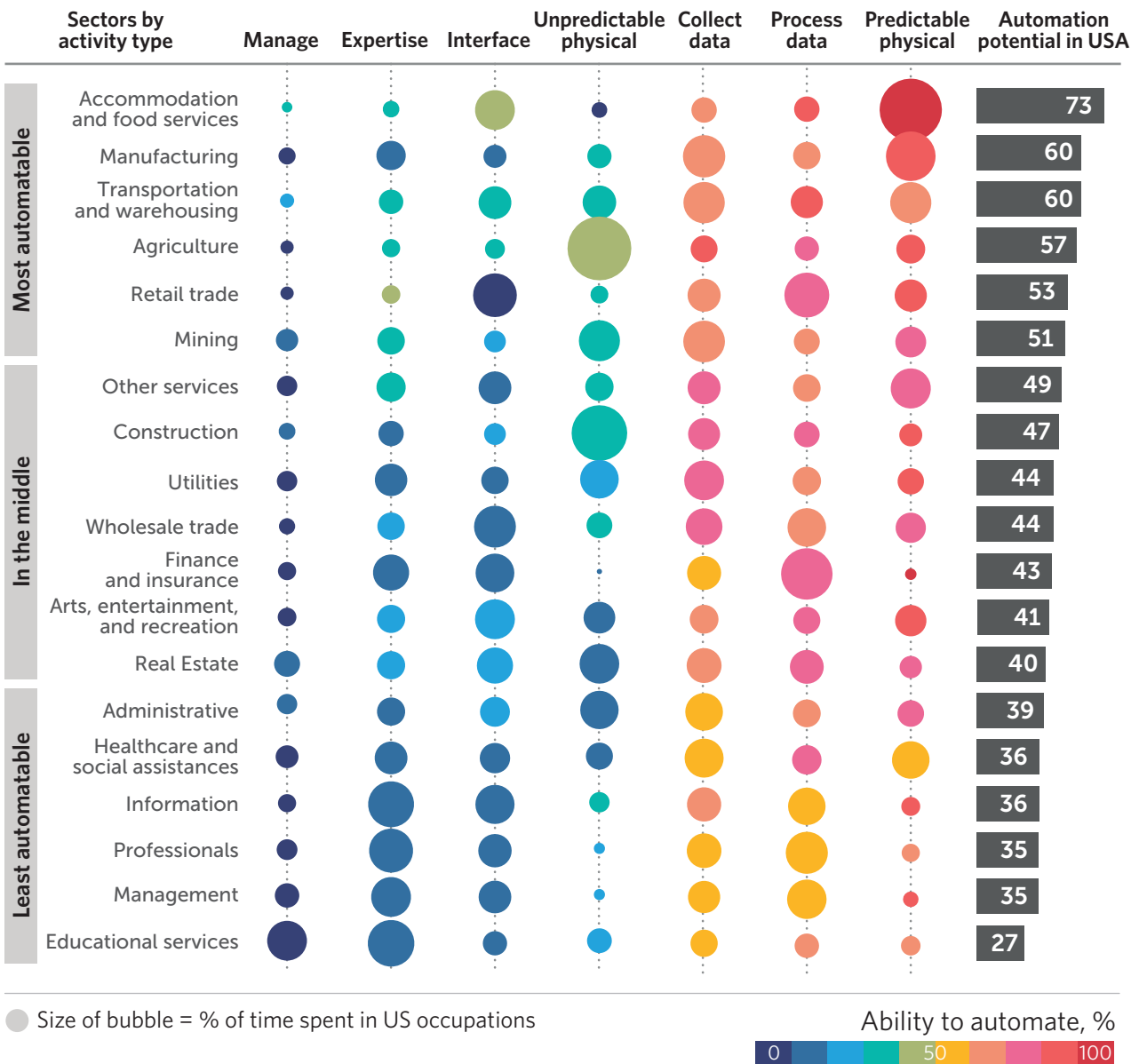
McKinsey extrapolated their US-based analysis to 46 other countries, including the UK, and found that around half of the activities carried out by workers today could be partially automated by adapting currently demonstrated technologies⁴. The study also reported that ~5% of jobs are at risk of being fully displaced by automation using current technology (McKinsey, 2017, p.8), while the OECD (2016, p.33) estimates that within the next 20 years 10% of occupations in the UK will be fully automatable, at the current rate of technological change. The relative share of mid- and low-skilled roles in the overall labour force has already declined significantly since 1993, with computerisation cited as a cause (Gardiner & Corlett, 2015). A likely consequence of technologies partially or fully replacing some jobs is that workers will need to adapt to these changes mid-career or at multiple career stages, either by altering their skillset ('reskilling'), updating and extending an existing skillset ('upskilling') or moving to less skilled work.

3 Social intelligence refers to competencies linked to self-awareness, social awareness, relationship management, the ability to negotiate and persuade in order to change the minds and behaviours of others, and the ability to provide personal assistance and care to others (Frey & Osborne, 2014).

4 Employee weighted overall % of activities that can be automated by adapting currently demonstrated technologies.

FIGURE 1.2

Potential of automation of a range of job sectors in the US economy using current technology. Sectors are broken down into different categories of work activity, and the ability to automate is indicated for each category. Data taken from US Bureau of Labor Statistics; figure adapted from “What’s now and next in analytics, AI, and automation”, May 2017, p.7, McKinsey & Company, www.mckinsey.com. Copyright © 2017 McKinsey & Company. All rights reserved. Reprinted by permission.



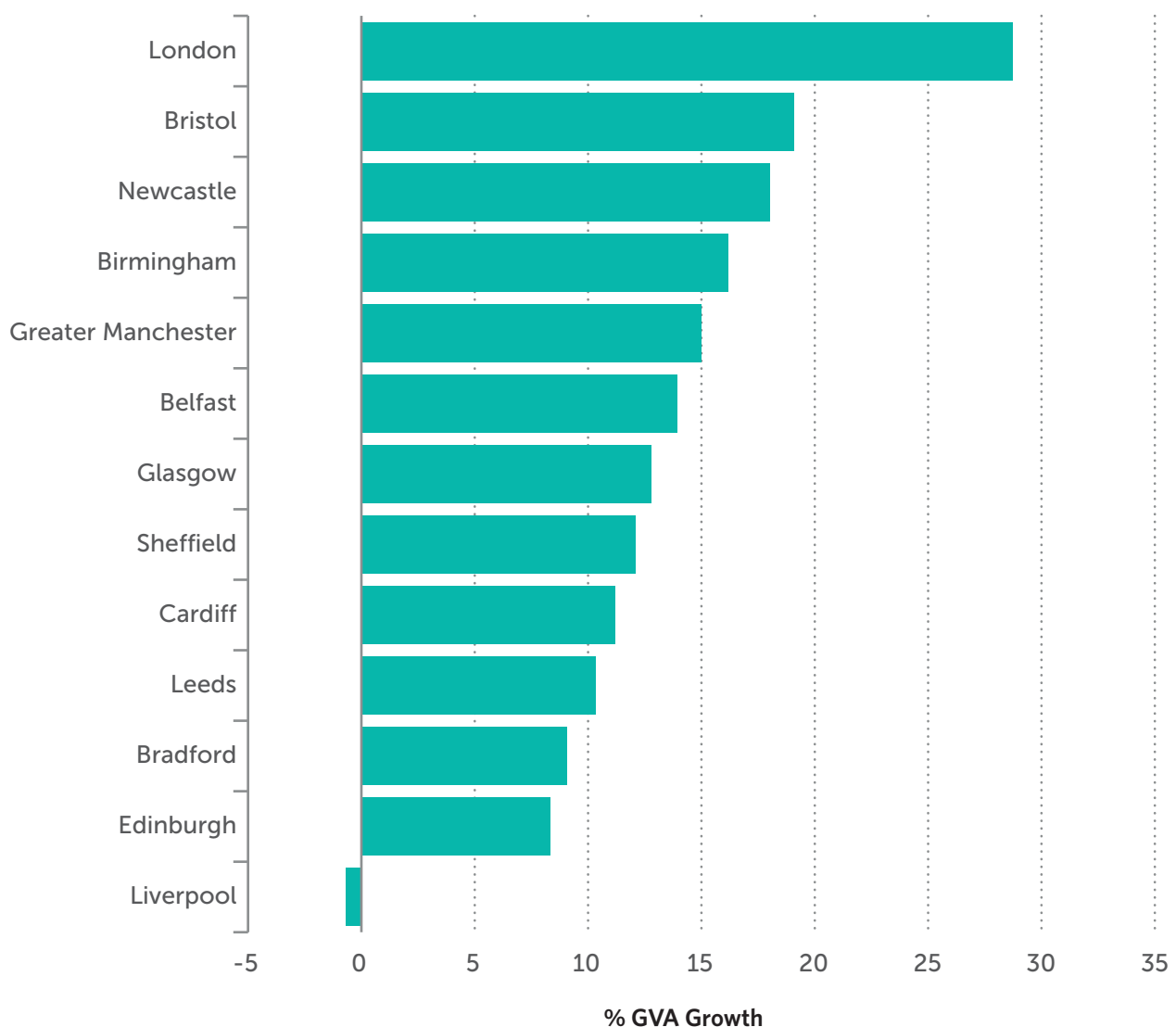
Although much attention has been directed at how automation will disrupt existing occupations and jobs, technological change will also enable the creation of new sectors and innovations. This will provide the foundation for occupations and jobs that do not currently exist but will require a transition period while new and existing workers respond to the demand for new skills. While technological change will affect different types of jobs in the economy, there is a debate over whether it will reduce the overall level of employment. Past transitions to automation have seen roles in sectors with declining employment evolve to higher productivity and higher wage roles, while surplus and new workers are absorbed by new and existing sectors. Skills play an important role in smoothing the transition, particularly to support movement to jobs with the potential for higher wages.

5. POLARIZING TRENDS IN THE ECONOMY AND SOCIETY

The sub-national distribution of skills is uneven. Only two of the 15 lowest-skilled local enterprise partnership (LEP) areas are found south of the Midlands, and only two of the highest-skilled are north of the Midlands (UKCES, 2014a)⁵.

Regional disparities in economic performance in the UK have persisted for many years, with London contributing disproportionately more to the UK economy, and considerable regional variation in wages. Despite predictions that London and South East England would be badly hit by the 2009 economic recession due to the importance of the financial services sector, it was regions in the North and Midlands that experienced the largest increase in unemployment rates. In fact, since 2009, London has witnessed the strongest growth in gross value added (GVA) relative to other major cities in the UK (Figure 1.3) (ONS, 2015b).

FIGURE 1.3
5-year gross value added growth in selected UK cities, 2009 to 2014.
Figure taken from ONS, 2015b, p.5.



5 There are 38 LEPs in total.

Improving workers' skill levels should increase their output which will, all other things being equal, lead to higher wages. Wages have historically tracked improvements in labour productivity, because what a business can spend on employing someone is intrinsically linked to the value they add. It follows that providing access to relevant skills training and lifelong learning is one tool that the government may use to mitigate geographic or socio-economic imbalances and improve employment prospects and economic opportunities across the country.

There are two caveats to this. First, labour mobility means that many workers with higher skills do not remain where they are raised or educated: for example, there is a net flow of graduates to areas with larger demand for high-skilled jobs, such as London (Foresight, 2016a) (this is less of a phenomenon when upskilling individuals who are not graduates). Labour mobility exacerbates regional imbalances, as those with more skills have the incentive — and often greater means — to move to areas where they can expect higher wages. Uneven skills distribution is to some degree both a cause and consequence of regional disparities. Labour mobility allows workers to move where their productivity can be maximised, but limits the potential effectiveness of addressing regional disparities through regional skills policy.

The second caveat is that, unless it is properly targeted, the provision of lifelong learning and skills may actually exacerbate inequality, even if it does boost overall prosperity. As Chapter 7 explains, the likelihood of participating in later-life learning is influenced by earlier education experience (Hills, 2015) (Tuijnman, 1991), meaning lower-skilled and lower-income workers are less likely to participate. The implication is that a policy to increase lifelong learning needs to address the underlying factors driving a person's openness to learning later in life — including issues such as self-confidence and awareness — and not just the provision of learning.

6. CHANGING EMPLOYMENT PATTERNS

Although many changes to work and jobs are attributable to technological innovation, the UK labour market is flexible in other respects. Changing employment practices include greater use of part-time and temporary workers and zero-hours contracts, in addition to a rise in full-time self-employment. Business specialists believe this contributes to the UK's relatively high employment and low unemployment rates (CIPD, 2016). It also makes it more challenging to fund and deliver training in established ways, possibly accounting for why formal training in the workplace appears to be in decline in the UK (OECD, 2012b). For example, few employers will offer training to temporary or casual workers (beyond statutory compliance such as health and safety) on the basis that, once trained, they are more likely to leave (OECD, 2002) (OECD, 2004). Furthermore, employers may find that arranging face-to-face training (whether external or in-house) for someone whose hours are regular and predictable is logistically easier than for someone whose hours are part-time, or who may have more than one job (OECD, 2010). Since the employer is not allowed to discriminate between full- and part-time workers, there is a danger that this will limit provision for all workers.

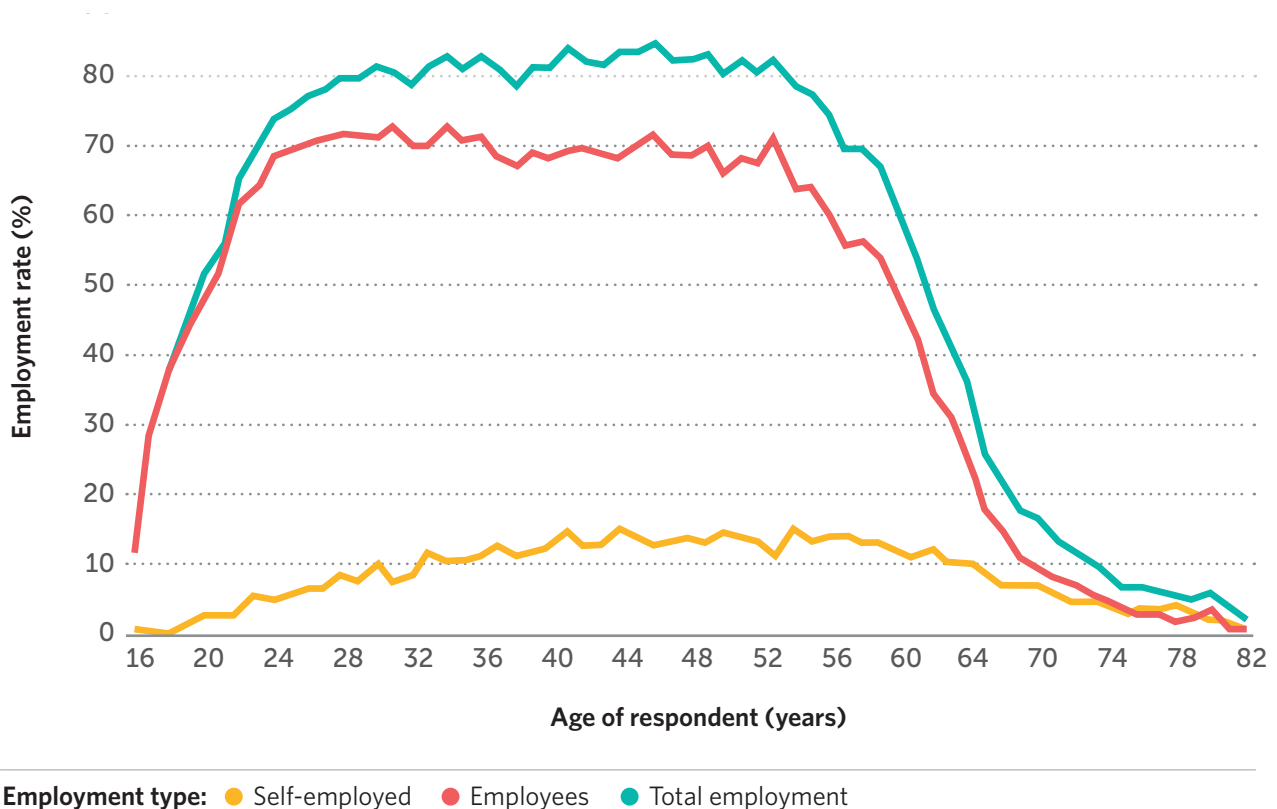
7. AN AGEING POPULATION

The UK population is ageing - more than 70% of UK population growth between 2014 and 2039 is projected to be in the over-60 age group, representing an increase from 14.9 million to 21.9 million people. In mid-2014, the median age of the UK population exceeded 40 for the first time, up from 33.9 in 1974 (Foresight, 2016b, p.18). This high-level trend has multiple interacting features which have different implications for skills and learning. First, the average length of life is increasing and, on average, individuals are living more years in both good and in poor health. Second, as well as living for longer, the stable birth rate means that the overall population structure is changing, with an increasing ratio of the number of dependents to the number of those of working age (the 'dependency ratio'). Third, the challenge of supporting a retired population with a relatively smaller workforce will be met, in part, by planned changes in the pension age encouraging older people to remain in work for longer, and to be more productive while they are there. The employment rate currently declines from 86% for 50 year olds, to 65% for 60 year olds and 31% for 65 year olds (Figure 1.4). Many people retire early as they can financially afford to do so, others due to ill health. Remaining career-resilient and employable for an extended working life could be particularly challenging for lower-skilled adults who, as a group, have lower participation rates in work-based training (BIS, 2013a).

FIGURE 1.4

Employment rate by type of employment and by age in the UK, 2014.
Figure taken from Foresight, 2016b, p.30; data taken from ILC, 2014, p.21.

Note: Survey of residents aged 16 and above of 40,000 households



SUMMARY

As one of the main factors of productivity, skills are intrinsically linked with economic growth, productivity improvement, competitiveness and innovation. Technology trends and other changes to employment patterns can change the type and volume of skills required within the economy. Patterns in the supply of skills are shaped by regional economic needs, and demands dictated by fluctuations in the labour market. This can result in short- or longer-term skills mismatches in local labour forces. This has the dual effect of increasing the requirement for training, as people adapt to new roles and even new sectors, and reducing the incentive for employers to invest in training their staff if they are less likely to stay in that company or sector for prolonged periods of time. The ageing population and planned changes to pension age are likely to result in longer working lives.

Collectively, these changes point to lifelong learning as critical to realising further growth driven by skill gains, building on the skills that individuals have when they leave the education system. Lifelong learning can enable a more adaptable workforce to respond to market and technological transitions in a way that continues to deliver productive employment for those affected, helping to create an inclusive economy. Chapter 2 considers the benefits and costs of learning and skills in more detail.



CHAPTER 2

Skills and Lifelong Learning: Benefits and Costs

The benefits of skills development and lifelong learning are multifaceted and accrue in many ways across the economy and society. A number of the benefits are interlinked: for example, any impact on employment outcomes can have benefits to the individual as well as the state and society.

Generally, returns from spending on learning can be considered with respect to:

- benefits to the individual, for example increases in wages and the probability of remaining in employment;
- benefits to the employer, for example greater profitability (also positively affecting society);
- benefits to society, including public health benefits, reduced welfare dependency and higher tax revenues.

The fact that benefits are spread across society raises a question about the appropriate form and level of learning provision by the constituent parts of society, in particular the individual, employer and the state. This chapter concludes by examining current and historical trends relating to the burden of the cost of learning.

KEY MESSAGES

- The increase in wages associated with education is considerable, although estimates of the size of the benefit vary. A bachelor's degree has been estimated to result in a £108,000-£210,000 mean net benefit from higher wages over a lifetime.
- Important benefits from lifelong learning accrue outside of the sphere of the individual. These include benefits to employers, exchequer benefits to the state (taxation and reduced welfare), and broader social and civic benefits such as social relations and health.
- The timing of learning affects the benefits. Early investment to mitigate the effects of disadvantages early in life is an important potential strategy. However, this does not preclude the necessity for, and benefits of, later investment.
- In absolute terms, the state and then the employer bear the biggest direct costs of financing education, although the relative balance has shifted in recent years towards the individual.

1. BENEFITS TO THE INDIVIDUAL

Analysis of the wage benefits associated with higher levels of education suggests that the returns on learning are substantial. A 2013 estimate found that an individual who has earned a bachelor's degree will earn on average £210,000 more over the course of their lifetime, after taxes and loan costs, than someone with only A-levels. The benefit is greater for women, at £252,000 than for men, at £168,000⁶ (BIS, 2013b, p.5).

There are important caveats to these numbers. First, due to differences in how the benefits could be calculated, there can be significant variation in such estimates. A 2011 study estimated a £108,000 net present value of a bachelor's degree⁷ (BIS 2011, p.55). Furthermore, those undertaking a degree may have a favourable socio-economic background, high human capital, and personal traits such as ambition, that in many cases mean they would have been likely to earn more even without a degree (Crawford, 2014) (Tinto, 1987). This limits the extent to which wage differentials are a good proxy for the benefits of skills. A degree can also act as a signal to employers, which has wage effects beyond the increase in skills.

The returns on other forms of academic and vocational qualifications are similarly positive according to New Economy (2017) calculations (Table 2.1), although previous evidence has showed minimal or low returns (Bhutoria, 2016). The net present value of vocational education is smaller, whilst the return on investment (per £1 invested) is higher for the individual as the upfront costs are smaller.

TABLE 2.1

Net present value and return on investment, for different qualifications for individuals and government. Data taken from New Economy, 2017, p.24.

Note: New Economy calculations from BIS, 2011 and BIS, 2013b.

	Net present value (the overall lifetime costs, including fees, subtracted from the benefits)			Return on investment (per £1 invested)		
	Individual	Government	Total	Individual	Government	Total
Vocational Level 2	£35,885	£20,043	£55,928	£10.54	£5.63	£16.17
Vocational Level 3	£53,506	£33,278	£86,784	£15.53	£5.17	£20.70
Degree	£229,762	£266,408	£496,170	£6.80	£24.67	£31.47

⁶ All these figures have been discounted at 3.5% consistent with Green Book guidance. The total mean benefit is greater for women because of differences in the gender wage gap and employment prospects across different levels of educational attainment (i.e. women with degrees are more likely to be in employment and have a narrower wage gap than those without a degree).

⁷ If current prices, also discounted.

The UK's ageing population will require individuals to remain economically active later in life in line with the projected increases in life expectancy, as well as maximising physical and mental health and independence. Education and skills may support individuals in making informed choices and decisions about their transitions into and through the labour market, helping them to adapt their skills and competencies while acquiring new or specialist skills to cope with demographic and labour market changes (Barnes, et al., 2017).

2. BENEFITS TO EMPLOYERS

Human capital theory suggests that employers are willing to fund training to meet specific business needs, but may be unwilling to fund activities that strengthen the position of employees in the external labour market without receiving some form of financial compensation for the potential loss of an employee. Firms benefit from upskilling the workforce to take on new higher-level tasks, increasing productivity (which often offsets the initial cost of training) and ensuring an on-going supply of occupational- or sectoral-specific new skills for the organisation (particularly important if combined with a lack of experienced, skilled workers in the local labour market). Yet empirical and case-study analyses identify other benefits for employers such as: enhancing their attractiveness as an 'employer of choice'; higher retention, leading to lower recruitment and training costs; compliance with legal or regulatory requirements; and increased capacity for innovation and adopting new technologies (Bhutoria, 2016) (Green, et al., 2016).

Employers report improvements in their employees' skills and abilities following public-funded basic skills training in literacy and numeracy⁸. Of 4,239 employers⁹ surveyed in 2016, some 64% saw an improvement in employees' abilities to perform and complete job tasks; the same number reported an improvement in employees' abilities to work independently; 55% noted an improvement in employees' ability to work in teams; and 42% saw an improvement in employees' abilities to use technology (BIS, 2016a, p.10) (IPSOS MORI Social Research Institute, 2016).

3. HEALTH BENEFITS

There is an association between increased levels of learning and reductions in self-reported depression and GP visits (Dolan & Fujiwara, 2012), along with other improvements in health and life satisfaction (Rossor & Knapp, 2016; Banks & Mazzonna, 2012). Although the causality is difficult to establish, many studies have found an association between learning and health benefits (Feinstein, et al., 2008). For example, 92% of those with the highest literacy proficiency levels in England and Northern Ireland reported that they were in good health, compared with 60% of those with the lowest level of literacy, a pattern repeated across OECD countries (OECD, 2014a, Table A8.1a (L)). Evidence is growing that cognitive training may help slow cognitive decline (Figure 2.1), although this is by no means conclusive (Rebok, 2014) (Simons, 2016)¹⁰. With an ageing population, and the associated increase in cognitive ill-health, including dementia, the benefits of lifelong learning could be significant if these uncertainties can be addressed.

⁸ A large majority of employers were delivering basic skills training as part of an apprenticeship programme which posed challenges in terms of isolating the impact of the basic skills training. See full report for details.

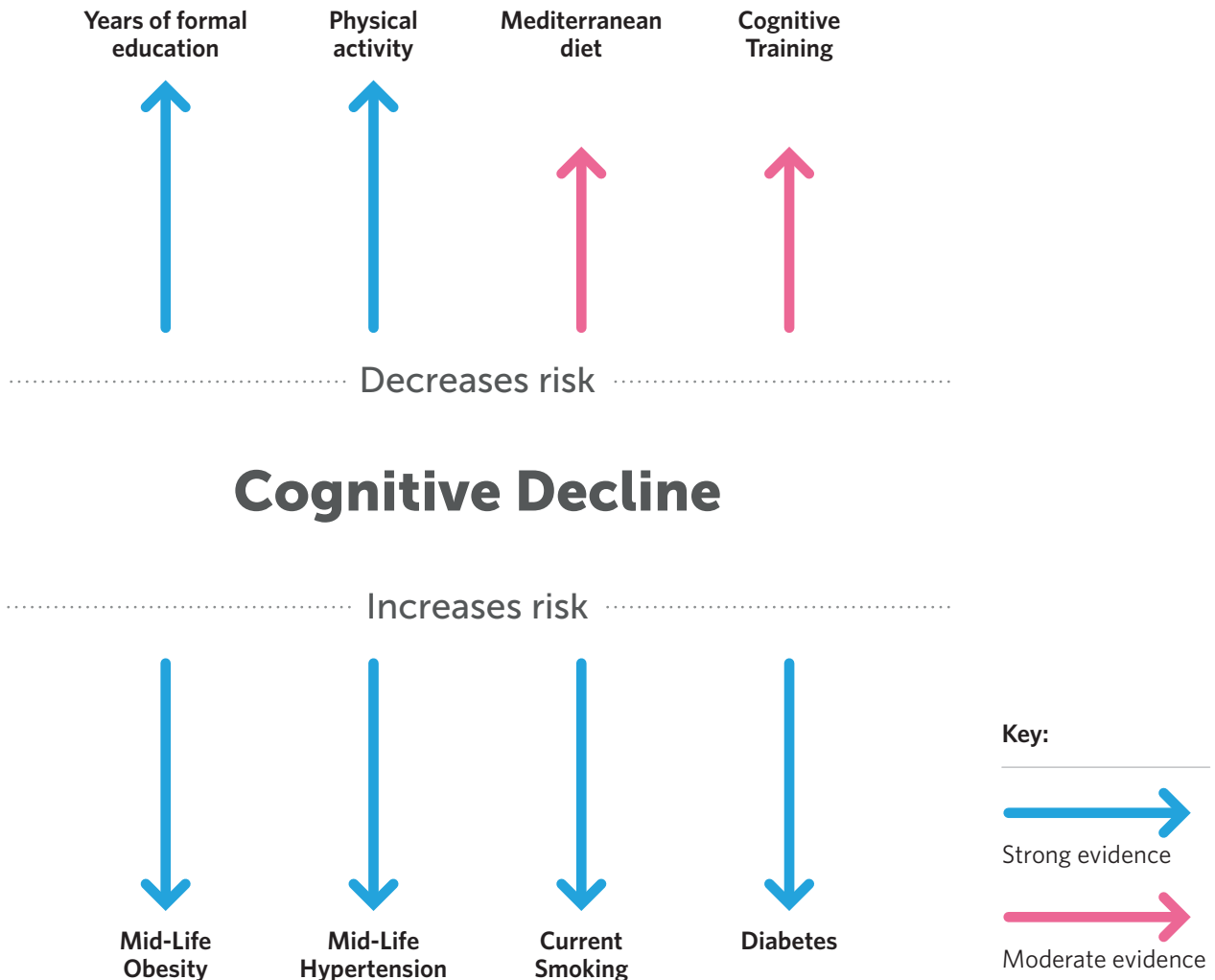
⁹ For the survey of workplaces in England the sample was drawn from the Inter-departmental Business Register, disproportionately stratified by size of worksite and sector to facilitate sub-group analyses. The final data has been weighted to be representative of all employers in England.

¹⁰ For example, Simons, D. et al. (2016) finds little evidence that cognitive training enhances performance on distantly related tasks or improves everyday cognitive performance. However, Rebok et al. (2014) find certain cognitive training interventions result in improved targeted cognitive abilities for 10 years and mitigate decline in instrumental activities of daily living.

FIGURE 2.1

Strength of evidence on risk factors for cognitive decline. Figure adapted with permission from Baumgart, et al., 2015, p.720.

Note: data not controlled for wealth or years of formal education.



4. WELFARE AND EXCHEQUER BENEFITS

Those who engage in education and learning to develop and maintain their skills throughout their working lives are more likely to stay in work longer, be productive, and progress in their careers (Brown, 2009). There are benefits to the exchequer that arise from those with higher qualifications receiving higher wages, including increased tax receipts (income tax, National Insurance and VAT) and reductions in unemployment. The discounted net present value of the associated revenue effects of bachelor's degrees for the exchequer has been estimated to be £253,298 for men and £305,110 for women (New Economy 2017, p.22; calculations using BIS 2013b exchequer benefit figures). With an average benefit to the exchequer of £279,000, compared with the aforementioned average benefit of £210,000 to the individual, the exchequer actually 'out-earns' the graduates through wage benefits associated with investment in HE; the rate of return per £1 investment is £24.67 compared with £6.80 for the individual (Table 2.1). Vocational qualifications also give positive net present values and rates of return to the exchequer (New Economy, 2017). There is a direct correlation, in both the UK and across the OECD, between employment rates and educational attainment (Table 2.2).

TABLE 2.2

Employment rate by educational attainment, UK and OECD, 2012.
Data taken from OECD, 2014a, p.114.

	Employment rates (percentage employed) of 25-64 year olds	
	UK	OECD average
Below upper secondary	57%	55%
Upper secondary or post-secondary non-tertiary	79%	74%
Tertiary	84%	83%

5. SOCIAL AND CIVIC BENEFITS

Early-life education is influenced by the socio-economic status and education level of an individual’s parents (BIS, 2013a). Parents with qualifications at Entry Level 2 (see Table 2.3 for description of qualification levels) or below tend to pass on their poor literacy and numeracy skills to their children (Bynner & Parsons, 2006). There is strong evidence from the United States that interventions in early-years education for disadvantaged children are highly cost effective, with additional benefits in other policy areas such as reducing crime and teenage pregnancy as well as fostering workforce productivity (Heckman & Masterov, 2007). A major European longitudinal study of young children’s development between the ages of 3 and 7 found that early-years education can help ameliorate the effects of social disadvantage (Sylva, et al., 2003). Lifelong learning (especially to raise literacy and numeracy levels) helps motivated adults overcome deficiencies in their initial education. This may also help circumvent the transmission of poor literacy and numeracy skills from parent to child, improving educational outcomes and prospects in the labour market, and thus bringing economic as well as social benefits.

Feinstein et al. (2008) reported that adult education may reduce racism, and increase civic participation and voting. They also found that lifelong learning is associated with quitting smoking and greater participation in sport. These benefits appeared to be greater for educationally disadvantaged adults, since this group suffers disproportionately from ill-health and has a higher capacity for benefitting from improvements.

Coates (2016) argued that education in prisons “is one of the pillars of effective rehabilitation. Education should build social capital and improve the wellbeing of prisoners during their sentences”. Adult learning can reduce reoffending rates for different categories of prisoner (Ministry of Justice, 2013). The cumulative effect of costs and losses over lifetimes means that an intervention that enables the individual to switch from a career of crime has a lasting pay-off (Coates, 2016).

TABLE 2.3

UK government guide to qualification levels.

Level	Description
1	Basic knowledge may be linked to job competence e.g. lower grade GCSE or basic literacy and numeracy
2	Good knowledge and appropriate for many roles e.g. 5 A*-C GCSEs
3	Demonstrate ability to apply knowledge in detail e.g. 2+ A Levels
4	Specialist and appropriate for technical jobs e.g. certificate of HE
5	High level of expertise and competence e.g. diploma of HE
6	Knowledge-based professional e.g. Honors degree or advanced BTEC
7	Highly developed complex professional knowledge e.g. Masters degree
8	Leading experts or practitioners with in-depth knowledge e.g. Doctorates

6. IMPACT OF TIMING OF LEARNING ON ECONOMIC RETURNS

Investment in education during the early years and primary school level is important, as it makes later investments more productive (Heckman & Masterov, 2007). Hence early intervention to mitigate the effects of early-life disadvantage is an important strategy. Increasingly, however, the evidence recognises that just because early investment is important as a means to narrow socio-economic gaps in attainment, this does not preclude the necessity for and benefits of later investments at secondary school level and beyond.

