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Working Futures
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Annexes
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Working Futures 2014-2024: Annexes

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Acknowledgements

This set of Annexes complements the main report providing more detailed results as well as information on sources and methods used.

The opinions expressed in this report are those of the authors and do not necessarily reflect the views of the UK Commission. The projections should be regarded as indicative of likely developments for the economy and the labour market given a gradual recovery from recession and re-establishment of longer term trends, rather than precise forecasts of what will inevitably happen. Many of the trends presented are very robust and are not sensitive to modest unanticipated shocks. They present a view of medium to longer term trends for the UK economy and labour market (5-10 years ahead). The results should be regarded as a robust benchmark for debate and used in conjunction with a variety of other sources of Labour Market Information.

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Introduction

Working Futures

Working Futures 2014-2024 is the latest in a series of quantitative assessments of the employment prospects in the labour market over a ten year horizon. It presents historical trends and future prospects by sector for the UK and its constituent nations and the English regions. The prime focus of Working Futures is on the demand for skills as measured by employment by occupation and qualification, although the supply side is also considered. The results are intended to provide a sound statistical foundation for the deliberations of all those with an interest in the demand for and supply of skills, including education and training providers, as well as the various agencies and departments of government.

This document presents a set of Annexes which provide additional detail on both the results and methods to complement those presented in Working Futures 2014-2024. The main document1 summarises the key findings, including the main employment trends, and the implications for the next 10 years if they continue. It covers macroeconomic and detailed employment prospects by industry, occupation, qualification, gender and employment status (full-time part-time and self-employment), providing a commentary explaining and interpreting the forecasts. It covers the whole of the UK and the constituent countries which make it up. This set of Annexes comprises:

- Annex A, which provides a brief technical description of the sources and methods used to generate the sets of employment projections by industry and occupation presented in Working Futures 2014-2024;

- Annex B, which presents a comparison with previous projections in Working Futures 2010-2022, covering sectoral employment and productivity, comparison with previous forecasts for occupations and qualifications and comparison with previous results by devolved country and English region;

- Annex C: presents new much more detailed results on occupation by the 369 4-digit SOC 2010 categories. The main report and Annexes are also supported by a separate Technical Report which provides a much more detailed description of sources and methods used.2

- Annex D provides detailed results by nation of the UK and region of England.

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[1] See Wilson *et al.*, (2016). *Working Futures 2014-2024*. UK Commission for Employment and Skills: Wath on Dearne..
[2] Wilson *et al.*, (2016) . *Working Futures 2014-2024: Technical Report*. UK Commission for Employment and Skills: Wath on Dearne

A comprehensive set of tabulations for the projections is provided in electronic format and supported by the User Guide[3], etc. All the detailed projections from Working Futures 2014-2024 are presented in the workbooks.

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[3] Excel workbooks and the related User Guide and General Guidelines for using the workbooks.

Annex A: Sources and Methods

A.1   Introduction

Working Futures is focussed on developing quantitative projections of employment, concentrating on occupations and qualifications by industry and nation / region. Following best practice worldwide, these are based on the results from a detailed multi-sectoral macroeconomic model (for a review see Wilson *et al.* (2004b)). Projections of occupational employment are driven by an underlying view of sectoral prospects (both output and productivity) in the geographical area concerned.

The foundation for the present set of projections is results from the well-established regional Multi-sectoral Dynamic Model (MDM-E3)[4] of the UK economy developed by CE and detailed occupational and qualification forecasting modules developed by IER. This approach has formed the basis for the previous *Working Futures* series of labour market projections.

A.2   Providing the sectoral and spatial detail required

As in the previous *Working Futures* projections, the UK Commission and its partners are interested in obtaining results at a detailed sectoral and geographical level. There are various technical and methodological issues that constrain what can be done. These include confidentiality and other related issues regarding the release of such detailed information into the public domain. The methods used here build on those developed in previous exercises.

In order to meet the remit specified for the previous *Working Futures* exercises, IER/CE have developed a detailed employment database covering all the main employment dimensions. Originally, this was based on the 41 (SIC 2003) based categories used in the CE multi-sectoral macroeconomic model MDM-E3. These were cross-classified by the 25 sub-major occupational groups of SOC2000, and by the 12 nations and regions of the UK, plus gender and status. This database has been developed over many years to be as consistent as possible with all the official published sources upon which it is based.[5,6] For *Working Futures 6* this database covers 75 (roughly SIC 2-digit) categories based on SIC2007.

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[4] The   E3 stands for Economy-Energy-Environment.
[5] Complete consistency is not possible since the various official sources are themselves inconsistent, not least because some (but not all) are subsequently revised and updated by ONS.
[6] ONS have not, until very recently, published consistent time series information, cross-classified by region at the level of detail required for this exercise. However, it is possible to generate estimates by using the information ONS/BIS are prepared to publish. While not strictly precise in a statistical sense,

There are considerable technical problems and constraints in building a database to cover such a detailed breakdown of sectors and local areas. Taking all these dimensions in combination implies that the database required for *Working Futures* needs to cover over 135,000 separate time series on employment alone (ignoring the qualifications dimension).[7] This poses problems of validation and quality assurance as discussed below.

A.3 Using the latest SIC and SOC categories

It is important that models and results are structured around classifications which are both commonly used and appropriate in characterising the economy. It is also necessary that the models are founded on sound data, which in the context of economic models such as MDM-E3 means the availability of robust time-series data on which to estimate model parameters. These two factors are often in tension, especially when classifications change. This problem has been faced many times by the CE/IER team over the past 30 years and has been dealt with successfully.

The move to SIC2007 for *Working Futures 4* represented a more fundamental change in the classification of industries than some of the previous revisions. This has not been changed in the subsequent results which all use the SIC2007 system for classifying industries.

Working Futures adopts the SOC2010 occupational classification. This classification system replaced SOC2000 in 2011 (and has been used to classify occupations for the 2011 Census and other official data since that date). Full details on the UK SOC2010 can be obtained from the ONS at:

http://www.ons.gov.uk/about-statistics/classifications/current/soc2010/index.html

The structure of UK-SOC2010 comprises nine major groups, 25 sub-major groups, 90 minor groups and 369 unit groups. The major and sub-major groups, and associated skill level specialisations are presented in Table A.4. As can be seen, the skill specialisation criterion is used to distinguish groups of occupations within each skill level.

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such estimates can provide useful information and intelligence to users about detailed employment trends. The current employment estimates reflect the latest ABI/BRES and LFS data available.
[7] That is: Sector (75) * occupation (25) * geographical area (12) * gender/status (6) = 135,000 separate time series.

The reworking of the database on to a SIC2007 and SOC2010 basis has been a substantial task that involved translating all the historical data on output, productivity and employment. The process results in set of data for 75 industries as set out in Tables A.1, A.2 and A.3 and 25 occupations as defined in Table A.5. These data are also cross classified by gender and status and for 12 spatial areas. Further disaggregation by 6 broad qualification levels is also made. This results in over 800,000 time series to be analysed and projected.[8]

For the sub-regional analysis a more aggregate set of industries is used as described in Table A.5.

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[8] That is 75 industries * 25 occupations * 6 gender /status categories * 6 qualification levels * 12 spatial areas.

Box A.1: UK-SOC2010 Classification

Jobs are classified into groups according to the concept of 'skill level' and 'skill specialisation'. As in SOC2000 and its predecessor SOC90, skill level is defined with respect to the duration of training and/or work experience recognised in the field of employment concerned as being normally required in order to perform the activities related to a job in a competent and efficient manner.

Skill specialisation is defined as the field of knowledge required for competent, thorough and efficient conduct of the tasks. In some areas of the classification it refers also to the type of work performed (for example materials worked with, tools used).

Skill levels are approximated by the length of time deemed necessary for a person to become fully competent in the performance of the tasks associated with a job. This, in turn, is a function of the time taken to gain necessary formal qualifications or the required amount of work-based training. Apart from formal training and qualifications, some tasks require varying types of experience, possibly in other tasks, for competence to be acquired. Within the broad structure of the classification major groups and sub-major groups reference can be made to these four skill levels (see Table A.5):

- The first skill level equates with the competence associated with a general education, usually acquired by the time a person completes his/her compulsory education and signalled via a satisfactory set of school-leaving examination grades. Competent performance of jobs classified at this level will also involve knowledge of appropriate health and safety regulations and may require short periods of work-related training. Examples of occupations defined at this skill level within the SOC2010 include postal workers, hotel porters, cleaners and catering assistants

- The second skill level covers a large group of occupations, all of which require the knowledge provided via a good general education as for occupations at the first skill level, but which typically have a longer period of work-related training or work experience. Occupations classified at this level include machine operation, driving, caring occupations, retailing, and clerical and secretarial occupations.

- The third skill level applies to occupations that normally require a body of knowledge associated with a period of post-compulsory education but not normally to degree level. A number of technical occupations fall into this category, as do a variety of trades occupations and proprietors of small businesses. In the latter case, educational qualifications at sub-degree level or a lengthy period of vocational training may not be a necessary prerequisite for competent performance of tasks, but a significant period of work experience is typical.

- The fourth skill level relates to what are termed 'professional' occupations and high level managerial positions in corporate enterprises or national/local government. Occupations at this level normally require a degree or equivalent period of relevant work experience.

Source: *http://www.ons.gov.uk/about-statistics/classifications/current/soc2010/soc2010-volume-1-structure-and-descriptions-of-unit-groups/index.html*

A.4 Limitations of the database, statistical reliability and confidentiality

Having established a very detailed employment database it is important to appreciate its limitations.[9] Such detailed breakdowns can only ever be indicative, since they are based on survey estimates that were not designed to produce precise estimates at this level of detail. It is also important to recognise that without enormous resources it is not possible to monitor and quality assure every one of these series (over 135,000 in the core results for this latest update to *Working Futures,* and more than 800,000 if qualification is also included). Although IER/CE have carried out checks to ensure that the basic trends and structural features of the data are sound, it is impossible to check and validate every series.

Working Futures 2014-2024 also includes a more limited set of projections for sub-regions (LEP areas in England and corresponding geographies in other countries of the UK). The aim in constructing the data series at this level is to provide a useful benchmark for consideration at a more disaggregated level rather than a fully thought out, local level forecast for each local area and detailed sector.[10]

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[9] These concerns are even greater at a sub-regional level such as 'city regions' or LEP areas.
[10] Local users and commentators may be in a position to develop more customised projections, taking into account local circumstances and focussing on issues such as sustainable communities, local growth hot spots and major public sector interventions. It is possible to facilitate this by providing software packages that enable users to develop their own locally customised scenarios. Such software, based on the well-established *Local Economy Forecast Model*, can be supplied at additional cost if required.

It is also important to recognise the difficulties in putting such detailed information into the public domain. These include confidentiality problems, as well as concerns about statistical reliability. The terms of the 1947 Statistics of Trade Act (and subsequent legislation) prohibits publicly collected data being disseminated in such a manner as to enable the identification of individual enterprises or individuals. Following detailed discussions with ONS it was agreed that detailed data at the 75 industry level by region from BRES could be placed by ONS in the public domain without being disclosive. This information, in combination with other data from the LFS can then be used to generate estimates of employment in various categories of interest (e.g. by occupation and by highest qualification held).

In addition to the issue of confidentiality, presenting detailed historical and projected data in a 'free access' fashion also raises a number of important additional issues for the UK Commission. The reliability of historical and projected data inevitably declines with greater sectoral and spatial disaggregation, and is certainly even less reliable in terms of levels for output data than for employment data.

This need not inhibit the presentation of the most detailed information, complete with the appropriate caveats, to the target group of users that the UK Commission is concerned to primarily inform (although as in the previous *Working Futures* results, steps have to be taken to ensure confidentiality constraints are not breached and that users are aware of the limitations of the data).

