



UK COMMISSION FOR
EMPLOYMENT AND SKILLS

Working Futures 2012 - 2022: Introduction and Commentary

Briefing Paper
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1 Introduction

Working Futures 2012-2022 (Wilson *et al.*, 2014) is the fifth in a series of decade-long projections of the UK's labour market. It arrives in a time of changing economic prospects. Where the last *Working Futures* (Wilson and Homenidou, 2012) arrived in the slow-recovering aftermath of a worldwide recession – the worst since the Second World War – the latest evidence suggests that, while uncertainty remains, the prospects for growth and jobs are rapidly improving. Many of the headwinds of the years since recession hit in 2008 – banking crises, debt deleveraging, commodity price shocks – seem now to have diminished. But there remain substantial uncertainties – opportunities as well as risks – which face all of those with an interest in the future UK labour market.

Employers considering the workforce needed to deliver on plans to invest and grow, employees seeking to develop a career or finance retirement, or policymakers looking to promote quality jobs and see rising living standards: all of us have an interest in understanding the variables at work in shaping employment and skills over the decade to come. *Working Futures* doesn't give easy answers on those questions; we don't present its projections as a concrete snapshot of the labour market in 2022, but instead as a baseline founded on rigorous assumptions about some of the key economic, technological and social trends, against which we can test our own opinions and expectations.

There is never any shortage of speculation about the future of the workplace. What we set out to do with *Working Futures* is move beyond isolated, anecdotal guesses and offer a rigorous, evidence-based projection covering the entire UK labour market. We do that by drawing on the best available evidence, in the form of hard data on trends in demographics, education, employment and the wider economy, and by using a set of proven models to work through how they are likely to evolve over a ten year timescale.

Some of the results line up well with the standard speculation. For example, we find plenty of confirmation here for the idea that the labour market is polarising (Goos and Manning, 2007), with expanding work at the top and bottom ends, while the middle is in relative decline. We also find that, while manufacturing output will grow, the overall shape of the UK economy will continue its long term move in favour of business services, as well as trade, accommodation and transport.

On the other hand, *Working Futures*' comprehensive analysis tells us what such simple speculations don't. Take job polarisation again: *Working Futures* projects that the largest share of growth is likely to come from the high-skill end, rather than the low-skill end, of the labour market; there will be nearly 2½ million more managerial, professional and technical jobs than there were in 2012. Although there is a fall projected in overall numbers of administrative and skilled trades roles, departures from the existing workforce means around 2 million new jobs to fill in these middle-skill occupations by 2022 as well.

Manufacturing will be a smaller part of the workforce, but jobs requiring scientific and engineering skills are increasing in importance – 350,000 more roles than in 2012, over 900,000 job openings. As the Baby Boom hits retirement, health and social care becomes a leading growth sector, with 1.6 million job openings for caring personal service roles. Women will take the majority of the new high-skill job openings, as part of the journey where those roles become shared more equally between the sexes. And after a tough time in recession and recovery, the construction industry will have over 1 million job openings to fill by 2022.

Working Futures is an exercise in quantitative labour market projection: it sets out, on the basis of clear assumptions, how the composition of the workforce will change over time. In the pages to follow, there are breakdowns by industry sector, by occupation, and by qualification level. What *Working Futures* doesn't explore is how those categories may themselves be constantly evolving. Through changing working practices and new technologies, the same job can evolve a very different set of skill levels and task requirements over a decade. For this reason, as a complement to *Working Futures*, the UK Commission for Employment and Skills is also publishing an analysis of the qualitative shifts that may be on the horizon, in a new report called *The Future of UK Jobs and Skills* (Störmer *et al.*, 2014).

2 Why Working Futures?

The UK Commission for Employment and Skills publishes *Working Futures* as a part of a range of labour market intelligence designed to give employers, employees and those delivering education and training the evidence they need to make long-term plans.

2.1 A time to look ahead

In December 2012, the Office of Budget Responsibility had forecast real output to grow at 1.2 per cent during 2013 (OBR, 2012), at the time of writing the latest data from the Office of National Statistics estimated output as having grown at 1.9 per cent during 2013. Circumstances are changing rapidly, and in a welcome direction. The harsh times experienced since the financial crisis may, finally, be drawing to a close. But after years of recession and slow recovery, we are all naturally cautious about making sure we are fully prepared for what the years ahead may bring — and what different choices we might need to make, as employers, employees or policymakers.

So *Working Futures 2012-2022* is appearing at an important moment for the British economy, when decisions are beginning to be taken with more confidence of future growth. Its role in that is very clear: it provides employers, current and future employees, and policymakers with some of the tools they need to start thinking about the possible shape of tomorrow's labour market, so that they can consider how best to achieve their goals operating within it. This report provides an overview of that information; but behind it is a wealth of data that the UK Commission for Employment and Skills makes available to break down the analysis by a sector-by-sector, occupation-by-occupation and area-by-area basis.

For employers, *Working Futures* gives the data on the changing labour supply, including the impact across different industries and occupations of shifting demands and demographic trends. For employees, it gives a sense of where the future jobs may be – and whether they're in growth industries, or meeting a need to replace retiring workers. And for policymakers, *Working Futures* allows us to think about whether we're going to have the right people in the right jobs in the future.

2.2 The need to think ahead

Whether we have the right people in the right jobs is of pressing importance for any nation. But for several decades, there has been a concern that the British economy has evolved with a bias to 'make do' with limited skills, to the extent of limiting further investment in training and not seeking to fully utilise each employee's talents. If we are in such a 'low skill equilibrium' (Finegold and Soskice, 1988) it could, in turn, limit our long-run prospects for sustainable growth. Thinking about the future balance of supply and demand for skilled employee is an important tool in thinking through options to improve our prospects.

Rapidly changing technology means a rapidly changing labour market, which creates an opening for substantial skills shortages to emerge with costly consequences for productivity (Haskel and Martin, 1993). For that reason, the ability to look ahead is highly prized – but also, given the complexity of today's economy, highly challenging to get right. Comprehensive analyses like *Working Futures* offer our best hope; not because they are likely to get the forecast right, but because they help us to think through what might result from different combinations of the critical factors (Haskel and Holt, 1999).

The UK Commission invests in *Working Futures* to challenge our thinking about the trajectory of the labour market: not to offer an unquestionable forecast, but to give an assessment of our likely current course, from which we can think about the alternatives. That takes place at the macro level for government, but also at the micro level for firms and individuals.

2.3 “All models are wrong; some are useful”¹

While no crystal ball, *Working Futures* is the leading source for UK labour market projection because its 10-year forecasts are:

- *Comprehensive*: it covers the entire UK labour market, investigating how different industry sectors' prospects interact, with some expanding and some contracting, and each changing in different ways.
- *Evidence-based*: it draws on the full range of data on the labour force and business population to provide a baseline by sector, occupation and local area, and uses sophisticated modelling to forecast how these different dimensions will evolve.

¹ The quotation is from the late statistician George E P Box.

- *Granular*: by allowing a breakdown by sector and occupation, it allows us to understand not only the likely broad changes in volumes of the British workforce, but also their implications for the skills mix in each industry sector.

Working Futures is a quantitative exercise, but those quantities are useful for comparison – between different sectors and areas, and between the present and the future. They are not useful as precise estimates, but the comparisons allow us to discern the broad patterns. For example, if two occupations are projected to grow by 45 per cent and 50 per cent respectively, *Working Futures* is best understood telling us to expect them to be about the same. If instead, one will grow by 45 per cent and one will shrink by 20 per cent, then the pattern is for a significant difference to emerge in their future.