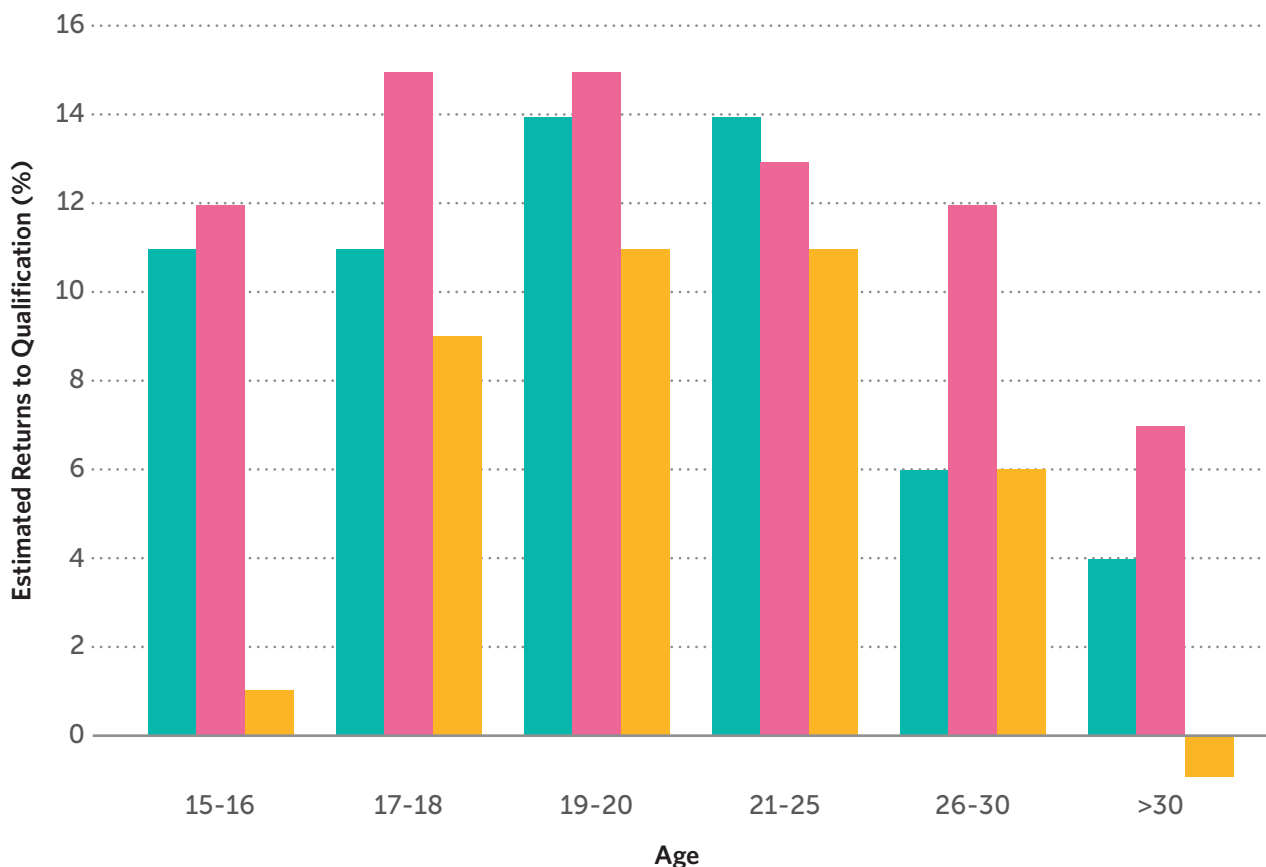
Estimates of the economic returns of education suggest that, while learning may be more advantageous at a younger age, there are also positive financial returns for adult learners (Bhutoria, 2016).

Undertaking Level 4+ qualifications is, on average, economically worthwhile for individuals until about the age of 45. The age is younger for Level 3 (age 30) and Level 2 (age 25) (New Economy, 2017, pp. 29-30). Figure 2.2 shows how the returns on Level 3 qualifications tail off as the age of acquisition gets closer to 30 (returns are also smaller for the youngest age group) (Bhutoria, 2016). As people get older, the amount of time left to earn higher wages, as a result of a qualification, decreases, until the increase in wages no longer outweighs the cost of gaining the qualification. As average retirement ages rise, the age at which it is beneficial to gain a new qualification may increase. In terms of median pay, Figure 2.3 suggests greater benefits if Level 3 and higher qualifications are obtained after age 25 compared with before.

FIGURE 2.2

Estimated earnings premium associated with qualifications at Level 3 by age of acquisition. Figure taken from Bhutoria, 2016. Data taken from BIS 2011, p.6.

Note: based on the extent to which hourly earnings achieved by those in possession of Level 3 qualifications exceed those with Level 2.



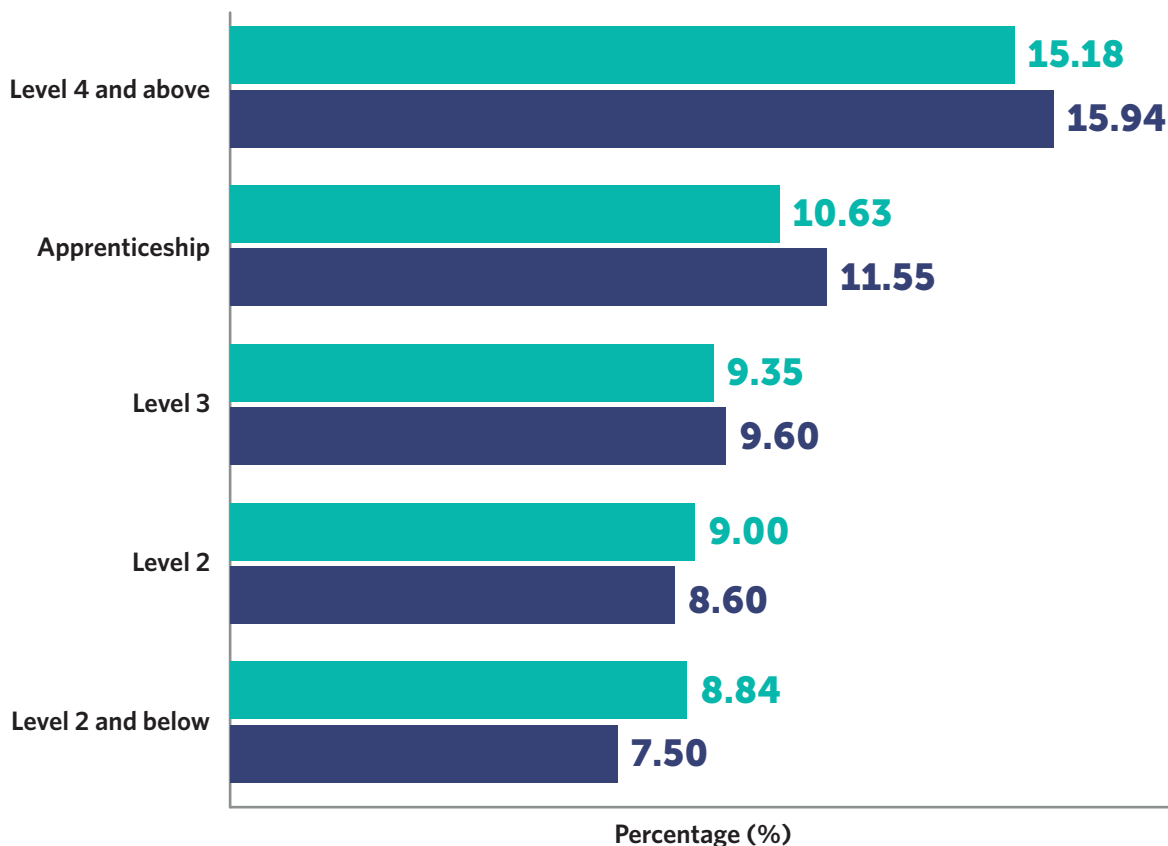
- City & Guilds Level 3
- Business & Technology Education Council Level 3
- National Vocational Qualifications Level 3

The economic analysis does not take into account what may be termed a moral argument for lifelong learning. Recognising that the education system may not work for individuals earlier in life for various reasons, and individuals' personal circumstances and attitude to learning may change, lifelong learning can provide adults with an opportunity to address deficiencies in their initial education. Furthermore, economic returns, largely derived from wage differentials, overlook many other potential benefits that may be achieved through education over the course of someone's life. These may include improvements in personal wellbeing and quality of life, or even benefits that have economic impacts, such as improved health. Chapter 7 elaborates on a number of other considerations that should be taken into account when comparing interventions at different stages of life.

FIGURE 2.3

Median hourly pay by qualification level obtained by under 25s and over 25s (£/hour).
Figure taken from New Economy, 2017, p.28.

Note: data taken from Quarterly Labour Force Survey, January to March 2016.



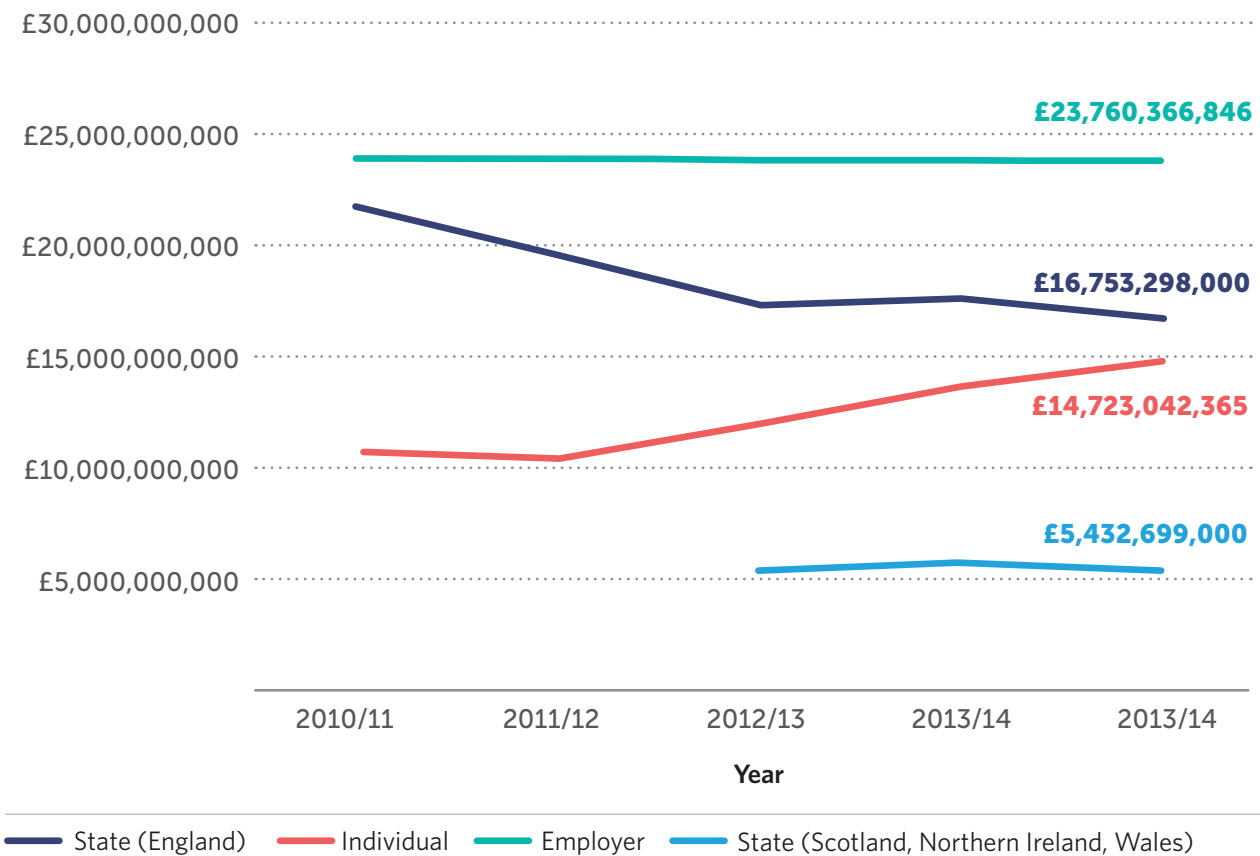
- Median pay - qualification obtained below age 25
- Median pay - qualification obtained over age 25

7. THE COST OF LEARNING AND SKILLS DEVELOPMENT

The costs of skills and lifelong learning are met by a combination of individual, employer and government contributions, in varying proportions. Spending in the UK on post-16 education and training has been estimated at over £60 billion per year in 2014/2015, excluding opportunity costs such as not working during this period. The state is the largest investor in post-16 learning, spending £25bn in 2014/15 (New Economy, 2017, p.8). Total state expenditure on post-16 education in the UK includes the aggregate spend across England, Scotland, Wales and Northern Ireland (totalling £22.2bn) and the amount the state spends on developing its own employees (about £2.9bn). Employer spending on training (including the state as an employer) was approximately £23.8 billion in 2014/15, and this has remained relatively consistent since 2010 (Figure 2.4) (New Economy, 2017, p.8). Individual investment in skills grew by 37% to £14.7 billion between 2010 and 2015, largely due to the switch from grant to loan funding for post-19 further and higher education. Although that change decreased the burden on the state, the real decline in expenditure is likely to be less than expected as some of the loans will not be repaid meaning the cost to the exchequer has only been deferred.

FIGURE 2.4

Total real-terms spending on post-16s' skills by government, employers and individuals in the UK, 2010/11 to 2014/15. Figure taken from New Economy, 2017, p.8.



SUMMARY

The private wage benefits associated with higher levels of education are considerable, notwithstanding caveats that make precise quantification difficult. Employers, the exchequer and wider society also gain important benefits. According to analysis of wage premiums, qualifications are more valuable the earlier they are undertaken in life, partly because total earning benefits from qualifications obtained later will often be lower due to a shorter remaining working life. There are other important benefits of learning later in life, such as social and civic benefits. The financing of education has shifted in relative terms towards the individual, although in absolute terms the state and employers still bear the biggest costs.



CHAPTER 3

Low Literacy and Numeracy in the UK

This chapter highlights the importance of literacy and numeracy skills in underpinning an individual's chances of finding and sustaining employment. It shows that literacy and numeracy levels in the UK compare poorly internationally and that there is considerable variation in proficiency across nations and regions within the UK. The chapter notes the risk this poses for future prosperity and competitiveness and outlines how literacy and numeracy proficiency might be improved.

KEY MESSAGES

- Literacy and numeracy skills bring a range of benefits to the individual, employers and society. These include personal wage and employment returns, improvements in company efficiency and productivity, economic growth and improved wellbeing across society.
- In the UK today, people aged 16 to 29 have on average worse literacy and numeracy than those aged 30 to 45. The point at which literacy and numeracy improves coincides with first-time entry into the workplace during young adulthood. Historical studies suggest that this phenomenon has persisted in the UK for a number of decades though the trend for declining employer training provision suggests that this cannot be assumed to continue.
- Literacy and numeracy is poor in the UK compared to a number of OECD countries especially for younger people – literacy for those aged 16-19 is third worst, ahead of only Chile and Turkey. This indicates that we are seeing the beginning of a trend in which a greater number of countries have better literacy and numeracy than the UK across the population.
- Literacy and numeracy achievement is subject to regional variation, with London and the South East achieving the highest scores in GCSE maths and English. The UK has one of the strongest associations between socio-economic background and literacy/numeracy among OECD countries.
- There is a case for literacy and numeracy training in work-related contexts and in conjunction with acquiring other skills. Such approaches can be embedded into academic, occupational and family learning programmes, and have positive social effects. Education reforms are already underway to address teachers' skills and improve A-level and GCSE qualifications, with the intention to improve literacy and numeracy skills among young people.

1. THE IMPORTANCE OF LITERACY AND NUMERACY

The OECD's Survey of Adult Skills (PIAAC) finds that literacy and numeracy skills have a noticeable impact on an individual's participation in the labour market and their chances of gaining employment across all surveyed countries (OECD, 2013). Drawing on longitudinal data from the 1970 British Cohort Study (BCS70), de Coulon et al. (2010) identify a strong relationship between literacy and numeracy and earnings. According to their analysis, an individual who moved from the median of the literacy or numeracy distribution to the 84th percentile would experience an increase in hourly wages of 14% (for literacy) and 11% (for numeracy), in the 2004 labour market, after controlling for early ability and family background (de Coulon et al., 2010, p.28).

The relationship between earnings and literacy and numeracy proficiency has been found to be particularly high in the UK relative to some competitor countries such as Sweden and Germany (Hansen & Vignoles, 2005). The wage premium associated with better literacy and numeracy skills appears to have been consistently high since at least the 1990s, according to an analysis of the 1954 National Child Development Study cohort, with no drop in demand for the skills despite increased supply (de Coulon, et al., 2010).

These associations may be explained by two phenomena. Employers place a high value on literacy and numeracy during recruitment (see Chapter 4), and low literacy and numeracy also hinders advancement in the workplace (Atkinson & Williams, 2003). These employer behaviours are likely to be driven by the significant negative effects of literacy and numeracy gaps in the workplace. In a survey of employers in England, one-third of those who cited literacy and numeracy deficits among their staff believed this had led to more errors, problems in introducing more efficient or new processes, additional training costs, and a decline in product or output quality. Of the companies that identified gaps in basic numeracy skills, 11% said that they had experienced fewer sales or lower profit margins as a consequence (BIS, 2016a, p.35).

There has been little research to quantify the monetary cost to employers of these skills deficits, and much of what is known is based on qualitative data collected from employer interviews (BIS, 2016b). However, the OECD has developed a macroeconomic model of the economy-wide benefits of improving basic literacy and numeracy in a number of countries. The OECD estimates that if every UK secondary school student acquired at least a minimal level¹¹ of literacy and numeracy skills by 2030, it would lead to total benefits of \$3.65 trillion (almost £3 trillion at current exchange rates) from 2015 to 2095. Effectively, GDP would be 12% higher in 2095 than it would be with a lower-skilled population, based on current GDP trends¹² (Hanushek & Woessmann, 2015, p.56).

The broader significance of literacy and numeracy skills in accessing opportunities throughout people's lives is also increasingly understood. Results from the OECD's Survey of Adult Skills for England and Northern Ireland¹³ indicate that literacy proficiency positively correlates with social and personal wellbeing, self-assessed health status and participation in the community (for example religious, political or charitable activities) (OECD, 2013).

11 In the OECD analysis, the 'minimal level' constitutes either the mean achievement of the country's current students or Level 1 skills on the OECD Programme for International Student Assessment (equivalent to GCSE - grade D, E, F or G), whichever is higher.

12 The authors note that increases of such a magnitude are unlikely since the gains in achievement over the next 15 years are, in their mind, beyond reasonable expectation. The authors state their intention with the calculations is to indicate the extensive long term benefits achieved by a country improving its education system.

13 Education and skills are devolved matters; the Scottish Government and Welsh Government chose not to participate in the most recent OECD survey of adult skills.

2. LITERACY AND NUMERACY SKILLS ARE LOWER AMONGST YOUNGER PEOPLE

In England and Northern Ireland, the generation aged 16 to 29 has lower levels of basic literacy and numeracy than those aged 30 to 45. Literacy and numeracy skills across age cohorts follow an ‘inverted U-shape’ curve, albeit with the group aged 60 to 65 (in England only) deviating from the trend and out-performing the preceding age group (Figure 3.1).

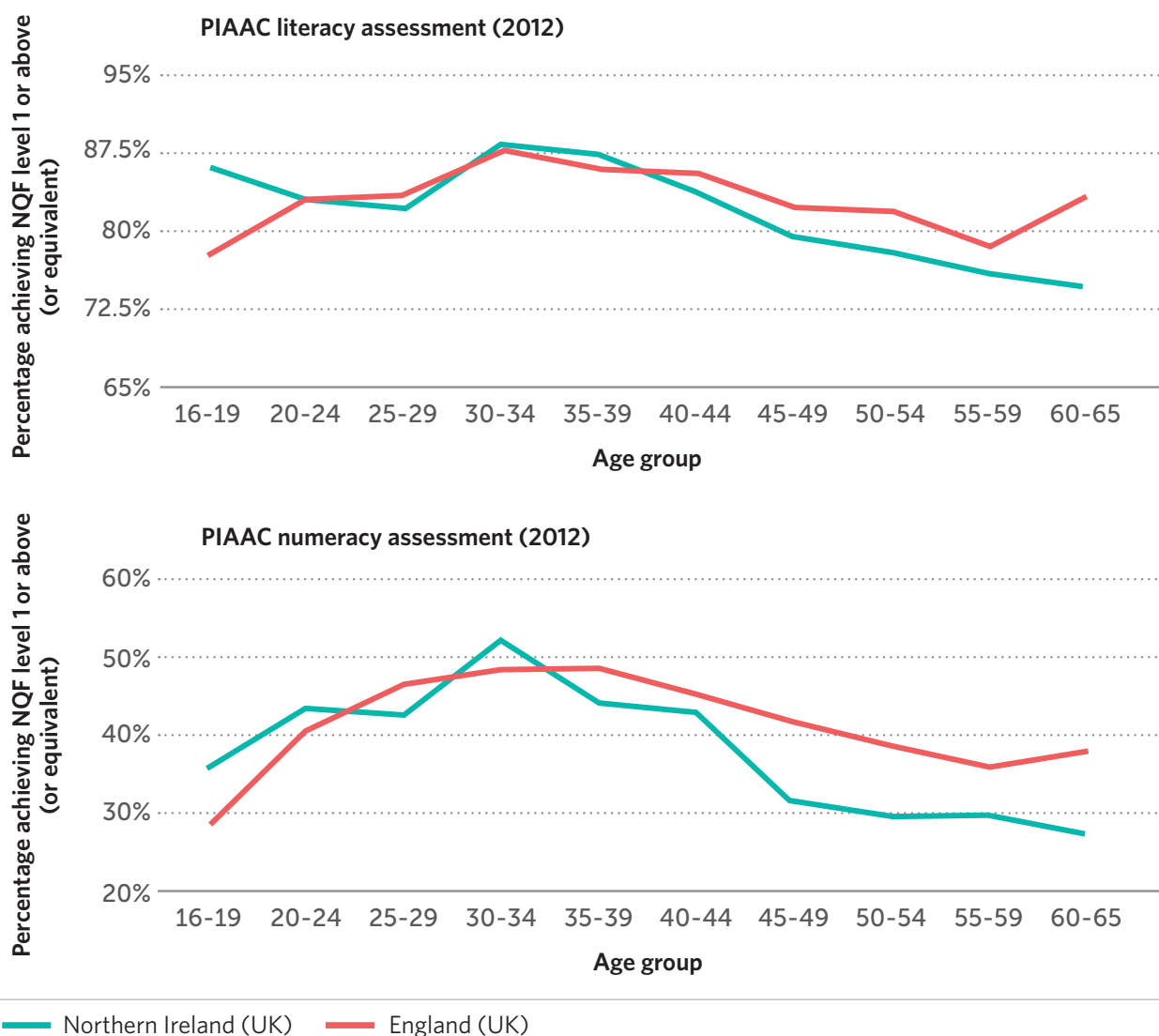
Literacy and numeracy performance among young people is broadly similar across England, Scotland and Northern Ireland; however, literacy and numeracy scores have been consistently lower in Wales than the rest of the UK (Kuczera, et al., 2016).

An important policy question is whether today’s cohort of younger people is exceptional in that they have lower levels of literacy and numeracy than the age groups immediately above them. This is explored in the next section, whilst Chapter 7 addresses maintaining and enhancing skills into later life.

FIGURE 3.1

English and Northern Irish literacy and numeracy attainment by age, according to the OECD’s PIAAC-2012 survey. Figure taken from Brooks & Lahmar, 2017, p.14.

Note: Level 1 of the UK National Qualification Framework represents achievement of knowledge and/or skills broadly equivalent to grades D to G at GCSE.



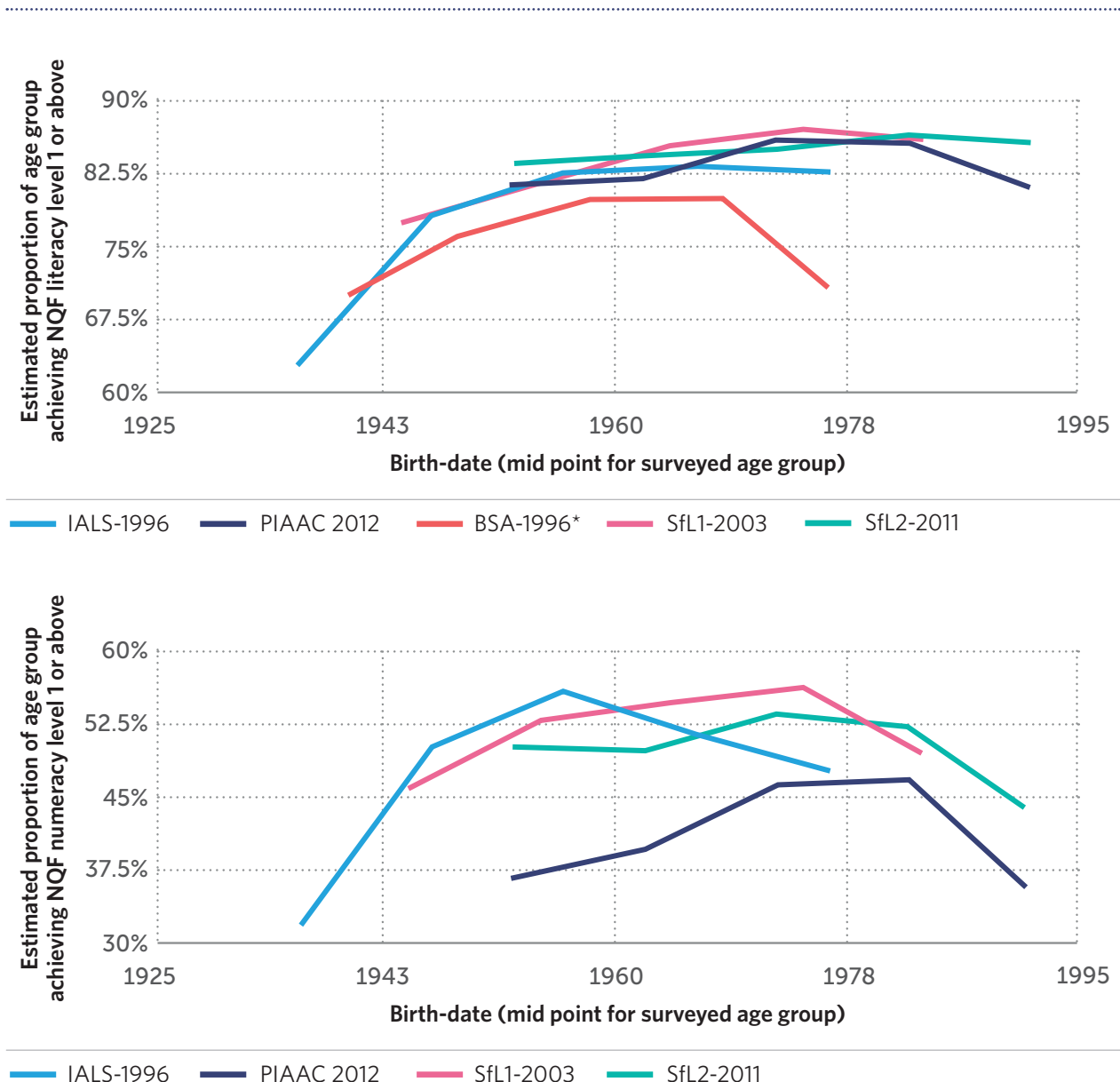
3. THE 'INVERTED U' SHAPE IS NOT NEW

The youngest age groups in the UK and its constituent countries have exhibited lower literacy and numeracy skills than the middle age groups, and similar levels to the oldest age groups in surveys since at least 1996 (Figure 3.2). This suggests that the 'inverted U-shape' pattern of literacy and numeracy attainment has persisted for at least two decades.

FIGURE 3.2

Literacy and numeracy attainment compared in surveys carried out over different time periods in the UK, or its constituent countries. Figure taken from Brooks & Lahmar, 2017, pp.8-9.

Note: curves are arranged so that each data point is above the mid-point of the relevant date-of-birth range. For example, PIAAC-2012 refers to the OECD Survey of Adult Skills conducted in 2012, a 23 nation/region survey covering literacy, numeracy and ICT skills; the youngest date-of-birth range in PIAAC-2012 is 16 to 19, the midpoint of which is 17.5; therefore the first data point is in 1994, 17.5 years prior to 2012. IALS refers to the International Adult Literacy Survey (1996), a 20-nation study coordinated by OECD including the whole UK. SfL1 refers to the Skills for Life Survey (2003), surveying literacy, numeracy and ICT in England. SfL2 refers to the Skills for Life Survey (2011), surveying literacy, numeracy and ICT in England. BSA-1996 refers to the Basic Skills Agency survey conducted 1996-1997. Data is derived from the Basic Skills Agency's 2001 recoded CD-ROM, but still reflects the position in 1996.



Brooks and Lahmar propose that the repeated trend in Figure 3.2 is caused by ‘life course factors’, whereby literacy and numeracy is affected by important life events such as entry into the workforce, progression in the workplace, and retirement. Evidence from longitudinal surveys support this explanation: repeated sampling of members of the National Survey of Health and Development 1946 Study and the 1970 British Cohort Study found that literacy and numeracy levels improved between adolescence and young adulthood (Brooks & Lahmar, 2017). In summary, the literacy and numeracy of today’s young people are not fixed for life, if historical trends persist in future generations. The observed improvement may be a result of young people being presented with the opportunity to enhance their literacy and numeracy skills while ‘on the job’, in addition to incentives to upskill. It is unclear if this trend will continue in view of changes in the labour market (see Chapter 1). Reduced provision of training in the workplace and a decline in employer investment in staff may lead to a less supportive work environment, potentially leading to less improvement in literacy and numeracy, skills underutilisation and the deterioration of skills due to lack of use (Calero et al., 2016).

Another important question is whether the curve is changing over time: in other words, whilst individuals, through repeated generations, may develop their literacy and numeracy upon entering the workplace, is the aggregate level of literacy or numbers rising or falling? Unfortunately the data is inconclusive on this point. The data in Figure 3.2 does not show any apparent trend, and only covers surveys over a relatively short time period, which may use inconsistent methodologies. However, what is clear is that the UK is at risk of falling further behind competitor countries in terms of literacy and numeracy.

4. UK LITERACY AND NUMERACY COMPARES POORLY WITH OTHER OECD COUNTRIES

Figures 3.3 and 3.4 show that many other OECD countries broadly exhibit an “inverted U-shape” trend relating to literacy and numeracy attainment. In general, the inverted U-shape is less pronounced in literacy than numeracy, with skill levels initially flatter and declining with age, implying that educational attainment is improving for younger cohorts in other OECD countries.

The international comparison shows the UK lags behind many of its peers. Seven countries have numeracy scores higher than or equal to the UK across all age groups, and the number increases considerably if the high-performing 60 to 65 age group is excluded. In the younger age groups, even more countries are outperforming the UK, and the UK’s literacy and numeracy attainment is below the OECD average up until the ages of 30 (for literacy) and 35 (for numeracy). This is particularly worrying because it may indicate that a number of countries are in transition from a lower curve to a curve which, once the younger age groups have grown older, is higher than the UK for most or all age groups. In essence Figures 3.3 and 3.4 may represent snapshots of a transition whereby a number of OECD nations are gaining higher basic skills across the entire population. A separate analysis concurs with these findings: there are three times more low-skilled people aged 16 to 19 in England (relative to population size), compared with the equivalent cohorts in top performing countries like Finland and Japan (Kuczera et al., 2016).

FIGURE 3.3

International comparisons of literacy for age groups 16-65 across OECD countries based on the OECD's PIAAC-2012 survey. Figure taken from Brooks & Lahmar, 2017, p.43.

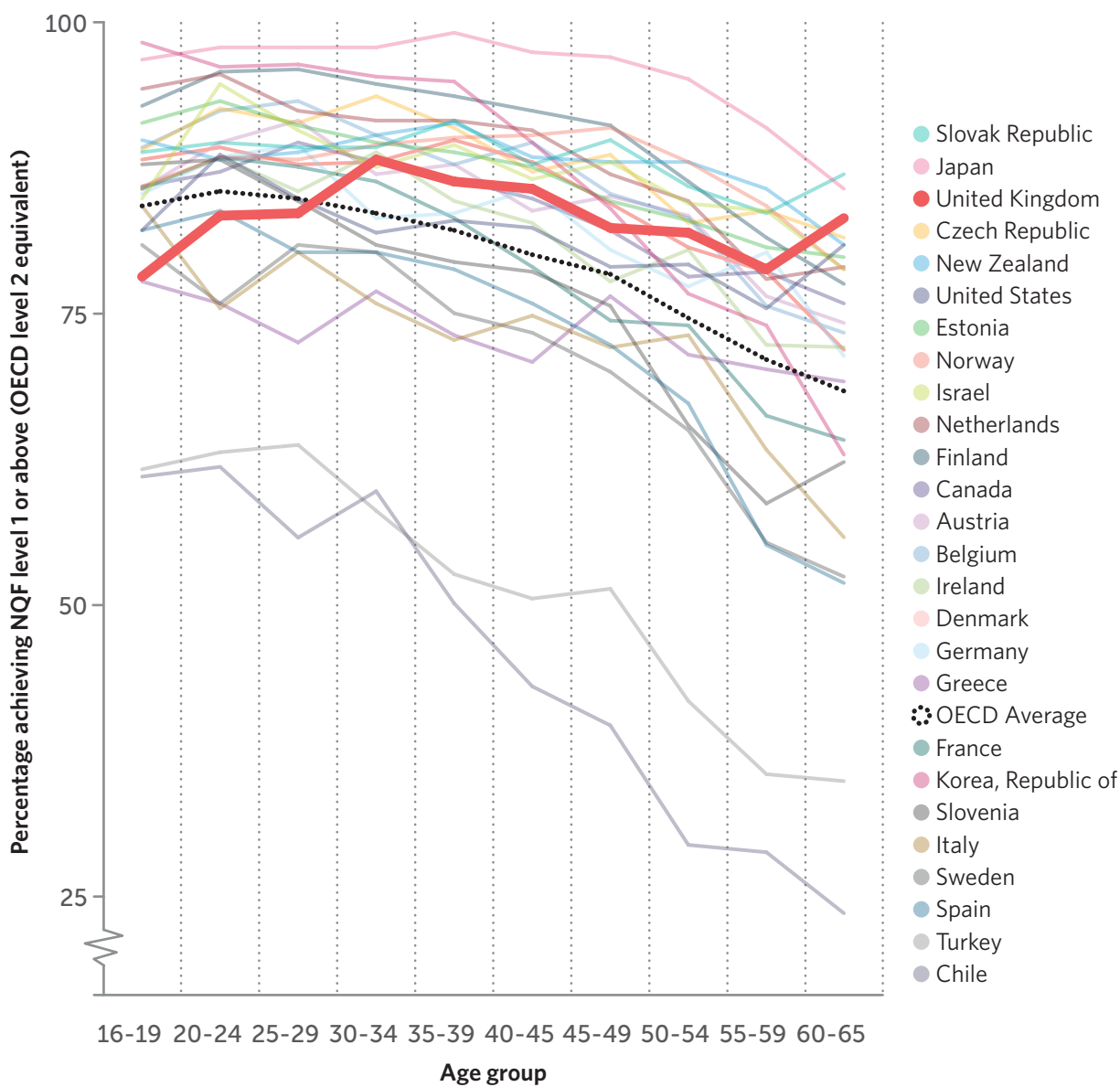
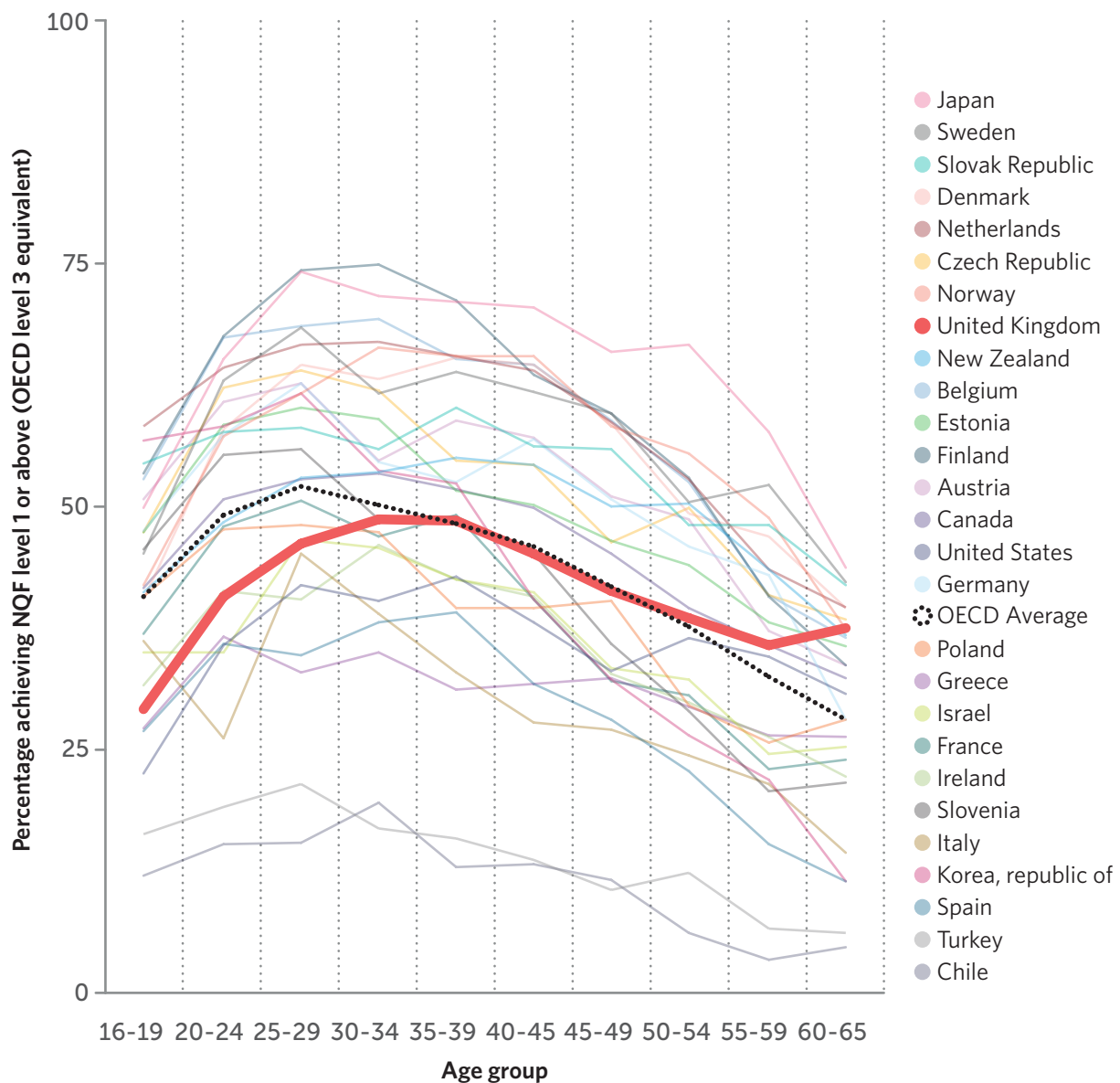


FIGURE 3.4

International comparisons of numeracy for age groups 16-65 across OECD countries based on the OECD's PIAAC-2012 survey. Figure taken from Brooks & Lahmar, 2017, p.44.