A.5   The multi-sectoral macroeconomic model

The demand for labour is a derived demand. It depends critically on developments in the markets for goods and services and the technologies used to produce them. In order to assess the prospects for the changing pattern of demand for skills, it is essential to ground the analysis on a foundation and understanding of the key economic factors influencing the economy and its structure. This requires a multi-sectoral macroeconomic model.

The cornerstone of the projections is CE's regional Multi-sectoral Dynamic Model (MDM-E3) of the UK economy. MDM-E3 is used to generate estimates of output, productivity and employment for all the main industrial sectors in the UK and its nations and regions (from here on, forecasts for the nations (Scotland, Wales, Northern Ireland) and regions (nine former Government Office Regions of England) of the UK will be denoted 'regional'). The sectoral output and employment forecasts are based on an integrated, one-model approach in which the detailed industry and regional analysis is consistent with the macro analysis.

To develop a model that embodies for all of the nations and regions an accounting structure (including input-output coefficients) to parallel that of the UK would inevitably entail a substantial exercise in data construction and imputation.[11] Instead, the approach taken in MDM-E3 is to make best use of the regional data available to support detailed modelling of the key variables of interest – output, labour demand and labour supply. The approach has been to build up a regional econometric model and database as an integral part of the MDM-E3 model. The model has a clear economic structure, uses incomplete and partial data, and applies econometric techniques to those variables for which the data is judged sufficiently robust to support econometric estimation. The forecasts and projections for the recent past are calibrated so as to reproduce the available data for employment and output. A sensible direction of economic causation for employment is an inherent feature of the model.

An important guiding principle is that that the regional variables and data are consistent with the UK variables and data. At the regional level, a less detailed industry classification has been adopted for the industry variables in the regionalised MDM-E3 (such as GVA and employment) because the available regional data are not sufficient to disaggregate to the more detailed categories used in the UK level analysis. However this is extended to the same 75 industry level by some simple assumptions about fixed shares.

In the macroeconomic model, key drivers (investment, productivity, prices, technical change, competitiveness, imports and exports) are modelled separately for each industry at the UK level. Sectoral productivity is determined within the model by a set of employment functions based on best practice time series analysis econometric approaches, using co-integration.

The determination of output depends upon the demand for that sector's products and services from: consumers; other producers (for investment goods and intermediate inputs); government; and from abroad. This in turn depends on prices and costs. The approach explicitly incorporates projected changes in the input-output structure of the economy over the forecast period. This is one of the key ways in which technological change affects the real economy. Relative price and wage movements and international competition are also key drivers of changes in the structure of industry output.

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[11] Previous versions of MDM-E3 included a fuller accounting treatment for the regions, but the advantages that this provided were not considered sufficient to outweigh the limitations of the data and associated efforts to maintain that treatment.

Employment at the UK level is treated as a demand for labour, derived from the demand for goods and services. UK employment equations are estimated, relating industrial (headcount) employment in each industry to its gross output, wage rates and other drivers. Long-run cointegrating relationships are identified and estimated and dynamic error-correction equations estimated to allow for short-run effects. In general the equations are well determined and the parameters are of the expected sign and magnitude.

To determine employment by region, for each industry in the region, employment is set to grow at an assumed rate of productivity incorporated exogenously in the model. These productivity assumptions are derived from historical trends in regional productivity growth (by industry). Regional employment, by industry, is then scaled to match the UK employment.

MDM-E3 is built around an input-output model, which means that the relationships between different parts of the economy are taken into account. The present results provide a consistent and systematic benchmark view for on-going debate and policy deliberations and the planning of skills provision. They reflect, in a manner which more partial approaches cannot, how individual sector developments "fit together" into an economy-wide picture.

Working Futures sets out a carefully considered view of what the future might look like. It is not intended to be prescriptive. Aggregate demand is modelled in a Keynesian manner, with a consumption function and investment equations at the UK level. However, the model also includes equations for average earnings by industry. Other aspects of the supply side come in through the export and import equations, in which capacity utilisation affects trade performance at the UK level. The detailed set of industry employment equations allows relative wage rates and interest rates to affect employment and industry-level productivity growth.

The use of the macroeconomic model, which is built around a full input-output matrix, provides a sound foundation for assessing industrial employment prospects. In particular, it deals explicitly with such important issues as sub-contracting and technological change which have been features of much recent structural change. These phenomena are dealt with in the model by changes in the pattern of purchases by one industry from another, as reflected in the input-output matrix and by the technical relationship between sectoral employment and output.

In order to meet the needs of all users, the present analysis is at a very detailed level, exploiting the detailed industries used in MDM-E3, which are defined by reference to the availability of data on input-output flows. To meet the needs of sectoral users, the MDM-E3 regional results have also been disaggregated to the 75 sectors listed in Table A.3.

Further information about data sources and methods is presented in the separate *Working Futures Technical Report*.

A.6   Regional and Sub-regional/Sub- national Projections

The Government's policies of 'localism' in Englandmean there is increased emphasis on sub-regional geographies, encompassing both local neighbourhoods and 'natural economic geographies'. Development of Local Enterprise Partnerships (LEPs) highlights a preference for 'functional economic areas', rather than 'artificial' boundaries.

In recognition of the importance of provision of economic and labour market intelligence to the LEPs (and analogous geographical areas in the devolved nations) *Working Futures* projections for 2014-2024 have also been prepared for various sub-regional functional economic areas (see Table A.4), selected in agreement with the UK Commission and its partners.

The main emphasis at the spatial level as far as reporting is concerned remains on the regions and devolved nations of the UK. Despite a renewed focus on sub-regional geographies there is recognition of a continuing need for overarching regional level information. Moreover, as stated above, regions still have a fundamental position in the sub-national statistical architecture. The sub-regional results are made available in Excel workbooks available through the UK Commission.

A.7   Occupational Projections including replacement demands

Occupational projections

The occupational projections are developed using largely extrapolative methods, based primarily on data from the Labour Force Survey (LFS) releases up to 2014.

Estimates of occupational employment within industries are produced by linking the sectoral employment results to the IER's occupational and regional models. These models are based on research about the factors expected to influence occupational structure at sectoral level (Briscoe and Wilson, 2003). The IER database for *Working Futures 2014-2024* has now been extended and updated on a SOC2010 basis, using detailed converters developed by IER in collaboration with ONS.[12]

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[12] Professor Peter Elias of IER has played a leading role in the development of SOC2000 and SOC2010.

The database provides breakdowns to the sector level used within RMDM. This has been modified to cover the detailed 75 industry categories based on SIC2007 agreed with UKCES and ONS. Using these data, it is feasible to generate industry by occupation employment matrices at a most detailed level (by the 75 sectors, 25 SOC2010 sub major groups, gender, status and region / country). These estimates are constrained to match published totals using a complex RAS iterative procedure to ensure that everything still adds up to the target totals by sector, occupation, region, etc.[13]

Replacement demands

The occupational employment estimates also include replacement needs. These take into account the need to replace those who leave the employed workforce because of retirement or other reasons. Replacement demands need to be added to any structural change (or so called expansion demand or decline) that is projected, in order to obtain an estimate of the overall requirement. The Replacement Demand estimates are based on quite limited data on age structures and flow rates from the LFS. They should be regarded as indicative rather than precise indications of the likely scale of replacement demands.

Estimates of replacement demands have been a key feature of IER occupational projections for many years. The projected net change in employment (expansion demand) tells only a part of the story in terms of future skill requirements. It is crucial to recognise that there will be job openings and important education and training requirements for many occupations where employment levels are expected to fall. These arise because of the need to 'replace' the existing skills that will be 'lost' as a result of retirements and other aspects of the normal process of labour turnover. The scale of replacement demand typically outstrips the scale of expansion demand by a considerable margin (in the current and previous *Working Futures* projections by an order of magnitude). This varies across occupations and sectors, but even where substantial job losses are projected, the replacement demand elements are usually more than sufficient to offset this. It is essential, therefore, for employers, education and training providers, and public agencies to recognise the different characteristics and requirements of these two different components of future skill needs.

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[13] RAS is an iterative technique designed to ensure that the row and column sums of a two- dimensional array match some target totals. It has been extended by IER to deal with multi-dimensional arrays. This is not a trivial problem. The present software used by IER to generate a consistent database runs to thousands of lines of complex computer code. This was substantially extended to meet the new requirements of *Working Futures* 3.

The various elements of replacement demand depend upon the rates of flows from employment due to factors such as retirement and occupational and geographical mobility. The main source of information that has been used to generate replacement demand estimates is the LFS. This includes estimates of the various flows in and out of the labour market, as well as information on age structure. However, while this can provide useful information across all sectors and regions combined, its sample size is inadequate to provide specific data for particular sectors and regions at a detailed level. There are real problems in obtaining estimates differentiated by all the various dimensions that UK Commission and its partners are interested in, notably sector and geographical area in tandem. It is obtaining consistent estimates, cross-classified by both dimensions simultaneously, which stretches the data beyond its limits.

Replacement demand (RD) estimates are sensitive to the precise assumptions made about the age structure of the workforce concerned and the rates of flows. These are likely to vary considerably across the various key dimensions but in a manner that is not very robustly measured in available statistics. In order to recognise this, as in the previous *Working Futures*, a set of benchmark projections are developed which recognise the importance of RD issues, and which set out clearly and transparently the assumptions upon which they are based, combined with the facility for interested users to develop their own alternative views (if they so wish).

Such numbers are provided to users on a *caveat emptor* basis. Further customisation is possible if users have specific information for that particular case. This is facilitated by providing Excel workbooks with a module that generates RD estimates using a standard set of assumptions but which allows the user to substitute their own alternatives.

Separate estimates of the key assumptions have been made available by sector or by spatial area. Using such information users can assess the sensitivity of outcomes to variations in such assumptions. This will be at the expense of such estimates no longer summing to the published benchmark aggregate figures.

Extension to 4-digit level of SOC2010

The aim is to expand the occupational results from 25 2 digit occupations by 75 industries to the 369 4 digit ones by 75 industries. In the *LMI for All* project,[14] historical data from the LFS were used to compute shares of 4 digit occupations within 2 digit groups for All Industries. These patterns were then applied to all industries and for all future years.

This runs into the problem that some 4 digit occupations are clearly industry specific. Applying the method above results in anomalous outcomes (e.g. the largest numbers of some textile operatives appearing in the industry food drink and tobacco rather than in the textiles industry). If industry specific shares are used instead of the all industry ones the problem is (in principle) resolved. However, there are at least two problems with this alternative:

First, using distinctive shares for (say) the 6 broad industry groups fails to resolve the problem since the differences above do not become apparent at this level (for example, applying shares based on the whole of the manufacturing instead of all industries will not make the differentiation between textiles and clothing and food drink and tobacco). To avoid that problem a much finer industry differentiation is needed (ideally at the 75 industry) level.

But this raises a second problem, notably that the LFS sample size is inadequate to produce robust shares at the 75 industry level. The only way around this impasse is to generate a set of industry-specific shares that is consistent (as far as possible) with the all the information available.

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[14] http://www.lmiforall.org.uk/

The "knowns" that the final estimates need to be consistent with are as follows:

1. The 75 industry employment totals

2. The 2 digit occupational totals

and within those:

3. The 75 industry x 2 digit occupational totals

1. - 3. are all available in the standard *Working Futures* database:

       i. for all years

They are also available:

       ii. by gender and status

       iii. by region/country

       iv. by qualification

Ideally, the expansion to the 4 digit level needs to cover all these dimensions.

Extension to ii. - iv poses more problems, not least in terms of the scale of the computations and programming required. Such extensions are however desirable since the detailed occupational patterns are likely to vary across these dimensions (see below).

The other "known" it is important to take account of (in principle at least) is information on the overall pattern of employment by 4 digit occupation (shares of 4 digit within 2 digit categories) when aggregated across all industries, all regions and all gender/status types.