2.4 Seeing through the numbers

It's by exploring these patterns between different parts of the projection – which industries expand and contract, which occupations flourish, and which geographies face the biggest challenges – that *Working Futures* can be of greatest help. Once we understand the differences, we can begin to think through their causes, which in many cases come back to assumptions within the forecast.

Many of those assumptions are there to simplify the analysis in a world with a lot of uncertainties. In that sense, the judgement in compiling the *Working Futures* analysis represents the end result of a set of informed assumptions made about future trends. Some assumptions are more uncertain than others, and the degree of uncertainty is greater now than it would have been a decade ago given our experience in recession. For example, it will only be after a period of sustained growth in the advanced economies that we will begin to get a sense of the rate of technical change, a fundamental factor for economic growth.

Hopefully, the assumptions forming *Working Futures* aren't too far from the way things will turn out – that's certainly the intention. But insofar as you may think things will be different, it should inform your view of the projections here. If you think, for example, technical change will be faster, then that will accelerate certain changes in key, technology-driven sectors and that will have ramifications for the demand for skilled labour. To help draw out the potential for variation, we discuss below the outcomes from two alternative scenarios we formed during the *Working Futures* development – one for low future growth prospects, and one where targeted action is taken to address a few key sectoral skills shortages in the British economy.

2.5 Tales of the unexpected

Whether within those assumptions or beyond them, if the recession of 2008-09 has taught us anything, it is that there are variables which we do not see until we're too close to do anything about them. The collapse of Lehman Brothers, and all that followed it, represents one major 'surprise' factor, still fresh in our minds, but there are others. International instability, environmental changes, and new technologies can all emerge quickly and create a decisive turn in the future outlook. These aren't necessarily negative, either: a new technology can create wholly new opportunities, unseen ahead of time, and an environmental change can take many forms.

Some variables are also a matter of our choices, and again these can have a range of effects. We have assumed here, for example, that the population will grow in line with the Office of National Statistics' projection for the UK's population, but this leaves out the possibility in a change in migration patterns in either direction. Equally, our assumptions about the path of government expenditure and taxation follow broadly the current path of policy; we do not consider what the effects might be of a change for more or less public service provision around that path.

Leaving aside such surprises, subtler, long term changes in technology and cultural practice can aggregate over a decade-long period to result in substantial changes in the status and needs of different occupations. There are many good examples here: of IT allowing management staff to handle a much greater part of their administrative workload autonomously; or of rising technological content making cars much more difficult for their owners to maintain without paying for assistance from garage technicians. Such changes can transform the way jobs are done, as well as the value of their output to employers.

For more on these questions, see the qualitative foresight analysis set out in the UK Commission for Employment and Skills' The Future of UK Jobs and Skills report (Störmer et al., 2014).

MODELS AND METHODS: Labour market forecasts in an economic context

Working Futures 2012-2022 is focused on projecting the future size and shape of the UK labour market. Future employment, and the composition of industries and occupations, are determined over a decade-long projection primarily by the building blocks of lasting economic growth: population change, technological innovation, global economic conditions, and productivity.

Therefore, although the projection covers each year across the period, we focus on the medium (2012-2017) and long (2012-2022) term picture because ultimately the short run fluctuations of the economy will prove much less important than those building blocks. Indeed, while unemployment certainly increased as a result of recession, the evidence of the very sharp recession of 2008-09 is that training activity was not greatly affected (Felstead *et al.*, 2013).

Still, we need an macroeconomic context within which to make our projections. *Working Futures'* macroeconomic context is provided by Cambridge Econometrics' MDM-E3 model, which has a Keynesian structure incorporating an input-output system, and has a design which allows for the level of sector and local detail necessary for the projection. That model draws on assumptions of the likely path of:

- worldwide output growth
- worldwide inflation rates
- exchange rates
- UK government current and capital spending
- UK tax rates and allowances
- UK and US interest rates

That model provides the envelope for our labour market projection, and forecasts an average annual growth rate of 2.1 per cent between 2012 and 2022. The total projection forecasts an increase of 1.8 million (6 per cent) in the number of people employed, similar to the growth seen in 2002-2012, and similar also to the projected growth in the labour force through that period (7 per cent). The MDM-E3 forecast of output and employment is then linked in a modular design with component models provided by the University of Warwick Institute for Employment Research:

- OCCMOD looks at occupational employment by region and industry.
- REPMOD draws on replacement demand by industry, region and occupation.

- There are then three Qualification models, to cover their overall supply according to the age structure, the sorting process into different occupations, and the overall composition by industry and occupation.

Developing the *Working Futures* takes time, and so the short run projection was locked in during the summer of 2013 and has been taken by surprise by the strength of the recent boom. But again, it's the long run that matters in considering the lasting changes in the structure of the labour market, and by 2017 – halfway through *Working Futures'* forecast period – there is only a small (3 per cent) difference with the latest and much more recent OBR output forecast (OBR, 2013).

The table below gives a summary of the key output and employment projections, along with the recent trends, over five-year periods:

	Historical Trends		Projections	
	2002-07	2007-12	2012-17	2017-22
GDP at Market Prices (% pa)	3.1	-0.4	1.7	2.5
GVA at Basic Prices (% pa)	3.2	-0.4	1.5	2.3
excl. Extra-Regio (% pa)	3.5	-0.2	1.5	2.3
GVA per capita (% pa)	2.1	-0.5	1.0	1.6
Manufacturing Output (% pa)	1.6	-1.6	1.1	1.8
Household Expenditure (% pa)	2.7	-0.6	1.8	2.3
Employment (jobs, millions)	31.8	32.1	32.8	33.9

Source: Cambridge Econometrics, MDM revision 12015.

Notes:

a) GDP = Gross Domestic Product

b) GVA = Gross Value Added

c) CPI = Consumer Price Index

d) Employment is total workplace employment (jobs) and includes HM Forces and refers to the last year of the period concerned

A Technical Report accompanies this Main Report with more detail on the modelling approach to Working Futures, including the forecast of economic prospects within which the labour market projection is formed.