5. REGIONAL AND SOCIO-ECONOMIC VARIATIONS IN LITERACY AND NUMERACY

Across England there are regional differences in the literacy and numeracy attainment levels of students at age 16, adding a spatial dimension to concerns over low skills among young people. Figure 3.5 shows that a lower proportion of students achieve five GCSEs at grade A* to C (including English and maths) in the North of England compared to London and the South East, although there are intra-regional variations. In some cases, these differences in attainment have persisted over decades, and in others, such as London, performance has improved steadily (Strand, 2015).

FIGURE 3.5

Percentage of pupils achieving 5 or more A*-C GCSEs (2015) in England. Figure taken from Schooldash Ltd., 2016. Contains National Statistics data © Crown copyright and database right 2017.

Note: cartogram distorted for population size.

Pupils achieving 5 or more A*-C GCSEs including English and Maths in 2015 (%)

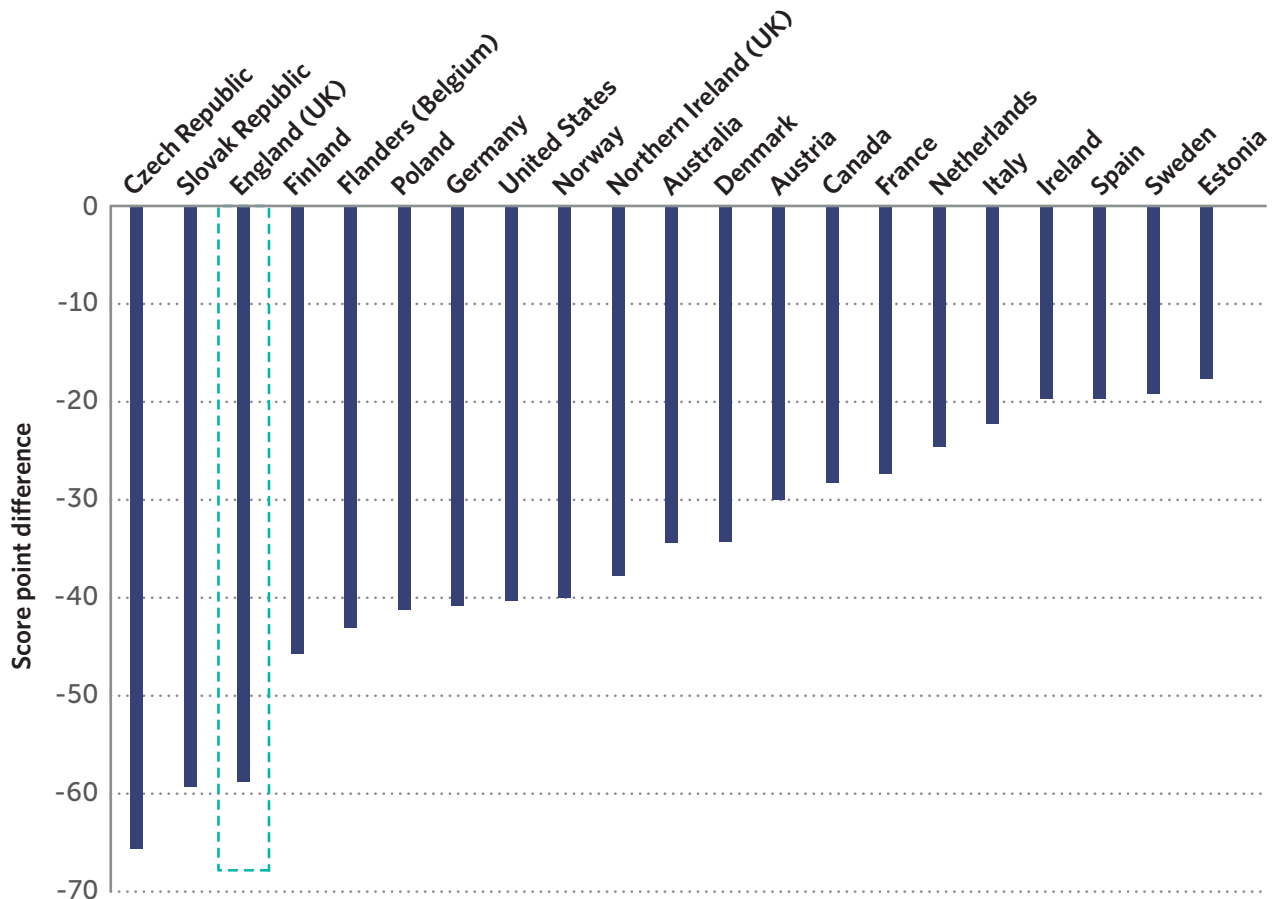
- above 61.8
- 58.2 to 61.8
- 56.3 to 58.2
- 52.3 to 56.3
- 52.3 and below



The gap between the highest and lowest performing cohorts of 15-year-olds in the UK is among the highest of all developed countries (Kuczera, et al., 2016), and much of this difference can be attributed to family background. Results from the OECD's Survey of Adult Skills (2012) show that individuals whose parents are not educated to above secondary school level are more likely to score Level 1 (GCSE grades D-G) or below (BIS, 2013a), implying intergenerational transmission of advantage or disadvantage from parent to child. The positive association between literacy and numeracy proficiency and socio-economic background in England and Northern Ireland is among the highest of all OECD countries (OECD, 2013). Young people (16-20 years) with at least one parent who completed secondary school scored almost 60 points higher in numeracy on the PIAAC survey than those with neither parent who did so (Figure 3.6) (Kuczera, et al., 2016, p. 27).

FIGURE 3.6

Score point difference in numeracy between persons aged 16-20 where neither parent attained at least upper secondary education and persons of the same age range where at least one parent did so. Data taken from OECD’s PIACC-2012 survey. Figure taken from © OECD, Kuczera, et al., 2016, p.27.



The evidence suggests that the literacy and numeracy skills of the UK’s population are in danger of slipping behind OECD countries. This could put the UK’s future prosperity and competitiveness at risk. However, the analysis also indicates that literacy and numeracy are not static, and can be improved in both early years and after leaving formal education. Indeed evidence suggests that beneficial impacts of literacy and numeracy proficiency on wages and employment exist regardless of when these skills are acquired during someone’s life (Vorhaus et al. 2011) although the benefits to total lifetime earnings will often be lower the later they are acquired. The remainder of this chapter identifies various approaches to improving literacy and numeracy skills.

6. FAMILY LEARNING CAN MITIGATE EFFECTS OF EARLY-LIFE DISADVANTAGE

Children’s attainment levels are related to a number of factors including socio-economic background, home learning environment and parental cognitive ability (Carpentieri et al., 2013) (Hills, 2016). Evidence suggests that early intervention can raise education standards in children from socio-economic groups at higher risk of falling behind (Kuczera et al., 2016). Family learning programmes that focus on numeracy and literacy development may help to achieve this. Programmes of this type generally include adult-only time, where parents (or the child’s carers) work on gaps in the adult’s

literacy and numeracy skills; children-only time, in which the teacher works on improving children's skills; and time for adults and children to learn together (NIACE, 2013).

A review of around 30 family literacy and numeracy programmes in the UK and elsewhere found that both parents and children benefitted from taking part (Brooks et al., 2008). In Sheffield, 65% of children who took part in family learning achieved good level of development, compared with 60% of those who did not take part. The gains were even greater, up to 15 percentage points, in disadvantaged groups (Sheffield City Council, 2011-2012) (NIACE, 2013, p.9). Family learning has also been shown to help achieve an average improvement in reading ability equivalent to six months of reading age (NRDC, 2012). Parental involvement in a child's secondary schooling (active private time engaging with a child such as helping with homework) has been found to overcome the negative effects of social class in influencing the exam performance of children at the age of 16 (Tuckett & Field, 2016) (Hills, 2016).

Family learning helps parents gain self-confidence and improved parenting skills while re-engaging in learning themselves (Harding & Ghezelayagh, 2014), and promotes positive attitudes to learning across the whole family (NRDC, 2012). The impact of family learning on social capital (Anderson, et al., 2010) and adult participant's self-confidence (Rodriguez-Brown, 2004) are becoming increasingly recognised. It is important to note that there is currently little longitudinal research on whether benefits are sustained throughout people's lives (Kuczera, et al., 2016), although a longitudinal study of a family learning project based in Turkey indicates long-term benefits (NRDC, 2012).

The government commissioned a baseline survey of Adult Basic Skills in 2002 (DfES, 2003) to produce a national profile of adult literacy, numeracy, and information and communication technology (ICT) skills, and to assess the impact of these skills on people's lives. After a period of sustained investment at scale in both adult literacy and numeracy teaching and family learning programmes in England, the Department for Business, Innovation and Skills commissioned a follow-up survey in 2010 to assess the change in literacy and numeracy levels over time amongst 16-65 year-olds. The report (BIS, 2012a) showed that, for literacy, the investment proved successful in helping significant numbers of adults over the threshold of a Level 2 qualification but less effective in helping improve the skills of adults with the lowest levels of proficiency (those at the so-called 'Entry Levels'). In the case of numeracy, most progress was seen at Entry Levels compared to smaller numbers of people attaining Level 2. Ofsted have reviewed the most effective family learning programmes, and found they generally demonstrate the following: outstanding teaching; a structured approach to learner development; provision throughout the year and at a range of venues within the community; opportunities for intergenerational learning; and a section of the programme dedicated to adult-only time (Ofsted, 2009).

7. IMPROVING THE CONNECTION BETWEEN QUALIFICATIONS AND LITERACY/NUMERACY PROFICIENCY

Around 30% of young people in England with upper secondary qualifications, including GCSE or equivalents or NVQs (UK Levels 2 and 3) as their highest qualification, have low literacy and numeracy proficiency. Even for those with maths and English GCSEs, the basic skills outcomes are weaker compared to young people with the equivalent qualifications in other OECD countries (Kuczera, et al., 2016, p.41). This suggests that the standard of literacy and numeracy skills required to complete upper secondary education in England is relatively low.

A number of reforms are underway to strengthen secondary school qualifications. GCSE and A-levels have been updated to comprise more demanding content (Ofqual, 2014). Since 2014, all 16- to 19-year-

olds who do not achieve at least a GCSE grade C in English or maths are required to re-sit these qualifications as part of their further education (FE) (Kuczera et al., 2016), and additional measures to support 19- to 23-year olds are also being implemented (ESFA, 2017). At this stage, it is too early to assess the impact of these measures on young people's literacy and numeracy skills. The UK system remains relatively distinctive in letting students discontinue English and maths beyond age 16 once a GCSE grade C or above is achieved.

8. UPSKILLING TEACHERS TO IMPROVE LITERACY AND NUMERACY ATTAINMENT

Improving the skills and motivation of teachers has been found to have a positive impact on the basic numeracy skills of young people in some countries, although there may be a time lag between a reform's introduction and its benefits becoming apparent. Reforms to basic skills education in Finland have led to a change towards research-based teacher education, whereby teachers are encouraged to constantly develop their teaching skills and knowledge through further research. Finland has also increased the academic requirements for teachers: classroom and subject teachers must obtain master's degrees; the former in education, the latter in their respective subjects. Significant improvements in numeracy and literacy skills among young people have been attributed to these reforms (Kupiaine, 2009).

In a 2014 report, Ofsted highlighted shortcomings in the teaching of English and maths in FE (Ofsted, 2014). One important issue was the observed lack of skill and experience among teachers in supporting learners to understand the concepts that underpin their skills development in these subject areas. Insecure subject knowledge in mathematics among teachers has been associated with negative attitudes towards teaching the subject, which in turn may be transmitted to the student (Bibby, 2002) (Goulding, et al., 2002).

With around one in five maths lessons and one in six English lessons in 2015 being taught by non-specialists, initiatives are currently underway in the UK to improve the skills of maths and English secondary teachers (DfE, 2016a, p.18). Grants of £20,000 are now offered to maths graduates who become teachers to encourage higher academic standards among secondary school maths teachers. Graduates choosing to teach English are also offered a bursary. Programmes to enhance the skills of existing maths and English teachers and support their professional development have also been introduced.

9. 'CONTEXTUALISED LEARNING' MAY ENHANCE LITERACY AND NUMERACY SKILLS

The observed improvement in young people's skills upon entering the workplace supports the case for a contextualised approach to learning, where skills are acquired while learning something else that falls within the individual's interests or needs (House of Commons, 2014-15). Such approaches can engage low-skilled learners who have negative feelings about classroom numeracy and literacy, positively change attitudes towards FE and training, improve self-confidence, and enable the achievement of numeracy and/or vocational qualifications (Brooks et al., 1996) (Ofsted, 2011) (Vorhaus et al., 2011). There is evidence that skills gained in conjunction with an occupational skill are more likely to be sustained (Kuczera et al., 2016). The army has reported impressive results through embedding literacy and numeracy learning in the workplace, with 10,703 Functional Skills (FS) English or maths awards achieved through the army apprenticeships route during 2012 and 2013 (House of Commons, 2014-15,

p.31). The use of contextualised content in prison-based programmes has led to increased voluntary attendance rates in classes and improved levels of engagement (Vorhaus et al., 2011).

Contextualised learning approaches in FE have also yielded good results. According to a recent Ofsted report, FE providers that had achieved 'outstanding' status featured strong collaboration between vocational teachers, subject teachers and specialist teachers in implementing learning activities to allow students to gain maths and English skills in meaningful, work-related contexts. This was found to have a positive effect on learners' development of these skills. The US Accelerating Opportunity initiative has also seen positive results in integrating basic skills alongside technical education courses at local community colleges for adult learners, such as a more positive attitude to learning among students and improved satisfaction (outcomes from first year of the programme). The initiative includes dual teaching by subject-specific teachers and technical instructors, which is more expensive than single-teacher-run classrooms (Anderson, et al., 2014) (Kuczera, et al., 2016). Ofsted recommends that FE providers promote communication and collaboration among vocational teachers and maths and English specialists to provide contextual approaches to the teaching of literacy and numeracy skills (Ofsted, 2014), but in the UK these approaches may be hampered by staff shortages as a result of the reported lack of maths teachers in the FE sector (Snelson & Deyes, 2016).

SUMMARY

There are significant advantages to improving literacy and numeracy, including wage and employment benefits to the individual, productivity benefits for employers, positive societal outcomes, and significant, long-term GDP benefits to the economy.

In the UK today, people aged 16 to 29 have on average worse literacy and numeracy levels than the generation aged 30 to 45. This appears to be part of a persistent historical phenomenon in the UK, whereby literacy and numeracy continue to improve around the age at which people enter the workplace for the first time. It is unclear whether this life course improvement is sustainable in the long term, given the changes to the labour market highlighted in Chapter 1 and the decline in employer investment in training discussed in Chapter 7.

The 'inverted U-shape' of literacy and numeracy attainment is consistent with other OECD countries, but the UK's literacy and numeracy attainment for young people is below the OECD average. This could be a snapshot of a transition whereby a majority of OECD countries ultimately achieve higher literacy and numeracy for all age groups. Literacy and numeracy achievement is subject to regional variation, with London and the South East achieving higher attainment scores. The UK has one of the closest associations between socio-economic background and literacy/numeracy in the OECD.

The fact that the UK lags behind other OECD countries in literacy and numeracy poses risks to the UK's future prosperity and competitiveness, but also indicates that there are interventions that can improve literacy and numeracy. Educational reforms, including addressing teachers' skills levels and making A-level and GCSE qualifications more stringent, are anticipated to improve literacy and numeracy skills among young people. The improvements in literacy and numeracy upon entry to the workplace suggest the effectiveness of contextual learning approaches in other spheres, including the family environment and in academia. Broadening the participation in these schemes, to more groups from an earlier age, could see individuals start their working lives with better literacy and numeracy skills.

CHAPTER 4

Improving the Work-Readiness of Labour Market Entrants

This chapter explores the types of skills that are in demand by employers and the shortcomings of labour market entrants. Possessing a good work ethic and character skills, such as such as responsibility, integrity and self-management are perceived by many employers as highly important, yet many applicants appear to lack these attributes. Possible approaches to helping individuals develop these skills before they enter the working world are discussed, as are the roles of the employer and education provider in achieving this goal.

KEY MESSAGES

- A significant number of employers believe labour market entrants are not properly prepared for the workforce. The UK compares poorly against other countries in this regard.
- Employers cite different failings in different surveys. In descending order, the following are generally cited by employers as the most important attributes of potential employees: attitudes towards work or 'character' skills; literacy and numeracy; qualifications and discipline-specific training (although this is important in certain sectors).
- Work placements and experience appear to be effective ways to help individuals gain the skills requested by employers. However, only around one-third of employers offer work experience placements, and those are geographically skewed towards the South East.
- The attitudes and qualities which employers seek can be developed within schools and through informal learning, for example participation in an after-school club, peer-to-peer learning or sports coaching.

1. POOR WORK-PREPAREDNESS IN THE UK

Almost every form of employment draws on workers' skills. Employers' perspectives on whether those leaving education are prepared for the labour market provide an insight into the effectiveness of the education system in teaching those skills. According to a 2014 survey by the UK Commission for Employment and Skills (UKCES), which gathered data from establishments that have recruited each type of education leaver in the previous 2 to 3 years, 36% of employers reported that 17- to 18-year-old school leavers in England are "poorly" prepared for the workforce (UKCES, 2014b, p.35). As may be expected, this number is higher for 16-year-old leavers and lower for FE and HE leavers (Figure 4.1). These findings are consistent with evidence provided to the House of Lords Select Committee on Social Mobility, which includes perspectives from the CBI and the Federation of Small Businesses (FSB) (House of Lords, 2016). The UK ranks near the bottom of a 9-country survey of the preparedness of "graduates/new hires" carried out by McKinsey (2012), though education providers tend to rate their graduates more highly (Figure 4.2).

FIGURE 4.1

English employers' rating of preparedness of education-leavers for work, based on survey evidence from establishments that have recruited each type of education leaver in the previous 2 to 3 years. Data taken from UKCES, 2014b, p.35.

Note: n (16-year-old school leavers) = 1,363; n (17- to 18-year-old school leavers) = 1,789; n (17 to 18-year-old FE college leavers) = 1,799; n (University/HE leavers) = 2,305.

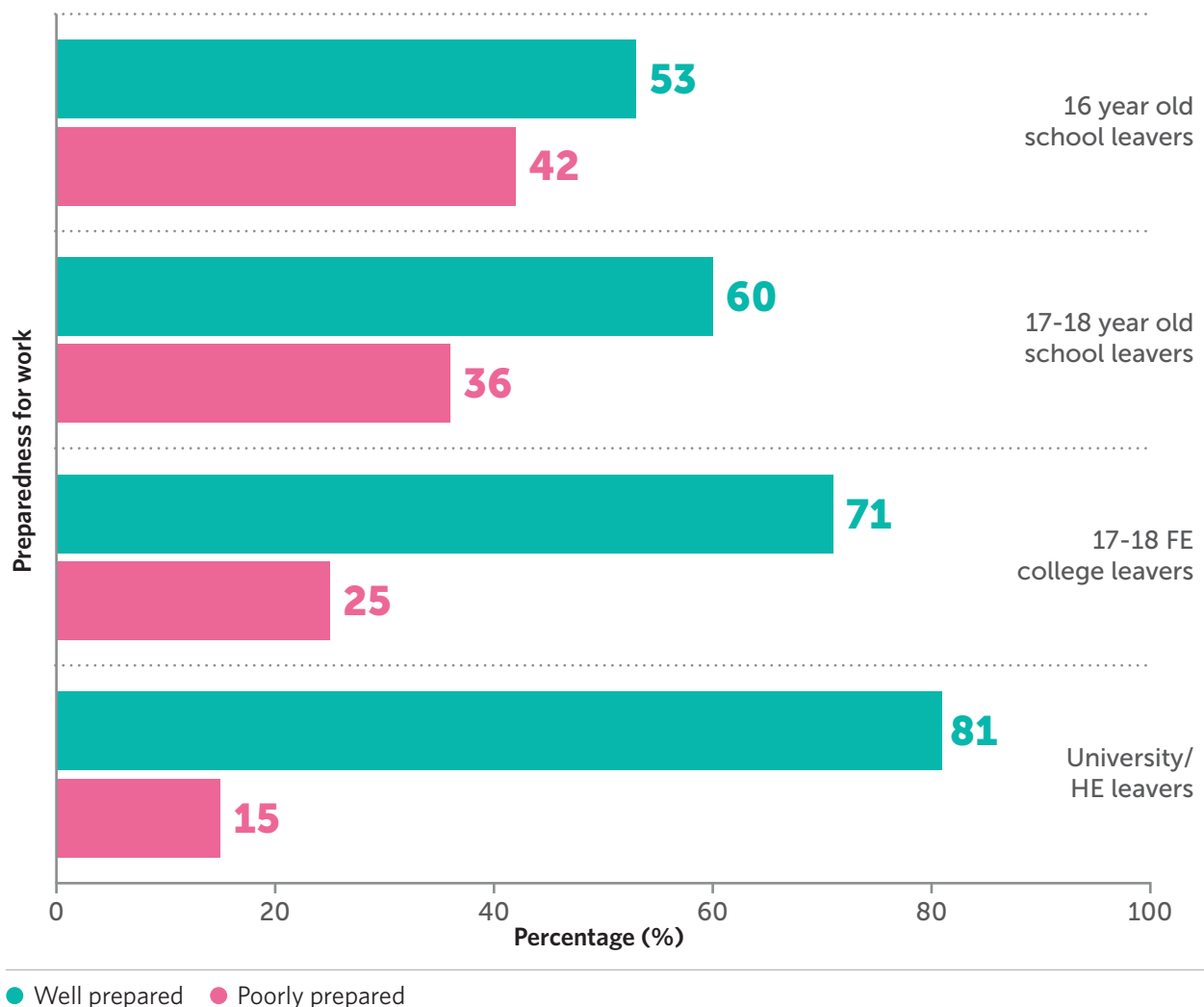
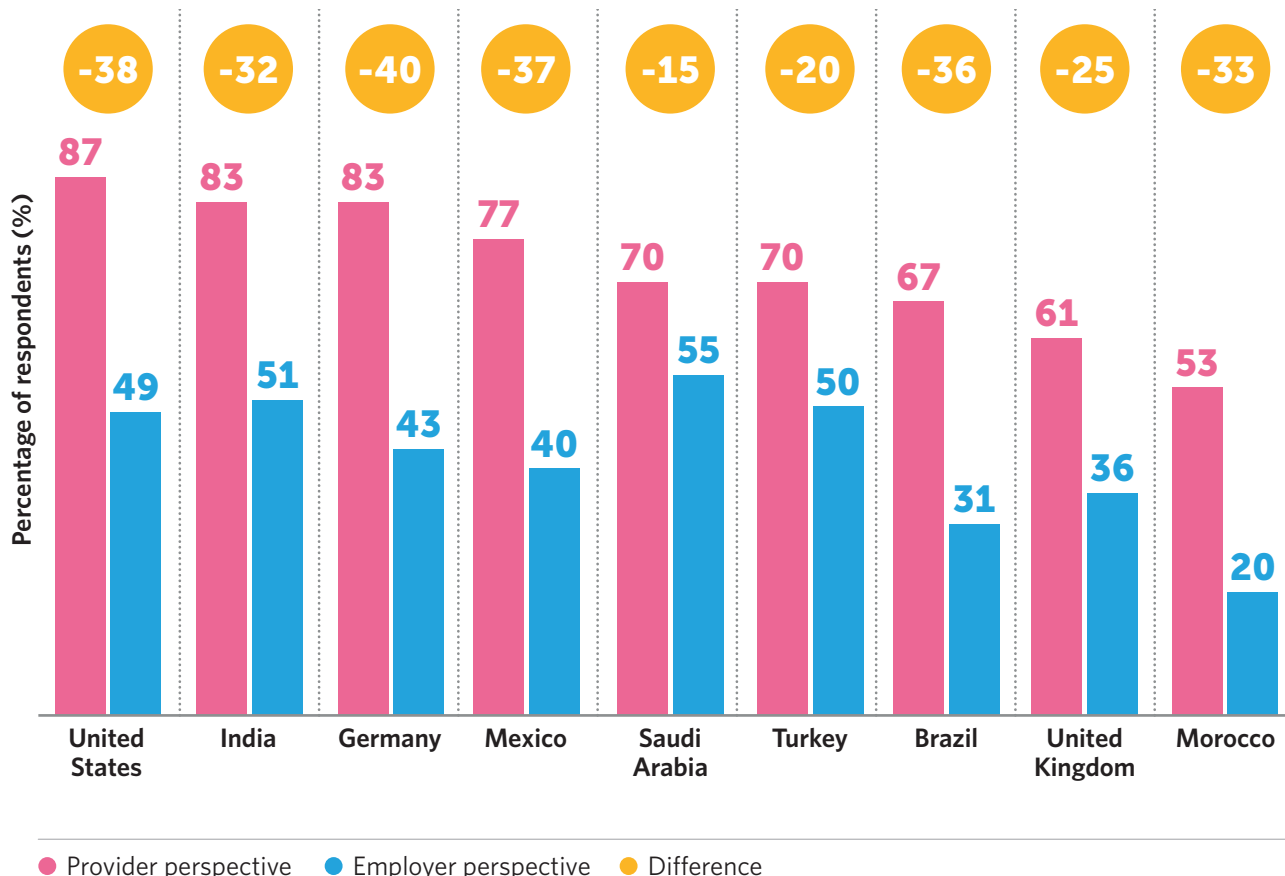


FIGURE 4.2

Percentage of employers and education providers who felt that graduates/new hires were prepared for the workplace according to a 9-country survey. Figure adapted from “Education to employment: Designing a system that works”, January 2013, p.40 McKinsey & Company, www.mckinsey.com. Copyright © 2017 McKinsey & Company. All rights reserved. Reprinted by permission.

Note: n (employers) = 300 per country (2,700 in total); n (education providers) = 100 per country (900 in total).



For firms, there is little evidence on whether there is a lasting impact of poor work-readiness on profits or productivity. However, for individuals, there is strong evidence that being unemployed when young leads to lasting negative effects in later life. This is manifested in terms of lower pay, a higher probability of unemployment later in life (Bell & Blanchflower, 2011) and higher levels of mental ill-health (Strandh, et al., 2014). McKinsey (2012) argues that, when aggregated, this may cause social and economic distress on a national level, as a result of too many young people believing their future is compromised. Even when unemployment is averted, labour market entrants are taking jobs with limited pathways to progression, such as part-time, low-skilled, temporary jobs, thus worsening social mobility (House of Lords, 2016) - although in some cases people may be taking these low-skilled jobs due to broader economic trends. Activities to improve work-readiness can help to reduce the likelihood of unemployment and underemployment.

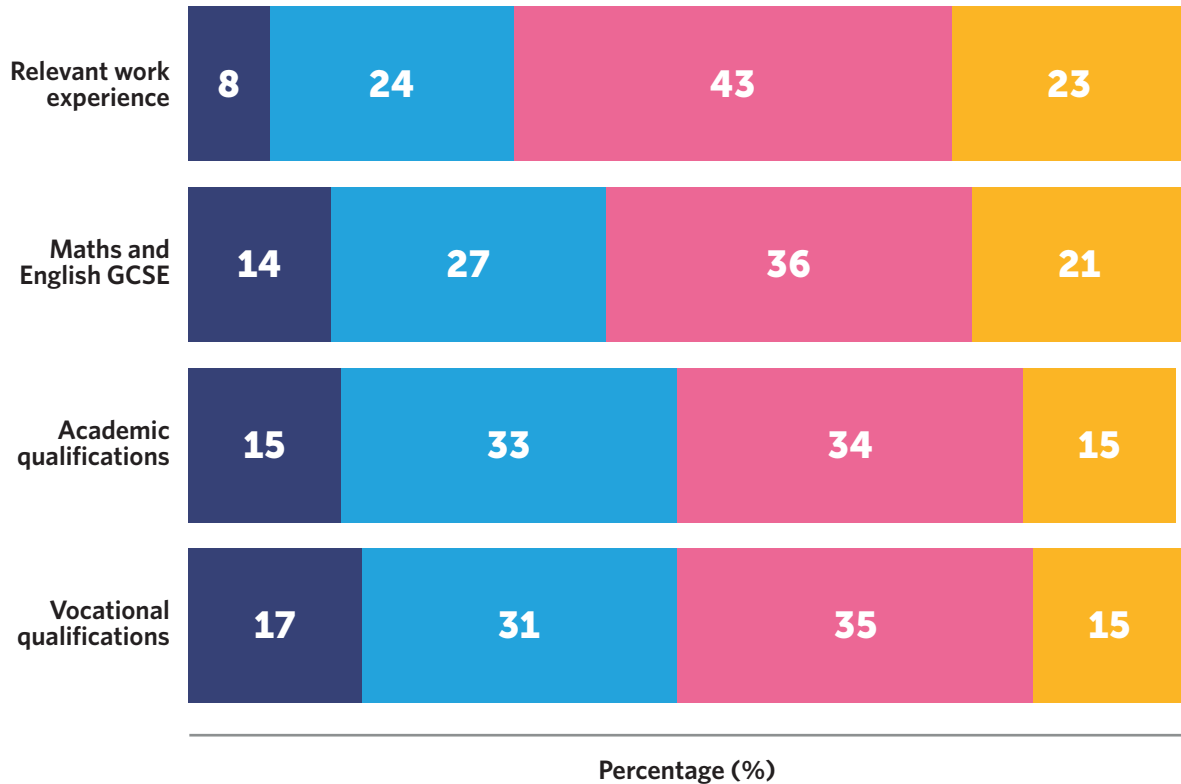
2. IMPROVING THE WORK-READINESS OF LABOUR MARKET ENTRANTS

UKCES's (2014a, p.23) survey of UK employers finds that "relevant work experience" is seen by two-thirds of employers as significant or critical when recruiting new staff (Figure 4.3). Work experience is cited as less important in the CBI's education and skills survey (2016), which identified "attitudes towards work/character" and "aptitudes for work" as the most important factors in recruiting school/college leavers (Figure 4.4). The difference may arise because the UKCES survey included older prospective employees, who may be expected to have more work experience than school/college leavers. McKinsey's survey of employers in 9 countries shows that "work ethic" and "teamwork" are seen as the most important factors in new hires (Figure 4.5) (McKinsey, 2012, p.44). UKCES's survey does not include an option of "work ethic" or "attitude towards work", although "relevant work experience" may be perceived by employers as a partial proxy for these attributes. Literacy or numeracy proficiency is cited in most survey results, but does not top the list. Qualifications or discipline-specific training are on average seen as less important, apart from in some sectors, such as education and financial services, where academic qualifications are considered much more important.

FIGURE 4.3

Importance of various work-related attributes according to a survey of UK employers. Figure adapted from UKCES, 2014b, p.23.

Note: n = 18,059; percentages do not add up to 100% as 'don't know' answers are not shown -2% in each case.