This was the aggregate information used in the approach to developing 4-digit level projections in the *LMI for All* project (as outlined in the paragraph above). In principle, this aggregate information could be extended to cover region and /or industry (for example the 6 broad sectors). Ideally, it can be further extended to differentiate the shares for each of the 75 industries. However this results in a very sparse data set, with many "gaps" where the LFS has no entries (yet it is almost certain that there are people employed in those categories).

A compromise solution has been adopted which computes more detailed shares than was done in the *LMI for All* project, but without trying to impose the final aggregate 4-digit level constraint (which requires a further RAS process).

The details of the algorithm developed to fill the gaps is summarised in Box A.2. The main steps are as follows:

- Step 1 - using the LFS data (combining years) generate a set of shares of 4 digit within 2 digit categories for each 75 industry category and covering dimensions ii - iv above for categories where data are available.

- Step 2 – where there are gaps use the nearest equivalent (more aggregate category) as set out in the Box.

- Step 3 – apply the final shares to the existing *Working Futures* employment data to generate a full data array of employment levels - 4 digit occupation by 75 industries. Step 3 effectively constrains this array to match the "knowns" in points 1. - 3. above.

The detailed occupational shares are extracted and applied as in the *LMI for All* project to the 2 digit occupational totals (but now differentiated for each of the 75 industries (as well as by region, gender/status and occupation).

The final RAS process did not reach a unique solution due to irreconcilable differences between the aggregated summary of 369 4 digit occupations on the one hand and the detailed allocation of these within all the 48,600 categories/dimensions (industries in particular). The final set of results is fully consistent with all the other dimensions used in the published *Working Futures* estimates (region / country; industry (75 level) gender, status, SOC 2 digit occupational category and qualification level). The final discrepancies at the 4 digit level were small and concentrated in just two sub-major groups (33 Protective Service Occupations and 62 Leisure, Travel and Related Personal Service Occupations).

Box A.2: Algorithm for developing the 4-digit occupational database

Expanding the 25 SMGs in *Working Futures* to 369 SOC Unit groups

WF data	LFS data
1990-2024	10 quarters combined

WF data		LFS data	
2	genders	2	genders
3	statuses	3	statuses
75	industries	75	industries
9	qualifications	6	qualifications
25	SMGs	369	SOC unit groups
12	regions		

From the LFS data, the shares for each unit group within each SMG is calculated.
The *Working Futures* employment level for that SMG is shared out to the Unit groups.
The share is applied to each nation/region and year

Where the LFS has no value in a cell, aggregations are tried in order.

All statuses
Both genders
Both genders and all statuses
All industries (by gender and status)
Both genders and all statuses all industries

Shares are calculated separately within the six qualifications and applied to the appropriate 9 qualifications in the *Working Futures* data.

A.8   Labour and Skill Supply Projections

There are many conceptual difficulties in modelling labour supply by level of skill. Most occupations are undertaken by people with a bewildering range of formal qualifications. This is partly a function of age, with older workers generally relying more upon experience than formal qualifications. Even allowing for the age factor, there are enormous differences. This makes defining the supply of people into an occupation almost impossible. It is possible to identify some key elements, focussing on the flows of people through the education and training system, but boundaries are too blurred and transitory to enable quantitative modelling. Much the same is true for the concept of supply of labour to a sector.

For these reasons, the development of supply estimates and projections by occupation and/or sector are not regarded as a practicable proposition. As in previous *Working Futures* exercises, the approach adopted is to focus on general projections of population and overall labour supply (those economically active) by gender for each geographical area, and to then disaggregate these by the highest levels of qualification held using various modelling techniques.

Labour supply projections are developed for the geographical areas detailed above and include:

- total population;

- population aged 16 and over;

- working age population;

- labour force;

- workforce;

- ILO unemployment;

- claimant unemployment;

- employed residents;

- workplace employment;

- labour market residual.

A set of stochastic equations is used to forecast economic activity rates for the UK by age-band/gender in MDM-E3. The remainder of the model required to construct the projections of labour supply indicators consists of a number of accounting equations to derive labour supply and unemployment from the existing labour market and demographic projections in MDM-E3.

For WF5 we had previously estimated equations for activity rates at the regional level by age-band/gender. However, for WF6, we reviewed these equations and they were not considered robust enough to produce reliable estimates of long term activity rate trends. In its place we developed equations at a UK level to produce a UK projection of activity rate which are then used to project forward regional activity rates.

The key stages to determine the labour supply indicators can be summarised as follows:

- UK activity rates (by age-band/gender) are modelled as a function of unemployment and lagged activity rates;

- regional activity rates are projected forward using the growth in the equivalent UK age-band/gender group;

- the regional labour force is determined by activity rates multiplied by the population (by age-band/gender) - this is then scaled to UK labour force and the final regional activity rates are calculated;

- workplace based employment jobs is determined using the existing MDM-E3 equations (see Section 4);

- the Labour Force Survey measure of employment (employed residents) is determined from workforce employment minus a labour market residual (note that one element of the residual is net commuting);

- some adjustments to the labour market residual are made in the projections to account for trend changes;

- from regional labour force minus regional LFS employment to determine regional unemployment (ILO).

The difference between the Labour Force Survey (LFS) measure and the workforce measure of employment is accounted for in the labour market residual. This includes net commuting which results from people travelling from their place of residence, across regional boundaries to their place of work.

ONS projections of population by region, gender and age-band are taken as exogenous inputs to MDM-E3.

The analysis described above provides projections of labour supply, for each of the countries and regions of the UK, by gender. The modelling work is undertaken by detailed age-band[15] so also delivers projections disaggregated by age-band.

Qualifications

With regard to qualifications held by the workforce, the present approach is intentionally pragmatic and eclectic, making the most of the limited data available. It focuses on the highest level of qualification held.

The results are internally consistent at the different levels of aggregation, and the modelling of the supply side, in particular, is complementary to the qualifications modelling previously carried out for the UK Commission by Bosworth (2013a, b and c). It builds on the models developed in previous *Working Futures* exercises, covering both demand and supply.

The "supply of qualifications" focuses on the future flows of individuals in the population with different qualification levels (based upon the new Regulated Qualifications Framework (RQF) which recently replaced the old Qualifications Credit Framework.[16] It uses a **National time series model** as described in Bosworth (2015a, b and c). The results are then linked to the projections of the population and projections of the labour force by age and gender produced by RMDM, as set out above.

An important distinction between the qualification results presented here and those developed in the earlier work by Bosworth is that the present analysis also considers the "demand side". This generates estimates and projections of employment, unemployment and inactivity rates by level of qualification, as well as the distribution of employment by sector, occupation and region.

This distinction between supply and demand is somewhat artificial, as the observed outcomes are the result of a combination of both demand and supply influences. The flow of individuals through qualification levels depends upon perceptions of current and future employment opportunities and wage rates. Likewise, employment by qualification is the outcome of the interaction between supply and demand.

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[15] The age-bands distinguished are 0-15, 16-24, 25-34, 35-44, 45-59, 60-64, 65+.
[16] Which in turn replaced the National Qualifications Framework see: www.qcda.gov.uk/resources/assets/qca-06-2298-nqf-web.pdf.

A **regional qualification model** produces equivalent regional results for employment (including results all for the individual countries and regions within the UK). This model focuses upon the shares of the employed population who are qualified to various levels. It uses a probabilistic approach (mprobit or mlogit) to modelling these shares. This ensures that the estimates (and projected shares) sum to 100 per cent. It covers the following main dimensions: country/region (12); gender (2); qualification level (6). The results are constrained to sum to the UK total from the national model.

The **demand side** results are generated through the macro model, which gives benchmark information on future employment prospects by occupation. Occupation is one of the main drivers of changing patterns of employment by qualification, as different occupations tend to have very different requirements (e.g. most professional occupations require higher level qualifications as a matter of course, etc). In addition there are often significant trends in these patterns within each occupational category which can be modelled and exploited to generate projections. The aggregate employment projections are then further disaggregated by a series of sub-models.

The **occupational/qualification shares model**, (QUALSHARE) develops projections of qualification shares within occupations. In order to reconcile the supply and demand sides, a **sorting algorithm** *(SORT)* then sorts people into occupations such that the various results from the different parts of the modelling exercise are made consistent. In particular, this model is designed to reconcile the projections from the **National** model with those from QUALSHARE. The former can be regarded as essentially a view of supply side developments (the overall numbers of people acquiring qualifications), while the latter is more concerned with which occupations they end up in. The SORT model uses an iterative RAS procedure to reconcile the two sets of estimates, constraining the overall qualification shares from QUALSHARE to match those from STOCKFLOW, while maintaining the patterns of occupational deployment in QUALSHARE. The constraint is imposed at the 2- digit occupational level. The key dimensions are: occupations (25); gender (2); qualification levels (6). SORT operates at a UK level.

Finally, there is an extended **replacement demand module***,* which generates estimates of qualification numbers for detailed industries and geographical areas. This final module provides the mechanism whereby the implications for individual sectors and regions are developed, focussing on replacement needs. The overall results from this module are calibrated to match the main results from the benchmark projections for the UK and its constituent countries and regions which emerge from SORT and REGQUAL. Data and parameters are provided for individual sectors and regions which enable customised projections for these categories to be developed. These include aggregate qualification and age profiles for individual sectors and regions (but not cross-classified). While data limitations mean that it is not possible to ensure that these results are consistent in every respect with those from the national results, they provide reasonably robust and consistent implications at the more detailed regional and sectoral level. The key dimensions covered are: occupations (25); gender (2); qualification levels (6); country/regions (12); sectors (22).

A.9   Workbooks and access to detailed results

A set of detailed Workbooks have been prepared consistent with those produced for previous *Working Futures* exercises.

The detailed format of the Workbooks is broadly similar to that used previously. They include sheets providing an occupation by industry shift-share analysis in most workbooks.

A separate workbook presents the results at the 4 digit occupational level.

The workbooks are available at https://www.gov.uk/government/collections/the-future-of-jobs-and-skills

Table A.1: Broad Sectors (SIC2007)

Broad Sector	SIC2007 Section	SIC2007 Division	Industry full name	Ind 22	Ind 75
1. Primary sector and utilities	A	01-03	Agriculture, forestry and fishing	1,2,6,7	1,2,24-27
	B	05-09	Mining and quarrying		
	D	35	Electricity, gas, steam and air conditioning		
	E	36-39	Water supply, sewerage, waste management		
2. Manufacturing	C	10-33	Manufacturing	3-5	3-23
3. Construction	F	41-43	Construction	8	28-30
4. Trade, accommod. & transport	G	45-47	Wholesale and retail trade; repair of motor vehicles	9-11	31-40
	H	49-53	Transport and storage		
	I	55-56	Accommodation and food activities		
5. Business & other services	J	58-63	Information and communication	12-17, 21-22	41-63,69-75
	K	64-66	Financial and insurance activities		
	L	68	Real estate activities		
	M	69-75	Professional, scientific and technical activities		
	N	77-82	Administrative and support service activities		
	R	90-93	Arts, entertainment and recreation; other services		
	S	94-96	Other service activities		
6. Non-marketed services	O	84	Public administration and defence etc	18-20	64-68
	P	85	Education		
	Q	86-88	Human health and social work		

Table A.2: Industry Groups (SIC2007)