3 The UK labour market in 2022

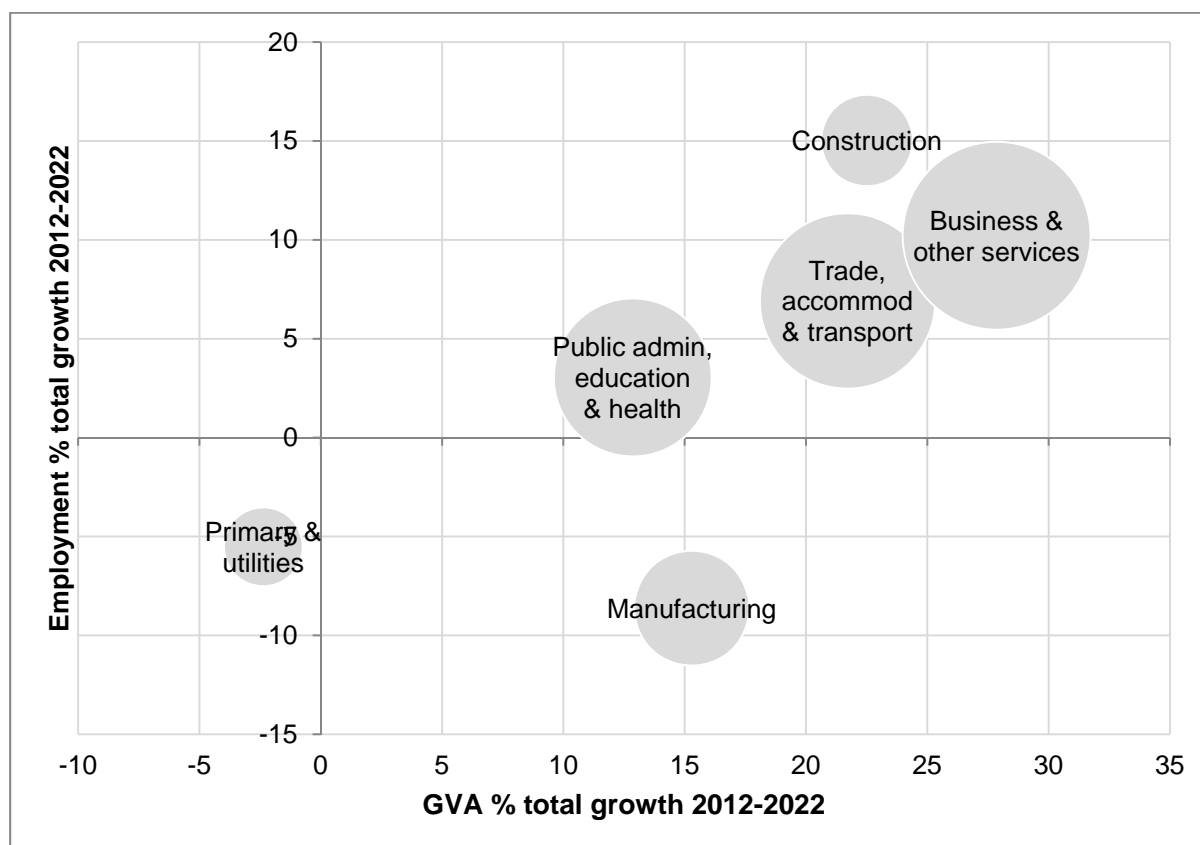
The collection of models used to develop *Working Futures* allows us to look at the future labour market from different dimensions. Beyond the headlines, we can explore the composition of output and employment by industry sector; the composition of the workforce by the numbers employed in different occupations; and we can look at the distribution of workforce by qualification skill level. Each dimension tells us something different about what we might expect about the future.

3.1 Key messages

Looking across the *Working Futures* projection, we see:

- The number of jobs is projected to rise by 1.8m over the next decade and the economy's output is set to expand by 20 per cent. An additional 12.5m job openings will come about from replacing workers leaving the labour force.
- Business services will be the driving sector of economic growth, adding 28 per cent in output and more than 1.1m jobs. IT will see the fastest jobs growth, at 31 per cent (280,000 jobs).
- A range of other service industries will also prove important sources of growth. Health and social work alone will add nearly 450,000 jobs.
- Care workers (nearly 600,000), corporate managers (nearly 500,000) and STEM professionals (over 350,000) will see the largest jobs growth. Business, public service, education and health professionals will account for another 820,000 net new jobs.
- While intermediate skill level roles are in overall decline, the task of replacing those exiting the workforce ensures that large numbers of job openings will exist across the skills range, including in manufacturing industries and skilled trade occupations.
- Continued improvements in gender balance will be seen, with large shares of new professional and associate professional jobs going to female employees, and female employees will also dominate the expanding care sector.

Figure 1: Projected output and employment growth, by sector group, 2012-2022



Source: Working Futures 2012-2022; size of circles indicates 2012 GVA output

Looking at the economy in terms of six broad sector groups, the headline projection is that the trend of the past several decades will continue: manufacturing will decline in its share of output and (especially) employment, with growth led by private sector services. At the same time, the share of the workforce made up by public administration, education and health services will fall back as fiscal consolidation continues to limit the opportunity for expansion. Construction is projected to grow somewhat, more than recovering the ground lost during recession.

3.2 The shift from manufacturing to services

It's worth addressing what these changes might mean for the British economy, and especially the projection of a further fall in manufacturing's share of output and employment. For many years, and especially since the recession of 2008-09, there has been a lot of pressure to see 'rebalancing' in favour of a larger role for manufacturing in the economy (see Westlake, 2013).

But it is important to be clear about what has happened – and seems likely to continue happening – with manufacturing. Over several decades, as technology has changed and global competition has intensified, British manufacturing has moved away from those industries in which our cost base makes us less competitive, and focused on those industries where our innovation and skills allow us to excel. These changes have not affected Britain uniquely; most advanced economies have seen manufacturing's share of output and employment decline as they have sought to specialise.

It's no accident that the UK's automotive manufacturers export more cars than ever before – cars are exactly the kind of high value-added products where we can and do compete successfully. So as much as our manufacturing base is a smaller part of the economy, it makes a much more effective contribution. Indeed, the decline of low value-added manufacturing is why our projection suggests that in 2022 British manufacturers will produce 15 per cent greater output than in 1990, but with just half the number of employees.

That change has been tough for many, but it represents a sustained improvement in productivity, the motor of economic growth. And in turn, the concentration on the best manufacturers has freed resources to feed the growth of business services – where Britain has unique advantages, and where the global demand is expanding as the likes of China and India grow – and the expansion of trade, accommodation and transport services, reflecting the needs of a more sophisticated consumer economy.

The sustained expansion of services may also reflect changing industry structure. Some services have grown specifically to support our more advanced manufacturers. In some industries a visible manufacturing decline has been matched by an increasing service expansion, dedicated to maintenance and support to customers after they've bought the manufactured goods. Certainly, evidence from the US is that some 14 per cent of the increased service sector share of the workforce can be attributed to the reorganisation of work from manufacturers to outsourced service providers (Berlingieri, 2013).

At an employee level, the same applies: product designers and consulting engineers are among the many employees in business services who may have been considered part of manufacturing decades before; but now they're found in a variety of workplaces. The projection of continued expansion in the number of science, research, engineering and technology professionals – from 1.35m in 2002 to a projected 2.1m in 2022 – tells us that advanced technical skills retain a critical place in the UK economy.

DEFINITIONS: Labour market indicators

There are different ways of looking at and measuring employment. Even at a very simple level, there's a distinction between the number of people in employment and the number of jobs – because one person can hold several jobs. Then there's the question of where a person is counted as being employed – is it at their residence, or where their workplace is? This especially is an important distinction in a more geographically mobile society. And then unemployment – how many people are out of work, but on what basis do we decide that they *would* be employed if they could be?

For clarity, these definitions are used throughout *Working Futures 2012-2022*. We start with where people are counted:

Residence basis: measured at place of residence (as in the Labour Force Survey (LFS)).

Workplace basis: measured at place of work (as in the Annual Business Inquiry (ABI) and Business Register and Employment Survey (BRES)).

These two bases then define different counts of employment:

Workplace employment (number of jobs): these are typically estimated using surveys of employers, such as the ABI and BRES, focusing upon the numbers of jobs in their establishments. In this report references to employment relate to the number of jobs unless otherwise stated.

Employed residents (head count): the number of people in employment. These estimates are based primarily on data collected in household surveys, e.g. the LFS. People are classified according to their main job. Some people have more than one job.

Unemployment is counted in two different ways:

ILO unemployment: covers people who are out of work, want a job, have actively sought work in the previous four weeks and are available to start work within the next fortnight (or out of work and have accepted a job that they are waiting to start in the next fortnight).

Claimant Unemployed: measures people claiming Job Seeker's Allowance benefits.

The total number of people active in the labour market can then be:

Workforce: the size of the workforce is obtained by summing workplace employment (employee jobs and self-employment jobs), HM Forces, government-supported trainees and claimant unemployment.

Labour Force: employed residents plus ILO unemployment

We can then measure as follows:

Labour market participation or **Economic activity rate:** the number of people who are in employment or (ILO) unemployed as a percentage of the total population aged 16 and over.

Labour Market Accounts Residual: workplace employment minus Residence employment. The main cause of the residual at national level is “double jobbing”. At a more disaggregated spatial level, net commuting across geographical boundaries is also very significant. The difference will also reflect data errors and other minor differences in data collection methods in the various sources.