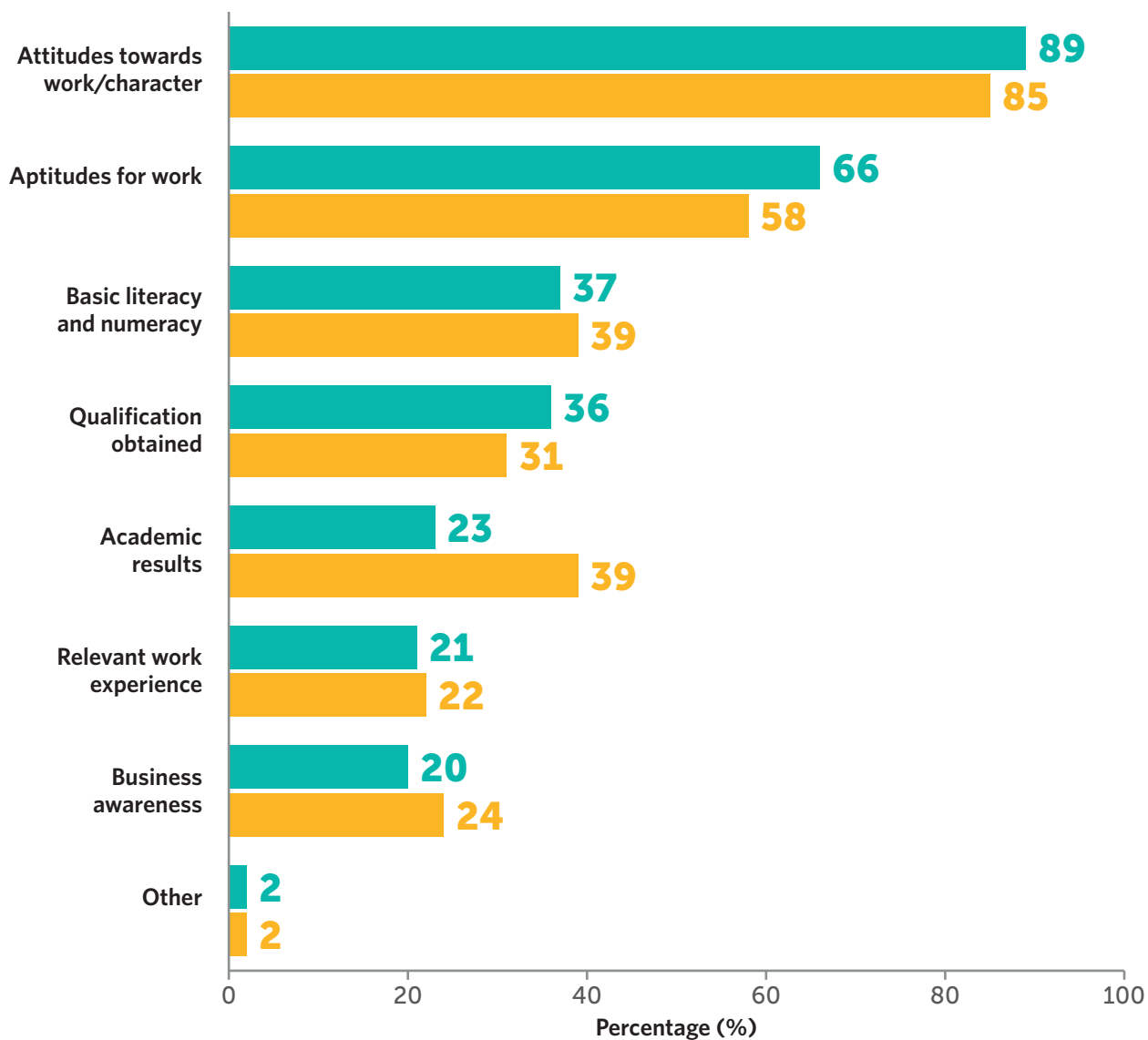


● No value ● Small amount of value ● Significant ● Critical

FIGURE 4.4

Most important attributes for new job recruits (school/college leavers) to possess according to a survey of UK employers. Figure adapted from © CBI, 2016b, p.31.

Note: n= ~ 500 organisations.

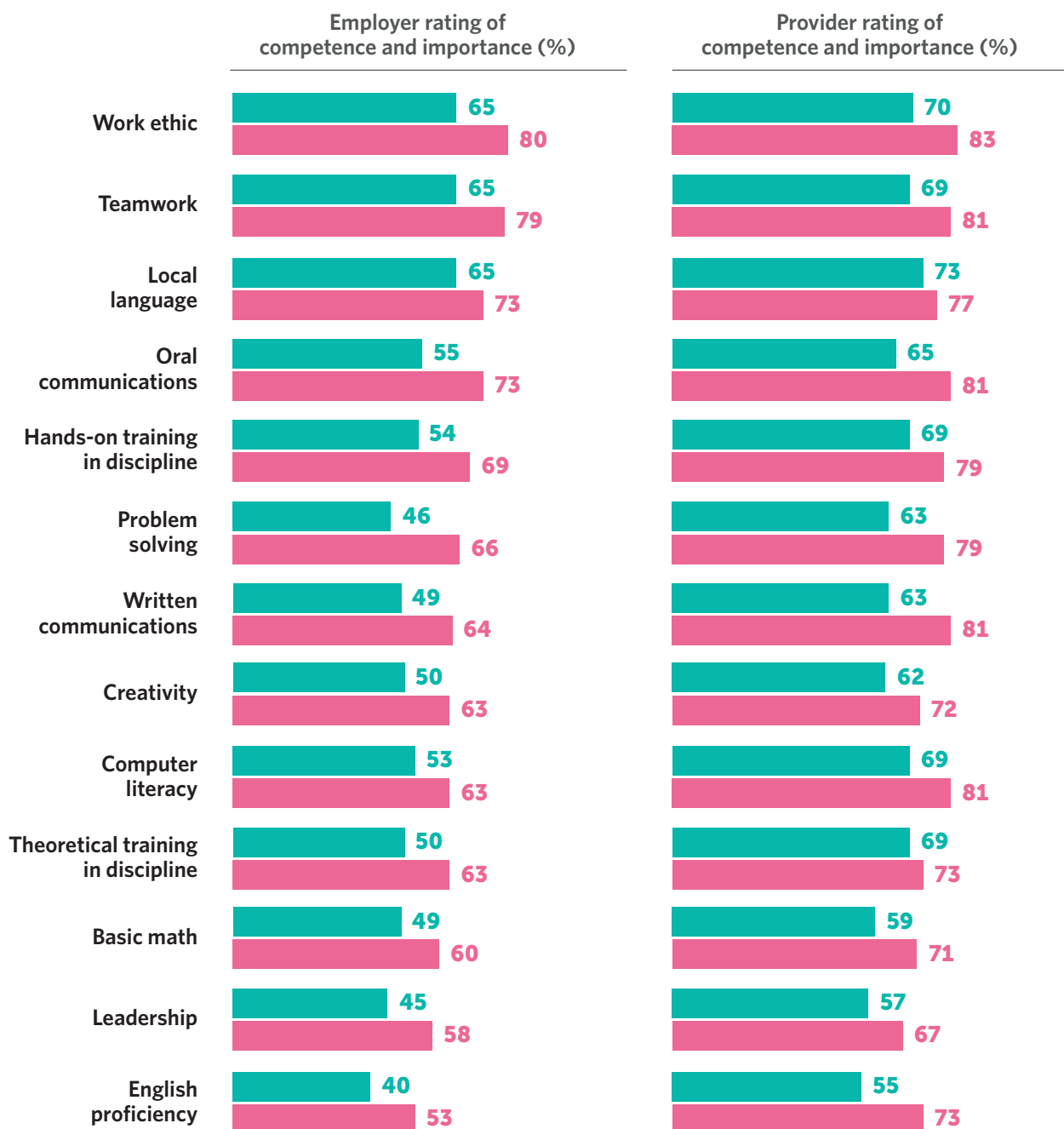


● 2016 ● 2015

FIGURE 4.5

Importance of various skills for new hires, and competence of new hires in those skills according to an international survey of employers and education providers. Figure adapted from © McKinsey, 2012, . Figure adapted from “Education to employment: Designing a system that works”, January 2013, p.44, McKinsey & Company, www.mckinsey.com. Copyright © 2017 McKinsey & Company. All rights reserved. Reprinted by permission.

Note: green bar indicates % of respondents who scored new hires as 8 or higher out of 10 when asked to rate competency on a scale of 0 to 10; where 0 is low and 10 is high. Pink bar indicates % of respondents who responded 8 or higher in terms of how important these skills are for new hires; where 0 is low and 10 is high; n (employers) = 300 per country (2,700 in total); n (education providers) = 100 per country (900 in total). Local language was only asked outside US and UK, and English proficiency was asked in all countries even when language of business was not English.

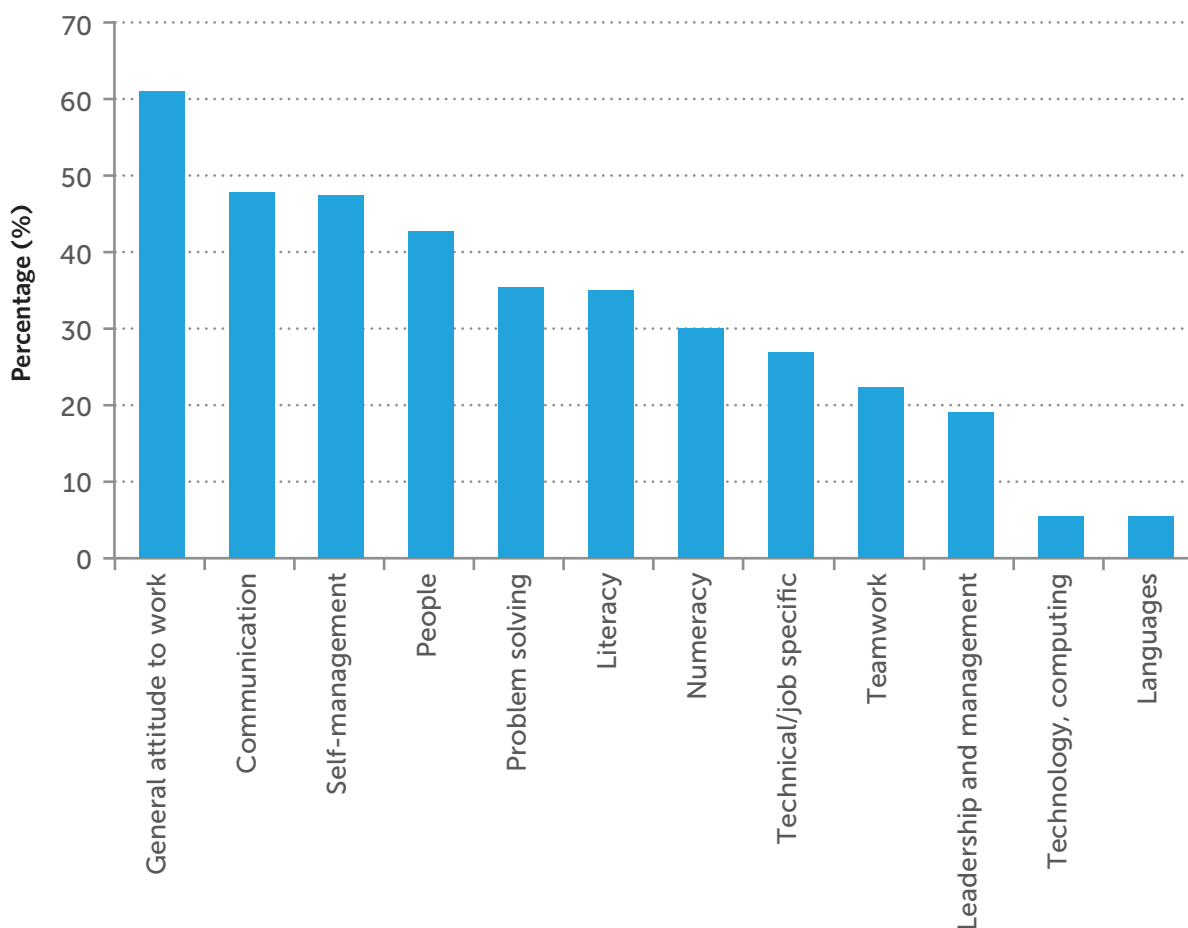


● Competence ● Importance

The McKinsey survey found that new hires are generally weakest in problem solving, written communication, basic maths and leadership, with the first two seen as more important in recruitment. The CBI survey found that around one-half of businesses are not satisfied with school and college leavers’ work experience (56%) or their skills in communication (50%), analysis (50%) and self-management (48%) (CBI, 2016b, p.32). Employers reported less dissatisfaction with recruits’ basic literacy (32%) and numeracy (29%) skills. The more representative National Employer Skills Survey conducted by the UKCES, shows employers largely ascribe poor work readiness to a lack of work- or life-experience: one-quarter of employers (in England, Wales and Northern Ireland) reported this to be the case for 16-year-old school leavers, and 10% of employers felt this was an issue for university leavers (UKCES, 2014b, p.35). The Federation of Small Businesses submission to the House of Lords Select Committee on Social Mobility records that “small businesses say young people they encounter are often not sufficiently prepared for the workplace. This includes not understanding how to present themselves, poor communication skills, and lack of time-keeping” (Figure 4.6) (Federation of Small Businesses, 2015). Heckman and Kautz (2013) cite US and UK employer survey data from the past 30 years as highlighting various ‘character skills’, such as responsibility, integrity and self-management as important for carrying out tasks in the workplace.

FIGURE 4.6
 Skills most lacking in recruitment candidates under the age of 24, according to a survey of small businesses. Figure adapted from Federation of Small Businesses, 2015.

Note: n = 2,000.



Although there is a risk of attributing too much significance to such survey evidence, which may reflect differing cultural expectations between generations, it can be surmised that employers seek the following qualities in individuals, in descending order of importance:

- positive attitude towards work, or character skills;
- literacy and numeracy skills; and
- previous work experience, qualifications or training in required discipline (more or less important, depending on sector).

Both cognitive and character skills are crucial to success in economic and social life (Heckman & Kautz, 2013). Character skills include perseverance, self-control, trust, attentiveness, self-esteem and self-efficacy, resilience to adversity, openness to experience, empathy, humility, tolerance of diverse opinions, and the ability to engage productively in society. Cognitive skills include fluid intelligence, or the rate at which people learn, and crystallised intelligence, which is acquired knowledge. Heckman and Kautz note that older terminology refers to character skills as ‘traits’, yet this is problematic as it conveys “a sense of immutability or permanence”. The distinction is important, as the authors argue that character skills can be developed over a lifetime and are more malleable in old age compared with cognitive skills (Heckman & Kautz, 2013).

McKinsey finds that successful programmes that improve pathways to work require education providers and employers to step into each other’s worlds, and also to actively engage with students early on (McKinsey, 2012). The next section describes possible ways to achieve this, such as: work experience or work placements; informal learning (see Box 4.1 for definition); and provision by schools and colleges. An important next step — beyond the scope of this report — is to consider how such measures may be scaled up. McKinsey notes three typical challenges to achieving scale: constraints on the resources of education providers; insufficient opportunities to provide young people with hands-on learning experiences; and the reluctance of employers to invest in training unless it involves specialised skills (McKinsey, 2012, p.21).

The chapter later considers measures to address attitudes towards work, or character skills. Steps to improve literacy and numeracy are discussed in Chapter 3. Chapter 5 identifies how to ensure qualifications are better aligned to employer requirements.

BOX 4.1: DEFINITIONS: TYPES OF LEARNING (UNESCO, 2016)

- **Formal learning** is defined as learning that is intended to lead to a nationally recognised qualification (e.g. university degree).
- **Non-formal learning** is a course or organized activity that does not lead to a nationally recognised qualification and is either self-motivated or peer driven (e.g. participation in a Workers’ Educational Association or U3A course, a Duke of Edinburgh award or participation in a sewing circle or local history group).
- **Informal learning** is learning that involves individual or collective study to improve knowledge of a subject, not involving taught classes or qualifications. This might include reading books, manuals, attending seminars and solving problems with colleagues in the workplace. Generally the impulse for informal learning comes from the individual or group of individuals, whereas formal and non-formal learning fit within existing organisational structures, for example a classroom, workplace or course.

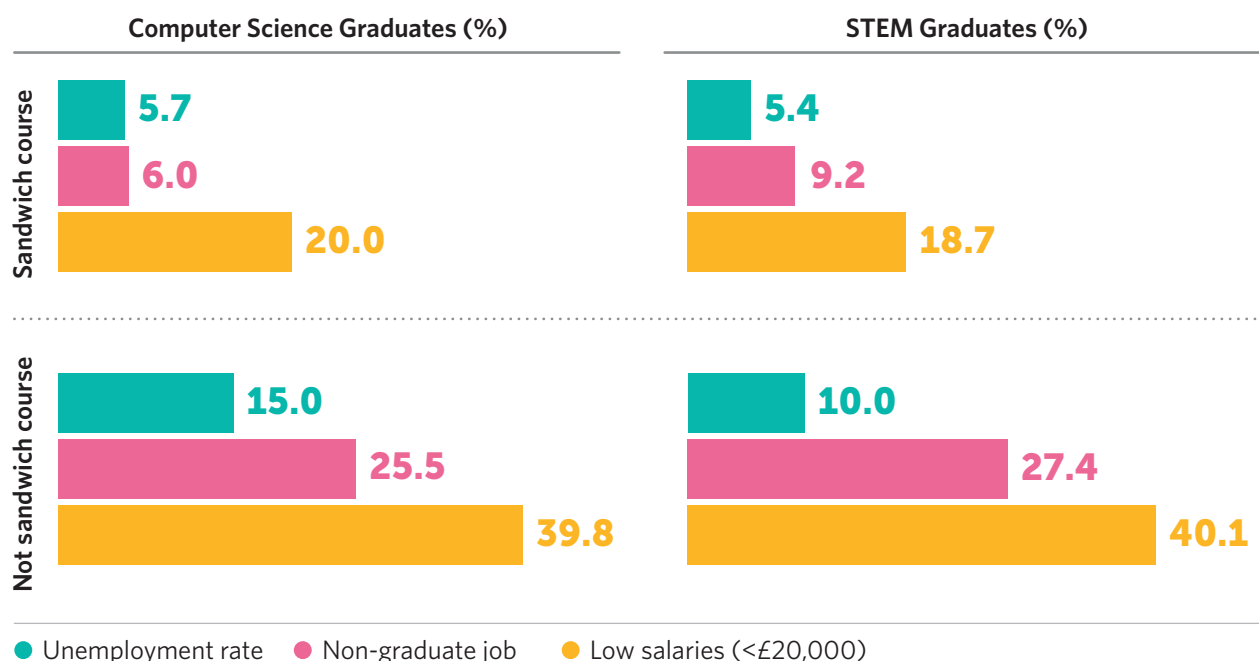
3. WORK EXPERIENCE AND WORK PLACEMENTS

Work experience plays an important role in preparing prospective employees for the workplace, as well as in helping individuals find employment through organisational recruitment strategies. Data indicates that, controlling for highest level of attainment, young people who have four or more work experience activities during their education are five times less likely to fall into the classification of ‘not in education, employment, or training’ (NEET) (Mann, 2012, p. 27-28). From their empirical study of interventions in the US, Heckman and Kautz (2013) find that the most promising adolescent programmes integrate aspects of work into traditional education. In the UK, science, technology, engineering and maths (STEM) and computer science graduates who have taken part in sandwich courses (university course including a year’s formal practical experience) typically enjoy significantly better employment outcomes compared with those who have not (Figure 4.7) (Shadbolt, 2016, p. 29).

FIGURE 4.7

Employment outcomes of UK graduates from STEM and computer science courses 6 months after leaving higher education. Data taken from Shadbolt, 2016, p. 29.

Note: full-time graduates from publicly-funded English Higher Education Institutions in the period 2011 to 2014.



Although work experience is perceived as important by employers, and is considered helpful in building other positive attributes, according to the 2014 UKCES survey only 38% of employers in the UK had offered work placements in the previous 12 months (UKCES, 2014b, p.39). The report of the House of Lords Select Committee on Social Mobility notes that “some of the skills needed for the workplace can only be gained through experience of work” (House of Lords, 2016). The Select Committee also received evidence that employers “expect education to prepare young people, rather than seeing it as part of their responsibility when an employee starts work”. This creates a ‘Catch 22’ situation: to be adequately prepared for work, labour market entrants need the skills that are best acquired through working (UKCES, 2011).

Compounding the mismatch between employers wanting and offering work experience, there are regional differences in the proportion of employers offering work placements (Figure 4.8), with

employers outside of London less likely to offer work placements. This may be because areas that perform better on economic indicators such as GVA and areas with higher levels of knowledge intensive businesses tend to have higher proportions of employers offering work placement opportunities to young people (UKCES, 2015a).

For those businesses not offering work experience placements, a lack of suitable options for work experience within their workplace was the most commonly cited barrier (38%) (UKCES, 2014b, p.53). High-quality work experience is incorporated into most FE courses (DfE, 2015), and the government recently accepted recommendations for the establishment of 15 routes to skilled employment, which include college-based and employment-based learning across a number of sectors. Employers will advise on the knowledge, skills, and behaviours that individuals need in order to ensure that their requirements are reflected in the design of each route. These proposals were taken forward in the 'Post-16 Skills Plan' (DfE, 2016b) and are included in the Technical and Further Education Bill currently before Parliament (Technical and Further Education Bill, 2016-17). However, work experience or placements are not uniformly offered in HE. A small number of universities in the UK provide the majority of sandwich courses, a number of which were previously Colleges of Advanced Technology and polytechnics (BIS, 2012b).

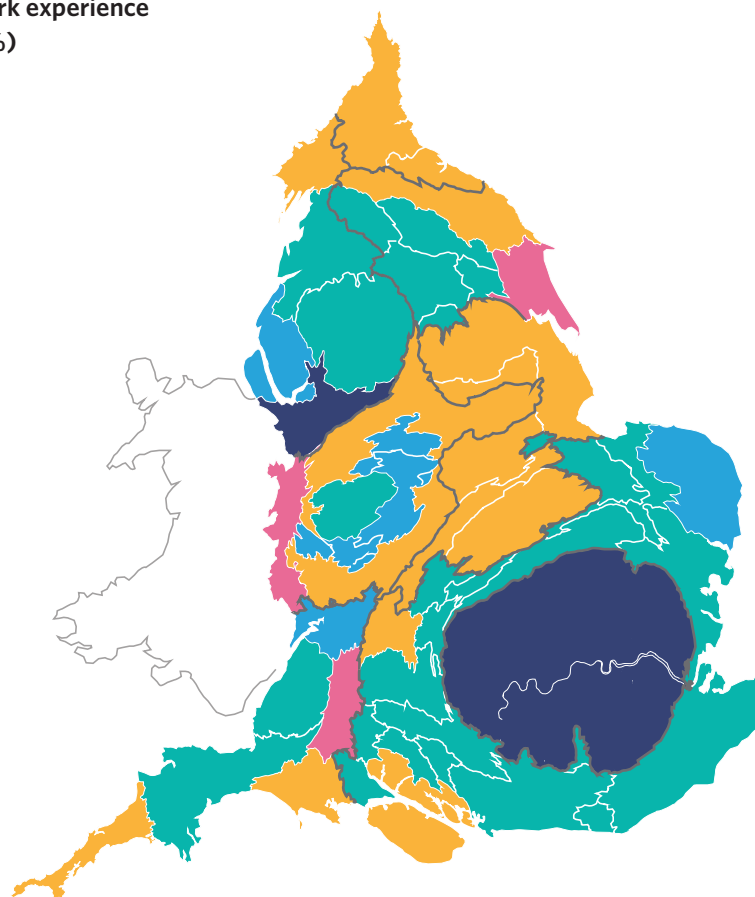
FIGURE 4.8

Local proportion of employers in England offering work placements in the last 12 months, as surveyed in 2014. Figure taken from World Mapper, 2016. Contains National Statistics data © Crown copyright and database right 2017.

Note: cartogram adjusted for population.

Employers offering work experience placements in 2014 (%)

- above 45
- 40 to 45
- 35 to 40
- 30 to 35
- 30 and below



4. INFORMAL LEARNING TO DEVELOP POSITIVE ATTITUDES TO WORK AND CHARACTER SKILLS

The House of Lords Select Committee on Social Mobility found that young people are developing a wide range of skills through work with voluntary sector organisations, citing the example of the Barnardo's Phase 2 service, which provides advice on the skills needed to support sustained employment.

Research undertaken by Demos (London, UK) found that non-formal learning (see Box 4.1 for definition), in various forms, can have a significant impact on both educational and character outcomes (Birdwell, 2015). The report, which draws upon evidence from surveys of 14-18-year-olds and teachers from around Great Britain, as well as a detailed case study of the UK's Scout Association, demonstrates that teachers, youth leaders and young people agree that non-formal learning in this context works in boosting social and emotional skills, as well as positive attitudes towards school. Heckman and Kautz (2013) identify adolescent mentoring as effective in improving outcomes, particularly in educational attainment and employment.

Informal learning is not taken up equally across the population. Demos finds that people from disadvantaged backgrounds are least likely to take part in informal learning, and therefore least likely to develop the skills required for success; the Federation of Small Businesses cites limitations in social networks as causing people from disadvantaged backgrounds to have fewer opportunities to develop life skills outside of the school setting (House of Lords, 2016) (Federation of Small Businesses, 2015). Informal learning would need to be targeted in such a way that it addresses these differences in uptake, in order for it to widely improve attitudes towards work and character skills.

5. ROLE OF SCHOOL AND EARLY-YEARS INTERVENTIONS

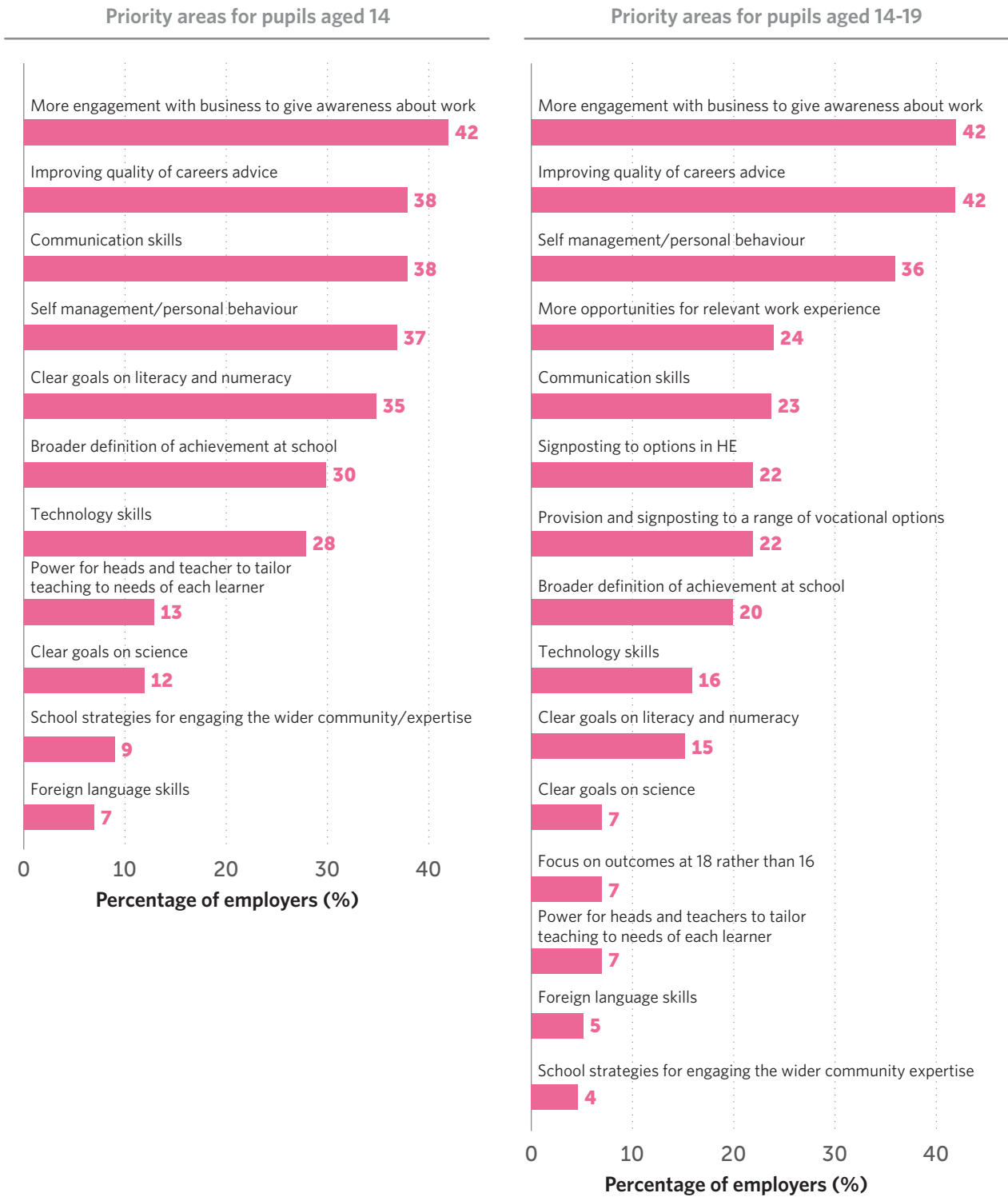
The House of Lords Select Committee on Social Mobility report notes that life skills are not embedded in an effective way alongside or within the curriculum, with young people leaving the education system insufficiently prepared for the world of work. The CBI survey found that employers consider "more engagement with business to give awareness of work" as the priority area for education for both pre- and post-14-year-olds (CBI, 2016b, pp. 33-34) (Figure 4.9). Businesses also seek higher levels of "self-management/personal behaviour" and "more opportunities for relevant work experience" in post-14 education (careers advice, which is the second highest priority for employers, is covered further in Chapter 5). In their analysis of US case studies, Heckman and Kautz (2013) found that many early interventions targeting infants, such as the Nurse Family Partnership and the Perry Preschool Program, successfully improve character skills. They also found that large-scale programmes implemented in schools were successful.

The University of Birmingham's interdisciplinary Jubilee Centre for Character and Virtues has developed the 'Character Education: Evaluation Handbook for Schools' to assist primary and secondary schools in assessing initiatives to develop pupils' non-cognitive skills (University of Birmingham, 2013). There is currently no public information about the effectiveness of this handbook, but collaborations also exist between schools and businesses to better prepare young people for employment. The British Chambers of Commerce School and Business Partnership Project, in collaboration with the Government Equalities Office, developed 'A Model for School and Business Partnerships to Promote Young People's Career Prospects' (British Chambers of Commerce, 2016). This initiative focused on raising young women's aspirations in well-paid STEM-related careers.

FIGURE 4.9

Priority areas for action in education for pupils aged 14 and those aged between 14 and 19 years. Data taken from CBI, 2016b, pp.33-34.

Note: n = 500 employers.



SUMMARY

Many employers feel that labour market entrants are unprepared for the workplace, and the UK compares poorly with other countries in this regard. A range of reasons are given for this in different employer surveys but they tend to cluster around three themes. These are, in priority order: poor attitudes towards work and other character issues; literacy and numeracy; and the wrong qualifications or disciplinary skills. Work experience appears to be an effective route to developing the attitudes and character traits desired by employers. However, work experience placements are only offered by around one-third of companies, and this is geographically skewed towards the South East. Focusing on improved access to work experience can be a productive route for policy makers. There is also the potential for using informal learning to help prepare individuals for work, although this is not likely to be equally taken up across the socio-economic spectrum, meaning that schools should also play an important role. An important next step is to assess the scalability of promising options.



CHAPTER 5

Mismatches Between Demand for and Supply of Skills

This chapter explores the supply of and demand for skills in the UK and examines skills underutilisation and skills shortages.

Although skills mismatches are an inherent phenomenon in any labour market, evidence suggests the incidence of skills underutilisation is particularly high in the UK, which can be damaging both to the economy and society. The graduate wage premium identified in Chapter 2 means it is rational for an individual to get a degree, but this premium is an average aggregate number so some qualifications may make less sense for some individuals and add to skills mismatches. Better labour market information (LMI) can unpack the aggregate information and inform future choices around education with historic evidence of benefits from studying specific courses in specific places. The chapter concludes by considering potential measures to improve labour market efficiency, centred on LMI.

KEY MESSAGES

- Mismatches between the demand for and supply of skills can result in skills underutilisation (when the skills supplied by the workforce exceed the skills in demand by employers) and skills gaps and shortages (when demand exceeds supply).
- Skills mismatches arise in any economy: as the nature of work changes there are lags caused by the time required for individuals to adjust their skills and the education system to respond. However, the incidence of skills underutilisation in the UK is high compared with many other countries. Labour mobility can both address and contribute to this.
- Skills underutilisation has negative impacts on employees, including lower pay and poor job satisfaction, and on employers, including diminished productivity and quality of work.
- Skills shortages exist across the economy and vary depending on sector and occupation. Skill gaps within companies and vacancies due to skills shortages impede organisational efficiency and productivity and negatively affect staff.

KEY MESSAGES (CONTINUED)

- An imbalance in the demand for and supply of skills can be caused by: a disconnect between the skills that are in demand and the educational and occupational choices people make; training and education providers failing to mirror the demands of the labour market; changes in the marketplace and the inevitable time lag between the speed of changes in demand (particularly for fast moving technological change) and the response of the education and training systems.
 - Better LMI can help workers and employers forecast skills requirements and respond to fluctuating supply and demand for skills, resulting in a more efficient labour market. LMI may also be used to support better quality and more robust career information, advice and guidance so that the skills in demand are effectively communicated to those entering the labour market and those planning to change careers.
-

1. SKILLS MISMATCHES IN THE UK

The UK currently has high levels of employment, with unemployment rates at an 11-year low. In 2016 the employment rate (the proportion of people aged 16 to 64 in work) was 74.5%, the joint highest since comparable records began in 1971 (ONS, 2017a). However, skills mismatches are likely to occur as a natural part of any economy. Skills surpluses exist when the supply of particular skills in the workforce is greater than the demand for those skills by employers, and results in skills underutilisation. Skills shortages occur when demand for specific skills by employers is greater than the supply of those skills by the labour force. The evidence suggests that skills mismatches are a particular problem in the UK.

2. SKILLS UNDERUTILISATION IN THE UK

Over half of the UK's workforce (51% of employees) report having skill levels that are higher than needed to do their current job, ranking the UK the second highest in the EU for skills underutilisation (Figure 5.1) (Cedefop, 2014). Although these are self-reported figures, their findings are mirrored in employer surveys which suggest that a high proportion of jobs (22%) do not require an education beyond compulsory schooling (Figure 5.2). This ranks second only to Spain when compared to other EU states surveyed (OECD, 2012c, p.168). Whilst relying on surveys means cultural differences may affect how they are completed, independent estimates of British graduates employed in non-graduate roles are around 50% (CIPD, 2015, p. 14; ONS, 2013).

FIGURE 5.1
 Skills underutilisation (%) in EU countries, 2014. Figure adapted from Cedefop, 2014 © European Union.

Note: n=49,000 EU workers; skills underutilisation is defined as a percentage of adult employees who report that they have higher skills than required to perform their current job.