Ind 22	SIC2007 Section	SIC2007 Division	Industry full name	Ind 75
1. Agriculture	A	01-03	Agriculture, forestry and fishing	1
2. Mining & quarrying	B	05-09	Mining and quarrying	2
Manufacturing	C	10-33	Manufacturing	3-23
3. Food drink & tobacco		10-12	Food, drink and tobacco	3,4
4. Engineering		26-28	Engineering	16-18
5. Rest of manufacturing		13-25,29-33	Rest of manufacturing	5-15,19-23
6. Electricity & gas	D	35	Electricity, gas, steam and air conditioning	24
7. Water & sewerage	E	36-39	Water supply, sewerage, waste management	25-27
8. Construction	F	41-43	Construction	28-30
9 Whol. & retail trade	G	45-47	Wholesale and retail trade; repair of motor vehicles etc	31-33
10. Transport & storage	H	49-53	Transport and storage	34-38
11. Accommod. & food	I	55-56	Accomodation and food activities	39-40
Information & comm.	J	58-63	Information and communication	41-46
12. Media		58-60, 63	Media and communication	41-43
13. IT		61,62	Information technology	44-46
14. Finance & insurance	K	64-66	Financial and insurance activities	47-49
15. Real estate	L	68	Real estate activities	50
16. Professional services	M	69-75	Professional, scientific and technical activities	51-57
17. Support services	N	77-82	Administrative and support service activities	58-63
18. Public admin. & defence	O	84	Public administration and defence etc	64
19. Education	P	85	Education	65
20. Health & social work	Q	86-88	Human health and social work	66-68
21. Arts & entertainment	R	90-93	Arts, entertainment and recreation; other services	69-72
22. Other services	S	94-96	Other service activities	73-75

Table A.3: Detailed industries used in *Working Futures* (2007 SIC)

Ind 75	SIC2007 Section	SIC2007 Division	Industry full name	Ind22	Ind 6
1. Agriculture etc	A	01-03	Agriculture, forestry and fishing	1	1
2. Coal, oil & gas, mining & related	B	05-09	Coal, oil and gas, other mining and quarrying	2	1
3. Food products	C	10	Food products	3	2
4. Beverages & tobacco		11-12	Beverages and tobacco products	3	2
5. Textiles		13	Textiles	5	2
6. Wearing apparel; leather etc		14-15	Wearing apparel, leather and related products	5	2
7. Wood etc		16	Wood and cork products	5	2
8. Paper etc		17	Paper and paper products	5	2
9. Printing & recording		18	Printing and reproduction of recorded media	5	2
10. Coke & petroleum; chemicals etc		19-20	Coke and refined petroleum products, chemicals and chemical products	5	2
11. Pharmaceuticals		21	Pharmaceutical products	5	2
12. Rubber & plastic		22	Rubber and plastic products	5	2
13. Other non-metallic		23	Other non-metallic mineral products	5	2
14. Basic metals		24	Basic metals	5	2
15. Metal products		25	Metal products except machinery and equipment	5	2
16. Computers, etc		26	Computer, electronic and optical products	4	2
17. Electrical equipment		27	Electrical equipment	4	2
18. Machinery etc		28	Machinery and equipment n.e.c.	4	2
19. Motor vehicles, etc		29	Motor vehicles, trailers and semi-trailers	5	2
20. Other trans. Equipment		30	Other transport equipment	5	2
21. Furniture		31	Furniture	5	2
22. Other manufacturing		32	Other manufacturing	5	2
23. Repair & installation		33	Repair and installation of machinery and equipment	5	2
24. Electricity, gas, etc	D	35	Electricity, gas, steam and air conditioning supply	6	1
25. Water	E	36	Water collection, treatment and supply,	7	1
26. Sewerage		37	Sewerage	7	1
27. Waste management		38-39	Waste and waste management services	7	1
28. Construction	F	41	Construction of buildings	8	3
29. Civil engineering		42	Civil engineering	8	3
30. Specialised construction		43	Specialised construction activities	8	3
31. Motor vehicle trade	G	45	Wholesale and retail trade or motor vehicles and motorcycles	9	4
32. Wholesale trade		46	Wholesale trade	9	4
33. Retail trade		47	Retail trade	9	4

34. Land transport, etc	H	49	Land transport and transport via pipelines	10	4
35. Water transport		50	Water transport	10	4
36. Air transport		51	Air transport	10	4
37. Warehousing, etc		52	Warehousing and support activities for transportation	10	4
38. Postal & courier		53	Postal and courier services	10	4
39. Accommodation	I	55	Accommodation	11	4
40. Food & beverage services		56	Food and beverage service activities	11	4
41. Publishing activities	J	58	Publishing activities	12	5
42. Film & music		59	Motion picture, video and music publishing	12	5
43. Broadcasting		60	Programming and broadcasting activities	12	5
44. Telecommunications		61	Telecommunications	13	5
45. Computer programming etc		62	Computer programming, consultancy and related activities	13	5
46. Information services		63	Information service activities	12	5
47. Financial services	K	64	Financial service activities	14	5
48. Insurance & pensions		65	Insurance and pension funding	14	5
49. Auxiliary financial services		66	Activities auxiliary to financial services and insurance	14	5
50. Real estate	L	68	Real estate activities	15	5
51. Legal & accounting	M	69	Legal and accounting activities	16	5
52. Head offices, etc		70	Activities of head offices; management consultancy activities	16	5
53. Architectural & related		71	Architectural and engineering activities	16	5
54. Scientific research		72	Scientific research and development	16	5
55. Advertising, etc		73	Advertising and market research	16	5
56. Other professional		74	Other professional, scientific and technical activities	16	5
57. Veterinary		75	Veterinary activities	16	5
58. Rental & leasing	N	77	Rental and leasing activities	17	5
59. Employment activities		78	Employment activities	17	5
60. Travel, etc		79	Travel agency and tour operator activities	17	5
61. Security, etc		80	Security and investigation activities	17	5
62. Services to buildings		81	Services to buildings and landscape activities	17	5
63. Office admin		82	Office administrative; office support activities	17	6
64. Public admin. & defence	O	84	Public administration and defence, compulsory social security	18	6
65. Education	P	85	Education	19	6
66. Health	Q	86	Human health activities	20	6
67. Residential care		87	Residential care activities	20	6
68. Social work		88	Social work activities without accommodation	20	6
69. Arts & entertainment	R	90	Creative, arts and entertainment activities	21	6
70. Libraries, etc		91	Library, archives, museums and other cultural activities	21	6
71. Gambling		92	Gambling and betting activities	21	6
72. Sport & recreation		93	Sport activities, amusement and recreational activities	21	6

73. Membership organisations	S	94	Activities of membership organisations	22	6
74. Repair of goods		95	Repair of computers and personal household goods	22	6
75. Other personal service		96	Other personal services activities	22	6

Table A.4: Sub-regional Geographies in *Working Futures* 6

WF 6 Sub-regional Geography **England: Local Enterprise Partnerships (LEPS)**	Local authorities included
Black Country	Dudley, Sandwell, Walsall, Wolverhampton
Buckinghamshire Thames Valley	Buckinghamshire
Cheshire and Warrington	Cheshire East (unitary), Cheshire West and Chester (unitary), Warrington (unitary)
Coast to Capital	Brighton and Hove (unitary), East Sussex: Lewes, Croydon, Epsom and Ewell, Mole Valley, Reigate and Banstead, Tandridge, West Sussex
Cornwall and Isles of Scilly	Cornwall (unitary), Isles of Scilly
Coventry and Warwickshire	Warwickshire, Coventry
Cumbria	Cumbria
Derby, Derbyshire, Nottingham and Nottinghamshire	Derby, Derbyshire, Nottingham (unitary), Nottinghamshire
Dorset	Bournemouth (unitary), Dorset, Poole (unitary)
Enterprise M3	Basingstoke and Deane, East Hampshire, Hart, New Forest, Rushmoor, Test Valley, Winchester, Elmbridge, Guildford, Runnymede, Spelthorne, Surrey Heath, Waverley, Woking
Gloucestershire	Gloucestershire
Greater Birmingham and Solihull	Cannock Chase, East Staffordshire, Lichfield, Tamworth, Birmingham, Solihull, Bromsgrove, Redditch, Wyre Forest
Greater Cambridge and Greater Peterborough	Cambridgeshire, Uttlesford, North Hertfordshire, King's Lynn and West Norfolk, Forest Heath, St Edmundsbury, Peterborough (unitary), Rutland (unitary)
Greater Lincolnshire	Lincolnshire, North Lincolnshire (unitary), North East Lincolnshire (unitary)
Greater Manchester	Greater Manchester
Heart of the South West	Devon, Somerset
Hertfordshire	Hertfordshire

Humber	East Riding of Yorkshire (unitary), Kingston upon Hull (unitary), North East Lincolnshire (unitary), North Lincolnshire (unitary)
Lancashire	Lancashire, Blackburn with Darwen (unitary), Blackpool (unitary)
Leeds City Region	Barnsley, Craven, Harrogate, Selby, West Yorkshire, York (unitary)
Leicester and Leicestershire	Leicester (unitary), Leicestershire
Liverpool City Region	Halton (unitary), Merseyside
London Enterprise Panel	Greater London
New Anglia	Norfolk, Suffolk
North Eastern	County Durham (unitary), Northumberland (unitary), Tyne and Wear
Northamptonshire	Northamptonshire
Oxfordshire	Oxfordshire
Sheffield City Region	Bolsover, Chesterfield, North East Derbyshire, Bassetlaw, South Yorkshire
Solent	East Hampshire, Eastleigh, Fareham, Gosport, Havant, New Forest, Test Valley, Winchester, Isle of Wight (unitary), Portsmouth (unitary), Southampton (unitary)
South East	East Sussex, Essex, Kent, Medway (unitary), Southend-on-Sea (unitary), Thurrock (unitary)
South East Midlands	Bedford (unitary), Aylesbury Vale, Central Bedfordshire (unitary), Luton (unitary), Milton Keynes (unitary), Corby, Daventry, Kettering, Northampton, South Northamptonshire, Cherwell
Stoke-on-Trent and Staffordshire	Staffordshire, Stoke-on-Trent (unitary)
Swindon and Wiltshire	Swindon (unitary), Wiltshire (unitary)
Tees Valley	Darlington (unitary), Hartlepool (unitary), Middlesbrough (unitary), Redcar and Cleveland (unitary), Stockton-on-Tees (unitary)
Thames Valley Berkshire	Bracknell Forest (unitary), Reading (unitary), Slough (unitary), West Berkshire (unitary), Windsor and Maidenhead (unitary), Wokingham (unitary)
The Marches	Herefordshire (unitary), Shropshire (unitary), Telford and Wrekin (unitary)

West of England	Bath and North East Somerset (unitary), Bristol (unitary), North Somerset (unitary), South Gloucestershire (unitary)
Worcestershire	Worcestershire
York North Yorkshire and East Riding	North Yorkshire, York (unitary), East Riding of Yorkshire (unitary)
Wales: Economic Areas	
North	Anglesey, Conwy, Denbighshire, Flintshire, Gwynedd, Wrexham
Mid	Ceredigion, Powys
South West	Carmarthenshire, Neath Port Talbot, Pembrokeshire, Swansea
South East	Bridgend, Blaenau Gwent, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Rhondda, Cynon, Taff, Torfaen, Vale of Glamorgan
Scotland: Regional Skills Assessment Areas	
Aberdeen City and Shire	Aberdeen City, Aberdeenshire
Ayrshire	East Ayrshire, North Ayrshire, South Ayrshire
Borders	Scottish Borders
Dumfries & Galloway	Dumfries & Galloway
Edinburgh and Lothians	East Lothian, Edinburgh (City of), Midlothian
Fife	Fife
Forth Valley	Clackmannanshire, Falkirk, Stirling
Glasgow	Glasgow City, East Dunbartonshire, East Renfrewshire
Highland and Islands SIP	Argyll & Bute, Eilean Siar, Highland, Moray, Orkney Islands, Shetland Islands, Perthshire & Kinross
Lanarkshire	East Dunbartonshire, North Lanarkshire, South Lanarkshire