Total Population: the total number of people resident in an area (residence basis).

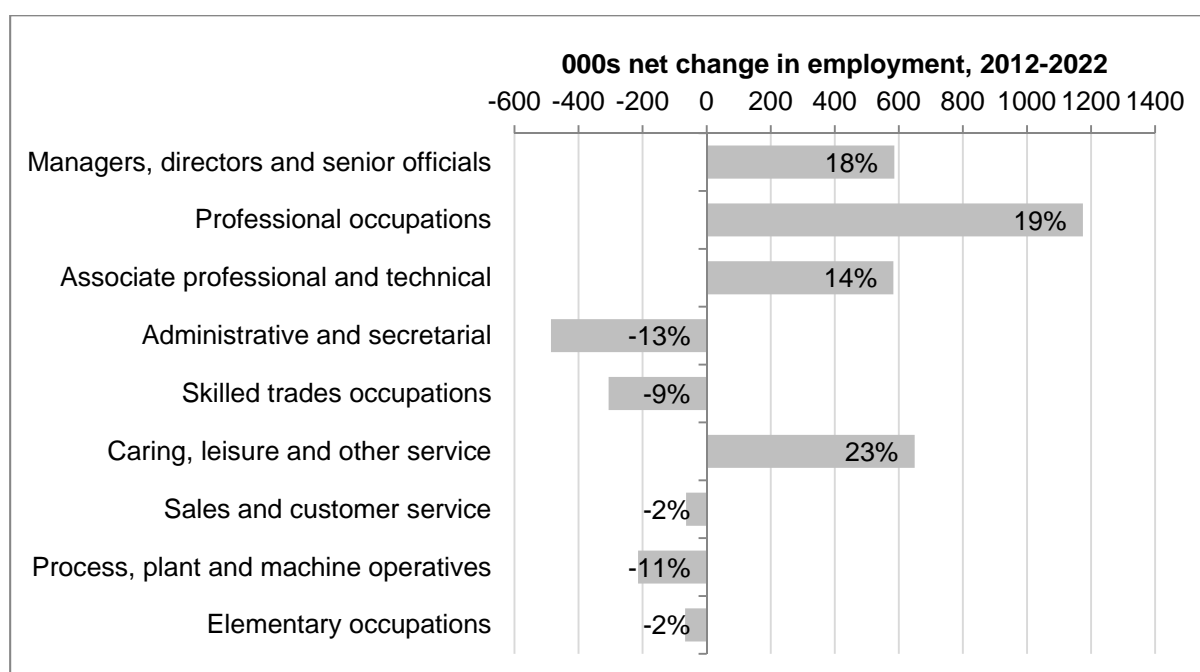
Population 16+: the total number of people aged 16 and above (residence basis).

Working-age population: the total number of people aged 16-64 (males) or 16-64 (females), (residence basis). The State Pension age of females will increase from 60 in 2011 to 65 in 2018. From 2018 the State Pension age for all (both males and females) will start to increase to reach 66 by 2020.

3.3 The shifting demands of occupations

Just as changing industry structure for the most part reflects longstanding trends, so too do changes in the occupational structure. *Working Futures* projects big increases in all three high-skill categories – the managerial, professional and technical workforce is set to expand by nearly 2½ million by 2022. At the same time, low skill occupations are set to expand by a little under ½ million; although this is dominated by the growth in the care sector, which on its own is projected to add an extra 600,000 jobs.

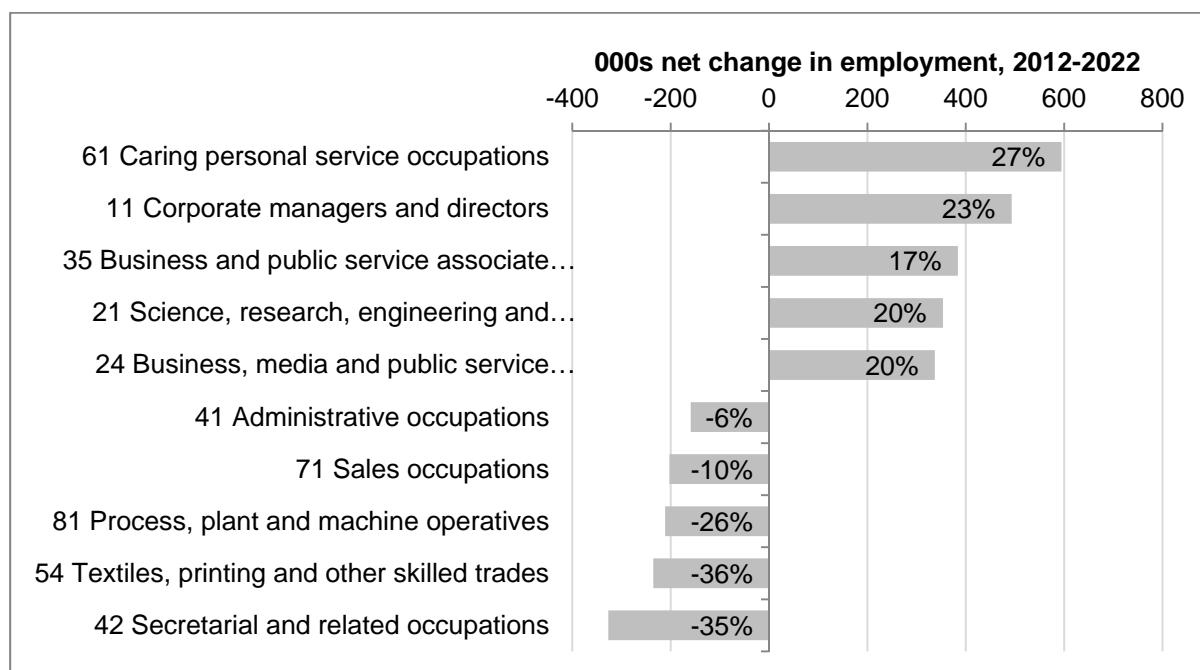
Figure 2: Net change in employment, by occupation Major Group, 2012-2022



Source: *Working Futures 2012-2022*; % figures indicate change compared to 2012 base

That latter change represents a definite shift in trends over recent years, reflecting the decisive impact of an ageing society, as the Baby Boom generation, born between 1945 and 1965, have begun to retire. Another shift, which has been underway for some time, is for a sustained decline in the intermediate skill occupations: the skilled trades and administrative and secretarial workforce is projected to decline by nearly three quarters of a million jobs by 2022.