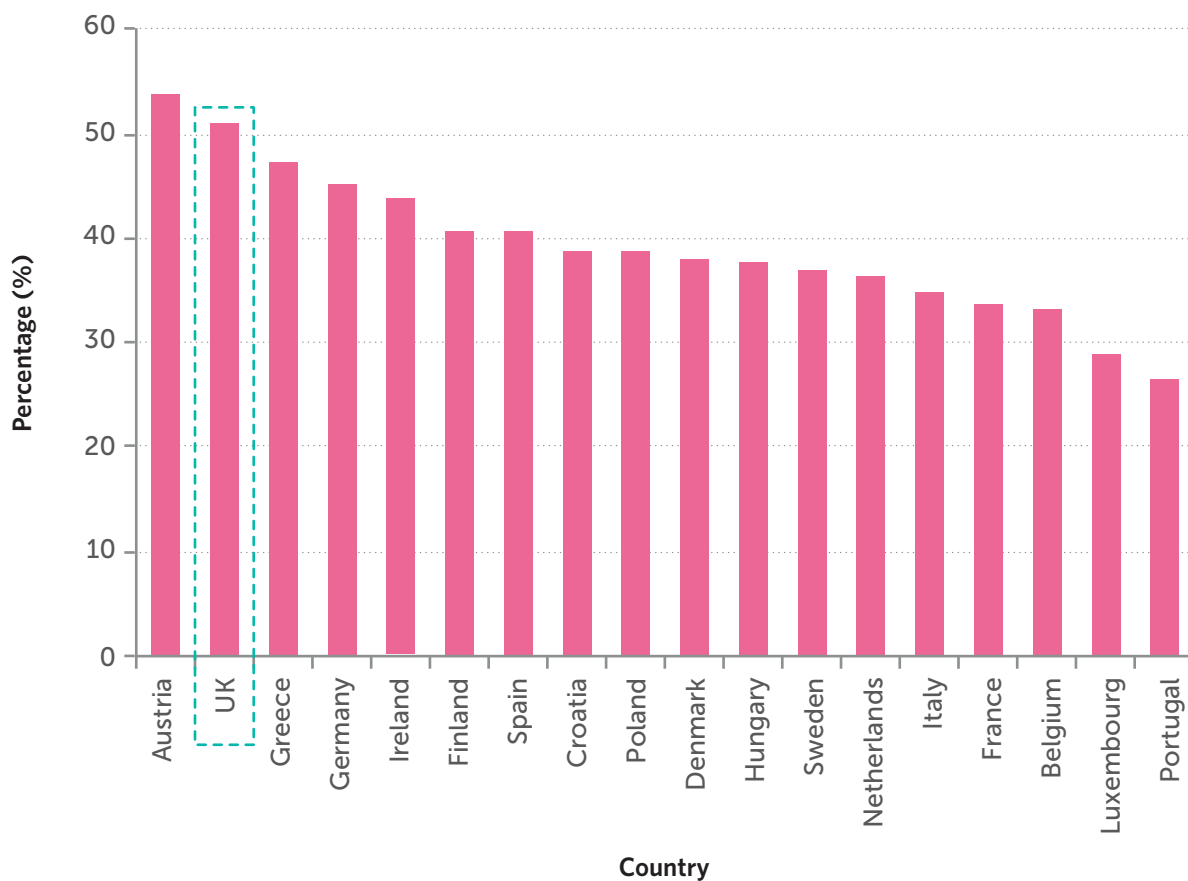
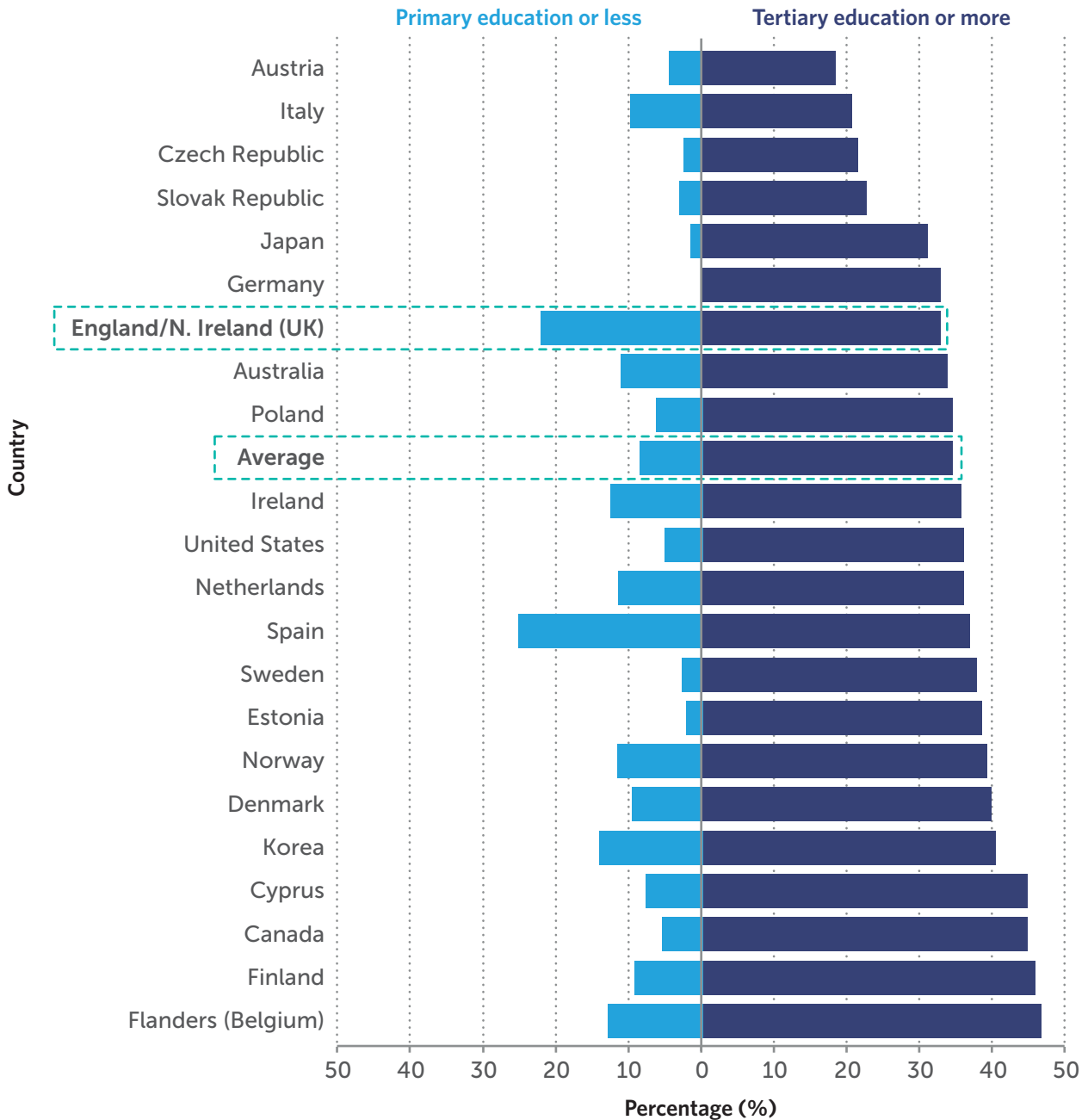


FIGURE 5.2

Percentage of workers in jobs requiring primary education (ISCED-1) or less and those in jobs requiring tertiary education (ISCED-5 or higher). Figure adapted from © OECD, 2013, p.168.

Note: ISCED is the International Standard Classification of Education, a statistical framework for organizing information on education maintained by UNESCO; n = ~5000 per country.



3. THE COST OF SKILLS UNDERUTILISATION

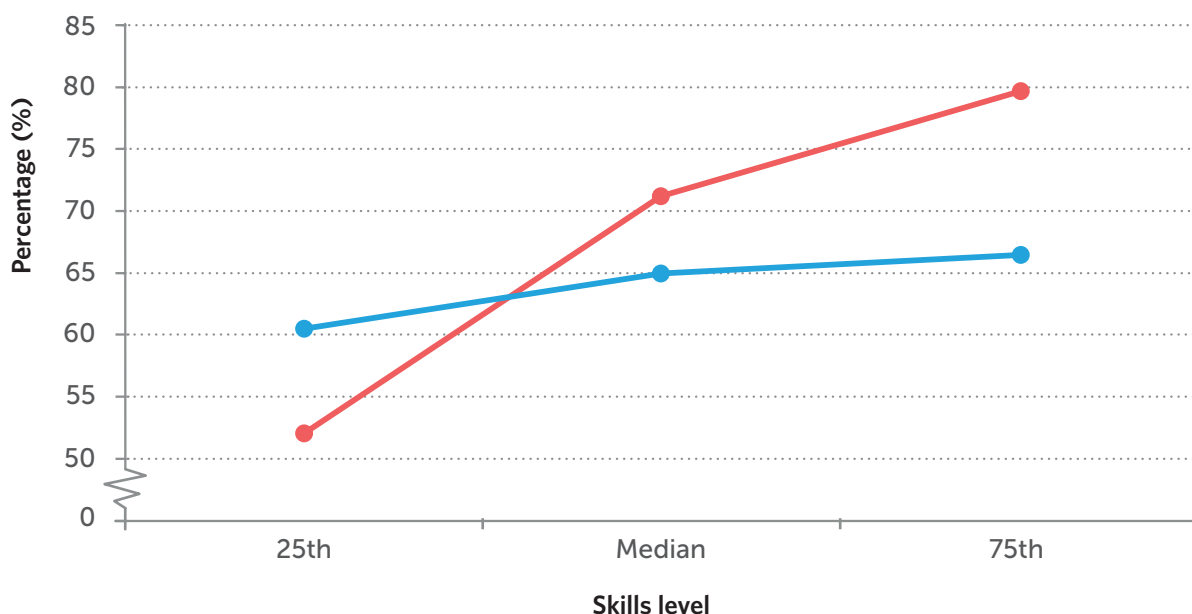
Skills underutilisation is associated with lower pay and poor job satisfaction, as opposed to equally skilled workers who are using their skills more fully (UKCES, 2015a). For example the significant increase in graduates in recent decades, alongside other labour markets changes, has contributed to a higher median wage premium for graduates, but a wider spread between the highest and lowest graduate earners (Figure 5.3). The result is that the wage difference between the highest and lowest earning graduates is much higher than it was a decade ago (Green & Henseke, 2016). This may reflect an increasing spread of real skill levels across the graduate population, possibly as a result of the recent growth in university participation, partially driven by expansion among less selective institutions (Office for Fair Access, 2014). The underutilisation of skilled workers affects not only individuals but also society generally (Green, 2016a).

For industry, skills underutilisation can result in lower productivity and lower product/service quality (Dickerson, et al., 2015). Full utilisation of skills could boost productivity by as much as 3% (equivalent to £25bn) of the labour share of UK GDP (based on 2016 GDP) (Holmes, 2017). Although full utilisation is an implausible theoretical maximum, this figure underscores the potential economic benefits of increasing utilisation. A more realistic move towards the levels of skills utilisation seen in other European countries like Germany and France would represent a boost of £5-9bn (Holmes, 2017, p.15).

FIGURE 5.3

The impact of tertiary education on wage premium, where wage premium is the percentage difference between the hourly pay of those with tertiary education compared with those with lower secondary education. Figure taken from Green, 2016a, p.14.

Note: the estimates derive from quartile analysis of data taken from labour force surveys (Green & Henseke, 2016). 1997/2001 reflects the average for these two years. The equivalent applies to 2006/2012. Survey data taken from: Skills and Employment Survey, 2012 (SN 7466) of 3,200 workers aged 20-65 years; Skills Survey, 2006 (SN 6004) of 7,787 workers aged 20-65 years; Skills Survey, 2001 (SN 4972) of 4,470 workers aged 20-65 years; Skills Survey, 1997 of 2,467 workers aged 20-60 years.



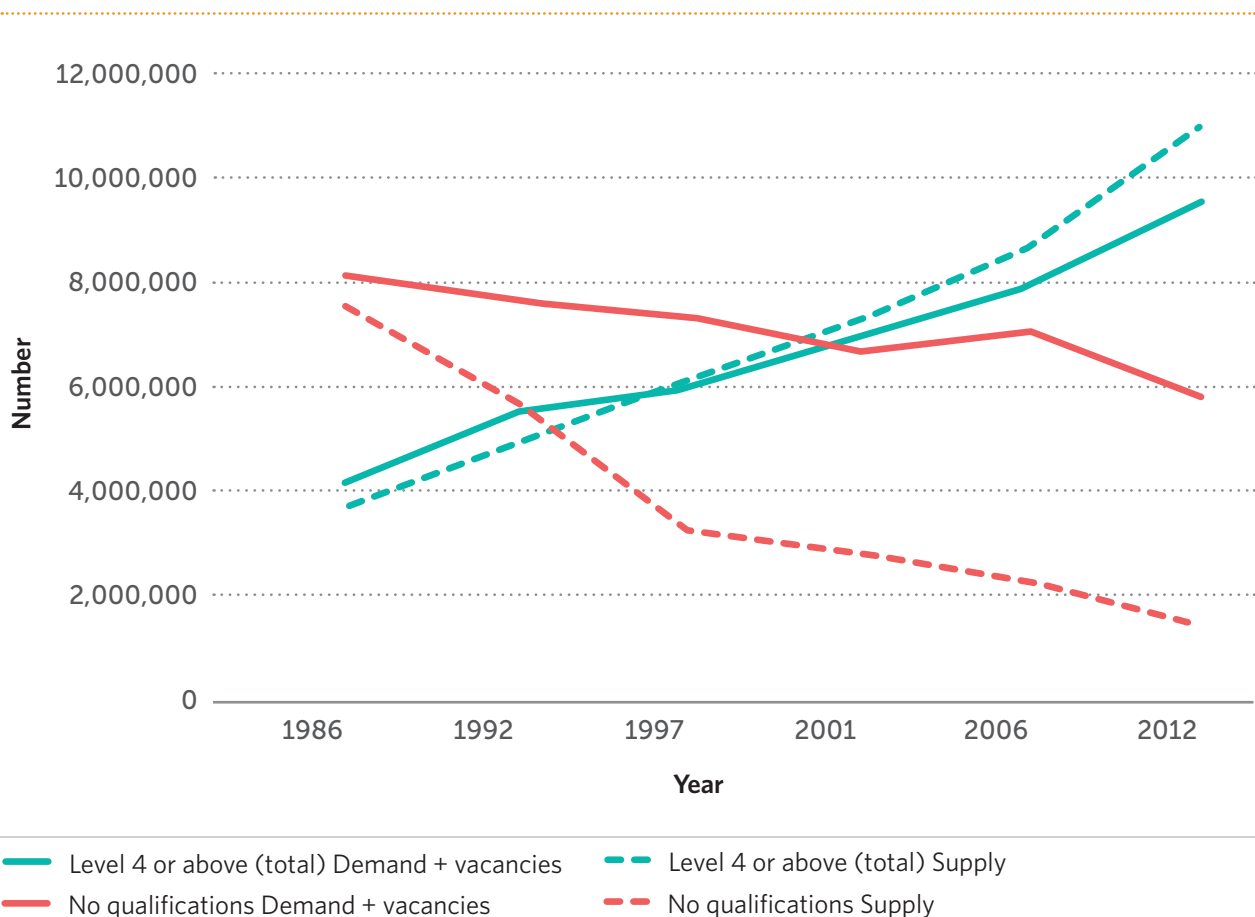
4. EXPLANATIONS FOR SKILLS UNDERUTILISATION IN UK

Skills underutilisation is caused by an oversupply of a given skill compared to employer demand for a given skill. Since the 1990s, the UK has witnessed a growing surplus of individuals with Level 2, 3, 4 and above qualifications¹⁴. In contrast, there has been a growing deficit of workers with no qualifications (Felstead & Green, 2013). For example, Figure 5.4 shows that the number of jobs requiring Level 4 or above qualifications has more than doubled in recent decades, but the rise in the number of individuals with those qualifications has outpaced demand. Conversely, there has been a long-running undersupply of workers with no qualifications (Felstead & Green, 2013, p.23).

FIGURE 5.4

Qualification supply and demand mismatch in Britain from 1986 to 2012, where demand is the number of jobs + vacancies requiring no qualifications/Level 4 and above, and supply is the number of people with no qualifications/Level 4 and above. Data taken from Felstead & Green, 2013, p.23.

Note: data taken from Skills and Employment Surveys 1986/1992/1997/2001/2006 for individuals in employment aged 20-60 years old (although 2006 and 2012 surveys additionally sampled those aged 61-65). The numbers of respondents were: 4,047 in the 1986 survey; 3,855 in 1992; 2,467 in 1997; 4,470 in 2001; 7,787 in 2006; and 3,200 in 2012.



Whilst increasing the number of workers with no qualifications may seem an obvious fix to this mismatch, it would greatly limit the scope for such individuals to maximise their potential and ability to move to jobs requiring qualifications later in their career.

¹⁴ See Table 2.3 for description of Levels.

Additionally, just because a role does not directly require a qualification does not mean that qualifications would not boost the productivity of those in the role. Another consideration is that what firms currently demand reflects what is on offer. The mismatch between supply and demand may be explained if the increase in the supply of qualifications has been strong but in areas where the skills developed are not valued, or if the quality is very suspect – firms are unlikely to want these qualifications. If increases in qualification levels were in areas which were more relevant or higher quality, then supply and demand might match more closely.

5. SKILLS SHORTAGES IN THE UK

Skills shortages generally arise when vacancies are hard to fill due to an insufficient number of potential recruits or a lack of the required skills among candidates. This report has already cited employer surveys highlighting this problem among first-time labour market entrants (see Chapter 4); however, evidence indicates that this issue exists across the workforce. The UK Employer Skills Survey 2015 found that more than a fifth of the 930,000 reported vacancies were “hard to fill because of skill shortages”. This amounts to 209,000 ‘skill shortage vacancies’ experienced to some degree by 6% of all employers (Vivian et al., 2016, p.151).

Skills shortages vary according to sector and occupation. The gas, electricity and water industries have the highest proportion of jobs classed as hard to fill due to skills shortages (36%), followed by 34% in construction and 30% in manufacturing. By occupation, the proportion is highest in skilled trades (43%), machine operators (33%) and in professional occupations (32%) (Vivian et al., 2016, p.151). The Home Office Migration Advisory Committee¹⁵ maintains a detailed list of specific skilled occupations deemed to be in shortage. Some skilled occupations that meet more than half of the Committee’s indicators for the existence of a shortage include: engineers, production managers in mining/energy, and town planning officers (MAC, 2013).

6. SKILLS SHORTAGES IN THE UK

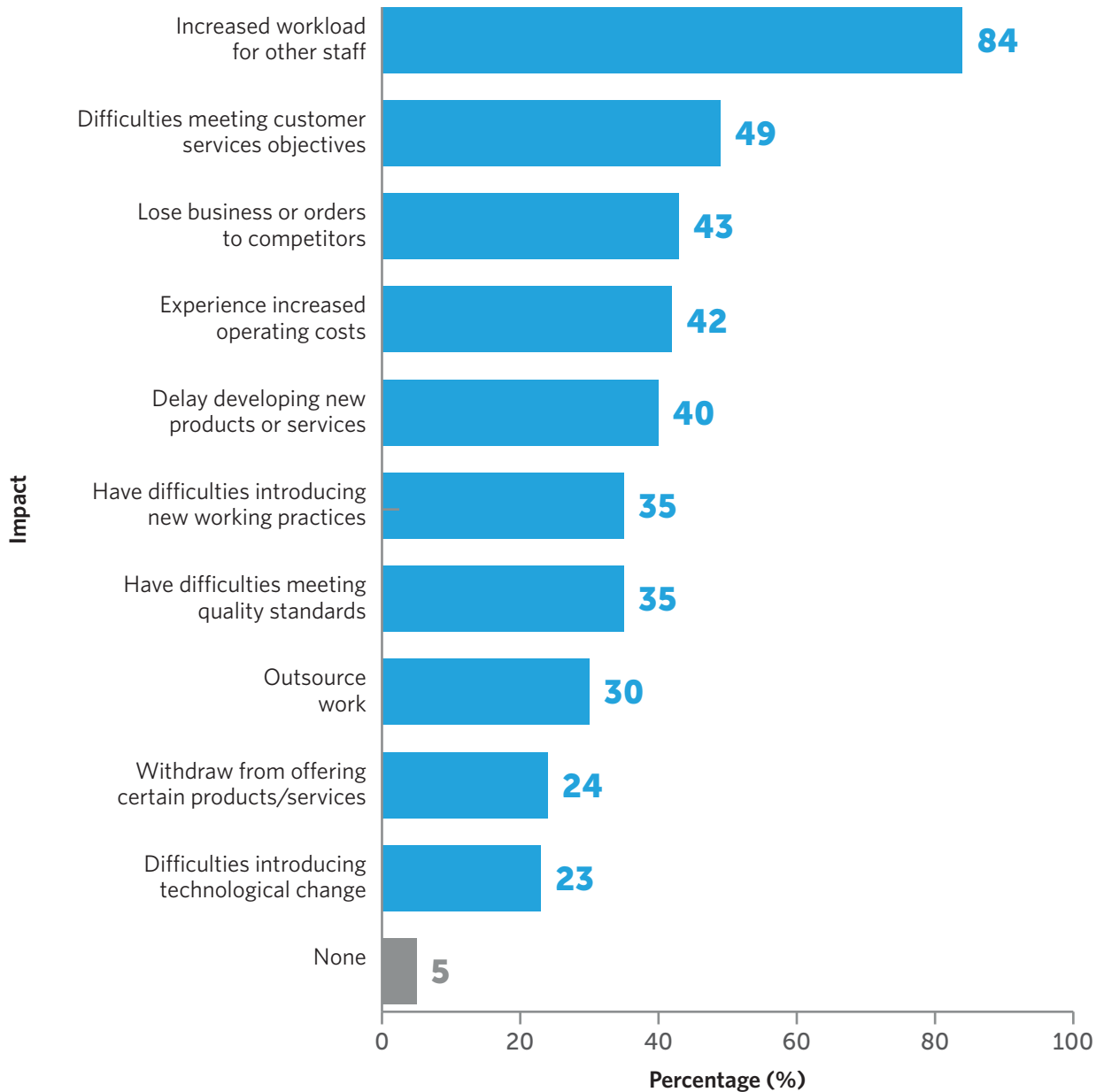
Employers who had indicated at least one skill-shortage vacancy felt that this had negatively affected their company in a number of ways, including loss of business to competitors (42%) and increased operating costs (43%) (Figure 5.5). There are wider implications of skill shortages, for example, affecting the wellbeing of staff and customers: 84% of employers thought skill-shortage vacancies increased the workload for other staff, and 49% said it caused difficulties in meeting customer services objectives (UKCES, 2015b, p. 163). The cumulative impact of skills shortages on the wider economy is difficult to quantify. One commentator estimated that if all vacancies created between 2014 and 2015 were filled at the current average wages, UK GDP would be boosted by £10bn (Sentance, 2015).

¹⁵ Occupations/job titles must be skilled, suffering from a labour shortage and deemed sensible to fill the shortage using labour from outside the EEA in order to be included in the Migration Advisory Committee list.

FIGURE 5.5

Negative impacts of skill-shortage vacancies on employers according to survey evidence. Figure taken from UKCES, 2015b, p.163.

Note: survey of establishments where all hard-to-fill vacancies are caused by skills related issues; n= 6,469 employers.



7. LABOUR MOBILITY AND SKILL MISMATCHES

The movement of workers, both within a national economy (internal migration) and across international boundaries (international migration) can affect skills mismatches, as skilled workers move to areas where their skillset is in demand or move away from areas of low demand. Removing the barriers to labour mobility within an economy should improve the efficiency of the labour market, reducing mismatches and boosting overall productivity, GDP and wages. However, as discussed in the next chapter this may exacerbate existing regional disparities and lead to local problems of a low skill equilibrium, even if it does boost aggregate economic performance.

International migration, both inward and outward, will affect the overall skills mix within an economy. It can help address skills mismatches when labour movement sees immigration to areas of skills shortages and emigration of surplus skills. Relative wage levels are important as workers are more likely to move if there is expected to be monetary advantage. But this can also exacerbate mismatches if skilled workers from a lower wage economy move to do a higher-paid but low-skill job that underutilises their skillset in a higher wage economy. Similarly, if skilled workers leave to seek better remuneration in another country, it can make a local skills shortage more acute.

These complex interactions mean that labour mobility's impact on mismatches varies, even if it is usually in the economic interests of those moving and aggregate GDP¹⁶.

8. MEASURES TO ADDRESS SKILLS MISMATCHES IN THE UK LABOUR MARKET

The coexistence of skills shortages and underutilisation of skills is symptomatic of inefficiencies in the UK economy: the supply of skills provided by the labour market is not aligned to the demand for skills by employers. This could be due to a number of reasons, including:

- Individuals find it hard to identify and access/undertake training for the skills that are in demand in the labour market or are not motivated to do so;
- Structural changes within the economy that affect demand for particular skills;
- Providers of education and training are not sufficiently responsive to changing skills demand, or the time lag between the identification of market needs and providers moving to adapt is too long;
- Economic factors that lead to limited opportunities, especially for new entrants, that see people take/hold on to jobs for which they are overqualified, or lead to employers recruiting workers with higher skill levels than required for the role. This could be because the economic cycle results in limited opportunities, especially for new entrants, or other circumstances such as seasonal work for students;
- Training and education providers being incentivised by student demand rather than employment market demand;
- Time lags between identification of market needs and gearing providers to adapt, exacerbated by rapid technological change;

¹⁶ See Chapter 6 for more on how this report addresses policy relating to skills and migration.

-
- A long lead time to acquire skills and qualifications, so earlier life decisions are needed to take requisite qualifications for certain routes. This is compounded when young people lack access to meaningful careers guidance;
 - Employers raising the qualification requirements for the limited pool of jobs available, even though the skills levels of the jobs have not changed and there are sufficiently qualified applicants; and
 - Employers incorporating practices and processes which only require low skills, even though higher (and thus more expensive) skills are available in the labour market.

The remainder of this chapter and the next describe possible policy responses to skills mismatches. These responses can be grouped into improving LMI, providing better careers advice, and increasing employer demand for highly skilled workers.

One interpretation of the skills mismatches identified in Figure 5.4 is that investment in high skilled individuals would result in supply outstripping demand, while there are also a large number of jobs that require no qualifications, meaning that the workforce risks being over-qualified to perform these roles. Both of these scenarios raise questions about the most efficient level and focus of investment in skills. The analytical work outlined earlier points to the importance of improving skills to boost growth and prosperity, and the importance of skills in addressing inequality and regional disparity. This suggests that the focus should be on provision of high skill training that is less likely to be subject to mismatch and supporting the development of skills that can raise the skill level of jobs that currently require no qualifications.

9. LABOUR MARKET INFORMATION

Many countries have LMI systems in place to anticipate changes in the labour market and inform stakeholders of these predictions. The US O*NET system, Germany's BERUFENET and the Netherlands' POA ('Project Onderwijs en Arbeidsmarkt') are examples of large networks that link labour market and skills forecasts with careers advice and guidance to help match supply and demand. O*NET involves a detailed analysis of changing occupational employment structures, and this information is used to advise prospective employees on the types of qualifications and competences required to enter and advance in a particular job, ensuring that individuals are better equipped for the workplace (Wilson et al., 2017). Different countries organise their forecasting capabilities in different ways, and there is often a distinction between national and regional demand. In Germany, for example, it is not uncommon for region/sector specific surveys to be commissioned.

Investment in high-quality data and skills forecasting capability provides employers, individuals and policy makers with an accurate image of the present state and likely future state of the labour market, aiding effective decision making (Wilson et al., 2017). Occupational profiles can provide a more detailed picture of what skills are required in a changing employment structure, allowing skills demand to be more accurately defined. This information may be used to enable people to understand the skills and competencies required to follow a particular career path, in addition to influencing the content of training and education programmes.

In terms of the effectiveness of these systems, it is impossible to establish the counterfactual of what each of the aforementioned countries' labour markets would look like in their absence. Each country invests heavily in their LMI systems, and operates a process of constant evolution and improvement (in the case of the USA for over 65 years). Projections may turn out different to actual outcomes, but this does not necessarily mean the LMI system is ineffective or not useful (Wilson, et al., 2017).

In the UK, the Longitudinal Educational Outcomes (LEO) dataset is beginning to generate experimental statistics on the employment and earnings of HE graduates using matched data from different government departments. Such data offers the opportunity to investigate skills mismatch in more depth, and with more reliability, than relying on surveys alone. If accessible to students and careers advisors, the LEO data could help inform future choices around education as it provides historic evidence of benefits from studying specific courses in specific places. High quality and robust LMI, such as that offered by LEO, is a prerequisite for accurate and impartial careers advice and guidance (Bimrose & Barnes, 2010) (UKCES, 2011).

10. IMPROVING THE PROVISION OF CAREER GUIDANCE, ADVICE AND INFORMATION SERVICES

Careers guidance offered by education providers in the UK has been criticised for failing to provide high quality and accurate advice, which compromises the ability of schools, colleges and careers services to help direct individuals towards jobs and sectors where there is existing or emerging demand (House of Commons Library, 2016).

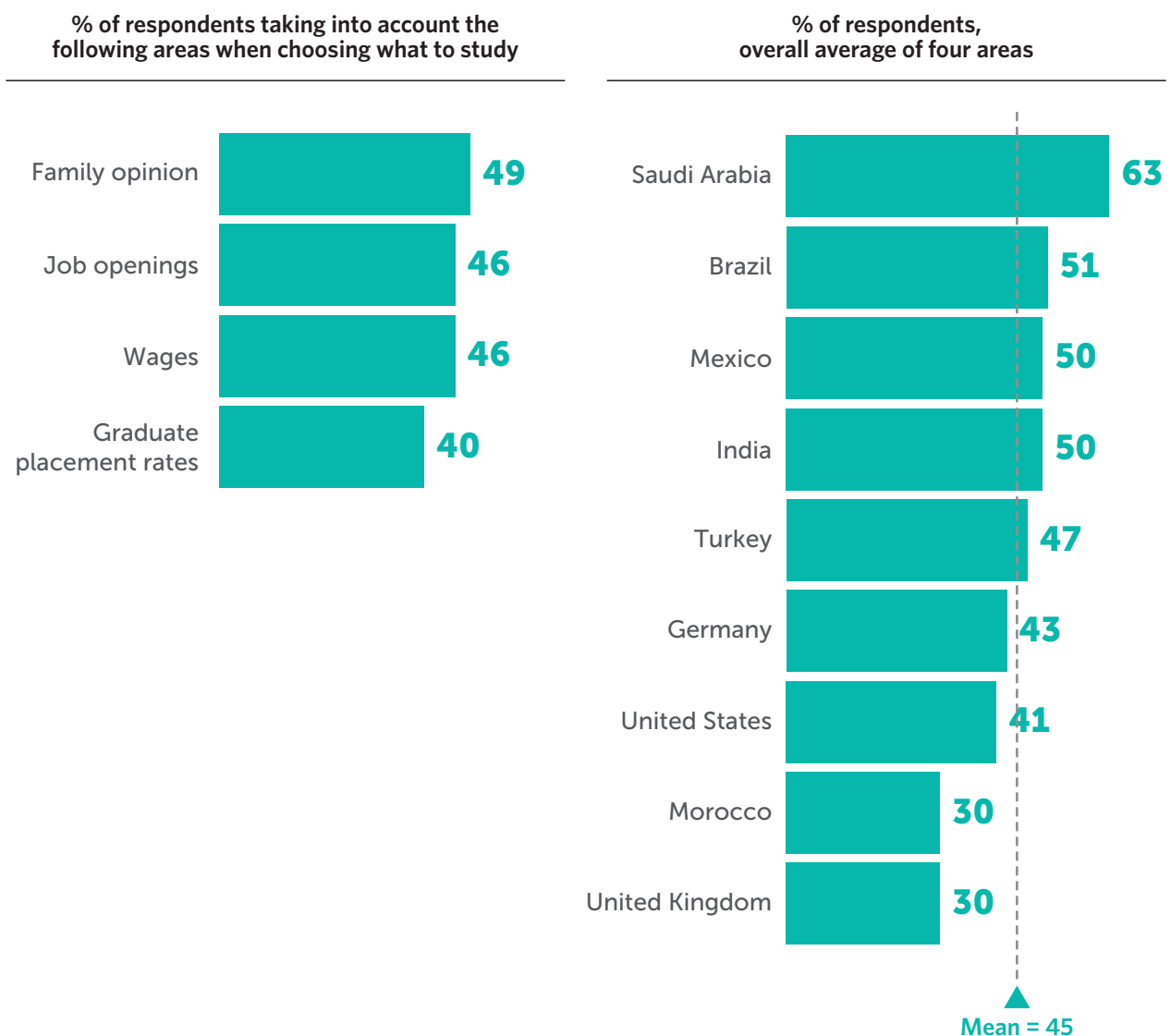
A McKinsey survey of young people¹⁷ in nine countries found that fewer than half (46%) reported that they knew about job openings or wages when choosing what to study; even fewer were aware of which education providers had the highest graduation rates and successful job-placement rates (40%) (McKinsey, 2012, p. 31). British young people emerged as some of the least well-informed with regards to each of these areas (30%) (Figure 5.6).

¹⁷ Eligible youth participants for the survey were defined as young people aged 15 to 29 who were either (a) in the labour force or (b) currently studying and would be looking for work in six months.

FIGURE 5.6

Youth knowledge when choosing what to study, based on survey data Aug-Sept 2012. Figure adapted from “Education to employment: Designing a system that works”, January 2013, p.31, McKinsey & Company, www.mckinsey.com. Copyright © 2017 McKinsey & Company. All rights reserved. Reprinted by permission.