Tayside	Angus, Dundee City, Perthshire & Kinross
West	East Renfrewshire, Inverclyde, Renfrewshire, West Dunbartonshire, East Dunbartonshire
West Lothian	West Lothian
Scotland: City Deal Areas	
Aberdeen and Aberdeenshire	Aberdeen City, Aberdeenshire
Glasgow	Glasgow, North Lanarkshire, South Lanarkshire, East Renfrewshire, East Dunbartonshire, West Dunbartonshire, Renfrewshire, Inverclyde
Edinburgh and South East Scotland City Region	Edinburgh (City of), Midlothian, East Lothian, West Lothian, Fife, Borders
Tayside	Dundee, Angus, Perth & Kinross
Inverness and Highlands	Highlands
Northern Ireland: Workforce Development Forum Areas	
Belfast	Belfast, Castlereagh
Northern	Coleraine, Ballymena, Ballymoney, Moyle, Antrim, Newtownabbey, Larne, Carrickfergus, Magherafelt
North West	Derry, Limavady, Strabane
Southern	Newry & Mourne, Armagh, Craigavon, Banbridge
South Eastern	Lisburn, North Down, Ards, Down
South West	Fermanagh, Omagh, Dungannon, Cookstown

Table A.5: SOC2010 Major Groups and Sub-major Groups

Major group	Sub-Major Groups	Skill Level
1 Managers, directors and senior officials	11 Corporate managers and directors	4
	12 Other managers and proprietors	3
2 Professional Occupations	21 Science, research, engineering and technology professionals	4
	22 Health professionals	4
	23 Teaching and educational professionals	4
	24 Business, media and public service professionals	4
3 Associate professional and technical occupations	31 Science, engineering and technology associate professionals	3
	32 Health and social care associate professionals	3
	33 Protective service occupations	3
	34 Culture, media and sports occupations	3
	35 Business and public service associate professionals	3
4 Administrative and secretarial occupations	41 Administrative occupations	2
	42 Secretarial and related occupations	2
5 Skills trades occupations	51 Skilled agricultural and related trades	3
	52 Skilled metal, electrical and electronic trades	3
	53 Skilled construction and building trades	3
	54 Textiles, printing and other skilled trades	3
6 Caring, leisure and other service occupations	61 Caring personal service occupations	2
	62 Leisure, travel and related personal service occupations	2
7 Sales and customer service occupations	71 Sales occupations	2
	72 Customer service occupations	2
8 Process, plant and machine operatives	81 Process, plant and machine operatives	2
	82 Transport and mobile machine drivers and operatives	2
9 Elementary occupations	91 Elementary trades and related occupations	1
	92 Elementary administration and service occupations	1

Source: SOC2010: Volume 1: Structure and Description of Unit Groups

Annex B: Comparison with Previous Projections

B.1   Comparison with previous results for Sectoral Employment and Productivity

It is informative to compare the current projections with those produced previously. The projections may change for three main reasons:

- revisions to historical data and perceptions of the current situation;

- amendments exogenous assumptions anbout what might happen next;

- modifications and corrections to the underlying models used to produce the projections, including previous model error.

All three elements play a role.

Figure B.1 and Tables B.1 – B.3 compare the employment forecasts from *Working Futures 2014-2024* (WF 6) with the forecasts from *Working Futures 2012-2022* (WF 5). Cambridge Econometrics' (CE) forecasts underpinning the WF 5 results were completed in Autumn 2013, and the last year of official UK employment data available at the time was for 2012 (CE uses June workforce jobs figures for each year, which were not available for 2013 when the forecast was being developed). Figure B.1 provides an overview of the difference in total UK employment (workforce jobs) in each forecast, and shows that there have been some revisions to the historical data since WF 5, due to newly available data and changes in ONS methodology.[43] The chart shows that in 2012, the last year for which WF 5 used official data, employment was recorded around 250,000 jobs higher than by the more recent data that was used for WF 6.

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[43] See http://www.ons.gov.uk/ons/guide-method/method-quality/specific/labour-market/articles-and-reports/revisions-to-workfoce-jobs--december-2015.pdfand previous versions.

Figure B.1: UK Total Employment (millions)
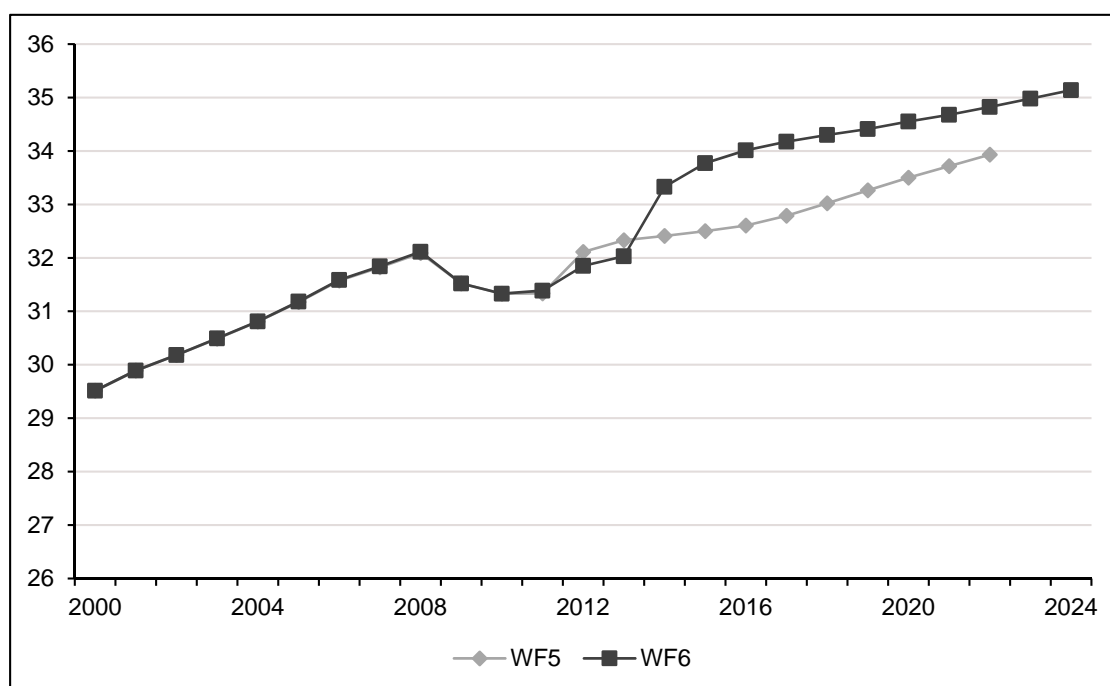
For WF5, the first year of CE's forecast was 2013; for WF6 it is 2015. For the WF6 forecast, we have official data for UK workforce jobs for 2013 and 2014 (and quarterly data up to March 2015, which were used to make an estimate for June 2015). The data show that, in 2014, workforce jobs increased much more sharply than CE had forecast for WF 5, and in fact the number of workforce jobs grew more sharply in 2014 than in any other year back to 2000.

After 2014 (which is a forecast in both sets of WF results), we now expect overall employment growth up to 2017 to be faster than was forecast for WF 5. From 2017 onwards the WF 6 forecast for employment growth is slightly slower than the WF 5 forecast. This is, in part, because following the outcome of the 2015 general election, the impacts on public sector employment of the government budget cuts are now expected to come through later in the forecast period, though private sector employment growth is also forecast to be slower than the WF 5 projections in the longer term.

Table B.1 compares the WF 6 and WF 5 forecasts by broad sector. The table shows how growth in employment was faster than expected (using data for WF 6 rather than the forecast for WF 5) over 2012-14 in all the broad sectors. Employment growth in Business & other services was especially high, at 8.7 per cent over 2012-14, while Non-market services employment growth was also far higher than expected, at 3.6 per cent compared to the WF 5 forecast of 0.9 per cent. Employment in the Primary sector & utilities, which was forecast in WF 5 to fall by 7.3 per cent, actually grew by 2.2 per cent according to the official data. Manufacturing was the only sector not to experience significant employment growth over 2012-14, though it still outperformed the WF 5 forecast of a fall of 1.7 per cent. As is evident from Figure B.1, growth over this two year period was largely driven by an upward surge in employment in 2014.

Over 2014-22, the absolute change in employment in the WF 6 forecast (1.49m) is around 30,000 jobs fewer than the WF 5 forecast (1.52m), although the *level* of employment in 2014 in the WF 6 forecast is 0.9m higher than in the WF 5 forecast (in part due to revised data and in part due to the sharp increase in employment seen in 2014).

Although in broad terms, the two forecasts are quite similar over the long term (2014-22), with overall growth of 4.5 per cent forecast in WF 6 compared with 4.7 per cent in WF 5, the outcomes for absolute job numbers by broad sector can be quite different. The forecast for growth in Non-market services (public administration, education, health and social work) is significantly different from WF 5, with growth of 0.6 per cent forecast over 2014-22 in WF 6 compared with a higher growth forecast of 2.4 per cent in WF 5. This is because the government budget cuts are now expected to lead to falling employment for a longer period (out to 2017), followed by lower employment growth in each year up to 2022 than was previously forecast . The forecast for an increase of 56,000 jobs in this sector over 2014-22 in WF 6 is almost 4 times smaller than the WF 5 forecast increase of 203,000 jobs. Across the broad sectors, the difference in forecast employment growth over this period is greatest for the Primary sector & utilities: a fall of around -7.6 per cent is forecast in WF 6, compared with growth of 1.9 per cent in WF 5. This is because the absolute level of employment in this sector was far higher in 2014 than previously expected, but is still expected to decline over the whole forecast period to around the same level as forecast in WF 5.

Table B.2 compares the two forecasts by status of employment (full-time, part-time, self-employment, by gender). Over 2012-14, which is historical data for WF 6 compared with forecast for WF 5, the overall change in employment that took place is much larger than was forecast in WF 5, as already discussed. In terms of growth rates, the greatest differences are in female self-employment (the smallest employment status), which saw growth of 14.4 per cent over this period, and male self-employment, which saw growth of around 3.9 per cent – both likely to be a reflection of the impact of recession on finding conventional employment, along with government policy on tax and welfare. All statuses of employment saw fairly strong growth over this period, whereas in the WF 5 forecast a decline was forecast in male self-employment.

Over 2014-22, the pattern of growth across most of the employment statuses is expected to be broadly similar to the WF 5 forecast, as long term trends re-establish themselves. The most obvious difference between the employment status forecasts is in male self-employment, which is expected to fall by 0.8 per cent in the WF 6 forecast compared to a rise of 0.7 per cent in the WF 5 forecast., This suggests that the current boom in self-employment is only to be a short term feature of the economy in the coming years. The strongest growth over this period, as in WF 5, is expected to be seen in male part-time employment, as the long term trend continues. In absolute terms, however, the greatest increase in employment over 2014-22 is now forecast to be in female full-time employment (420,000). In WF 5 the greatest absolute increase was also forecast to be in female full–time employment at a slightly higher figure of 450,000. Male and female part-time employment was also forecast to grow strongly over this period in both WF 5 and WF 6.