Figure 3: Net change in employment, Top and Bottom 5 Minor Groups, 2012-2022



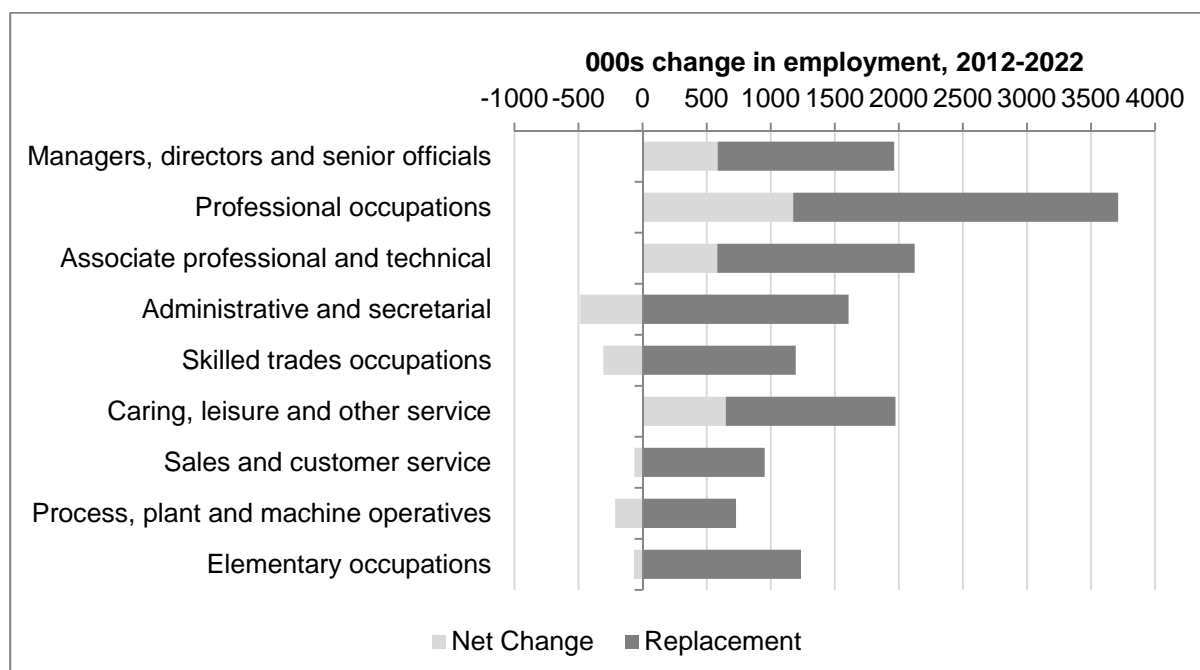
Source: *Working Futures 2012-2022*; % figures indicate change compared to 2012 base

Secretarial roles especially are projected to be in steep decline, losing over a third of the nearly one million jobs currently in this category. Whereas skilled trades' decline owes much to the shift to services, the decline of administrative and secretarial roles owes much to the increased impact of technology on jobs made up of routine tasks (Goos and Manning, 2007). While *Working Futures* projects technology 'polarising' the labour market away from traditional middle-skill roles (discussed further below), it's worth saying that the ageing of the current workforce will still mean plenty of new job opportunities in those roles.

3.4 Net changes and replacement demands

In considering the overall *Working Futures* projection, it is important to be clear on what it implies for the structure of the economy, as against the changes in particular labour markets. There is an important macro/micro distinction here, because while the headlines are that highly skilled jobs are in demand, and medium skilled jobs are in decline, they can conceal substantial demand for employees across all categories.

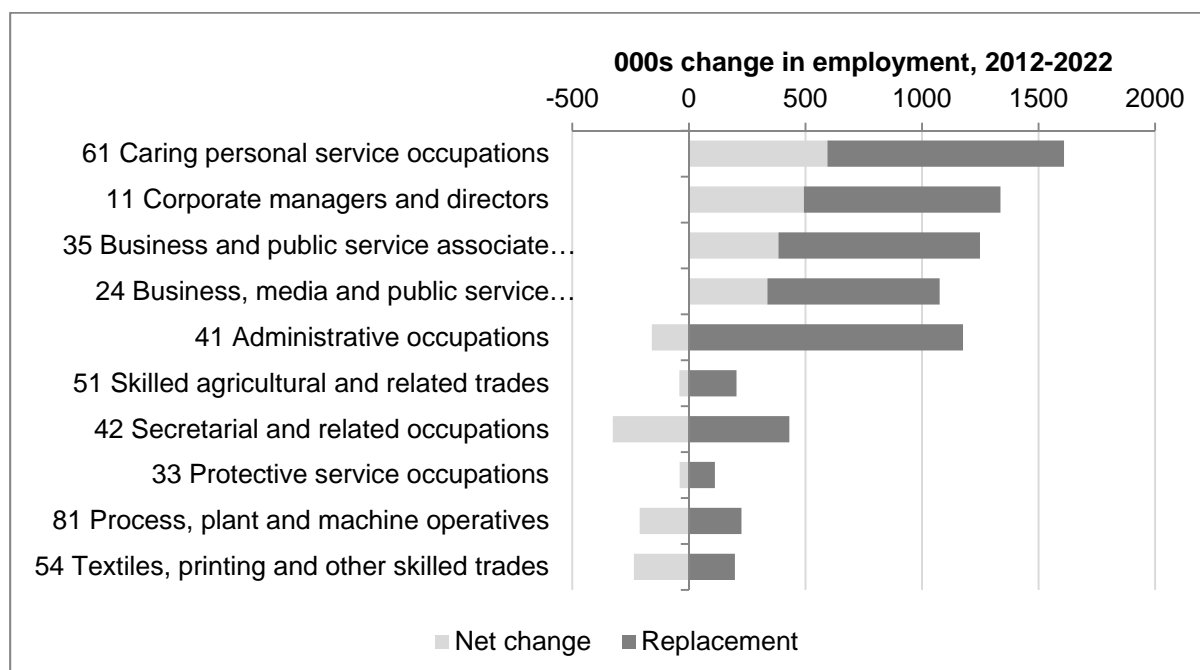
Figure 4: Total change in employment, by occupation Major Group, 2012-2022



Source: Working Futures 2012-2022

The reason for this is replacement demand. While the headline changes reflect the total demand in each sector or occupation, the supply of labour is changing all the time as employees exit the workforce for a variety of reasons. As the Baby Boom generation retire they leave a large number of often skilled and responsible posts vacant; so too do people leaving the workforce for other reasons – domestic responsibilities or promotions. Even in a sector with no net change in the number of employees required, there can still be a large replacement demand just to stand still.

Figure 5: Total change in employment, Top and Bottom 5 Minor Groups, 2012-2022



Source: *Working Futures 2012-2022*

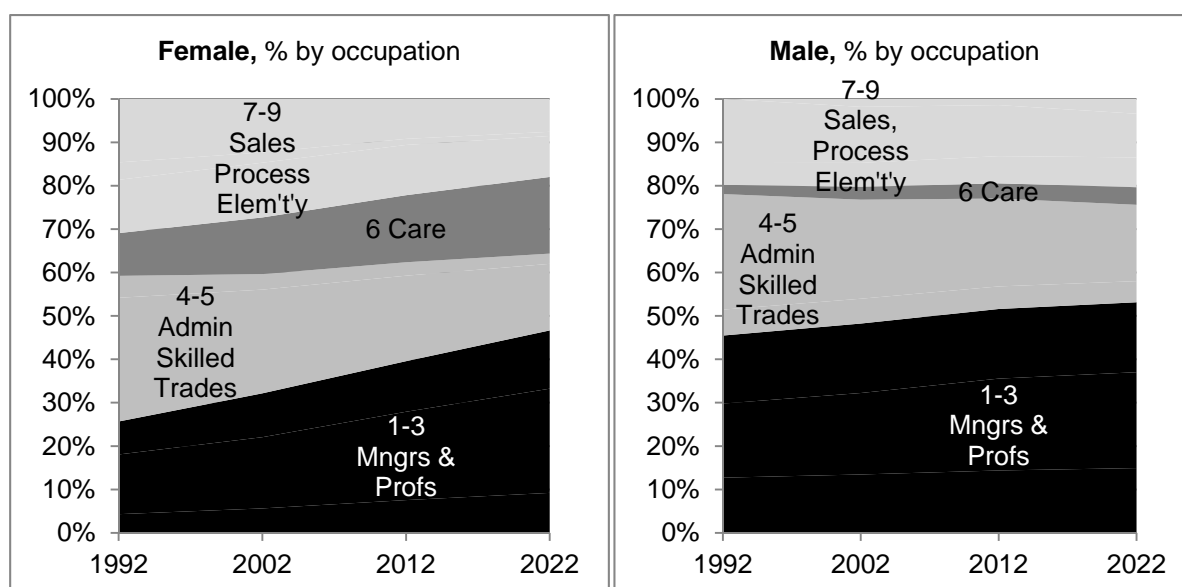
So, for example, while administrative roles will see a net loss of nearly 300,000 (8 per cent), there will still be over 1.1 million job openings between 2012 and 2022. Likewise, manufacturing employment will contract by over 200,000 (9 per cent) but there will still be over 650,000 new job openings in the sector. For young people or those looking for a career change, these will represent real job opportunities even as demand over all diminishes. While this happens in many sectors, it is particularly the case in the ‘skilled trades’ – classic intermediate skill level occupations which we project to decline in terms of total numbers, Baby Boom workers play a significant role here and they will need to be replaced.