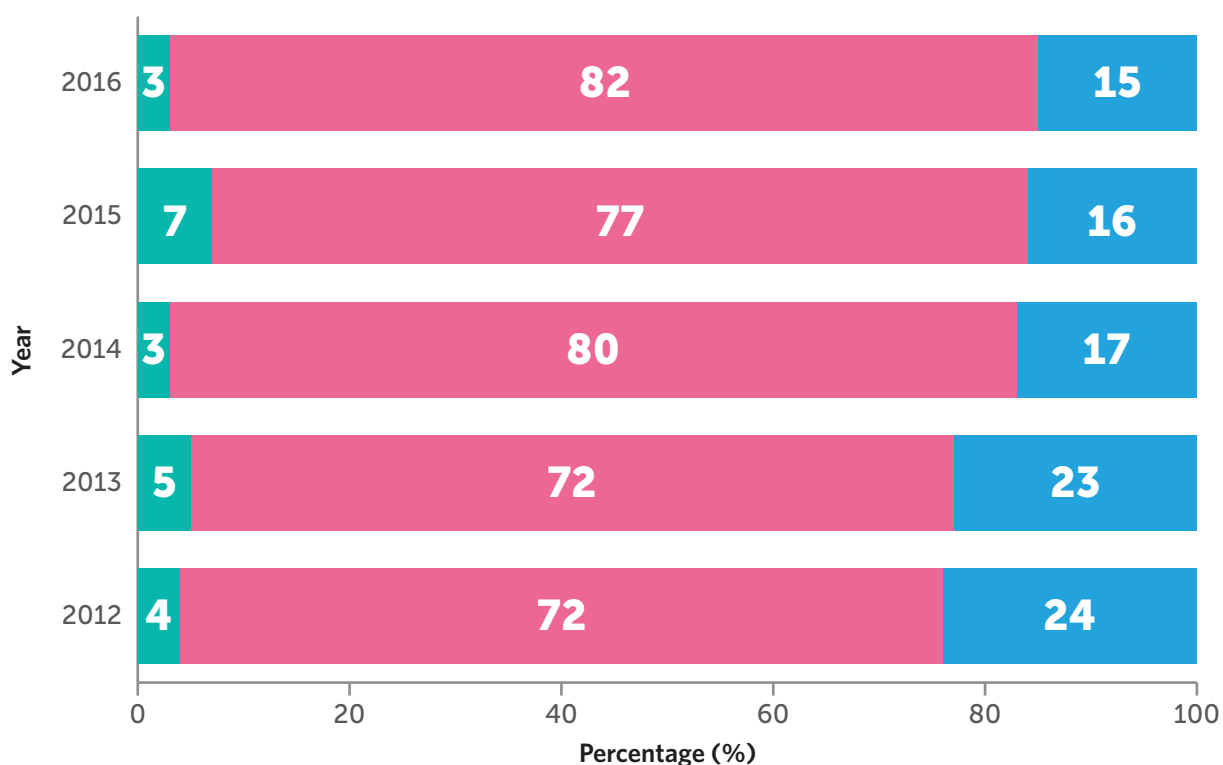
Note: a minimum of 500 youths were surveyed from each country. Respondents selected from the options: I knew my family’s opinions of various disciplines/programs when I chose what to study; I knew which careers had many jobs when I was choosing what to study; I knew which careers had high wages when I was choosing what to study; I knew which education providers had high graduation rates and successful job placement rates when I chose where to study. Eligible youth participants for the survey were defined as young people aged 15 to 29 who were either (a) in the labour force or (b) currently studying and would be looking for work in six months’ time.



In the CBI's 2016 survey of employers, 82% of businesses across the UK stated that the quality of careers advice that young people receive is not good enough to help them make informed decisions about future career options. Only 3% consider the quality of current careers advice to be adequate (Figure 5.7) (CBI, 2016b, p. 43).

FIGURE 5.7
Business views on the quality of careers advice for young people (%). Figure taken from © CBI, 2016b, p. 43.

Note: results are based on the CBI/Pearson education and skills survey 2015, which received responses from more than 300 organisations, collectively employing more than 1.2 million people across the UK.



● Good enough ● Not good enough ● Unsure

The provision of careers guidance, advice and information services in the UK varies across regions and devolved nations. A study of deficiencies in the career support system across the UK identifies that it is weakest in rural parts of the country, particularly in the coastal regions, as well as in post-industrial areas, but relatively strong in London and the surrounding counties. These inequalities in career support have persisted for some time in many regions, although London provides a promising example of overcoming the link between socio-economic disadvantage and career outcomes through concerted policy efforts (The Careers & Enterprise Company, 2016).

In England, the National Careers Service aims to provide information and guidance to young people and adults through online, telephone and face-to-face services; however, the latter is currently only available to adults (National Careers Council, 2014). Ofsted reported that during 2013, 80% of schools were ineffective in ensuring that students in years 9-11 (ages 13-16) were receiving an acceptable level of

information, advice and guidance needed to support decision making (Ofsted, 2013). A potential cause of the inadequate careers guidance and advice is the speed with which career opportunities evolve as a result of changes in technology, products, services and markets. Millions of people in the UK now work in jobs that did not exist when their parents left school and there is uncertainty over the roles and skills that will be most prominent in the future. Arguably, this elevates the importance of effective and responsive advice and guidance (CBI, 2016a).

Technology may be able to provide a solution. A shift from face-to-face careers guidance to online provision may help widen and improve access to careers services (UKCES, 2011); however, there is a danger that those who are less motivated and engaged or unable to access online services will miss out on gaining careers information and advice (Green, et al., 2016). Provision of online information may also help teachers and other adults access better information, which they can then feed to students. Providing LMI to significant people in young people's lives is important, as many of them might not access these sites themselves. School-mediated employer engagement can enable young people to access trusted LMI and advice. This, in tandem with work experience, can have a positive effect on both entry into the labour market and the earnings of young people (Mann, 2013). It is important that careers advice and guidance is an ongoing process for all, rather than an opportunity for just school leavers or those who are unemployed.

SUMMARY

The incidence of skills underutilisation in the UK is high compared with many other countries. This is partly based on survey evidence, which means cultural differences may affect how citizens in different countries respond, but other (non-survey) evidence concurs. Skills underutilisation has negative impacts such as lower pay and poor job satisfaction for the individual, in addition to lower productivity and product/service quality for the employer. At the same time, evidence suggests that employers are not able to recruit the high quality employees they want.

The concurrence of skills underutilisation and skills shortages can be attributed to mismatches in the demand for and supply of skills across the economy, resulting from labour market inefficiencies. A number of these inefficiencies arise because of the trends and deep structural drivers outlined in Chapter 1: automation of certain types of work, increasing international competition, reductions in workplace training and cohorts of older, skilled workers leaving the labour force as the demographic bulge of the post-war 'baby boom' generations reach retirement age. Labour mobility is one way in which mismatches can be avoided but this can have local consequences and there are circumstances in which it can create mismatches.

While the underutilisation of skills points towards a lack of demand for skilled workers, this should not detract from the evident benefits associated with a more highly skilled workforce, such as improved productivity, prosperity and greater equality. The graduate wage premium identified in Chapter 2 does still mean it is rational for an individual to get a degree. However, this premium is an average aggregate number so some degrees or qualifications for some individuals may make less sense and add to skills mismatches. Better LMI can unpack the aggregate information and inform future choices around education with historic evidence of benefits from studying specific courses in specific places.

More generally, effective policy responses can smooth the interaction between demand for and supply of skills. As the structural trends and drivers identified in Chapter 1 are likely to persist and possibly

accelerate over the coming decades, there is a need for the provision of high quality and robust career information, advice and guidance to young people and adults, particularly at key transitional points e.g. a change in career, leaving the education system, and during unemployment. Chapter 7 discusses this through the lens of lifelong learning. Part of the initial value of degrees and other qualifications is that they expand people's capability to learn at future points, even if the direct learned skills from education are not being utilised.



CHAPTER 6

Low Skills Equilibria

Chapter 5 identified two situations where the demand for and supply of skills are out of kilter: skills surpluses, where the supply of skills exceeds demand, and skills deficits, where the demand exceeds supply. 'High skills equilibria' or 'low skills equilibria' are circumstances where the skills required by employers are matched by the skills provided by employees, but the latter can cause significant economic and social problems. This chapter outlines the features and impacts of low skills equilibria, and ways to address this issue through skills policy.

KEY MESSAGES

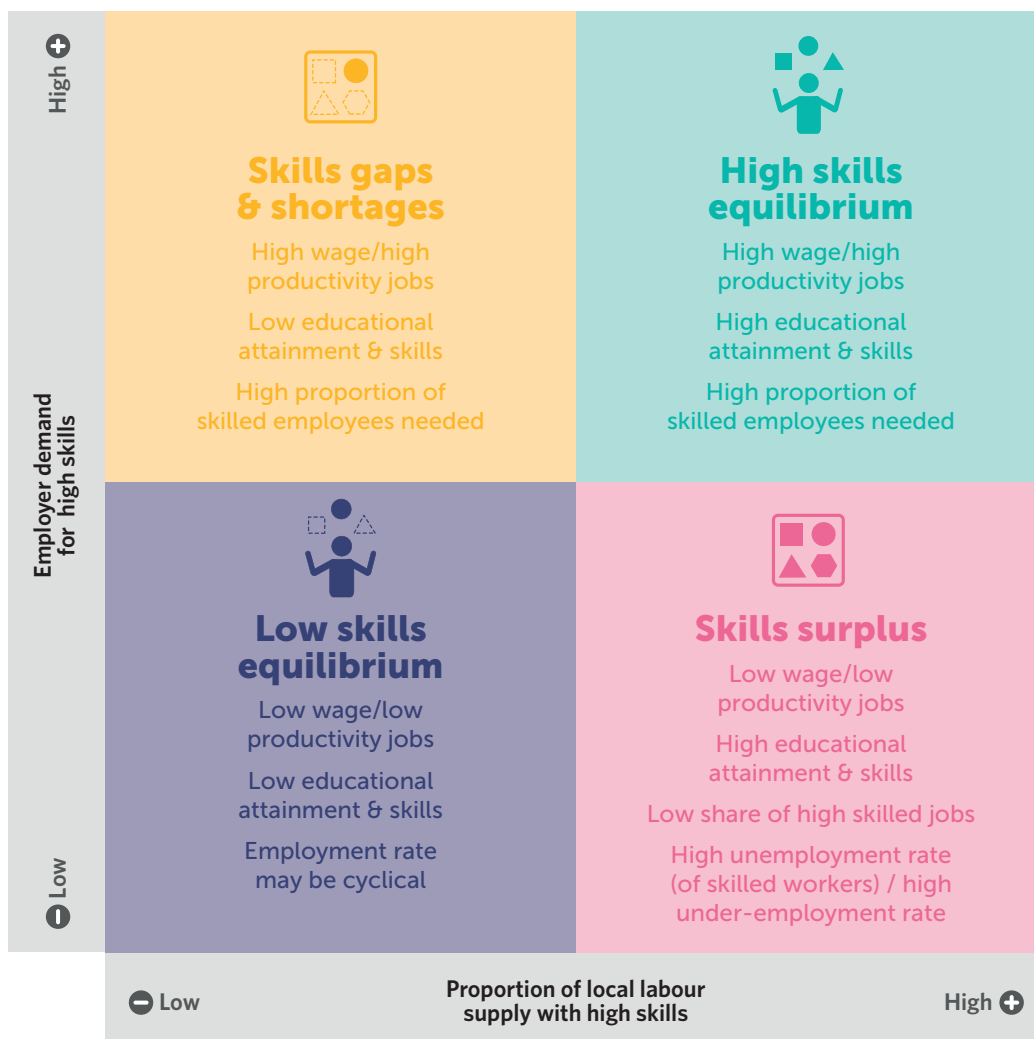
- A low skills equilibrium exists where there is demand for predominantly low skills coexisting with supply of predominantly low skills. Whilst skills and employment are matched, and firms may make adequate profits, there are a number of problematic outcomes. These include low productivity, low wages and low employment, particularly among sectors that are vulnerable to automation and/or international competition.
- Areas in low skills equilibrium are disproportionately found in North West England, South West Scotland, Wales, the area in eastern England between the Wash and the Humber, and more generally rural and coastal areas. A number of these areas are poorer than the European average in terms of GDP per capita.
- Whilst addressing the supply of skills is an important component of a strategy to address low skills equilibria and move towards high skills equilibria, doing this alone would risk skills surpluses, skills migration and underutilisation of skills. There are approaches that seek to overcome this scenario by focusing on optimising the way such skills are used within organisations.
- Close partnerships between employers and training providers can help address low skills equilibria or skills underutilisation. A targeted, regional, sub-national approach is likely to be more effective at enabling this.

1. SKILLS EQUILIBRIUM

In high skills equilibria employers require high-skilled labour, generally to produce high-value goods or services, and the labour market adequately provides high-skilled workers to fulfil these roles. Conversely, in low skills equilibria, employers are likely to have developed to produce low-value goods and services, which require low human capital input. The local labour market provides a pool of low-skilled workers, and the supply of high-skilled workers is low (Green, 2012). Characteristics of low and high skills equilibria are outlined in Figure 6.1, while the skills surpluses and skills deficits are described in Chapter 5. Migration is a variable feature of the various skills states described in Figure 6.1. For example, when an area experiences skills surpluses, individuals with high skills, and the necessary means, are more likely to leave, either for other parts of the country or abroad. In low skills equilibria, individuals with high skills are likely to leave, and individuals with low skills are more likely to stay or move to another area where jobs are available. Fully assessing the implications of internal and international migration is outside the scope of this report, but is briefly touched upon at the end of this chapter as a policy which can affect skills.

FIGURE 6.1

Characteristics of localities where the employer demand for high skills is low/high and where the proportional supply of workers with high skills is low/high. Adapted from Green, 2016b, p.1; based on Green, et al., 2003.



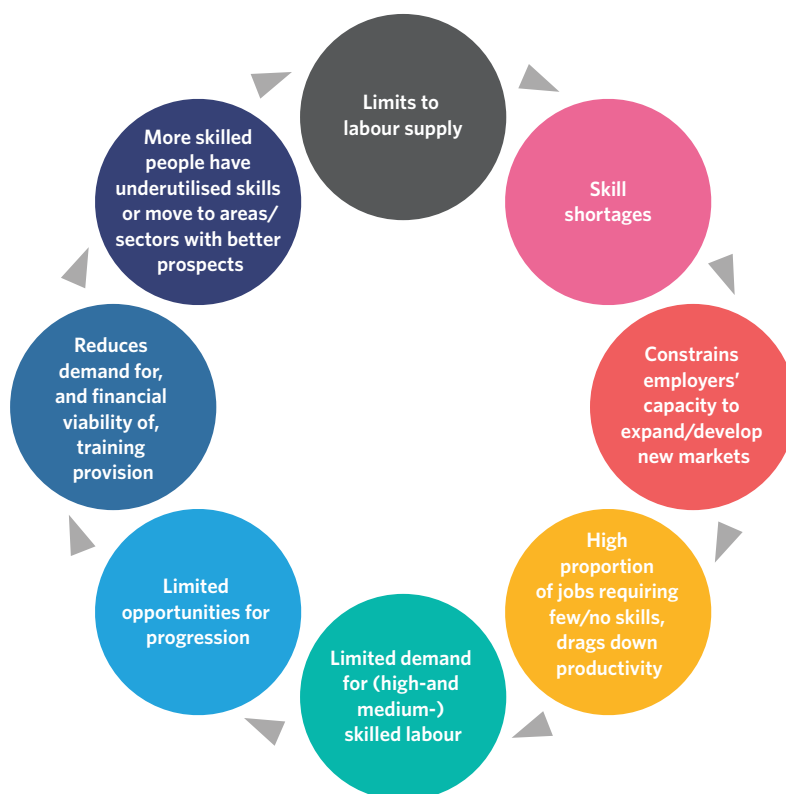
This chapter does not cover the impacts of the other trends discussed in Chapter 1, such as a ‘hollowing out’ of demand for medium level skills from the labour market caused by technology, but recognises this is also a driver for a relative increase in demand for high skills, reinforcing high and low skills equilibrium.

2. IMPACTS OF LOW SKILLS EQUILIBRIA

Businesses based on low skills, and operating in low skills equilibria, can be profitable. The main losers from low skills equilibria are employees (relative to if they had higher skills) and the broader economy in which it operates. Sectors and localities with low skills equilibria are characterised by low productivity, low innovation and slow growth in real incomes. There is limited demand for higher skilled, higher wage labour, thus depressing local wages. In turn, this constrains the ability of an employer to expand or develop new markets and also decreases local demand for training, making training less financially viable (Green, 2016b). Thompson et al. (2016) attribute half of the UK’s labour productivity slowdown since 2011 to shifts in the structure of the economy away from higher productivity sectors towards low productivity areas like hotels and catering, where low-paid, low-skilled work is prevalent.

Low skills equilibria are problematic for individuals because low-skilled jobs have lower wages and tend to be less secure. In many cases they carry a higher risk of replacement by automation by virtue of their routine nature (Deloitte, 2015). Due to limited opportunities for local career progression, skilled individuals either move to different areas (further weakening supply) or see their skills underutilised (see Chapter 5). In this way, the low skills equilibrium acts as a feedback loop, depressing productivity and demotivating individuals while dis-incentivising investment in skills. Figure 6.2 shows the circumstances that characterise low skills equilibria, and which stifle improvements in skill levels and in productivity.

FIGURE 6.2
Self-perpetuating cycle resulting in a ‘low skills trap’. Adapted from Green, 2016b, p.2.



3. UK REGIONS AND SECTORS IN LOW SKILLS EQUILIBRIA

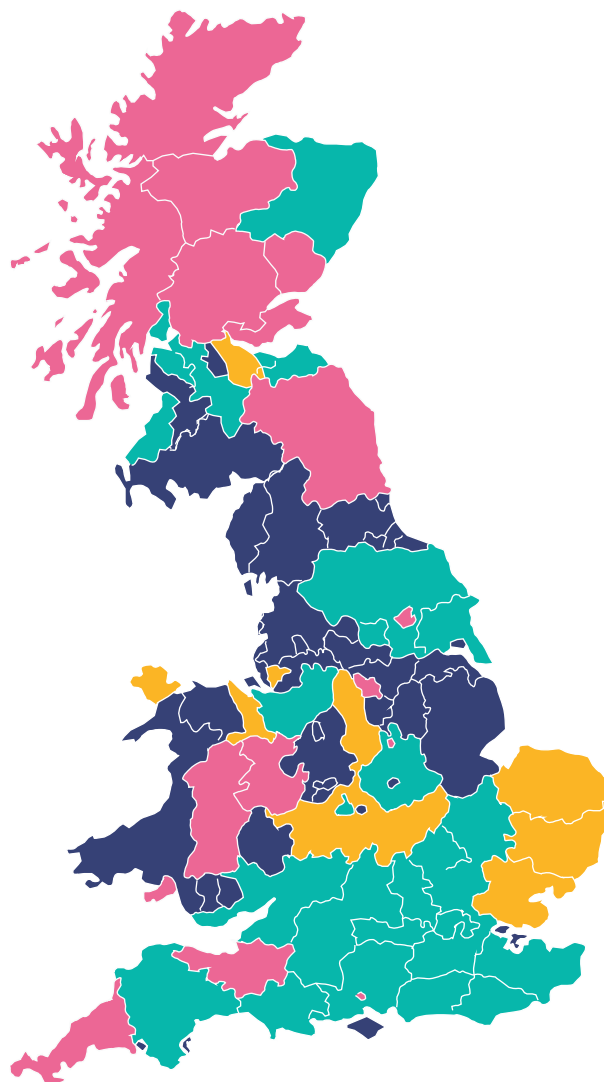
Regions can develop low skills equilibrium when there is a concentration of employers in a region producing low price goods and services that rely on low-skilled or standardised production. The OECD (2014) provides assessments of where low and high skills equilibria are found in the UK, alongside areas of skills deficit and skills surplus (Figure 6.3). In their analysis, areas of low skills equilibria are defined as those that have below average proportions of people with post-secondary education, and a low composite 'skills demand' indicator. The latter comprises the percentage of the local labour force in medium and high-skilled occupations combined with labour productivity (GVA) for each worker. High skills equilibria have the opposite features. Regions with a high proportion of people with post-secondary education and a low composite skills demand indicator were designated as areas of skills surplus; areas of skills deficit have the opposite features. Low skills equilibria are geographically skewed towards certain parts of the UK, including North West England/South West Scotland, Wales, the area in Eastern England between the Wash and the Humber, and more generally rural and coastal areas. Conversely, high skills equilibria are skewed towards southern England, although there are other important pockets elsewhere.

FIGURE 6.3

Skills classifications of sub-regions in the United Kingdom (excluding Northern Ireland).
Figure adapted from OECD, 2014b, p.280.

Skills classifications:

- High skills equilibrium
- Skills deficit
- Skills surplus
- Low skills equilibrium



The OECD calculations are relative, in that each indicator is calculated in relation to the national average – therefore each country in the OECD analysis will, by definition, show high skills equilibria as well as low skills equilibria. Figure 6.4 indicates that UK regions are underperforming in absolute terms as well as relative terms, or at least in comparison with a wider block of countries in Europe. There are a number of UK regions that compare poorly to the European average GDP, with four UK regions having fallen below the European average GDP per capita since 2008 (Eurostat, 2016). Comparing Figures 6.3 and 6.4, a number of UK regions which are below the European average GDP per capita are also in low skills equilibria, potentially making it harder for them to catch up to the average. Figure 6.5 shows skills classifications of localities within the North West England, where the majority are in low skills equilibrium.

FIGURE 6.4

Gross domestic product per inhabitant in purchasing power standard in relation to the EU-28, 2014. Figure taken from Eurostat, 2016.

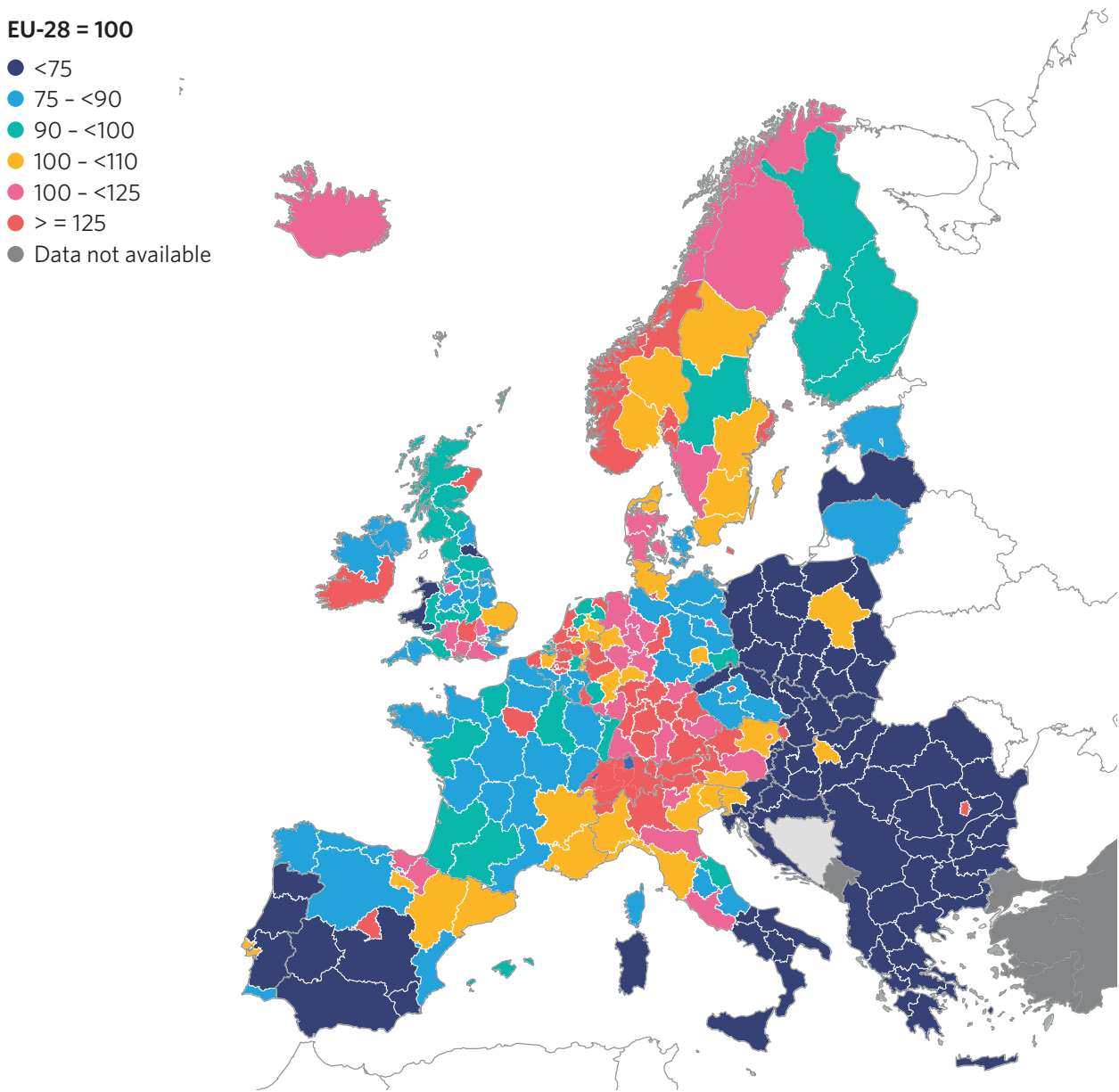
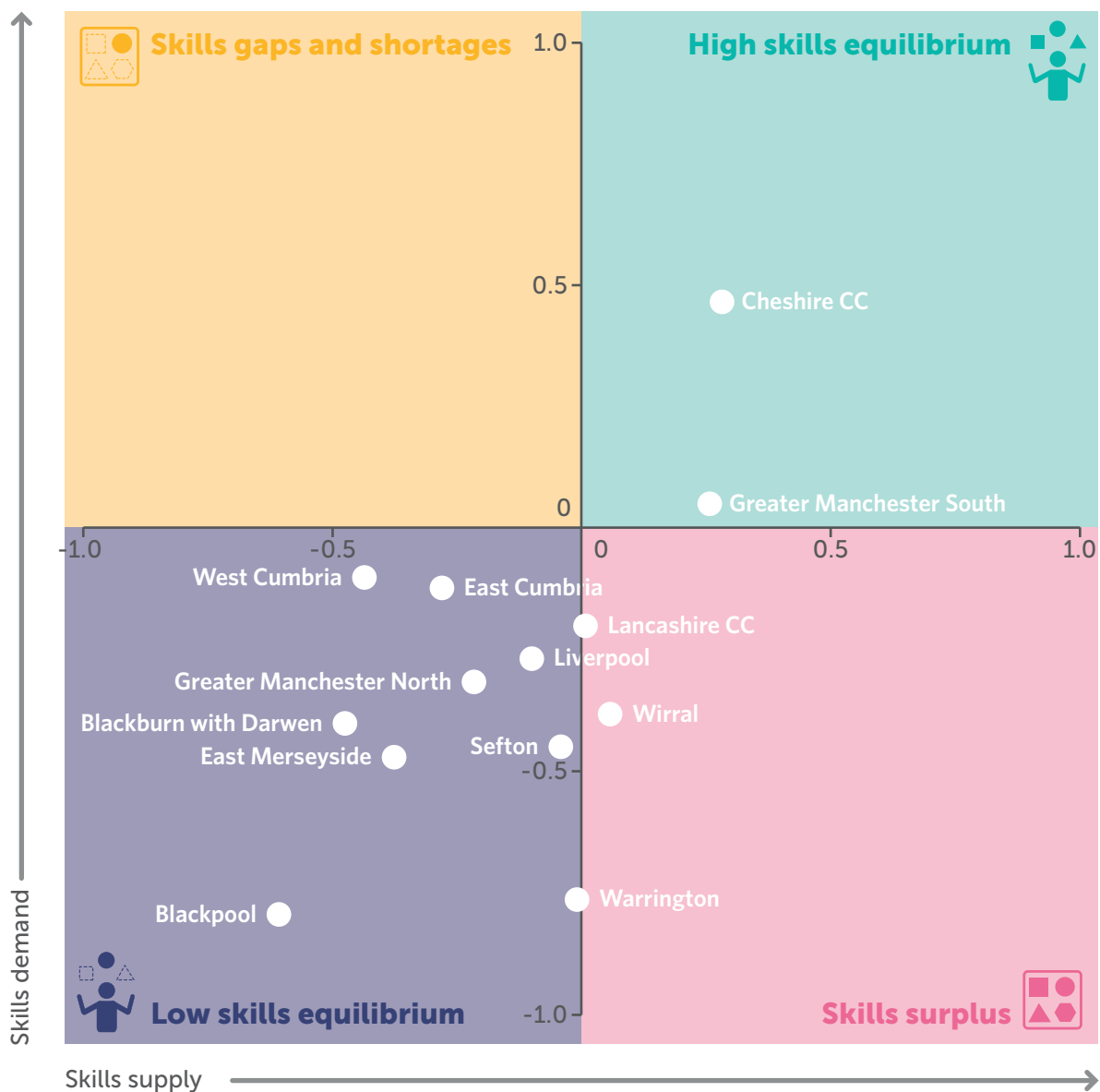


FIGURE 6.5

Skills classifications of sub-regions in Northwest England in 2011. Figure taken from OECD, 2014b, p.75.

Note: each locality is given an indicator for 'skills demand' (a composite indicator comprising the percentage of medium and high skilled occupation, combined with labour productivity measured through gross value added per worker) and 'skills supply' (the percentage of people with post-secondary education). Each axis shows the deviation from the UK average: residing at 0 equates to the UK average, whilst residing at 0.5 represents a 50% increase or decrease from the UK average.



Low skills equilibria are not unique to particular sectors, but they may be more prevalent in sectors where an industry offers standardised goods or services with low or non-complex specifications, such as hospitality, retail, cleaning and social care (Green, 2016b) (Edwards et al., 2007). Clearly this interacts with local and regional factors, as some of these sectors are more likely to be located in certain places, for example peripheral rural areas or seaside towns.

4. STRATEGIES FOR ADDRESSING LOW SKILLS EQUILIBRIA

Low skills equilibria are defined by low supply of skills and low demand for skills. Increasing the supply of high skills is an important part of a strategy to address low skills equilibria, and this includes measures described in Chapters 3-5 and 7. However focusing solely on supply-side measures without addressing the demand for skills would risk skills surpluses and underutilisation of skills, as identified in Chapter 5. The next sections of this chapter cover national and regional measures to stimulate demand for skills. This involves both demand-side and supply-side measures, as the regional level offers the opportunity to deploy both in a targeted and locally informed way.

5. NATIONAL APPROACHES FOR STIMULATING DEMAND FOR SKILLS

The demand for skills is determined by employers and thus internal business management decision making. The sectors and products that employers focus on, and the extent to which they innovate or invest, will determine which skills are required. If companies move into higher value-added markets, the levels of skills that they require, and the extent to which they use these skills, tend to increase. Mason (2011) shows that there is a strong positive correlation between skill levels among a company's workforce and companies that have a high 'product market strategy' score¹⁸.

Government policy can seek to influence employer demand and hence improve skills. These policies go beyond the remit of skills policy. For example, if innovation policy can encourage businesses to provide higher value-added products, this is likely to drive greater demand for high skills in a region or sector, enabling a shift away from low skills equilibrium towards high skills equilibrium. The OECD (2014) notes that innovations do not necessarily arise from just high level R&D, but, more often, from a focus on incremental management practices within the workplace. Labour market and market regulation policies can directly affect skills demand. This could be through minimum qualification requirements and licence to practice, although both can affect labour market flexibility and competition. Indirect measures may include minimum wages as these increase the incentive to invest in raising the productivity of existing workers given the increased cost of hiring more workers.

Welfare policy may also have an impact. For example, if welfare policy emphasises a 'work first' approach, this may result in unemployed people being placed in any job irrespective of the qualifications required, the quality of the role, and how it matches with the individual's skillset. In contrast a 'career first' approach could help individuals realise the potential for progression and skills development, although both approaches clearly have associated trade-offs. These policy areas are not developed further in this report because to do so would significantly increase the scope. Nonetheless they are mentioned as they do affect the way skills are deployed in the UK.

Another approach to increase the utilisation of high skills is to engage employers in shaping training provision. This can foster in-work progression by supporting employees in acquiring new skills, whilst simultaneously assisting employers in developing jobs that are higher skilled and more productive. This approach has been trialled in the US, with findings including improved employment prospects and increased likelihood of gaining higher wage jobs (Maguire et al., 2010) (Conway & Giloth, 2014). A case study of the social care sector in Scotland also demonstrates the potential of this approach. The Open University collaborated with the sector to develop a management qualification designed to up-skill and unlock the full potential of supervisors working in social care. To do this, the university combined

¹⁸ Companies with a high 'product market strategy' score are broadly classed as those that produce high-specification products at premium prices in certain markets and seek to compete through new product development and other forms of innovation.

distance learning with workplace tutorials, online discussions, and workplace peer and mentor support. An important feature of the project was that it engaged the students' line managers in discussions around how students could be used more effectively in the workplace. It also facilitated discussions on how their roles and practices could be changed to make better use of supervisors' skills and knowledge. Putting these discussions into practice resulted in greater productivity, improvements to the delivery of care and greater job satisfaction among employees. The UK Commission on Employment and Skills and the Productivity Commission led by Charlie Mayfield have argued that high performance work (HPW) practices --- human resource management practices aimed at stimulating employee and organisational performance - are essential to improving productivity and skills utilisation (Productivity Leadership Group, 2016). But in 2015 just 12% of UK employers had adopted HPW practices that would support the productive development and deployment of employee skills (Vivian et al., 2016, p.119).

6. REGIONAL AND LOCAL APPROACHES TO ADDRESSING LOW SKILLS EQUILIBRIA

Different regions face different challenges in breaking out of low skills equilibria. Coastal communities and rural areas, for example, face particular challenges in unlocking their growth potential and breaking out of economies reliant on seasonal, low-waged and low-skilled jobs. So action needs to be tailored to local needs. At the regional and local levels, decision makers are more likely to have a better understanding of their local economic drivers and labour market dynamics than national policy makers (Green, 2012), and important skills players, such as local employers, education/training providers and funders, can be more easily convened. LEPs have already responded by developing skills strategies which take into account local needs. Local universities and colleges can be encouraged to better apply their research to local sectors and increase their capabilities for technology and knowledge transfer, becoming a source of expertise on how to use skills, as well as a supplier of skills.

A more ambitious approach would be to change the local economic development model, as is demonstrated by recent interventions implemented in San Antonio, Texas. Historically, the city has been characterised as a low wage, low tax and low regulation economy. But the city recognised that the 'low wage' economic strategy of attracting inward investors to the city was not sustainable, so the economic strategy was changed to stimulate economic growth from within San Antonio, with a tightly targeted sector-based policy focusing on better jobs in globally competitive sectors (Green, *et al.*, 2017).

Transport policy - whether national or devolved - is likely to have an impact on regional economies and the local labour market. For example, improving transport links will increase the size of 'travel to work areas' (ONS, 2016), which may allow highly skilled people to travel to work in places where there is higher demand for their skills without having to move house, reducing local skills underutilisation and 'skills flight'. Whilst individuals may not deploy their skills in the local economy, they may have additional spending power which they do deploy. There are likely to be other intangible benefits of retaining individuals with high skills in the local area: for example their presence may motivate others to develop their skills, and individuals with high skills could later switch to high-skilled jobs, which may appear in the local area. Finally, policies that facilitate labour mobility, and the skill mix of migrants, could affect an area's possible transition either towards or away from a low skills equilibrium (Green, 2016b).

SUMMARY

Low skills equilibria are an entrenched problem in several local areas and sectors, limiting productivity growth and slowing the growth of wages. The problem is difficult to address as many firms operating in low skills equilibria are concentrated in sectors with relatively low-value-added products and services with limited requirements for highly skilled workers.

Boosting the supply of high skills is part of the answer, and approaches to do so are covered in other chapters of this report. However, addressing supply without addressing the demand for high skills will likely result in skills surpluses and underutilisation of skills, leading to labour market inefficiencies, as described in Chapter 5. Case studies demonstrate how intermediaries and training providers can successfully upskill workers and in parallel optimise the way in which skills are used in the workplace. Certain approaches to driving up the demand for high skills may operate outside of the immediate skills policy domain, for example encouraging expansion of higher value-added sectors across the UK as part of a broader industrial strategy. There are particular opportunities at the local level, where it may be easier to facilitate dialogue between key actors, and a better understanding of the local labour market can be acquired.