Table B.1: Comparison of *Working Futures* 6 and 5 - Employment by Broad Sector

Working Futures 5	2012	2014	2022	2024	2012-14	2014-22	2012-22
	Employment (000s)						
Primary sector & utilities	819	759	773	n.a.	-60	15	-45
Manufacturing	2,646	2,601	2,417	n.a.	-44	-184	-228
Construction	2,010	2,019	2,312	n.a.	9	293	302
Trade, accomod. & transport	8,572	8,566	8,986	n.a.	-6	421	414
Business & other services	9,665	10,014	10,788	n.a.	349	774	1,123
Non-marketed services	8,401	8,453	8,657	n.a.	52	203	255
Total	32,112	32,412	33,933	n.a.	300	1,521	1,821
	Shares (per cent)				**Growth (per cent)**		
Primary sector & utilities	2.5	2.3	2.3	n.a.	-7.3	1.9	-5.5
Manufacturing	8.2	8.0	7.1	n.a.	-1.7	-7.1	-8.6
Construction	6.3	6.2	6.8	n.a.	0.5	14.5	15.0
Trade, accomod. & transport	26.7	26.4	26.5	n.a.	-0.1	4.9	4.8
Business & other services	30.1	30.9	31.8	n.a.	3.6	7.7	11.6
Non-marketed services	26.2	26.1	25.5	n.a.	0.6	2.4	3.0
Total	100.0	100.0	100.0	n.a.	0.9	4.7	5.7
Working Futures 6	2012	2014	2022	2024	2012-14	2014-22	2012-22
	Employment (000s)						
Primary sector & utilities	819	837	773	765	18	-64	-46
Manufacturing	2,590	2,591	2,430	2,350	1	-161	-160
Construction	2,048	2,092	2,352	2,393	44	260	304
Trade, accomod. & transport	8,332	8,604	9,145	9,248	272	541	813
Business & other services	9,685	10,523	11,385	11,552	838	862	1,700
Non-marketed services	8,377	8,684	8,740	8,833	307	56	363
Total	31,851	33,331	34,825	35,141	1,480	1,494	2,974
	Shares (per cent)				**Growth (per cent)**		
Primary sector & utilities	2.6	2.5	2.2	2.2	2.2	-7.6	-5.6
Manufacturing	8.1	7.8	7.0	6.7	0.0	-6.2	-6.2
Construction	6.4	6.3	6.8	6.8	2.2	12.4	14.9
Trade, accomod. & transport	26.2	25.8	26.3	26.3	3.3	6.3	9.8
Business & other services	30.4	31.6	32.7	32.9	8.7	8.2	17.6
Non-marketed services	26.3	26.1	25.1	25.1	3.7	0.6	4.3
Total	100.0	100.0	100.0	100.0	4.6	4.5	9.3

Source: Cambridge Econometrics, MDM revision 12015 and 12956

Table B.2: Comparison of *Working Futures* 6 and 5 - Employment by Status

Working Futures 5	2012	2014	2022	2024	2012-14	2014-22	2012-22
		Employment (000s)					
Male FT	11,755	11,792	12,054	n.a.	37	263	300
Female FT	7,121	7,243	7,710	n.a.	122	467	589
Male PT	2,412	2,492	2,889	n.a.	81	397	478
Female PT	6,639	6,715	7,075	n.a.	76	360	437
Male SE	2,842	2,820	2,839	n.a.	-23	19	-4
Female SE	1,344	1,350	1,365	n.a.	7	15	21
Total	32,112	32,412	33,933	n.a.	300	1,521	1,821
		Shares (per cent)				Growth (per cent)	
Male FT	36.6	36.4	35.5	n.a.	0.3	2.2	2.6
Female FT	22.2	22.3	22.7	n.a.	1.7	6.5	8.3
Male PT	7.5	7.7	8.5	n.a.	3.3	15.9	19.8
Female PT	20.7	20.7	20.9	n.a.	1.2	5.4	6.6
Male SE	8.9	8.7	8.4	n.a.	-0.8	0.7	-0.1
Female SE	4.2	4.2	4.0	n.a.	0.5	1.1	1.6
Total	100.0	100.0	100.0	n.a.	0.9	4.7	5.7
Working Futures 6	2012	2014	2022	2024	2012-14	2014-22	2012-22
		Employment (000s)					
Male FT	11,579	12,096	12,420	12,443	518	324	841
Female FT	7,070	7,377	7,800	7,908	307	423	730
Male PT	2,375	2,487	2,876	2,979	112	389	501
Female PT	6,592	6,827	7,204	7,310	235	377	612
Male SE	2,857	2,968	2,945	2,922	110	-23	87
Female SE	1,378	1,576	1,580	1,579	199	4	203
Total	31,851	33,331	34,825	35,141	1,480	1,494	2,974
		Shares (per cent)				Growth (per cent)	
Male FT	36.4	36.3	35.7	35.4	4.5	2.7	7.3
Female FT	22.2	22.1	22.4	22.5	4.3	5.7	10.3
Male PT	7.5	7.5	8.3	8.5	4.7	15.7	21.1
Female PT	20.7	20.5	20.7	20.8	3.6	5.5	9.3
Male SE	9.0	8.9	8.5	8.3	3.9	-0.8	3.0
Female SE	4.3	4.7	4.5	4.5	14.4	0.3	14.7
Total	100.0	100.0	100.0	100.0	4.6	4.5	9.3

Source: Cambridge Econometrics, MDM revision 12015 and 12956

Table B.3: Comparison of *Working Futures* 6 and 5 – Productivity

Working Futures 5	Change (per cent)		
	2012-14	2014-22	2012-22
Primary sector & utilities	5.4	-1.9	3.3
Manufacturing	2.3	23.4	26.2
Construction	-0.7	7.3	6.5
Trade, accomod. & transport	3.4	7.8	11.5
Business & other services	0.5	15.3	15.8
Non-marketed services	-1.2	10.9	9.5
Total	1.1	12.7	13.9
Working Futures 6	Change (per cent)		
	2012-14	2014-22	2012-22
Primary sector & utilities	-4.0	15.2	10.5
Manufacturing	2.1	23.4	26.0
Construction	6.6	14.7	22.2
Trade, accomod. & transport	4.3	12.2	17.0
Business & other services	-2.0	11.5	9.3
Non-marketed services	-3.2	14.0	10.3
Total	-0.1	14.0	13.8

Source: Cambridge Econometrics, MDM revision 12015 and 12956

Table B.3 compares productivity growth in the two forecasts. The table shows that over 2012-14, rather than increasing by 1.1 per cent as forecast in WF 5, productivity actually fell slightly by 0.1 per cent, as employment levels grew very strongly (in 2014), outstripping growth in output. The greatest differences in actual productivity growth over 2012-14 compared to the WF 5 forecast were in the Primary sector & utilities (-9.4 percentage points) and Construction (7.3 percentage points).

Over 2014-22, overall productivity growth (14.0 per cent) is now forecast to be higher than in the WF 5 forecast (12.7 per cent). The greatest change in the forecast for productivity by broad sector is again in the Primary sector & utilities and Construction, which are both now forecast to increase by around 15 per cent over this period, compared with a decrease of 1.9 per cent for the former sector and an increase of 7.3% for the latter sector in WF 5. The strongest growth in productivity is still expected to be in manufacturing (23.4 percent) as employment declines over this period while output continues to grow.

B.2 Comparison with previous forecasts for occupations and qualifications

Table B.4 presents a comparison of the results by occupation.

There have been some minor changes with regard to trends in occupational structure between WF 5 and WF 6, the main differences arise as a result of the more rapid recovery of overall employment levels now expected and differences in the pace of change between sectors.

The main difference between the two sets of projections is the fact that in the WF 6 projections total employment is now expected to rise by around 3 million between 2012 and 2022 (as opposed to 1.9 million in WF 5). This is principally due to the unexpected sharp rise in employment in 2014 rather than a faster rate of growth over the period as a whole. This benefits most occupations to some degree but the main beneficiaries are those that are already projected to be on a positive trend (managers, professionals, associate professionals and caring leisure and other service occupations (SOC Major Groups 1, 2, 3 and 6)). The employment falls in "declining" occupations are expected to be less pronounced as a result of general employment growth in early part of period.

Job losses are still expected for administrative and secretarial occupations, skilled trades and process, plant and machine operatives (SOC Major Groups 4, 5 and 8).

Sales and customer service occupations (SOC Major Group 7) are now expected to see a modest increase compared with a small decline previously, but the overall sense is one of stability (although that obscures rather different patterns for more routine jobs of this kind, which are declining faster than average as a consequence of technological and other changes). The downward trend for less skilled general sales occupations (Sub-major Group 7.1) is offset by small increases for the more skilled customer service occupations (Sub-major Group 7.2).

Employment amongst elementary occupations (SOC Major Group 9) is now projected to rise slightly, although this average number hides job losses for many of those employed in such occupations within this group, as well as variations across the industries where they are employed.

Overall at the Major Group level, the occupational trends (in structure and percentage shares) projected remain very similar to those observed over the period since the early 1980s, as presented in previous *Working Futures* projections.

Table B.4: Comparison of *Working Futures* 6 and 5 by Occupation

WF 5	Employment (000s)					Growth (000s)					
(SOC 2000)	2007	2012	2014	2017	2022	2007-12	2012-14	2012-17	2014-22	2017-22	2012-22
1. Managers, directors and senior officials	3,013	3,303	3,407	3,571	3,889	291	103	268	483	318	586
2. Professional occupations	5,698	6,270	6,639	6,917	7,444	572	369	647	805	528	1,175
3. Associate professional and technical	4,096	4,182	4,314	4,452	4,764	86	133	271	450	312	583
4. Administrative and secretarial	4,121	3,756	3,661	3,490	3,270	-365	-95	-265	-391	-221	-486
5. Skilled trades occupations	3,714	3,522	3,382	3,327	3,216	-192	-140	-195	-166	-111	-306
6. Caring, leisure and other service	2,561	2,859	3,062	3,189	3,508	298	204	330	446	319	649
7. Sales and customer service	2,687	2,698	2,646	2,622	2,633	11	-52	-76	-12	12	-64
8. Process, plant and machine operatives	2,109	1,989	1,924	1,859	1,775	-120	-65	-130	-149	-84	-214
9. Elementary occupations	3,629	3,348	3,210	3,202	3,280	-281	-137	-145	70	78	-67
All occupations	31,627	31,926	32,246	32,630	33,781	299	320	704	1,535	1,151	1,855
	Share (per cent)					Growth (per cent)					
1. Managers, directors and senior officials	9.5	10.3	10.6	10.9	11.5	10	3	8	14	9	18
2. Professional occupations	18.0	19.6	20.6	21.2	22.0	10	6	10	12	8	19
3. Associate professional and technical	13.0	13.1	13.4	13.6	14.1	2	3	6	10	7	14
4. Administrative and secretarial	13.0	11.8	11.4	10.7	9.7	-9	-3	-7	-11	-6	-13
5. Skilled trades occupations	11.7	11.0	10.5	10.2	9.5	-5	-4	-6	-5	-3	-9
6. Caring, leisure and other service	8.1	9.0	9.5	9.8	10.4	12	7	12	15	10	23
7. Sales and customer service	8.5	8.4	8.2	8.0	7.8	0	-2	-3	0	0	-2
8. Process, plant and machine operatives	6.7	6.2	6.0	5.7	5.3	-6	-3	-7	-8	-5	-11
9. Elementary occupations	11.5	10.5	10.0	9.8	9.7	-8	-4	-4	2	2	-2
All occupations	100.0	100.0	100.0	100.0	100.0	1	1	2	5	4	6

Comparison of *Working Futures 6* and *5* by Occupation continued

WF 6	Employment (000s)					Growth (000s)					
(SOC 2000)	2007	2012	2014	2017	2022	2007 -12	2012- 14	2012- 17	2014- 22	2017- 22	2012- 22
1. Managers, directors and senior officials	2,848	3,072	3,304	3,515	3,771	224	231	443	467	255	698
2. Professional occupations	5,613	6,077	6,596	6,960	7,401	465	519	882	805	441	1,324
3. Associate professional and technical	4,284	4,337	4,638	4,859	5,130	53	300	522	492	271	793
4. Administrative and secretarial	3,860	3,533	3,565	3,430	3,141	-327	33	-103	-424	-289	-391
5. Skilled trades occupations	3,782	3,563	3,611	3,624	3,491	-219	48	61	-121	-133	-72
6. Caring, leisure and other service	2,652	2,900	3,134	3,274	3,502	248	234	374	369	228	603
7. Sales and customer service	2,530	2,550	2,600	2,610	2,577	20	50	60	-23	-33	27
8. Process, plant and machine operatives	2,210	2,052	2,067	2,035	1,923	-159	15	-17	-144	-112	-129
9. Elementary occupations	3,867	3,581	3,652	3,713	3,739	-286	71	132	87	25	158
All occupations	31,646	31,665	33,167	34,020	34,674	19	1,502	2,355	1,507	654	3,009
	Share (per cent)					Growth (per cent)					
1. Managers, directors and senior officials	9.0	9.7	10.0	10.3	10.9	8	8	14	14	7	23
2. Professional occupations	17.7	19.2	19.9	20.5	21.3	8	9	15	12	6	22
3. Associate professional and technical	13.5	13.7	14.0	14.3	14.8	1	7	12	11	6	18
4. Administrative and secretarial	12.2	11.2	10.7	10.1	9.1	-8	1	-3	-12	-8	-11
5. Skilled trades occupations	12.0	11.3	10.9	10.7	10.1	-6	1	2	-3	-4	-2
6. Caring, leisure and other service	8.4	9.2	9.4	9.6	10.1	9	8	13	12	7	21
7. Sales and customer service	8.0	8.1	7.8	7.7	7.4	1	2	2	-1	-1	1
8. Process, plant and machine operatives	7.0	6.5	6.2	6.0	5.5	-7	1	-1	-7	-6	-6
9. Elementary occupations	12.2	11.3	11.0	10.9	10.8	-7	2	4	2	1	4
All occupations	100.0	100.0	100.0	100.0	100.0	0	5	7	5	2	10

Table B.5 makes a similar comparison of the qualifications projections. As with the occupational results a key difference is the overall scale of employment change projected which boosts the net growth for many categories.