3.5 Changing gender balance

Through the course of the *Working Futures 2012-2022* projections, we see some substantial shifts not only in the size of occupations, but also in the difference between the projected shifts for male and female employees. Partly driven by aggregate changes, where women see the largest increases in full-time employment, ‘professional’ and ‘associate professional and technical’ roles are projected to see more than two-thirds of their net increase accounted for by female employees. Meanwhile, while male employment in ‘administrative and secretarial’ roles is broadly stable, female employment accounts for the sizeable drop in that workforce.

What is going on here? The most likely explanation is the interaction of demographics with changing attitudes to female employment. As the *Working Futures* projection proceeds, an increasing number of employees born in the 1950s will leave the workforce, while employees born later will be promoted, and new employees born in the late 1990s and early 2000s will start work. The very different ambitions, and the much lower barriers to female progression, mean that the changing age structure of the workforce will lead to a big shift in the gender balance.

Figure 6: Occupational composition, male and female employment, 1992-2022



Source: *Working Futures 2012-2022*

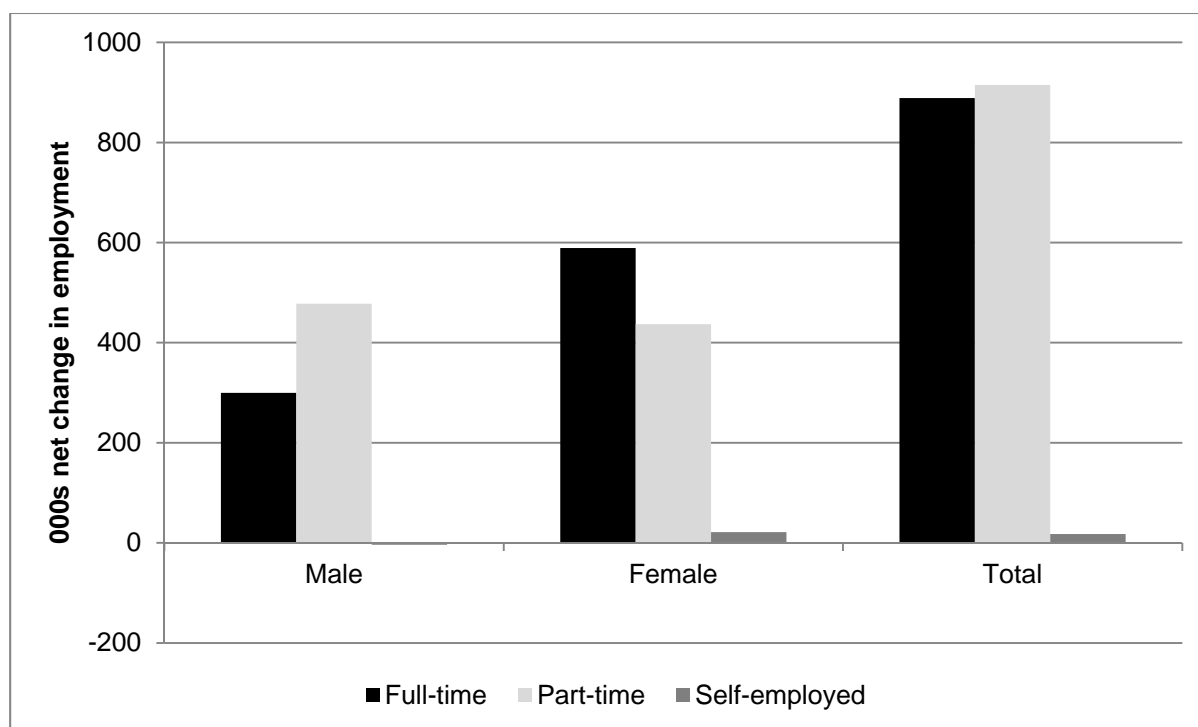
In part, that means the big changes are a correction of past imbalances: women have historically been over-represented in administrative and secretarial roles, and under-represented in professional and technical roles. Over the long term, female participation has moved towards fifty per cent in all high skill occupational categories; change is slower in administrative roles and stagnant in traditionally male skilled trades.

Results in low skill categories are perhaps driven by sectoral shifts: declining process roles increasingly male-dominated (9 per cent female by 2022), sales roles becoming more equal (65 per cent female to 58 per cent), perhaps as women are drawn to roles in the expanding care and leisure sector, which they dominate (81 per cent female). With their increasing equal participation in high-skill roles and their historic dominance in the care sector, women take a leading role in the growth sectors of the UK labour market.

3.6 More full time workers, more part time workers

Finally, an emerging feature *Working Futures* projects for the labour market – reassuring after recent years – is substantial increases in both full-time and part-time employment. Interesting also, while the increase in part-time jobs is relatively evenly distributed between men and women,² around two out of three net new full-time jobs will be taken by women.

Figure 7: Change in employment by status and gender



Source: *Working Futures 2012-2022*

If these trends do come to pass, what will they mean? Again, in terms of the gender split, there is likely to be an element of correcting past imbalances: increasing numbers of men combining work and domestic responsibilities, with increasing numbers of women focusing on careers. That may be partly driven by preference, but it may also be a reflection of changes in earning potential: to speculate, if women are more likely to work in the expanding care sector than men, then its growth may make their full-time work more attractive.

Through the recession there has been an understandable concern about the growth in part-time and self-employed work as a second-best response to the limited availability of full-time employment opportunities. However true this may be, in the conditions of sustained, solid growth *Working Futures* projects to 2022, we should not assume further growth in part-time employment to be unwanted – it seems likely that it will largely reflect changing preferences.

² Although this represents a change from past trends – male part-time employment is the fastest growing category, at 20 per cent over current levels.

4 What will make the difference? Some key variables

A wide range of variables and contingencies will determine how the labour market turns out; far wider than can be considered in any discussion. But there are some obvious candidates – particular uncertainties that will affect the labour market’s medium term path, and long-term trends which are difficult to quantify, but will influence the longer term view, as we head towards 2022.

4.1 The medium term

The worldwide experience of the recession of 2008-09, and of the slow return to recovery after it, has unsettled many assumptions about the stability of economic growth. In a very direct sense, that’s because there remains a substantial overhang, in terms of the Eurozone or of the public finances. In a subtler sense, we are left to wait and see how the economy will fare as it returns to growth so many years after such a sharp contraction.

4.2 The fragility of the Eurozone

The initial post-recession recovery in the first half of 2010 stalled for a variety of reasons, but the very visible problems of the Eurozone were high among them. As a major export market for the UK, the tough times emerging then for the Eurozone periphery, with risks to some of the core countries, the outlook was bleak and the effects on growth were all too visible.

Substantial progress has been made since then, in large part because of a resolve from the new European Central Bank president Mario Draghi to do “whatever it takes” in order to stabilise the Euro. However, growth remains mixed in the Eurozone economy, and many of the structural problems are a long way from resolution. While some progress is being made with public debt problems in certain member states, many member states still have very high levels of corporate and household debt, a burden which has lightened little since the Eurozone crisis began (*The Economist*, 2013).