CHAPTER 7

Learning Across the Life Course

There are different stages at which skills are acquired, including early years (<5), primary and secondary schooling (5-16), post-16 (16-approx. 19), tertiary (approx. 18-25), and lifelong learning (post initial education). Learning beyond the early education system brings a range of benefits; however, these are currently more likely to be realised by wealthier socio-economic groups. This chapter explores the uneven uptake of lifelong learning across society and options for addressing it. Although early life investment yields the greatest dividends in narrow economic terms, there are significant benefits from later-life learning that achieve a range of policy objectives.

KEY MESSAGES

- The impact of technological change and dynamic global markets on jobs makes it important for individuals to reskill throughout life to remain competitive in the modern economy.
- Participation in learning declines with age. This may be linked to the decline in work-related training among older employees, for which the UK ranks poorly in international comparisons. This trend is particularly significant given the UK's ageing workforce.
- There has been a decline in formal work-based training since 2001. Employer investment in training in England fell by 14.5% in real terms between 2005 and 2011. Low-skilled employees receive less training than high-skilled employees.
- Socio-economic status is a powerful predictor of participation in later life education, with those in poorer or less-educated groups less likely to undertake it. Propensity to participate in later-life learning is influenced by earlier education experience.
- Technology and business trends may result in greater opportunities for informal and non-formal training. There has been a shift from formal to informal learning for adults aged 55+ between 2005 and 2012. However, higher socio-economic groups are more likely to engage in informal and non-formal learning, partly because of positive prior experience of learning.
- Whilst cost and time barriers to learning apply to everyone, individuals with no qualifications are more likely to cite attitudinal barriers including lack of confidence, lack of interest and feeling too old to learn.

1. PARTICIPATION IN LEARNING THROUGHOUT LIFE

In 2015, 22% of adults reported being current learners, and 41% reported taking part in some form of learning in the previous three years. This definition includes formal and informal learning (see Box 4.1 in Chapter 4) and learning in and outside of work. These headline figures have been relatively constant since the survey series began in 1996 (NIACE, 2015a, p.1).

However, below the surface of these relatively stable overall figures there are more changeable dynamics. First, participation in learning declines with age, with older people less likely to engage in it than younger people (NIACE, 2015a), leaving older people more vulnerable to rapid changes in the labour market. This phenomenon is likely to be linked to uptake of job-related training or education, which also declines through life, particularly among men (Figure 7.1). The UK ranks third worst in the OECD for work-related non-formal training for older workers (Figure 7.2) (OECD, 2012d, p. 81).

FIGURE 7.1

Percentage of male and female UK workers undertaking job-related training or education in the previous 3 months by age group, Q1 2017. Data taken from ONS, 2017b.

Note: $n = 30,721$.

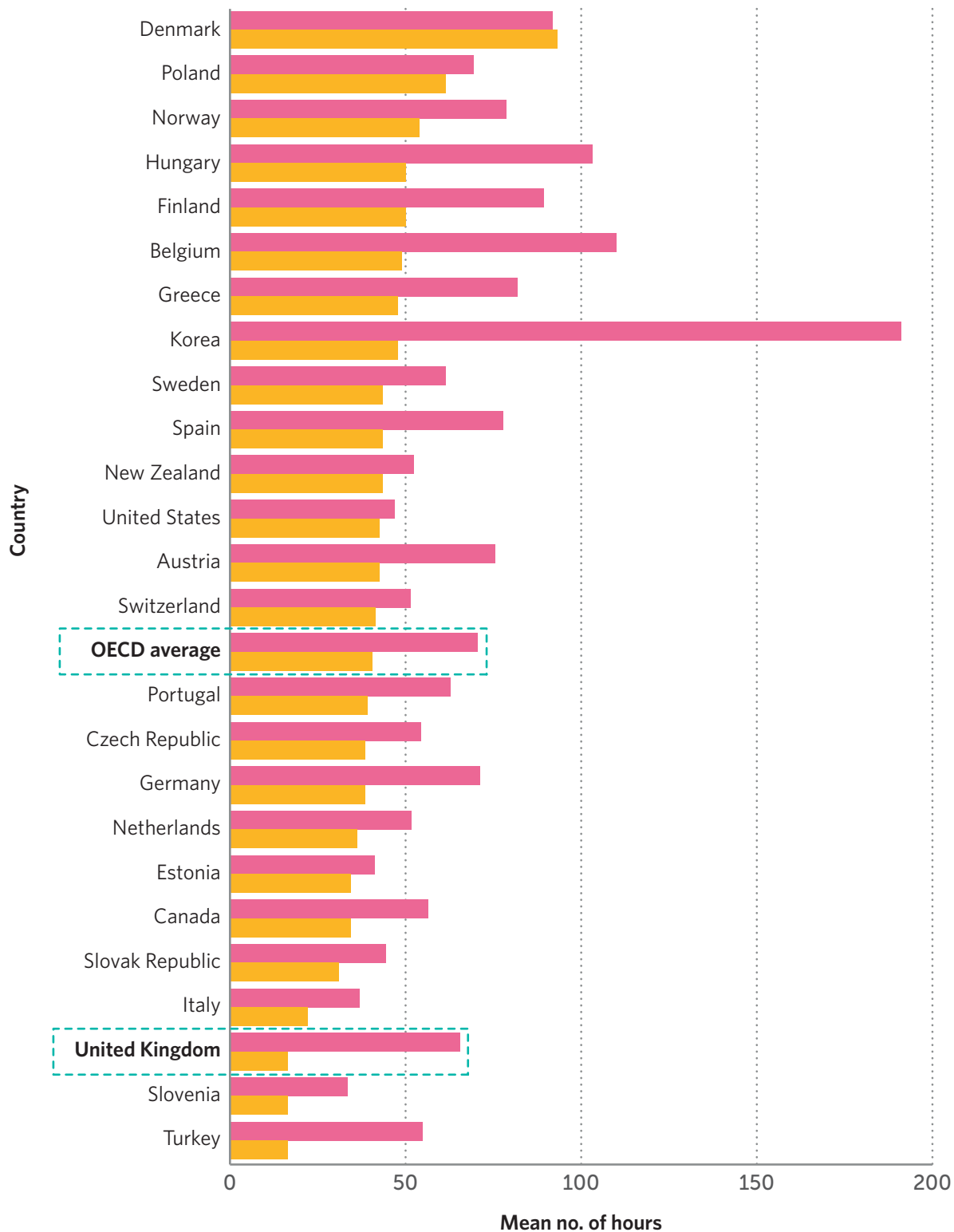


FIGURE 7.2

Mean hours of job-related non-formal education by age group, 2007

Figure taken from OECD, 2012d, p. 81.

Note: almost all work-based training falls under non-formal education; n= 5,000 randomly sampled respondents from each country.



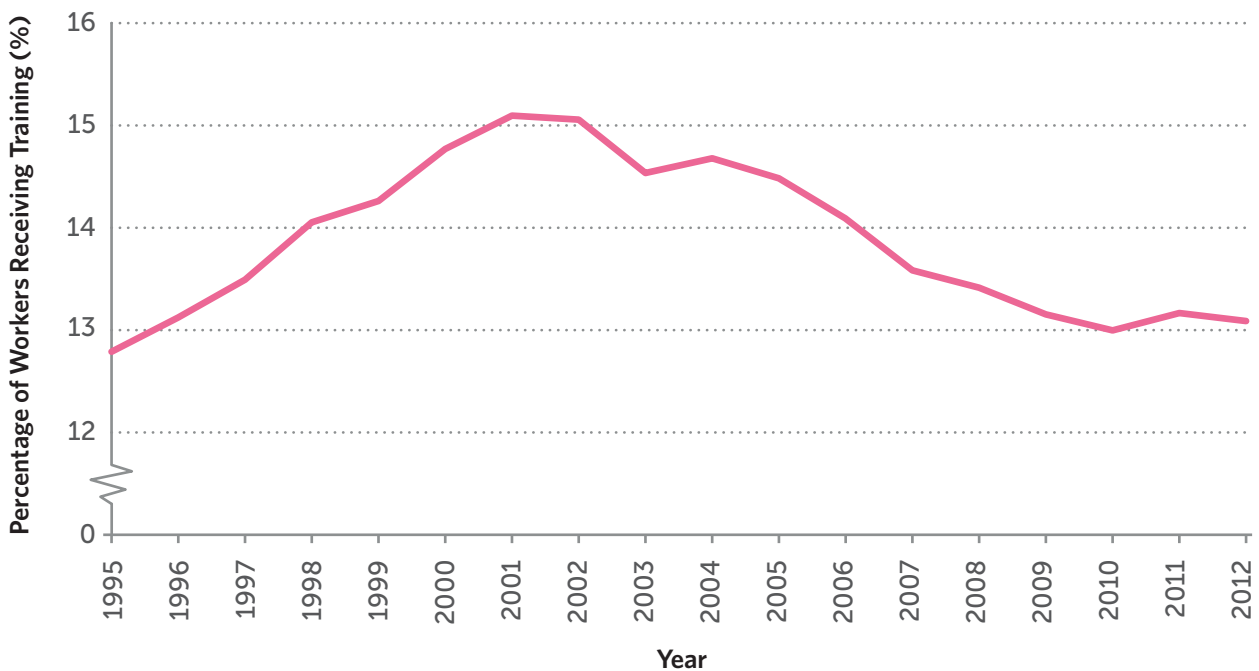
2. FORMAL, WORK-BASED TRAINING IS IN DECLINE

The provision of formal work-based training has declined for the population as a whole since 2001 (Figure 7.3). This may be related to structural changes in the labour market that include changing employment practices, such as greater use of part-time and temporary workers, as well as significant growth in small and self-employed businesses as described in Chapter 1 (BIS, 2015b).

FIGURE 7.3

Percentage of workers receiving job-related training in 'previous 4 weeks'. Data based on ONS Labour Force Survey. Figure taken from Green, et al., 2015, p.430, © John Wiley & Sons Ltd.

Note: $n = 40,000$.



3. LIFELONG LEARNING IS SKEWED TOWARDS RICHER SOCIO-ECONOMIC GROUPS

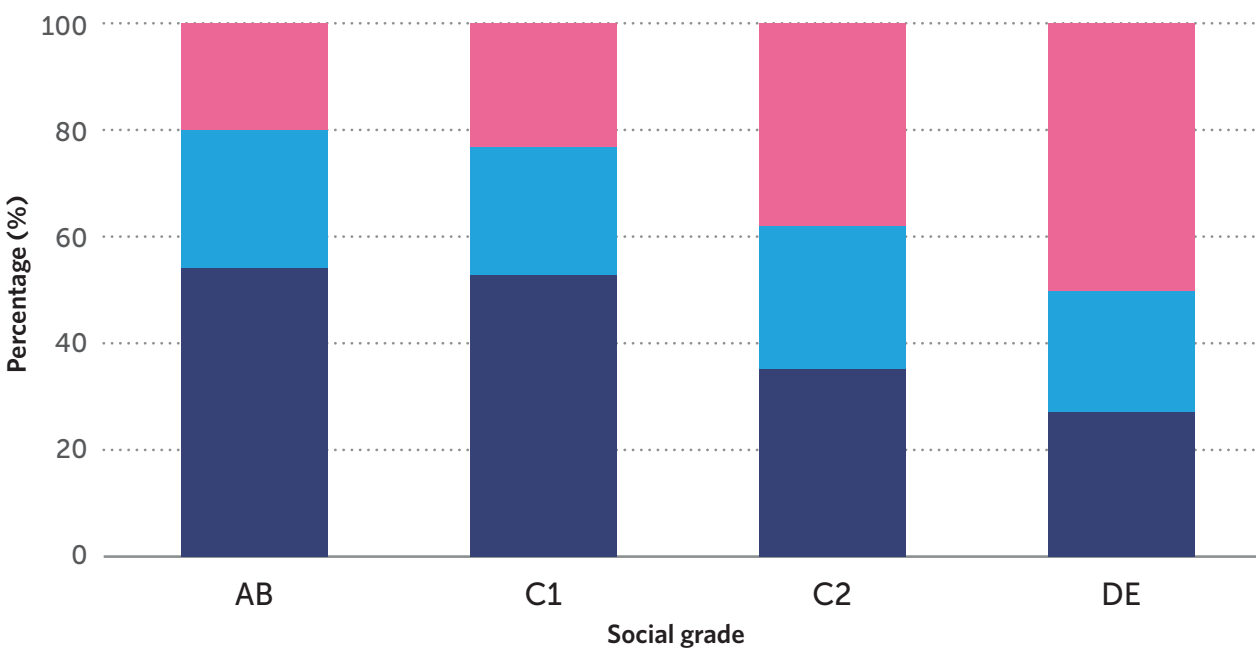
Learning is not evenly taken up across society, with those from lower socio-economic groups being significantly less likely to participate. Around half (49%) of unskilled workers and people on limited incomes (in the generally poorer 'DE' socioeconomic group) have not participated in learning since leaving full-time education, compared with 20% of those in the generally wealthier 'AB' socioeconomic group. In contrast, 54% of individuals in the AB socioeconomic group have undertaken learning in the last three years, compared to 26% for the DE group (Figure 7.4, see caption for description of social groupings) (NIACE, 2015a, p. 2).

FIGURE 7.4

Adult participation in learning by socio-economic class, 2014.

Figure taken from © NIACE, 2015a, p 2.

Note: n = 5000 adults (aged >16) across the UK (%). Social grades are described by the National Readership Survey, and include: Social Grade A: High managerial, administrative, or professional; Social Grade B: Intermediate managerial, administrative and professional; Social Grade C1: Supervisory, clerical and junior managerial, administrative and professional; Social Grade C2: Skilled manual workers; Social Grade D: Semi-skilled and unskilled manual workers; Social Grade E: State pensioners, casual and lowest grade workers, unemployed with state benefits only.



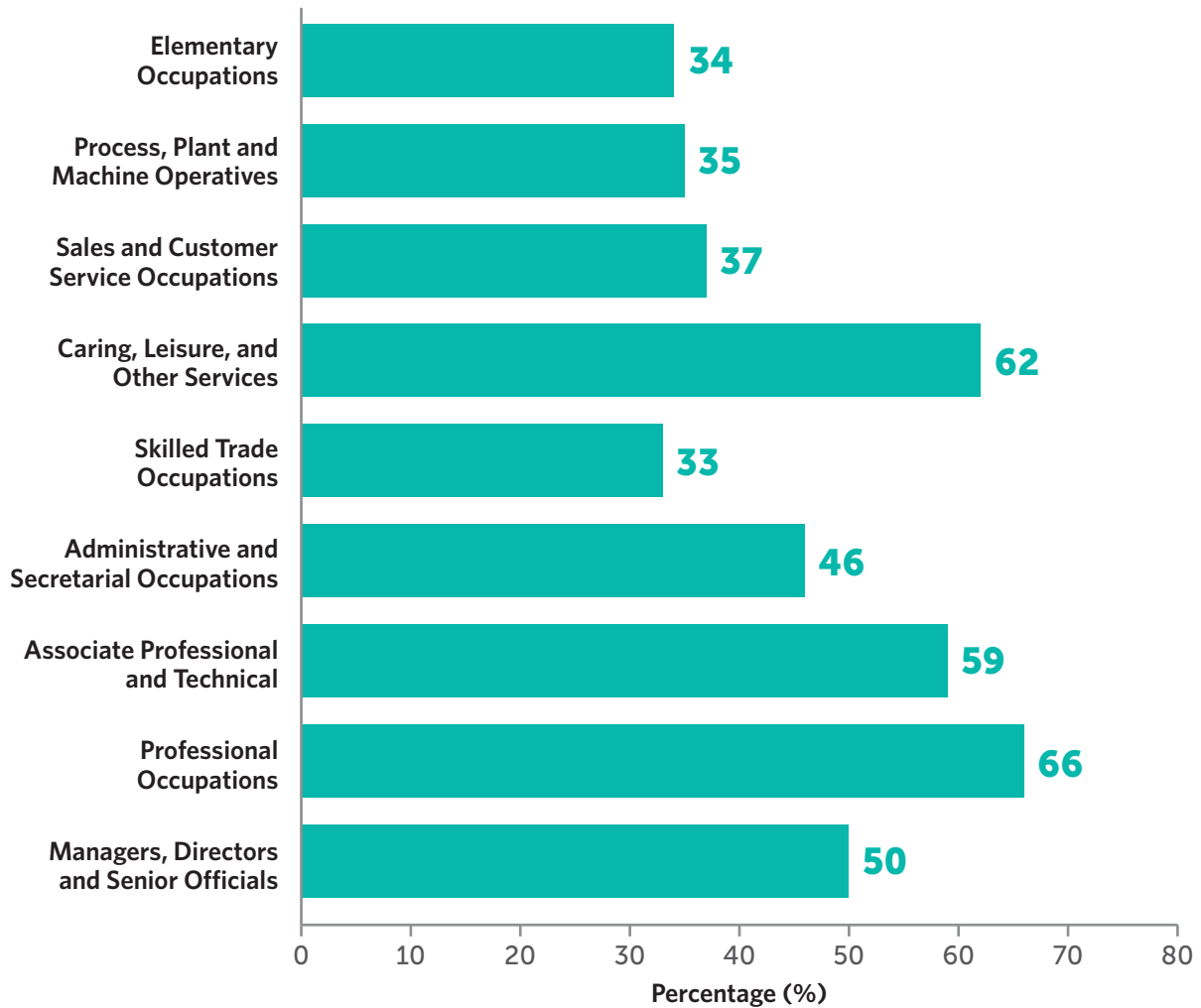
● Learning in last 3 years ● Past learning (3+ years ago) ● Not since leaving full-time education

Some of the lowest participation in learning is amongst individuals in occupations that have the greatest potential for automation. A McKinsey study (2017) of the US labour market finds that jobs in accommodation and food service, manufacturing, transportation and warehousing, and retail are most at risk of automation, while a UK-based analysis led by Frey and Osborne (2014) identifies office and administrative support and sales roles as most at risk. The sectors identified by both studies coincide with those reporting low participation in learning among staff, particularly elementary occupations (or routine jobs), process, plant and machine operatives, sales and customer service occupations, and skilled trade occupations (Figure 7.5) (NIACE 2015, p. 2). More generally, lower-skilled workers are less likely to receive workplace training than higher skill workers. The majority of unskilled workers receive no formal training at work, whilst employers focus their resources on higher-skilled employees (Green, et al., 2015).

FIGURE 7.5

Participation in learning by occupation, 2014. Figure taken from NIACE 2015, p.2.

Note: survey of 5000 adults aged >16.



4. WHERE AND HOW ADULTS LEARN IS CHANGING

In recent years there has been a trend towards learning in non-formal and informal environments, including at home, online and in informal work settings. Technology trends and changing business models offer different types of access to education. Between 2005 and 2012, there was a shift from formal to informal learning for adults aged 55 and over (Figure 7.6). The number of adults (aged 19+) in FE in England declined from 3.2 million 2011/12 (SFA, 2013, p.1) to 2.3 million in 2015/16 (DfE, 2017, p.5) and the number of UK undergraduates (full-time and part-time) aged 30 and over has declined from 496,325 in 2005/06 (HESA, 2007) to 256,440 in 2015/16 (HESA, 2017).

There may be some significant opportunities from this transition, which are outlined below. However, evidence also suggests that wealthier individuals with greater confidence in their learning abilities are more likely to actively participate in informal and non-formal learning without intervention. According to a 2010 survey, while participation in formal learning is similar among individuals earning £31,200 and above and those earning £10,399 or less, a significantly greater proportion (63%) of higher earners say that they take part in informal learning than lower earners (25%) (Figure 7.7) (McNair, 2012, p.26).

These figures may be affected in the future by the increasing proliferation of computers and smart phones along with new platforms such as massive open online courses (MOOCs), which may reduce some barriers to learning.

FIGURE 7.6

Proportion of adults aged 55+ learning in different locations in 2005 and 2012.

Figure taken from McNair, 2012, p.26.

Note: representative survey of 4601 people aged over 55 across the UK.

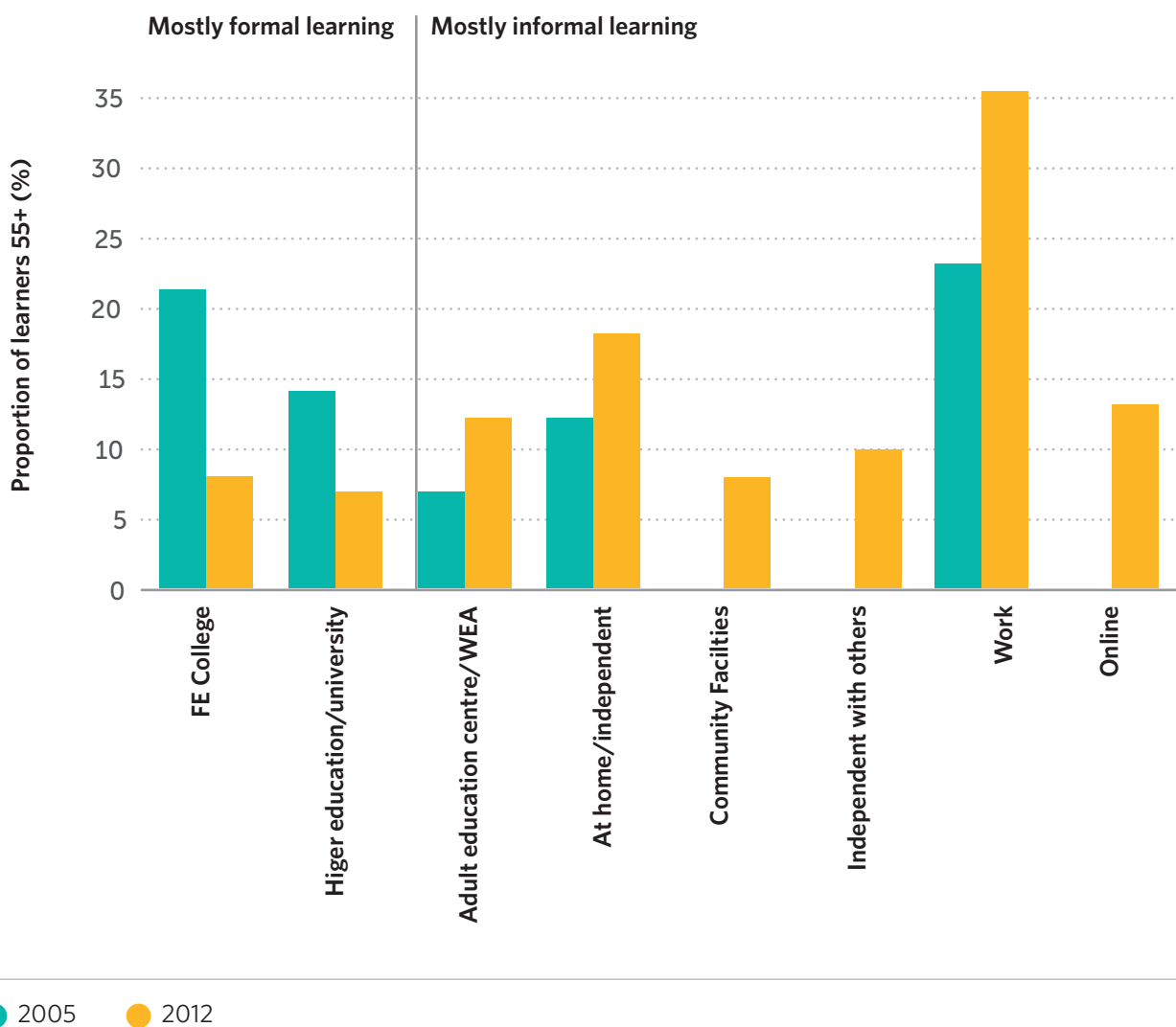


FIGURE 7.7

Percentages of various household income groups reporting different types of learning, 2010. Figure taken from BIS, 2012c, p.21.

Note: n = 3806.

	£10,399 or less	£10,400-£20,799	£20,800-£31,999	£31,200+
Any learning	55	61	72	84
Formal learning	25	23	26	29
Non-formal learning	25	31	40	56
Informal learning	25	35	44	63

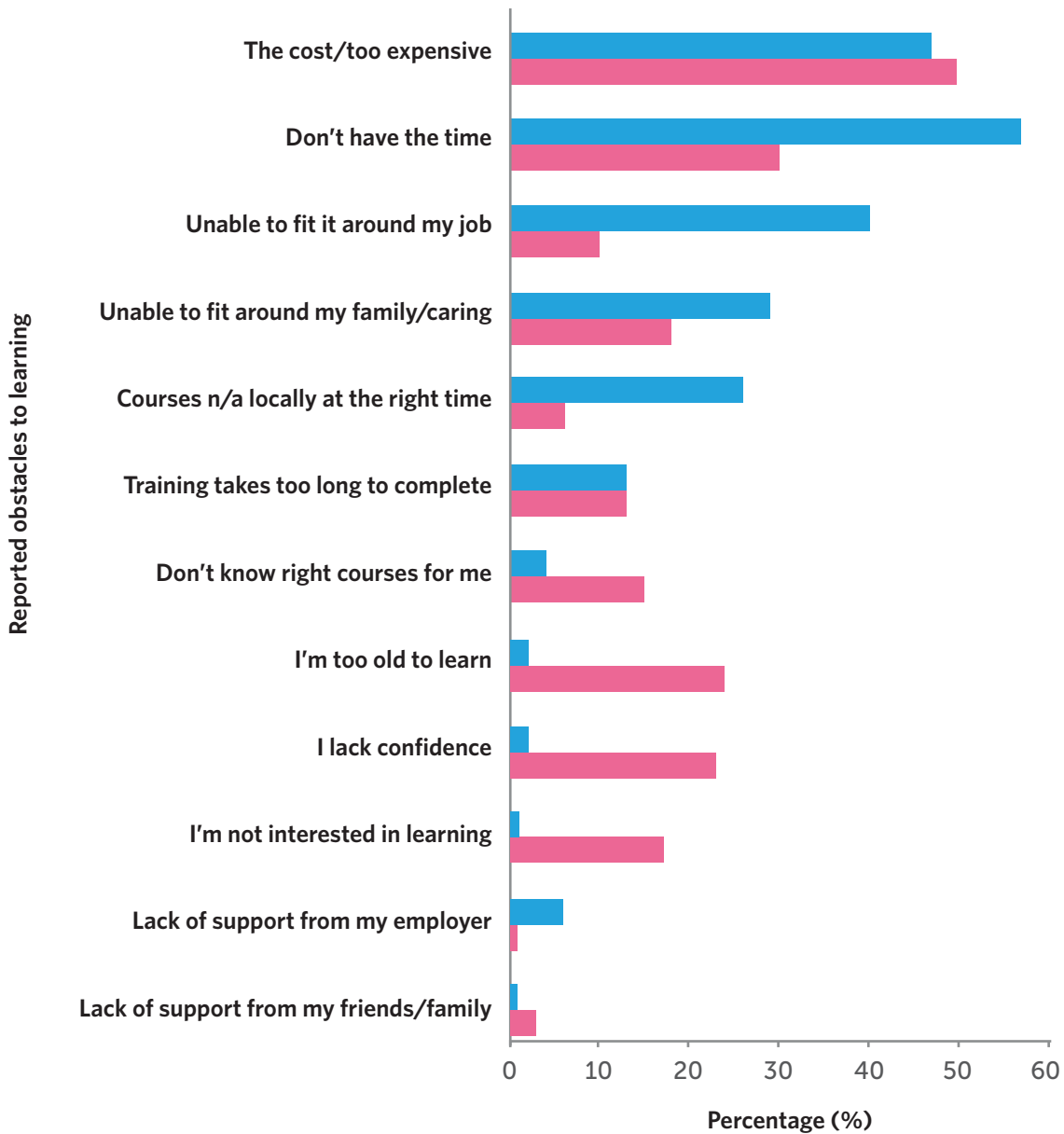
5. ATTITUDINAL BARRIERS AMONG THOSE WITH A POOR EXPERIENCE OF EDUCATION

Propensity to participate in later-life learning is influenced by earlier educational experience (Bynner & Parsons, 2006), with Tuijnman (1991) observing that “the best single predictor of later participation in education is earlier participation”. The evidence in Figure 7.7 suggests that wealthier adults overcome inhibitions and barriers to training in later life, but the same is not true for low earners who potentially did not benefit from the early education system. Survey evidence identifies that attitudinal barriers are disproportionately important for individuals with poor previous experience of education. Figure 7.8 shows that individuals with no formal qualifications were more likely to report the following attitudinal barriers: ‘I don’t know the right course for me’, ‘I’m too old to learn’, ‘I lack confidence’ and ‘I’m not interested in learning’. It is important to note that cost (affordability) and lack of time were reported as the most significant barriers to the uptake of learning, regardless of qualification level (McNair, 2012, p. 65).

FIGURE 7.8

Reported obstacles to learning and reasons for not learning by qualification level (%), 2010. Figure taken from McNair, 2012, p. 65.

Note: percentages may add to above 100 as respondents were allowed to provide multiple answers; n=5000.



● Level 5 ● No qualifications

6. ADDRESSING THE NEEDS OF POTENTIAL LEARNERS

Certain interventions can address the barriers experienced relating to time pressures identified in Figure 7.8, including fitting learning with work and family/caring responsibilities. Measures that ‘unbundle’ higher or FE qualifications into smaller manageable courses can enable individuals to accrue credits that lead to a formal qualification in a more flexible way (Craig, 2015) (Bacon & MacKinnon, 2016). These reforms might also apply to sub-degree Higher National Certificates/Higher National Diplomas qualifications (Wolf, 2016).

Other interventions may address the attitudinal barriers which are more specific to individuals with no or low qualifications (Field & Tuckett, 2016). Local, face-to-face contact is shown to work well in engaging new learners, whilst intermediary bodies, with strong community roots, can play a role (Management Development Review, 1992). For example, the TUC Unionlearn initiative (Miller et al., 2012) and the Ford Motor Company’s Employee Development and Assistance Programme have succeeded in encouraging lower-skilled employees to undertake voluntary learning. Men’s Sheds, which provide a platform for skill-sharing and informal learning among men in the community, serves as another example (Cordier & Wilson, 2014).

Special efforts are needed to reach out to the oldest generations. Intergenerational learning interventions, in which grandparents and grandchildren learn together, hold advantages for both age groups (Boström, 2014), whilst MOOCs can be applied in community settings, including those dealing with the oldest adults (Hasan & Linger, 2016). In addition broadcasting is considered to have had a powerful reach into homes and communities in stimulating and guiding informal learning in topics including science and language (Field & Tuckett, 2016).

A longitudinal study of people who had undertaken community learning courses in the UK found that many benefits, including improved basic skills and motivation to apply for work, were felt most strongly among learners who lacked qualifications, came from black and minority ethnic backgrounds, and/or lived in the most deprived areas. Similarly, of the 38% of respondents who reported that they had gained or would gain qualifications as an outcome of their participation in community learning, the majority fell into the same social groups and/or were seeking employment (BIS, 2014, p.11). This indicates that there are long-term benefits of community learning in fostering future participation, particularly among disadvantaged groups.

Individuals are more likely to consider re-engaging with learning at various life stages, including while parenting, during retirement or after bereavement. Many parents are drawn to participate in learning out of interest in their children’s early years’ development and school performance. The Social Mobility Commission argues for a “holistic” approach to improving adult education by increasing parents’ skill levels, with a view to improving the development of children (Social Mobility Commission, 2016). Open access programmes tend to recruit those already well-placed and motivated to encourage informal learning in the family. However, short term ‘taster’ events and more targeted interventions can engage those who are at most risk of falling behind in key skills, including literacy, numeracy and IT skills (Field & Tuckett, 2016).

7. BALANCE OF FUNDING

Adult learners in England are not charged fees for basic literacy and numeracy provision, and the government announced in 2016 that basic digital skills training will also be available free of charge. The UK government has experimented with public funding for people of all ages to access courses, leading to a first Level 2 qualification (see Table 2.3 for description of qualifications) free of fees and with a co-funded experiment in Individual Learning Accounts. Both trials demonstrated that it is possible to raise demand for learning, although they generated criticism over value for money, the effectiveness of untargeted initiatives and course quality (Parliamentary Select Committee, 2003).

More recently, the government supported a pilot programme of Mid-Life Career Reviews, aimed at encouraging older workers (including those in prison) to re-equip themselves for the labour market or productive retirement (NIACE, 2015b). In addition, in 2016 the government broadened access to the Advanced Learner Loan to people over the age of 19 who wish to undertake approved qualifications at Levels 3 to Level 6 (including A-levels, diplomas, certificates, access to HE and advanced/higher apprenticeships) at an approved training provider in England. For individuals who are not eligible to receive the loan, they will need to self-fund or, if they are in work, seek employer support. This poses a question as to whether there is a case for increased investment in lifelong learning.

With regard to increasing workplace training, the government has previously piloted a Train to Gain Employer Training Scheme, which aimed to increase qualification-based, employer-provided training for low-qualified employees. The programme was later terminated, due to criticisms over its management (House of Commons, 2010), and it was concluded that alternative approaches were needed to incentivise employers to support training in the workplace (BEIS, 2010) (IFS, 2011).

Chapter 2 showed that there are positive financial returns for adult learners acquiring Level 4+ qualifications, on average, until the age of about 45, while Level 2 and Level 3 qualifications are economically worthwhile up until the ages of 25 and 30, respectively (New Economy, 2017, pp. 29-30). However, Chapter 2 also showed that the total economic returns to the individual and state are greatest when investment is earlier in life. This is already reflected in public policy where education up to age 18 receives significantly more funding than later life education, with HE somewhere between the two.

However, there is still a strong case for lifelong learning in that it achieves a number of other policy objectives alongside improved earnings. The wage analyses omit employer or non-wage benefits from later life education, which could in turn lead to benefits for the government, such as in terms of health and justice, that cannot easily be accounted for. Other benefits include the extent to which later life education may be an effective tool for achieving policy goals relating to addressing regional or economy-wide inequality. Later life education may have an important role in reducing the costs associated with unemployment. Providing individuals with an opportunity to address the negative consequences of their initial engagement with the education system from earlier in life could also be seen as part of a government's social contract with citizens, especially where there may have been deficiencies in the education system or people's personal circumstances and attitudes to education may have changed.

The estimates of wage returns from learning are based on economy-wide averages that may hide important differences. Effective and targeted later-life interventions may outperform weaker early life interventions, although conversely better early-life investments can make later-life investments

more cost-effective. There will also be an inflexion point whereby the level of investment in education up to age 18 faces diminishing returns such that it becomes more cost-effective to invest in later life education, although this is potentially offset by the fact that per student funding is relatively low in early years (<5). Understanding these trade-offs is important to help government prioritise resources. These wage benefit estimates tell us about the current aggregates and not the marginal case of investing in early versus later life interventions from the current level.