There have been some further revisions to the projected patterns employed by highest level of qualifications held. These revisions reflect the amendments made to the supply side. They raise the projected proportion of those in employment who are qualified at RQF levels 6 and reduce that of those qualified at RQF levels 7 and 8 compared with the previous projections. However, the broad patterns of change are very similar to those published previously with the employed workforce becoming increasingly well qualified. The overall message, of rapidly increasing shares and numbers at higher level (RQF level 4-8) and declines at RQF level 0-1, remains.

Table B.5: Comparison of *Working Futures 6* and *5* by Qualification

WF 5	(000s)					Growth (000s)					
	2007	2012	2014	2017	2022	2007-12	2012-14	2012-17	2014-22	2017-22	2012-22
RQF8	254	361	436	501	615	107	76	140	179	114	255
RQF7	1,910	2,525	3,046	3,488	4,230	615	521	963	1,185	743	1,705
RQF6	4,119	5,256	6,434	7,134	8,238	1,137	1,177	1,878	1,804	1,104	2,982
RQF5	1,912	1,960	2,049	2,105	2,206	47	89	145	158	102	247
RQF4	1,504	1,656	1,880	2,026	2,246	152	224	371	366	219	590
RQF3	6,033	6,111	6,147	5,972	5,665	78	36	-139	-482	-307	-446
RQF2	6,805	6,448	6,532	6,375	6,216	-357	85	-73	-317	-159	-232
RQF1	5,493	4,700	4,113	3,712	3,234	-792	-587	-989	-879	-477	-1,466
No Qual	2,937	2,117	1,610	1,317	1,129	-819	-507	-800	-480	-188	-988
	30,966	31,134	32,246	32,630	33,781	168	1,112	1,496	1,535	1,151	2,647
	Share (per cent)					Growth (per cent)					
RQF8	0.8	1.2	1.4	1.5	1.8	42.1	21.0	38.9	41.0	22.9	70.6
RQF7	6.2	8.1	9.4	10.7	12.5	32.2	20.6	38.1	38.9	21.3	67.5
RQF6	13.3	16.9	20.0	21.9	24.4	27.6	22.4	35.7	28.0	15.5	56.7
RQF5	6.2	6.3	6.4	6.5	6.5	2.5	4.5	7.4	7.7	4.8	12.6
RQF4	4.9	5.3	5.8	6.2	6.6	10.1	13.5	22.4	19.5	10.8	35.6
RQF3	19.5	19.6	19.1	18.3	16.8	1.3	0.6	-2.3	-7.8	-5.1	-7.3
RQF2	22.0	20.7	20.3	19.5	18.4	-5.2	1.3	-1.1	-4.8	-2.5	-3.6
RQF1	17.7	15.1	12.8	11.4	9.6	-14.4	-12.5	-21.0	-21.4	-12.9	-31.2
No Qual	9.5	6.8	5.0	4.0	3.3	-27.9	-24.0	-37.8	-29.8	-14.3	-46.7
	100.0	100.0	100.0	100.0	100.0	0.5	3.6	4.8	4.8	3.5	8.5

Comparison of *Working Futures 6* and *5* by Qualification continued

WF 6	(000s)					Growth (000s)					
	2007	**2012**	**2014**	**2017**	**2022**	**2007-12**	**2012-14**	**2012-17**	**2014-22**	**2017-22**	**2012-22**
RQF8	248	348	394	440	495	100	46	93	102	55	148
RQF7	1,832	2,421	2,714	3,053	3,418	589	293	632	704	365	997
RQF6	4,061	5,141	6,617	7,738	9,283	1,080	1,476	2,597	2,666	1,545	4,142
RQF5	1,893	1,914	2,048	2,188	2,372	21	134	274	324	184	458
RQF4	1,458	1,585	1,861	2,138	2,495	126	277	554	633	356	910
RQF3	6,112	6,142	6,633	6,532	6,298	30	491	390	-335	-234	156
RQF2	6,827	6,588	6,607	6,601	6,255	-239	19	13	-351	-345	-332
RQF1	5,657	4,911	4,488	4,025	3,259	-746	-422	-885	-1,229	-766	-1,651
No Qual	2,886	2,085	1,804	1,304	799	-801	-281	-781	-1,006	-505	-1,286
	30,975	31,134	33,167	34,020	34,674	159	2,033	2,886	1,507	654	3,540
	Share (per cent)					Growth (per cent)					
RQF8	0.8	1.1	1.2	1.3	1.4	40.1	13.2	26.7	25.9	12.5	42.5
RQF7	5.9	7.8	8.2	9.0	9.9	32.1	12.1	26.1	25.9	11.9	41.2
RQF6	13.1	16.5	20.0	22.7	26.8	26.6	28.7	50.5	40.3	20.0	80.6
RQF5	6.1	6.1	6.2	6.4	6.8	1.1	7.0	14.3	15.8	8.4	23.9
RQF4	4.7	5.1	5.6	6.3	7.2	8.6	17.5	34.9	34.0	16.6	57.4
RQF3	19.7	19.7	20.0	19.2	18.2	0.5	8.0	6.4	-5.1	-3.6	2.5
RQF2	22.0	21.2	19.9	19.4	18.0	-3.5	0.3	0.2	-5.3	-5.2	-5.0
RQF1	18.3	15.8	13.5	11.8	9.4	-13.2	-8.6	-18.0	-27.4	-19.0	-33.6
No Qual	9.3	6.7	5.4	3.8	2.3	-27.7	-13.5	-37.5	-55.7	-38.8	-61.7
	100.0	100.0	100.0	100.0	100.0	0.5	6.5	9.3	4.5	1.9	11.4

Source: Sheet WF5v6QUALcomp in: \\ads.warwick.ac.uk\SHARED\IE\Projects\WorkingFutures\data\tables\WFComparison20160215.xlsx

Annex C: Developing projections at the most detailed occupational level (SOC 2010 4-digit categories)

C.1   Development of the detailed 4 digit occupational projections

This Annex describes indicative results at the more detailed 4-digit level of SOC2010, including a brief description of how they have been produced. There are some 369 4 digit categories, so this represents a very significant expansion of the level of detail presented previously. Robust official data at this level only exist at a very aggregate spatial / sectoral level due to the limited sample size of the key data source (the LFS).

An initial set of estimates was produced for the LMI for All project[44]. This extended the previous set of Working Futures results to provide such additional detail for LMI for All. This was done by applying a very simple expansion technique. LFS data were combined for a number of years (2013: 4 quarters; 2014: 4 quarters; and 2015: 2 quarters). These data were used to generate shares of 4 digit occupational categories within the 2 digit occupational categories (sub-major groups) used elsewhere in this chapter. These shares were then applied for all years and across all industries.

This imposes the strong assumptions that these patterns do not change over time and that they are common across industries, both of which are unlikely to hold true in all cases.

With regard to changes over time, the LFS sample is not regarded as sufficiently large to generate meaningful differences over time when broken down by industry and other key dimensions. Analysis of changes over time is possible if all other dimensions are combined. However the number of independent observations is limited due to the change in classification to SOC2010 in 2011. For the present these patterns are therefore assumed fixed over time. In future, as more data become available on a SOC 2010 basis, this assumption will be revisited.

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[44] See www.lmiforall.org.uk for further details.

The assumption of similar patterns across industries is also problematic. It is apparent by inspection of the detailed results that some 4 digit occupations are concentrated in particular sectors. Taking this into account is important if more plausible patterns are to be generated. For example, assuming the same patterns across all industries, the distribution of 4-digit occupational categories such as textile process operatives are spread over all sectors (including food products, which ends up being the largest sector for employment of this group). This is at odds with intuition which suggests that this category should be heavily concentrated in the textile sector. This is an inevitable consequence of the implicit assumption that distribution of employment by industry at 4-digit SOC level is essentially the same as for the parent 2-digit sub-major group.

The only way to avoid such anomalies is to use sector specific patterns. The scope for doing this is however severely limited by the sample size in the LFS. An analysis at the level of the 6 broad sectors used in Chapter 2 of the main report is possible, but this still does not provide sufficient granularity to avoid the problem highlighted for textile process operatives. In order to avoid this problem it is necessary to go to a much more detailed level. However this then increases the probability that cells are empty or contain very few numbers, even though in reality there may be significant numbers employed in such categories. Even where cells are occupied, the small sample numbers involved mean that they may not provide a reliable picture of the shares of interest. Combining together a number of LFS quarters mitigates these problems.

LFS data have been used to produce detailed 369 occupation by 75 industry arrays using the data currently available (combining all years). These data arrays are sparsely populated for many industries, (especially when also classified by gender, employment status, region and qualification). Therefore an algorithm has been developed to fill the gaps. In order to ensure consistency with the other Working Futures estimates the estimates are constrained to match the industry totals (75 industries) and the SOC 2 digit employment totals. Details are given in Annex A.

C.2 Indicative results for 4 digit occupational projections

It is only possible to provide a broad summary of the results at the 4 digit level. The full detail can be found in the Working Futures workbooks and at the LMI for All data portal.

Tables C1-C.6 provide results for a selection of the 369 occupational categories. The tables highlight those occupations that are:

- the most important in terms of 2014 employment levels (Table C.1);

- expected to show the most significant net increases between 2014 and 2024, in absolute and % growth terms (Tables C.2 and C.3 respectively);

- expected to show the most significant net job losses between 2014 and 2024, in absolute and % growth terms (Tables C.4 and C.5 respectively); and finally

- expected to show the most significant replacement needs between 2014 and 2024, in absolute terms (Table C.6).

It should be emphasised that that when looking at some of these results, especially for rates of change between years, this may involve categories with small cell sizes which are much more subject to statistical "noise".

Table C.1 shows that the largest 4 digit occupational categories (in terms of numbers of jobs in 2014) are dominated by sales, administrative, teaching, caring occupations and cleaners. The largest occupations in the professional and managerial categories are Nurses (SOC # 2231), Teachers (SOC #2341 and 2315), Managers and directors of retail and wholesale establishments (SOC #1190) and Medical Practitioners (SOC 5241) who make it into the top 20 for the first time.