With Eurozone growth mixed and inflation near zero, still-high public and private debt levels continue to be a source of great concern. There remains uncertainty about the ability of some member states to withstand further adverse shocks. The result is lasting, substantial uncertainty over the Eurozone’s growth potential, all the more important given its importance for UK exports.

4.3 The damage done by the Great Recession

One of the key uncertainties in looking ahead is the extent to which the recession of 2008-09 reflected or resulted in permanent damage to the economy's growth capacity. With the UK highly specialised in financial services, and our banking sector highly damaged, the question is of particular importance, especially given what we know about the history of recessions linked to financial crises (Reinhart and Rogoff, 2009). Further, the sluggish recovery from 2010 to 2012, with falling productivity and falling real wages all suggests a reasonable concern that the UK may suffer lasting damage.

With the slow recovery and the problems of stagnant productivity there has been no shortage of controversy over whether the UK's problems have been driven from the demand-side (Martin and Rowthorn, 2012) or the supply-side (Oulton, 2013). In the former case, the argument is that 'supply-side pessimists' are obstructing the removal of a demand constraint which is encouraging switching into low-value activity. In the latter case, the argument is that financial crises often leave a legacy of lower output – perhaps as much as 5½ per cent - even if future growth rates will return to their previous levels.

The truth will only become clearer as the economy recovers. The most recent statement of the Office for Budget Responsibility (2014) estimates the output gap as less than 2 per cent output at the end of 2013, suggesting a substantial loss of potential compared to the path of the economy until recession struck. There seems little doubt now that there has been *some* lasting loss, compared to the pre-recession peak – but it is not yet certain how much we have been set back, or the growth rates we will be able to sustain into the future (but see Besley and Van Reenen, 2013).

4.4 The changing public sector

As a consequence of the recession of 2008-09, the British government continues to work to reduce its large budget deficit, and to avoid a rise in public debt to undesirable levels. While there has been disagreement about the timing of fiscal consolidation, it is the consensus that it will be necessary to bring the budget into sustainable balance for the health of the UK economy.

The effect of this on the path of the economy, and the composition of the workforce, is difficult to be certain about. There was controversy about the effects of budgetary austerity on the demand-side of the economy in 2010-12, and further austerity measures may well lean against the expansion of demand. Against that, the present return to robust growth suggests a gradual return to more normal economic conditions, where monetary policy should be able offset the majority of any such reduction in demand.

Furthermore, in terms of growth and labour market effects, changes in the public sector can have a range of consequences. While there may be fewer employment opportunities, public services may be delivered more efficiently and effectively. At the same time, while undoubtedly stressful for those concerned, displaced public sector employment increases the workforce available for private sector employers to expand where they find opportunities to do so.

4.5 The role of investment

The lack of growth in business investment – slumped during the recession, and never recovered – is a recurrent theme in much of today’s commentary about the return to economic growth. Many have argued that lacklustre business investment, remaining well below its 2007 peak while household spending is left to drive growth, is a sign that the recovery is built on weak foundations.

Such speculations can be taken too far. Investment is often a lagging contributor to growth, and that it is always more likely to follow and respond to a boost to household spending, than it is to precede it (McCafferty, 2014). But while investment does not need to lead the recovery, it does need to follow for it to be sustainable. The timing and scale of any return to growth in investment will be critical factors in determining future economic prospects.

It is also unclear whether, in an increasingly service-driven economy, we are counting the right things when we measure investment. ‘Intangibles’, ranging from research and development expenditure, computer software, and spending on skills and organisational improvement are not recorded in traditional measures of investment. By 2008, one recent estimate has it that intangibles investments were £37bn larger than the more traditional, tangible categories such as machinery and equipment or commercial property (Dal Borgo *et al.*, 2013). Further, this intangible investment has held up well through the recession, and its proper inclusion in the measurement of output significantly reduces the ‘productivity puzzle’ of the past several years (Goodridge *et al.*, 2013).

4.6 The long term

The supply and demand for labour is also subject to the influence of longer-lasting variables, all of which would be present even if the 2008-09 recession hadn't occurred. These reflect large-scale demographic shifts, changes in competition and technology which affect the global economy, and cultural changes which affect the way we think about work. On all of these points, our *Future of UK Jobs and Skills* report (Störmer *et al.*, 2014) sets out some more of the potential range of futures we face; here we give a sense of their importance for the *Working Futures* projections.

4.7 Demography

The most obvious demographic factor is migration; the large increase in immigration in the 2000s has changed the profile of the British workforce and has a lasting effect visible through the projection to 2022. Projecting migration is beyond our scope in *Working Futures*, and is a highly uncertain business: the European Union allows a high degree of mobility across member state labour markets, so the workforce can change rapidly in response to changing conditions, while greater transport and communication links have made working around the world more attractive for many British citizens.

More predictable, and potentially more pressing for employers and policymakers alike, is the prospect of ageing as the Baby Boom generation begins to retire. The sheer size of this age cohort, combined with the much greater life chances available to it compared with previous generations (especially for women), means that it makes up a significant part of the managerial, technical and skilled workforce. As these workers retire, there is the potential for a substantial loss of human capital to the economy, which may have important implications for the UK's economic performance.

Recent research in the US suggests that the largest effects will be to come in the following decade (the 2020s) rather than this one, as the largest part of the cohort were born in the late 1950s and early 1960s (Neumark *et al.*, 2013). The Baby Boom took a different profile in the UK, with an initial peak in 1947 – many of whom have been retiring in the past few years – and then a further peak in 1964 and 1965 (Willetts, 2013). With changes to the state pension age, this latter group of workers will not be retiring until around 2030 – but in the meantime, still-significant numbers will continue to retire, with important implications for workforce planning.

4.8 Globalisation

While long a driving factor in changing labour demand, the recession of 2008-09 brought home just how much our economic prospects depend on the state of the global economy, and how intense competition can be in world markets.

The rise of major emerging economies – such as the BRICs (Brazil, Russia, India, China) – means greater opportunity but also greater competition in pursuing that opportunity. Evidence from changing prices suggests that the UK economy benefited greatly from global competition as the likes of China greatly expanded the supply of low-cost manufactured goods; but also, the evidence is that the terms shifted in the 2000s as we faced rising costs for imported commodities (Broadbent, 2014).

The outlook may now be better, especially as emerging economies' demand for some of our advanced products and services expands. But the experience of the past decade reminds us that the opportunities of globalisation may bring with it greater exposure to rapidly changing conditions in world market. Our plans – whether as employers, employees, or policymakers – need to be able to adapt to those changing conditions.

4.9 Technology

In the same way, technological change has become a constant feature of economic life. The arrival of the internet and the expansion of mobile telephony over the past two decades have transformed the way we work and consume. New developments on the way promise more opportunity, through automation or biotechnology, but their precise economic impact is not always so easy to assume. There is an argument that recent innovations have not had the decisive productivity effect of those of the first half of the twentieth century (Gordon, 2012); but it may be that we are just about to see those effects arrive, transforming the way we work with technologies we are only beginning to get used to (Brynjolfsson and McAfee, 2014).

Certainly, the innovations of a hundred years ago – electricity, the internal combustion engine, running water, chemicals – did transform our economic and social life, and it is a high bar for today's technologies to meet. But even if they do, while their effect on productivity might be profound, their effect on the demand for labour is much less predictable, with a potential for very different effects for workers in different occupations. Computing power, for example, can substitute for employees in the delivery of routine tasks, but can complement others facing complex problem-solving tasks (Autor *et al.*, 2003).