8. OPPORTUNITIES PROVIDED BY TECHNOLOGY

Technology may offer a way for later-life learning to become more cost effective and accessible to wider parts of the population. MOOCs, such as those offered through the Open University-led FutureLearn initiative, have worldwide reach, as do instructional videos from YouTube and TEDTalks. Worldwide sign-up to MOOCs doubled to 35 million between 2014 and 2015. Such courses may offer a cost-effective form of delivering certain kinds of teaching or training. The completion rate of many MOOCs is around 7% (Ho et al., 2014, p.2) and although this figure seems low, it still represents a significant number of learners globally (2.45 million). There are also potential benefits from partially completed courses, particularly given their low cost for delivery, such as providing a stepping stone to other learning opportunities. An interesting case study is provided by *ich-will-lernen.de* ('I want to learn'), Germany's largest open learning portal for beginners/advanced beginners, which is funded by the Federal Ministry for Education and Research (Bonn, Germany). It provides free learning materials to increase users' literacy skills and basic education, and offers exercises to promote learners' employability and ability to obtain a school leaving certificate. Since 2004, it has been used by more than 400,000 learners. The interactive exercises are compiled individually for each learner, and are guided by online tutors (Windisch, 2015, p.72). Although the long term impacts of this platform on the learner have not been investigated, the portal is widely cited as an example of delivering adult learning opportunities (Grotlüschen & Bonna 2008) (Kuczera et al. 2016).

As with other forms of informal or non-formal learning, online learning is likely to be disproportionately taken up by those in higher socio-economic groups with existing positive experiences of education. This is particularly the case given the existing digital divide in the UK, with younger individuals from higher socio-economic background more likely to have digital skills than older individuals from poorer socio-economic backgrounds. These technologies are still in their infancy and as they become more sophisticated and tailored to users and particular jobs/skills it could be that they remove many of the obstacles to skills acquisition.

SUMMARY

Lifelong learning in the UK compares poorly internationally, is heavily skewed towards wealthier socio-economic groups, and is disproportionately consumed by younger people. This is happening at the time that automation is predicted to replace jobs and economic trends indicate that adaptability will be an increasing priority for individuals and the UK.

There is a case for investing resources in lifelong learning, especially given technological change and the increasing proportion of older age groups who traditionally have lower uptake of learning earlier in life. Investing in education earlier in life has, on average, a higher financial payback and is likely to lead to better equality outcomes. However, important policy outcomes can be achieved from lifelong learning.

Decision making can be helped by a better understanding of the inflexion point, where later-life learning begins to have an equal or better return than early life education. Additionally, more work can be done to understand the non-wage returns regarding lifelong learning, including those related to health, cognition and wellbeing.

A useful approach is to analyse the barriers faced by individuals in accessing lifelong learning, and how they differ between population groups, such as those with or without existing qualifications. Understanding different user needs and priorities at different stages of the life course can also be productive. Community learning, and other forms of informal and non-formal learning facilitated by technological and social trends, have potential to provide a gateway to those who have a low propensity to learn. However, without the use of more targeted interventions, these types of learning are likely to be restricted to individuals who already have good prior experience of education.



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Commissioned papers

Bacon, L. & MacKinnon, L., 2016. *Lifelong digital skills development, current picture and future challenges*. London, UK: Foresight, Government Office for Science.

Barnes, S.-A., Brown, A. & Warhurst, C., 2017. *Education as the Underpinning System: Understanding the Propensity for Learning Across the Lifetime*. London, UK: Foresight, Government Office for Science.

Bhutoria, A., 2016. *Economic Returns to Education in the United Kingdom*. London, UK: Foresight, Government Office for Science.

Brooks, G. & Lahmar, J., 2017. *Life Course and Cohort Factors in Adult Basic Skills Levels*. London, UK: Foresight, Government Office for Science.

Campbell, M., 2016. *The UK's Skills Mix: Current Trends and Future Needs*. London, UK: Foresight, Government Office for Science.

Damodaran, L. & Burrows, H. *Digital skills across the lifetime – existing provisions and future challenges*. London, UK: Foresight, Government Office for Science.

Felstead A. & Unwin, L., 2016. *Learning Outside the Formal System - What Learning Happens in the Workplace, and How Is It Recognised?* London, UK: Foresight, Government Office for Science.

Field, J. & Tuckett, A., 2016. *Informal Learning in the Family and Community*. London, UK: Foresight, Government Office for Science.

Gambin, L. & Hogarth, T., 2016. *The UK Skills System: How Well Does Policy Help Meet Evolving Demand?* London, UK: Foresight, Government Office for Science.

Green, A., 2016. *Low Skill Traps in Sectors and Geographies: Underlying Factors and Means of Escape*. London, UK: Foresight, Government Office for Science.

Green, A. et al., 2016. *The UK's Skill System: Training, Employability and Gaps in Provision*. London, UK: Foresight, Government Office for Science.

Green, F., 2016. *Skills Demand, Training and Skills Mismatch: A Review of Key Concepts, Theory and Evidence*. London, UK: Foresight, Government Office for Science.

Green, A. & Hogarth, T., 2016. *The UK Skills System: How Aligned are Public Policy and Employer Views of Training Provision?* London, UK: Foresight, Government Office for Science.

Holmes, C., 2017. *The Cost of Skills Underutilisation in the UK*. London, UK: Foresight, Government Office for Science.

Laurillard, D., Derrick, J. & Doel, M., 2016. *Building Digital Skills in the FE Sector*. London, UK: Foresight, Government Office for Science.

Mallows, D. & Litster, J., 2016. *How can We Motivate Adults to Engage in Literacy and Numeracy Learning?* London, UK: Foresight, Government Office for Science.

New Economy, 2017. *Investment in Skills*. London, UK: Foresight, Government Office for Science.

Schuller, T., 2017. *What are the Wider Benefits of Learning Across the Life Course?* London, UK: Foresight, Government Office for Science.

Tuckett, A. & Field, J., 2016. *Factors and motivations affecting attitudes towards and propensity to learn through the life course*. London, UK: Foresight, Government Office for Science.

Wilson, R. et al., 2017. *Labour Market Anticipation: Lessons from around the World*. London, UK: Foresight, Government Office for Science.

Bibliography

Aghion, P. et al., 2013. *LSE Growth Commission Report - Investing for Prosperity*. London, UK: LSE Growth Commission.

Anderson, J., Anderson, A., Friedrich, N. & Kim, J.E., 2010. Taking Stock of Family Literacy: Some Contemporary Perspectives. *Journal of Early Childhood Literacy*, 10(1), pp. 33-53.

Anderson, T. et al., 2014. *The First Year of Accelerating Opportunity: Implementation Findings from the States and the Colleges*. Washington DC, USA: Urban Institute.

Atkinson, J. & Williams, M., 2003. *Employers Perspectives on the Recruitment, Retention and Advancement of Low-pay, Low-status Employees*. Brighton, UK: The Institute for Employment Studies.

Bank of England, 2014. The UK Productivity Puzzle. *Quarterly Bulletin*, Q2.

Banks, J. & Mazzonna, F., 2012. The Effect of Education on Old Age Cognitive Abilities. *The Economic Journal*, 122(560), pp. 418-448.

Baumgart, M. et al., 2015. Summary of the Evidence on Modifiable Risk Factors for Cognitive Decline and Dementia. *Alzheimer's & Dementia*, 11(6), pp. 718-726.

Bell, D. & Blanchflower, D., 2011. *Young People and the Great Recession*, Bonn, Germany: Institute for the Study of Labour.

Bibby, T., 2002. Shame: An Emotional Response to Doing Mathematics as an Adult and a Teacher. *British Educational Research Journal*, 28 (5), pp. 705-721.

Bimrose, J. & Barnes, S.-A., 2010. *Labour Market Information (LMI), Information Communications And Technologies (ICT) and Information, Advice And Guidance (IAG): The Way Forward?* Wath-upon-Deerne and London, UK: UK Commission for Employment and Skills.

Birdwell, J., Scott, R., 2015. *Learning by Doing*, London, UK: Demos.

BIS, 2011. *The Returns to Higher Education Qualifications, Research Paper Number 45*, London, UK: Department for Business Innovation and Skills.

BIS, 2012a. *The 2011 Skills For Life Survey: A Survey of Literacy, Numeracy and ICT Skills In England*. London: Department for Business, Energy and Industrial Strategy.

BIS, 2012b. *A Review of Business University Collaboration*. London, UK: Department for Business, Energy and Industrial Strategy.

BIS, 2012c. *National Adult Learner Survey 2010*, Research Paper Number 63. London, UK: Department for Business, Energy and Industrial Strategy.

BIS, 2013a. *The International Survey of Adult Skills 2012: Adult Literacy, Numeracy and Problem Solving Skills in England*, Research Paper 139. London, UK: Department for Business Innovation and Skills.

BIS, 2013b. *The Impact of University Degrees on the Lifecycle of Earnings: Some Further Analysis*, Research Paper No. 112. London, UK: Department for Business Innovation and Skills.

BIS, 2014. *Community Learning Learner Survey*, Research Paper Number 170. London, UK: Department for Business Innovation and Skills.

BIS, 2015a. *UK Skills and Productivity in an International Context*, Research Paper Number 262. London, UK: Department for Business Innovation and Skills.

BIS, 2015b. *UK Skills and Productivity in an International Context*, Research Paper Number 262, London, UK: Department for Business, Energy and Industrial Strategy.

BIS, 2016a. *Impact of Poor Basic Literacy and Numeracy on Employers*, Research Paper Number 266. London, UK: Department for Business, Energy and Industrial Strategy.

BIS, 2016b. *Impact of Poor English and Maths Skills on Employers*, Literature Review, Research Paper Number 267. London: Department for Business, Energy and Industrial Strategy.

Boström, A., 2014. Intergenerational Learning and Social Capital. In: B. Schmidt-Hertha, S. Krasovec & M. Formosa, eds. *Learning Across Generations in Europe: Contemporary Issues in Older Adult Education*. Rotterdam, the Netherlands: Sense.

British Chambers of Commerce, 2016. *A Model for School and Business Partnerships to Promote Young People's Career Prospects*. London, UK: British Chambers of Commerce & Government Equalities Office.

Brooks, G. et al., 1996. *Family Literacy Works: The NFER Evaluation of the Basic Skills Agency's Family Literacy Demonstration Programmes*. London, UK: Basic Skills Agency.

Brooks, G. & Lahmar, J., 2017. *Life Course and Cohort Factors in Adult Basic Skills Levels*. London, UK: Foresight, Government Office for Science.

Brooks, G., Pahl, K., Pollard, A. & Rees, F., 2008. *Effective and Inclusive Practices in Family Literacy, Language and Numeracy: A Review of Programmes and Practice in the UK and Internationally*. Reading: CfBT Education Trust.

Brown, A., 2009. *Higher Skills Development at Work: A Commentary by the Teaching and Learning Research Programme*. London, UK: Economic & Social Research Council.

Bynner, J. & Parsons, S., 2006. *New Light on Literacy And Numeracy: November 2006*, London, UK: Natural Resources Defense Council.

Calero, J., Murillo Huertas, I. & Raymond, J., 2016. Education, Age and Skills: An Analysis Using the PIAAC Survey. IEB Working Paper N. 2016/03. SSRN.

Carpentieri, J.D., Cara, O. & Litster, J., 2013. *The Intergenerational Transfer of Numeracy Skills*. London, UK: National Research and Development Centre.

CBI, 2012. *First steps: A New Approach for our Schools*. London, UK: Confederation of Business and Industry.

CBI, 2016a. *Unlocking regional growth*. London, UK: Confederation of Business and Industry.

CBI, 2016b. *The Right Combination: CBI/Pearson Education and Skills Survey 2016*. London, UK: Confederation of Business and Industry.

Cedefop, 2014. *European Skills and Jobs Survey*. [Online] Available at: <http://skillspanorama.cedefop.europa.eu/en/indicators/skills-under-utilisation#1> [Accessed 04/10/2016].

CIPD, 2015. *Over-qualification and Skills Mismatch in the Graduate Labour Market*. [Online] Available at: https://www.cipd.co.uk/Images/over-qualification-and-skills-mismatch-graduate-labour-market_tcm18-10231.pdf [Accessed 21/11/2016].

CIPD, 2016. *Latest Labour Market Statistics Underline Strength of UK's Flexible Labour Market*. [Online] Available at: <https://www.cipd.co.uk/about/media/press/200716-ons-response> [Accessed 18/01/2017].

Coates, S., 2016. *Unlocking Potential: A Review of Education in Prison*, London: Ministry of Justice.

Conway, M. & Giloth, R., 2014. *Connecting People to Work: Workforce Intermediaries and Sector*. New York: Aspen Institute.

Cordier, R. & Wilson, N., 2014. Community-based Men's Sheds: Promoting Male Health, Wellbeing and Social Inclusion in an International Context. *Health Promotion International*, 29(3), pp. 483-493.

Craig, R., 2015. *College Disrupted: The Great Unbundling of Higher Education*. New York, NY, USA: St. Martins Press.

Crawford, C., 2014. *Socio-Economic Differences in University Outcomes in The UK: Drop-Out, Degree Completion and Degree Class*, IFS Working Paper W14/31. UK: University of Warwick and Institute for Fiscal Studies.

De Coulon, A., Marcenaro-Gutierrez, O. & Vignoles, A., 2010. The Value of Basic Skills in the British Labour Market. *Oxford Economic Papers*, 63(1), pp. 27-48.

Deloitte, 2015. *From Brawn to Brains: The Impact Of Technology on Jobs in the UK*. London, UK: Deloitte.

-
- DfE, 2015. *Post-16 Work Experience as Part of 16 to 19 Study Programmes and Traineeships*. London, UK: Department for Education.
- DfE, 2016a. *Training New Teachers*. London, UK: National Audit Office.
- DfE, 2016b. *Post-16 Skills Plan*. London, UK: Department for Education.
- DfE, 2017. *Further Education and Skills in England January 2017, SFR07/2017*. London, UK: Department for Education.
- DfES, 2003. *The Skills for Life Survey: A National Needs and Impact Survey of Literacy, Numeracy and ICT skills (Research Brief RB490)*. London, UK: Department for Education and Skills.
- Dickerson, A., Green, F., Mane, F. & Henseke, G., 2015. *Individual and Institutional Determinants of Skill Underutilization*. CEDEFOP/IZA Workshop on Skills and Skill Mismatch. Thessaloniki, Greece.
- Dolan, P. & Fujiwara, D., 2012. *Valuing Adult Learning: Comparing Wellbeing Valuation to Contingent Valuation*. London: Department for Business, Energy and Industrial Strategy.
- Edwards, P., Sengupta, S. & Tsai, C.-J., 2007. *Managing Work in the Low-skill Equilibrium: A Study of UK Food Manufacturing*, SKOPE Research Paper No 72. Oxford, UK: Centre on Skills, Knowledge and Organisational Performance.
- ESFA, 2017. *The Legal Entitlements for 2017 to 2018*. London, UK: Education and Skills Funding Agency.
- Eurostat, 2016. *GDP at Regional Level*. [Online] Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/GDP_at_regional_level [Accessed 05/04/2017].
- Federation of Small Businesses, 2015. *FSB response to the Social Mobility Committee of the House of Lords' Inquiry into the Transition from School to Work For 14-24 Year Olds*. [Online] Available at: <http://data.parliament.uk/WrittenEvidence/CommitteeEvidence.svc/EvidenceDocument/Social%20Mobility/Social%20Mobility/written/21483.html> [Accessed 08/02/2017].
- Feinstein, L., Budge, D., Vorhaus, J. & Duckworth, K., 2008. *The Social and Personal Benefits Of Learning: A Summary of Key Research Findings*. London, UK: Institute of Education.
- Felstead, A. & Green, F., 2013. *Underutilization, Overqualification and Skills Mismatch: Patterns and Trends*. Glasgow, UK: Skills Development Scotland.
- Foresight, 2016a. *Future of Cities: Graduate Mobility and Productivity: An Experiment in Place-Based Open Policy-Making*. London, UK: Foresight, Government Office for Science.
- Foresight, 2016b. *Future of an Ageing Population*. London, UK: Foresight, Government Office for Science.
- Frey, C. B. & Osborne, M. A., 2014. *Agiletown: The Relentless March Of Technology and London's Response*, London: Deloitte.
- Gardiner, L. & Corlett, A., 2015. *Looking Through the Hourglass: Hollowing Out of the UK Jobs Market Pre- and Post Crisis*. London, UK: Resolution Foundation.
- Goos, M., Manning, A. & Salomons, A., 2014, *Explaining Job Polarization: Routine-biased Technological Change and Offshoring*. *The American Economic Review*, 104 (8), pp. 2509-2526.

Goulding, M., Rowland, T. & Barber, P., 2002. *Does it matter? Primary Teacher Trainees' Subject Knowledge in Mathematics*. *British Educational Research Journal*, 28(5), pp. 689-704.

Green, A., 2012. *Skills for Competitiveness: Country Report for United Kingdom*. Paris, France: OECD LEED Programme.

Green, A., Hasluck, E., Hogarth, T. & Reynolds, C., 2003. *East Midlands FRESA Targets Project – Final Report*. Birmingham, UK: East Midlands Development Agency.

Green, A., Kispeter, E., Sissons, P. & Froy, F., 2017. *How International Cities Lead Inclusive Growth Agendas*. York, UK: Joseph Rowntree Foundation.

Green, F. et al., 2015. The Declining Volume of Workers Training in Britain. *British Journal of Industrial Relations*, 52(2), p. 422-448.

Green, F. & Henseke, G., 2016. The Changing Graduate Labour Market: Analysis Using a New Indicator of Graduate Jobs. *IZA Journal of Labor Policy*, 5(14), pp. 16.

Green, F., 2016a. *Skills Demand, Training and Skills Mismatch: A Review of Key Concepts, Theory and Evidence*. London, UK: Foresight, Government Office for Science.

Green, A., 2016b. *Low Skill Traps in Sectors and Geographies: Underlying Factors and Means of Escape*. London, UK: Foresight, Government Office for Science.

Hansen, K. & Vignoles, A., 2005. The United Kingdom Education System in a Comparative Context. In: S. Machin & A. Vignoles, eds. *What's the Good of Education? The Economics of Education in the UK*. Princeton, NJ, USA: Princeton University Press.

Hanushek, E. & Woessmann, L., 2015. *Universal Basic Skills: What Countries Stand To Gain*. Paris, France: OECD.

Harding, C. & Ghezelayagh, S., 2014. *Community Learning Learner Survey: Additional Analysis of Participants Following Family Learning Courses: Research Paper Number 108*. London, UK: Department for Business, Energy and Industrial Strategy.

Hasan, H. & Linger, H., 2016. Enhancing the Well-Being of The Elderly: Social Use of Digital Technologies In Aged Care. *Educational Gerontology*, 42(11), pp. 749-757.

Heckman, J. & Kautz, T., 2013. *Fostering and Measuring Skills: Interventions that Improve Character and Cognition*. Cambridge, MA, USA: National Bureau of Economic Research.

Heckman, J. & Masterov, D., 2007. *The Productivity Argument for Investing in Young Children*, Chicago, IL, USA: University of Chicago.

HESA, 2016. *Graduate Employment*. [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/students/graduate-employment> [Accessed 21/11/2016].

HESA, 2007. *Student Record 2005–2006*, January 2007.

HESA, 2017. *Students and graduates: Students in 2015/16 by level and age group*. [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/students> [Accessed 08/08/2017]

Hills, J., 2016. *Good Times, Bad Times the Welfare Myth of Us and Them*. Bristol, UK: Policy Press, University of Bristol.

HM Government, 2017. *Building Our Industrial Strategy*. London: HM Government.

HM Treasury, 2015. *Fixing the Foundations: Creating a More Prosperous Nation*. London, UK: HM Treasury.

Ho, A. et al., 2014. *HarvardX and MITx: The First Year of Open Online Courses, Fall 2012-Summer 2013*. Boston, MA, USA: HarvardX and MITx Working Paper No. 1.

Holland, D., Liadze, I., Rienzo, C. & Wilkinson, D., 2013. *The Relationship Between Graduates and Economic Growth Across Countries*. London, UK: Department for Business, Energy and Industrial Strategy.

Holmes, C., 2017. *The Cost of Skills Underutilisation in the UK*. London, UK: Foresight, Government Office for Science.

House of Commons, 2010. *Train to Gain: Developing the Skills of the Workforce: Sixth Report of Session 2009-2010*. London, UK: House of Commons.

House of Commons Library, 2016. *Careers Guidance in Schools, Colleges and Universities (Briefing 07236)*. London, UK: House of Commons Library.

House of Commons, 2014-15. *Adult Literacy and Numeracy: Fifth Report of Session*. London, UK: House of Commons: Business, Innovation and Skills Committee.

House of Lords, 2016. *Overlooked and Left Behind: Improving The Transition from School To Work for the Majority of Young People*. London, UK: Select Committee on Social Mobility.

Hyde, M. & Phillipson, C., 2014. *How can Lifelong Learning, Including Continuous Training within the Labour Market, be Enabled and Who Will Pay for This? Looking Forward 2040 How Might This Evolve?* London, UK: Foresight, Government Office for Science.

ILC, 2014. *The Missing Million: Illuminating the Employment Challenges of the Over 50s*. London, UK: International Longevity Centre.

International Labour Office, 2010. *A Skilled Workforce for Strong, Sustainable and Balanced Growth*. Geneva, Switzerland: International Labour Office.

IPSOS MORI Social Research Institute, 2016. *Impact of Poor Basic Literacy and Numeracy on Employers, Research Paper 266*. London, UK: Department for Business, Innovation and Skills.

Kuczera, M., Field, S. & Windisch, H., 2016. *Building Skills for All: A Review of England*. Policy Insights from the Survey of Adult Skills. Paris, France: OECD.

Kupiaine, S., Hautamäki, J. & Karjalainen, T. 2009. *The Finnish Education System and PISA*. Helsinki, Finland: Helsinki University Print.

MAC, 2013. *Skilled Shortage Sensible: Full review of the Recommended Shortage Occupation Lists for the UK and Scotland, a Sunset Clause and the Creative Occupations*. London, UK: Migration Advisory Committee,

Home Office.

Maguire, S., Freely, J., Clymer, C. & Conway, M., 2010. *Tuning In to Local Labor Markets: Findings from the Sectoral Employment Impact Study*. Philadelphia, PA, USA: Public/Private Ventures.

Management Development Review, 1992, Employee Development at Ford. MCB UP Ltd, 5 (1), <https://doi.org/10.1108/EUM00000000000711>

Mankiw, N. G.; Romer, D. Weil, D.N., 1992. A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*. 107 (2), pp. 407-437.

Mann, A. & Percy, C., 2013. *Employer Engagement in British Secondary Education: Wage Earning Outcomes Experienced by Young Adults*. London, UK: Education and Employers.

Mann, A., 2012. *Work experience: Impact and Delivery - Insights from the Evidence*. London, UK: Education and Employers Taskforce.

Mason, G., 2011. *Product Strategies, Skills Strategies and Skills Updating Needs in England: New Evidence from the National Employer Skills Survey, Evidence Report 30*. Wath-upon-Deerne and London, UK: UK Commission for Employment and Skills.

Mckinsey, 2012. *Education to Employment: Designing A System That Works*. New York, NY, USA: McKinsey & Company, Inc.

McKinsey, 2017. *What's Now and Next in Analytics, AI and automation*. New York, NY, USA: McKinsey & Company, Inc.

McNair, S., 2012. *Older People's Learning in 2012: A Survey*. Leicester, UK: NIACE.

Michaels, G., Natraj, A., Reenen, V., 2017. Has ICT Polarized Skill Demand? Evidence from Eleven Countries over Twenty-Five Years. *Review of Economics and Statistics*, 96 (1) pp. 60-77.

Miller, L. *et al.*, 2012. *Evaluation of the Union Learning Fund: Learners, Workplace Cases and Extension to the Non-Union Sector*. London: Department for Business, Energy and Industrial Strategy.

Ministry of Justice, 2013. *Transforming Youth Custody: Putting Education at the Heart of Detention*. London, UK: Ministry of Justice.

National Careers Council, 2014. *Taking Action: Achieving a Culture of Change in Careers Provision*. London, UK: National Careers Council.

National Readership Survey, 2017. *Social Grade*. [Online]. Available at: <http://www.nrs.co.uk/nrs-print/lifestyle-and-classification-data/social-grade/> [Accessed 02/03/2017].

NIACE, 2013. *Family Learning Works: The Inquiry into Family Learning in England and Wales*. Leicester, UK: NIACE.

NIACE, 2015a. *Adult Participation in Learning Survey: Headline Findings*. Leicester, UK: NIACE.

NIACE, 2015b. *Mid Life Career Review Final report to the Department for Business, Innovation and Skills*. Leicester, UK: NIACE.

-
- NRDC, 2012. *Family Learning: A Review of the Research Literature*. [Online] Available at: http://www.learningandwork.org.uk/wp-content/uploads/2017/01/Family_learning_research_review_final-8_June_2012.pdf [Accessed 22/01/2017].
- OECD, 2002. *OECD Employment Outlook 2002*. Paris, France: OECD.
- OECD, 2004. *OECD Employment Outlook 2004*. Paris, France: OECD.
- OECD, 2010. *OECD Employment Outlook 2010*. Paris, France: OECD.
- OECD, 2012a. Labour Losing To Capital: What Explains The Declining Labour Share? In: *Employment Outlook 2012*. Paris, France: OECD.
- OECD, 2012b. *Education at a Glance 2012: OECD Indicators*. Paris, France: OECD.
- OECD, 2012c. *PIAAC: Survey of Adult Skills*. Paris, France: OECD.
- OECD, 2012d. *Education at a Glance 2012: Highlights*. Paris, France: OECD.
- OECD, 2013. *First Results from the Survey of Adult Skills*, Paris, France: OECD.
- OECD, 2014a. *Education at a Glance 2014: OECD Indicators*. Paris, France: OECD.
- OECD, 2014b. *Job Creation and Local Economic Development*. Paris, France: OECD.
- OECD, 2016a. Labour Market Statistics: Unemployment Rate. [Online] <https://data.oecd.org/unemp/unemployment-rate.htm> [Accessed 11/06/2017].
- OECD, 2016b. Level of GDP per Capita and Productivity. [Online] Available at: http://stats.oecd.org/index.aspx?DataSetCode=PDB_LV [Accessed 03/04/2017].
- Office for Fair Access, 2014. *Trends in Young Participation by Student Background and Selectivity of Institution*. [Online] www.offa.org.uk/wp-content/uploads/2006/07/OFFA-2014.01.pdf [Accessed 08/03/2017]
- Ofqual, 2014. *Get the Facts: GCSE and A level Reform*. [Online] Available at: <https://www.gov.uk/government/publications/get-the-facts-gcse-and-a-level-reform/get-the-facts-gcse-reform> [Accessed 04/11/2017].
- Ofsted, 2009. *An Evaluation of the Benefits of Family Learning for Participants, their Families and the Wider Community*. London, UK: Ofsted.
- Ofsted, 2011. *Removing Barriers to Literacy*. London, UK: Ofsted.
- Ofsted, 2013. *Going in the Right Direction? Careers Guidance in Schools from September 2012*. London, UK: Ofsted.
- Ofsted, 2014. *Teaching, Learning and Assessment In Further Education and Skills - What Works and Why?* Paris, France: Ofsted.
- ONS, 2013. *Graduates in the UK Labour Market: 2013: Figure 8*. [Online] Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/graduatesintheuklabourmarket/2013-11-19> [Accessed 14/08/2017].

ONS, 2015a. *International Comparisons of UK Productivity (ICP), First Estimates: 2015*. [Online] Available at: <https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/bulletins/internationalcomparisonsofproductivityfirstestimates/2015> [Accessed 01/ 03/ 2017].

ONS, 2015b. *London leads UK cities in economic recovery: December 2015*. [Online] Available at: http://webarchive.nationalarchives.gov.uk/20160106003539/http://www.ons.gov.uk/ons/dcp171766_426950.pdf [Accessed 01/18/2017].

ONS, 2016. *Travel to Work Area Analysis in Great Britain: 2016*, Newport, UK: Office of National Statistics.

ONS, 2017a. *UK labour market: March 2017*. [Online] Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/uklabourmarket/mar2017> [Accessed 27/03/2017].

ONS, 2017b. *Job related training or education in the last 3 months, UK, April to March 2017* Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/adhocs/007354jobrelatedtrainingoreducationinthelast3monthsuapriltomarch2017>

Parliamentary Select Committee, 2003. *Report, Select Committee on Public Accounts Tenth*. [Online] Available at: www.publications.parliament.uk/pa/cm200203/cmselect/cmpublicacc/544/54403.htm [Accessed 03/ 05/2017].

Productivity Leadership Group, 2016. *Raising our Ambitions for Business Performance*. [Online] Available at: <https://www.yumpu.com/en/document/view/55721795/how-good-is-your-business-really-raising-our-ambitions-for-business-performance> [Accessed 01/ 02/2017].

Rebok, G. et al., 2014. Ten-Year Effects of the ACTIVE Cognitive Training Trial on Cognition and Everyday Functioning in Older Adults. *Journal of the American Geriatrics Society* 62(1), pp. 16-24.

Rodriguez-Brown, F., 2004. Project Flame: A Parent Support Family Literacy Model. In: Wasik B., ed. *Handbook of Family Literacy*. Laurence Erlbaum, pp. 213-229.

Romer, D., 1996. *Advanced Macroeconomics*, 4th edition. New York, NY, USA: McGraw-Hill Companies Inc.

Rossor, M. & Knapp, M., 2016. Can we Model a Cognitive Footprint of Interventions and Policies to Help to Meet the Global Challenge of Dementia? *Lancet*, Volume 368, pp. 1008-1010.

Schooldash Ltd., 2016. *Analysis of DfE data: Cartogram of England Showing Local Authorities*. [Online] Available at: <https://www.schooldash.com/maps> [Accessed 05/ 10/ 2016].

Schwab, K., 2016. *The Global Competitiveness Report 2016-2017*. Geneva, Switzerland: World Economic Forum.

Sentance, A., 2015. *Skill Shortages are Costing the UK £10bn - and will Continue to Constrain Growth*. [Online] Available at: <http://www.cityam.com/224620/skill-shortages-are-costing-uk-10bn-and-will-continue-constrain-growth> [Accessed 28/04/2017].

SFA, 2013. *Statistical First: Release Further Education & Skills: Learner Participation, Outcomes and Level of Highest Qualification Held*. London, UK: Skills Funding Agency, Department for Business Innovation and Skills.

Shadbolt, N., 2016. *Shadbolt Review of Computer Sciences Degree Accreditation and Graduate Employability*. London, UK: Department of Business, Innovation and Skills and Higher Education Funding Council for England.

Sheffield City Council, 2011-2012. *Analysis of Foundation Stage Pupil Data*.

Simons, D. et al., 2016. Do "Brain-Training" Programs Work? *Psychological Science in the Public Interest*, 17(3), pp. 103-186.

Snelson, S. & Deyes, K., 2016. *Understanding the Further Education Market in England: Research Paper 296*. London, UK: Department for Business, Energy and Industrial Strategy.

Social Mobility Commission, 2016. *State of the Nation 2016: Social Mobility in Great Britain*, London, UK: Social Mobility Commission.

Strandh, M., Winefield, A., Nilsson, K. & A, H., 2014. Unemployment and Mental Health Scarring During the Life Course. *European Journal of Public Health*, 24 (3), pp. 440-445.

Strand, S., 2015. *Ethnicity, Deprivation and Educational Achievement at Age 16 in England: Trends Over Time*. London, UK: Department for Education.

Sylva, K. et al., 2003. The Effective Provision of Pre-School Education (EPPE) Project: Findings from the Pre-school Period. London, UK: UCL, The Institute of Education.

Technical and Further Education Bill, 2016-17. *Technical and Further Education Bill 2016-17*. [Online] Available at: <http://services.parliament.uk/bills/2016-17/technicalandfurthereducation.html> [Accessed 10/02/2017].

The Careers & Enterprise Company, 2016. *Understanding the Careers Cold Spots: The Careers & Enterprise Company Prioritisation Indicators 2016*. London, UK: The Careers and Enterprise Company.

Thompson, S., Colebrook, C., Hatfield, I. & Doyle, P., 2016. *Boosting Britain's strategy for Productivity, Innovation and Growth*. London, UK: Institute for Public Policy Research.

Tinto, V., 1987. *Rethinking the Causes and Cures of Student Attrition*, Chicago, IL, USA: University of Chicago Press.

Tuijnman, A., 1991. Lifelong Education: A Test of the Accumulation Hypothesis. *International Journal of Lifelong Education*, 10(4), pp. 275-285.

UKCES, 2011. *Helping Individuals Succeed: Transforming Career Guidance*, London, UK: UK Commission for Employment and Skills.

UKCES, 2014a. *The Labour Market Story: The State of UK Skills*. Wath-upon-Deerne, UK: UK Commission for Employment and Skills.

UKCES, 2014b. *Employer Perspectives Survey 2014: UK results, Evidence Report 88*, Wath-Upon-Deerne, UK: UK Commission for Employment and Skills.

UKCES, 2015a. *Catch 16-24: Youth Employment Challenge*, Wath-Upon-Deerne, UK: UK Commission for

Employment and Skills.

UKCES, 2015b. *UKCES Employer Skills Survey 2015: UK Results. Evidence Report 97*. Wath-Upon-Deerne, UK: UK Commission for Employment and Skills.

UNESCO, 2016. *Global Education Monitoring Report*. [Online] Available at: <http://unesdoc.unesco.org/images/0024/002462/246230E.pdf> [Accessed 02/01/2017]

University of Birmingham, 2013. *University of Birmingham Jubilee Centre: A Character Education Evaluation Handbook for Schools*. [Online] Available at: <http://jubileecentre.ac.uk/1721/character-education> [Accessed 02/02/2017].

Vivian, D. et al., 2016. *Employer Skills Survey 2015: UK Results. Evidence Report 97*. Wath-Upon-Deerne, UK: UK Commission for Employment and Skills.

Vorhaus, J., Litster, J., Frearson, M. & Johnson, S., 2011. *Review of Research and Evaluation on Improving Adult Literacy and Numeracy Skills: Research Paper Number 61*. London, UK: Department for Business, Energy and Industrial Strategy.

Windisch, H., 2015. *Adults with Low Literacy and Numeracy Skills: A Literature Review on Policy Intervention*. Paris, France: OECD.

Wolf, S., 2016. *Remaking Tertiary Education: Can We Create a System that is Fair and Fit for Purpose?* London, UK: Education Policy Institute.

World Mapper, 2016. *Schooldash Ltd. (2016) analysis of DfE data*. [Online] Available at: <https://www.schooldash.com/maps> [Accessed 10/ 05/2016].



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