That's a key foundation of the job polarisation argument: that traditionally middle-skill jobs are declining because of automation, while routine low-skill and complex high-skill jobs expand. As we have seen, *Working Futures* projections give some credence to this view at the macro level – high-skill and low-skill jobs are expanding, in keeping with a longer term trend (Goos and Manning, 2007).

It is though important to be clear: high-skill jobs are expanding at a much faster rate than low-skill jobs in the UK. There are opportunities available, and as we look ahead to a decline in the numbers working in administration or the skilled trades, we also see a big increase in associate professional and technical work, and in care and leisure. It may just be that it is our idea of 'middle-skill' that needs to change – but insofar as that is true, it may present some substantial challenges to our labour market institutions and practices.

Combining the way occupations themselves are changing, the shift towards new higher-skill jobs, and the effect of replacing demand sustaining continuing job opportunities in traditional middle-skill roles, there remains plenty of opportunity in the middle. Talk of 'hollowing out' can therefore be exaggerated (McIntosh, 2013). But it certainly is true that there are important, lasting changes going on in terms of the kind of work required and the jobs that employers create to deliver it – with challenges for employers, employees and government to adapt to a different labour market.

4.10 Changing work preferences

While naturally lamented when it is at odds with employees' preferences, the substantial increase in part-time working over the past several decades at least partly reflects changing preferences over working patterns. The same changes have been followed up in legislation, with the right to request flexibility in working conditions and the planned extension of maternity leave rights to cover both parents.

Over the long term, these changes reflect a rebalancing of priorities from work to having the time to meet domestic responsibilities. The typical decline in working hours across the twentieth century, common across advanced economies, is another example: having time for personal and family commitments is a luxury good, which more prosperous societies seek more of.

Such changes may also explain an increasing preference for some for self-employment, to allow a greater control over working arrangements, as well as for some, a greater variety over the content of work. Again, this isn't universal: some enter self-employment as a "least worst" option – that trend has been a natural concern over the recent years of recession and slow recovery.

But over the last few decades, the growth of part-time and self-employed is likely a reflection of changing work preferences. Looking ahead, past the recovery, how working preferences unfold will be a critical factor in the way supply and demand interacts over the coming decade.

5 Thinking about different futures

Working Futures 2012-2022 offers projections as the start of a conversation about the future; it's intended to inform thinking, providing a baseline against which different possible scenarios can be compared. To help with the process of starting the conversation, *Working Futures* has two derivative scenarios: one where economic prospects are significantly lower because of a global slowdown, and one where action is taken successfully to tackle skills shortages in a set of key sectors. Neither scenario reflects an assessment of the *likely* future: the UK Commission for Employment and Skills offers them to illustrate the need for plans to be robust across possible futures.

5.1 Diminished expectations: what happens if we have low growth?

What if the risks in the global economy do come to pass? What if global growth slows, and our key Eurozone export market slows even further? That's what happens in our first scenario, where average growth over the 2012-2022 forecast period falls from 1.9 per cent in the baseline scenario to just 1.3 per cent, with falling exports, investment and consumption. During the projection, growth never once goes above 2 per cent - a markedly lower growth path than we had from 1992 to 2008.

Some of the results of the low growth scenario are worth noting:

- As a tradable sector, manufacturing is sharply curtailed – growing 2½ per cent across 2012-2022, rather than the baseline 15 per cent. The consequences for employment are dramatic – with twice the fall in numbers employed (16 per cent).
- The baseline projection of robust growth in construction is cut in half – an average growth rate of 0.9 per cent rather than 2.1 per cent across 2012-2022. The projection of employment growth goes from 15 per cent to 3.3 per cent.
- Business services is much less affected, and so too trade, accommodation and transport and public administration, education and health.
- Total employment continues to grow, although with 900,000 fewer employed in 2022. There are though some significant compositional effects, with heavy reductions in full-time work, especially among men.

Overall, the shift in world growth rates makes for a big difference in the 2022 outturn. By then, in our low growth scenario, the UK's output is 6 per cent lower than it would have been in the baseline, and employment is 3 per cent lower. That fall is concentrated in manufacturing and construction industries, with lower exports and reduced prospect of improvements to infrastructure. Both industries in this scenario would see 11 per cent lower output than the baseline projection, and together account for more than 400,000 fewer jobs by 2022.

5.2 Higher skills: does addressing skills shortages make a difference?

What if some of our key sectors' acute skills shortages were alleviated? Given what we know about the higher costs and lower productivity resulting from skills shortages, it seems obvious we would be better off. In our second scenario, we model an uplift of the supply of skilled labour to four sectors:

- Energy
- Advanced manufacturing
- Construction
- Digital and ICT

Upskilling is modelled as a general shuffling of the qualification profile of the workforce; across the four sectors it results in a relatively small number (22,700) of workers moving up, each by one qualification level. But the results are impressive: in the first three sectors, productivity growth improves by 0.1 per cent per annum, and Digital and ICT productivity growth improves by 0.05 per cent per annum.³ The larger effect comes from spillovers as skills shortages are alleviated and firms can get on with growing their business., resulting in a net employment gain of over 150,000 jobs and a 1.2 per cent gain in output relative to the baseline scenario.

³ The lower improvement for Digital and ICT reflects the limited potential to improve the profile, given an already highly skilled workforce.

Although a smaller differences than the low growth scenario, it is important to see them in context. The low growth scenario represents a shift in *macro* conditions, but the higher skills scenario is emphatically *micro* in perspective, taking a small but significant shift in skilled labour supply as its starting point. A 1.2 per cent improvement in output over ten years means gaining half of an extra year's growth, achieved from an incremental shift in the skill levels of fewer than 1 in 1,000 of the UK's workforce.⁴

⁴ We have kept the intervention small to avoid placing too much reliance on extrapolating from the model's empirical regularities, but it remains speculative when those regularities – e.g. employer training – are formed under current policy conditions, and are unlikely to be invariant to changes (see Lucas, 1976).

6 Making the most of Working Futures 2012-2022

Working Futures 2012-2022 is produced to aid decision-making and advice about workforce plans, curriculum plans, career plans and government policies. For that reason, it carries a lot of different dimensions – sectors, occupations and qualifications, macro and micro trends, and so on. The main report (Wilson *et al.*, 2014) offers a reference guide to the projections the project has compiled; there's a lot more data than we can usefully put in report form.

For an employer thinking about workforce planning, the questions are about relative changes at the micro level – they need to think about replacement demand, and they need to size up the challenge compared to the current size of the workforce. For an education and training provider planning its curriculum, understanding the micro level – especially in the labour market – is what will matter. For a prospective employee, the micro level remains important, but growth rates are often less important than the raw volumes of jobs which will be available; after all, a fast-growing sector might still offer relatively few jobs, whereas a relatively slow-moving sector can be big enough to offer many opportunities.

For policymakers, macro and micro trends are important, although macro level data on the changing structure of the economy might be the first port of all. But the policymaker's view of *Working Futures* might be different: not mentioned specifically, but implicit in many of the uncertainties discussed in this introduction, is the possibility that policy might make a difference to outcomes. At national and local level, policy interventions – regulatory and tax changes, spending decisions, coordinating measures – will all influence the expectations and actions of employers and employees, leading to different futures.

The consequences of policy changes, intended and unintended, are always difficult to fully foresee. *Working Futures* doesn't solve that problem – what it does is give a framework to rigorously think through what the consequences might be, to arrive at a reasoned assessment. And that same approach applies to other users too, and ties in well with the general message to fall out of the *Working Futures* projection: the future is uncertain, but we can make the most of it – but we also have to ensure that our plans are sufficiently robust to accommodate the surprises it will bring.

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