Table C.2 shows that the largest projected increases in employment in absolute terms over the period 2014-2024 are not surprisingly in the same categories (notably various caring occupations and sales related ones (especially at higher skill levels)). However, various highly skilled occupations in financial and business, as well as IT occupations also appear in Table C.2. These increases are largely driven by industry effects as the sectors that employ such people are expected to grow rapidly.

The largest job losses are highlighted in Table C.3. These also affect some of the same categories featured in Table C.1, notably in the areas such as administrative officers and assistants, secretaries, PAs and receptionists, lower level sales occupations and cleaning staff. The continuing negative impact of IT on jobs that can be easily automated, as well as cutbacks in public administration as a result of fiscal retrenchment are key drivers.

Table C.4 shows that the occupations with fastest rates of increase between 2014 and 2014 are predominately in areas such as market research and managerial occupations. It should be noted that because of the expansion technique used % growth rates are common for 4 digit categories within each 2 digit occupation.

Table C.5 shows that the most rapid rate of job losses between 2014 and 2024 are largely expected to occur in specialist occupations amongst the operatives and administrative occupational groups. This is driven by technological change and continuing employment decline in certain construction and manufacturing industries, and less skilled office jobs generally.

The final table in this series (C.6) shows the scale of replacement demands over the period 2014-2024. This is largely dependent on the level of employment in the occupation in 2014. The occupations are therefore similar to those emphasised in Table C.1. If replacement needs are combined with so called expansion demands (the net change in employment between 2014 and 2024), this gives a measure of the total number of job openings. For those occupations expected to lose jobs between 2014 and 2024 (as highlighted in Table C.6), these structural changes partly offset the replacement demands. For those occupations where employment is expected to rise the structural and replacement demand elements reinforce each other.

Note that in the calculations replacement demand rates have not been differentiated at the 4 digit level of SOC. The same rates have been assumed for all 4 digit categories within a particular SOC sub-major group (the 2-digit level).

Table C.1: Top 20 4 digit occupations in terms of Employment levels in 2014

Occ(369) Name	Occ(25)	Employment 2014	rank	Employment 2024	rank
7111 Sales and retail assistants	20	1,215,436	1	1,154,502	1
6145 Care workers and home carers	18	846,220	2	981,446	2
4159 Other administrative occupations nec	12	670,606	3	643,088	5
2231 Nurses	4	667,365	4	763,831	3
9233 Cleaners and domestics	25	644,345	5	668,271	4
9272 Kitchen and catering assistants	25	486,734	6	504,808	9
2315 Primary and nursery education teaching professionals	5	475,437	7	523,584	7
3545 Sales accounts and business development managers	11	474,350	8	541,635	6
2314 Secondary education teaching professionals	5	461,616	9	508,364	8
9260 Elementary storage occupations	25	458,817	10	475,854	10
4122 Book-keepers, payroll managers and wages clerks	12	454,154	11	435,519	12
6125 Teaching assistants	18	394,859	12	457,958	11
1190 Managers and directors in retail and wholesale	1	366,638	13	430,258	13
6141 Nursing auxiliaries and assistants	18	350,411	14	406,406	14
8211 Large goods vehicle drivers	23	306,805	15	312,876	17
1121 Production managers and directors in manufacturing	1	300,229	16	352,325	15
2136 Programmers and software development professionals	3	279,771	17	315,343	16
9273 Waiters and waitresses	25	274,785	18	284,988	20
2211 Medical practitioners	4	266,034	19	304,489	19
5241 Electricians and electrical fitters	15	265,535	20	240,351	28

Source for all the 4 digit tables: M:\IE\Projects\WorkingFutures\data\workbooks\FourDigit\4DigitAnalysisTemplate.xlsm (Tables 4.10-4.15).

Notes: Highlighted occupations are sector specific.

Table C.2: Top 20 4 digit occupations, based on employment growth (000s), 2014-2024

sector specific Occ(369) Name	Occ(25)	Employment				Change 2014-2024			
		2014	rank	2024	rank	000s	rank	%	rank
6145 Care workers and home carers	18	846,220	2	981,446	2	135,226	1	16.0	39
2231 Nurses	4	667,365	4	763,831	3	96,466	2	14.5	83
3545 Sales accounts and business development managers	11	474,350	8	541,635	6	67,285	3	14.2	115
1190 Managers and directors in retail and wholesale	1	366,638	13	430,258	13	63,619	4	17.4	13
6125 Teaching assistants	18	394,859	12	457,958	11	63,099	5	16.0	34
6141 Nursing auxiliaries and assistants	18	350,411	14	406,406	14	55,996	6	16.0	42
1121 Production managers and directors in manufacturing	1	300,229	16	352,325	15	52,096	7	17.4	9
2315 Primary and nursery education teaching professionals	5	475,437	7	523,584	7	48,147	8	10.1	172
7219 Customer service occupations nec	21	265,502	21	312,657	18	47,155	9	17.8	5
2314 Secondary education teaching professionals	5	461,616	9	508,364	8	46,748	10	10.1	170
1131 Financial managers and directors	1	237,353	29	278,539	23	41,186	11	17.4	19
2211 Medical practitioners	4	266,034	19	304,489	19	38,454	12	14.5	84
2136 Programmers and software development professionals	3	279,771	17	315,343	16	35,572	13	12.7	145
2421 Chartered and certified accountants	6	213,649	36	247,472	25	33,823	14	15.8	54
2424 Business and financial project management professionals	6	210,720	38	244,080	26	33,359	15	15.8	56
6121 Nursery nurses and assistants	18	198,288	44	229,975	32	31,687	16	16.0	37
1132 Marketing and sales directors	1	181,916	53	213,482	41	31,566	17	17.4	16
1122 Production managers and directors in construction	1	176,728	55	207,394	42	30,666	18	17.4	7
2423 Management consultants and business analysts	6	192,160	47	222,581	37	30,421	19	15.8	58
3534 Finance and investment analysts and advisers	11	201,550	40	230,140	31	28,589	20	14.2	111

Source for all the 4 digit tables: M:\IE\Projects\WorkingFutures\data\workbooks\FourDigit\4DigitAnalysisTemplate.xlsm (Tables 4.10-4.15).

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Table C.3: Top 20 4 digit occupations, based on job losses 2014-2024 (largest fall, 000s)

sector specific Occ(369) Name	Occ(25)	Employment				Change 2014-2024			
		2014	rank	2024	rank	000s	rank	%	rank
4112 National government administrative occupations	12	239,293	28	229,474	33	-9,819	350	-4.1	281
7130 Sales supervisors	20	211,024	37	200,445	46	-10,579	351	-5.0	286
7112 Retail cashiers and check-out operators	20	250,117	26	237,578	29	-12,539	352	-5.0	287
8133 Routine inspectors and testers	22	80,054	115	66,398	148	-13,656	353	-17.1	336
4214 Company secretaries	13	42,673	199	28,013	264	-14,660	354	-34.4	363
4212 Legal secretaries	13	49,071	179	32,214	248	-16,858	355	-34.4	365
8149 Construction operatives nec	22	101,529	93	84,210	121	-17,319	356	-17.1	344
4217 Typists and related keyboard occupations	13	51,276	170	33,660	243	-17,615	357	-34.4	366
4122 Book-keepers, payroll managers and wages clerks	12	454,154	11	435,519	12	-18,636	358	-4.1	271
5223 Metal working production and maintenance fitters	15	205,542	39	186,049	53	-19,494	359	-9.5	329
5231 Vehicle technicians, mechanics and electricians	15	217,357	34	196,742	48	-20,614	360	-9.5	332
5434 Chefs	17	258,615	25	235,507	30	-23,109	361	-8.9	302
8111 Food, drink and tobacco process operatives	22	146,617	69	121,607	85	-25,010	362	-17.1	360
5241 Electricians and electrical fitters	15	265,535	20	240,351	28	-25,183	363	-9.5	317
4213 School secretaries	13	74,379	131	48,827	185	-25,552	364	-34.4	369
4211 Medical secretaries	13	79,908	118	52,457	179	-27,451	365	-34.4	368
4159 Other administrative occupations nec	12	670,606	3	643,088	5	-27,518	366	-4.1	273
7111 Sales and retail assistants	20	1,215,436	1	1,154,502	1	-60,934	367	-5.0	288
4215 Personal assistants and other secretaries	13	246,277	27	161,671	70	-84,605	368	-34.4	364
4216 Receptionists	13	260,076	24	170,730	63	-89,346	369	-34.4	367

Source for all the 4 digit tables: M:\IE\Projects\WorkingFutures\data\workbooks\FourDigit\4DigitAnalysisTemplate.xlsm (Tables 4.10-4.15).

Table C.4: Top 20 4 digit occupations, based on Employment Growth (%) 2014-2024

| sector specific | | Employment | | | | Change 2014-2024 | | | |
Occ(369) Name	Occ(25)	2014	rank	2024	rank	000s	rank	%	rank
7215 Market research interviewers	21	16,556	309	19,497	298	2,941	178	17.8	1
7211 Call and contact centre occupations	21	115,706	83	136,256	78	20,550	37	17.8	2
7220 Customer service managers and supervisors	21	137,290	73	161,673	69	24,383	24	17.8	3
7213 Telephonists	21	17,610	303	20,738	292	3,128	175	17.8	4
7219 Customer service occupations nec	21	265,502	21	312,657	18	47,155	9	17.8	5
7214 Communication operators	21	33,443	240	39,382	219	5,940	125	17.8	6
1122 Production managers and directors in construction	1	176,728	55	207,394	42	30,666	18	17.4	7
1123 Production managers and directors in mining and energy	1	15,855	313	18,606	304	2,751	181	17.4	8
1121 Production managers and directors in manufacturing	1	300,229	16	352,325	15	52,096	7	17.4	9
1161 Managers and directors in transport and distribution	1	79,127	122	92,858	104	13,730	54	17.4	10
1162 Managers and directors in storage and warehousing	1	94,824	97	111,278	91	16,454	47	17.4	11
1133 Purchasing managers and directors	1	55,364	161	64,971	153	9,607	83	17.4	12
1190 Managers and directors in retail and wholesale	1	366,638	13	430,258	13	63,619	4	17.4	13
1135 Human resource managers and directors	1	139,467	72	163,668	68	24,201	25	17.4	14
1136 Information technology and telecommunications directors	1	76,715	126	90,026	113	13,312	55	17.4	15
1132 Marketing and sales directors	1	181,916	53	213,482	41	31,566	17	17.4	16
1115 Chief executives and senior officials	1	68,603	139	80,507	125	11,904	65	17.4	17
1139 Functional managers and directors nec	1	115,789	82	135,881	79	20,092	39	17.4	18
1131 Financial managers and directors	1	237,353	29	278,539	23	41,186	11	17.4	19
1134 Advertising and public relations directors	1	26,321	271	30,888	255	4,567	146	17.4	20

Source for all the 4 digit tables: M:\IE\Projects\WorkingFutures\data\workbooks\FourDigit\4DigitAnalysisTemplate.xlsm (Tables 4.10-4.15).

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Table C.5: Top 20 4 digit occupations Job Losses 2014-2024 (largest % decline)

sector specific Occ(369) Name	Occ(25)	Employment				Change 2014-2024			
		2014	rank	2024	rank	000s	rank	%	rank
8142 Road construction operatives	22	23,559	279	19,540	296	-4,019	324	-17.1	350
8129 Plant and machine operatives nec	22	34,629	238	28,722	262	-5,907	336	-17.1	351
8123 Quarry workers and related operatives	22	11,758	337	9,753	347	-2,006	301	-17.1	352
8113 Textile process operatives	22	15,010	323	12,449	335	-2,560	305	-17.1	353
8122 Coal mine operatives	22	2,263	369	1,877	369	-386	259	-17.1	354
8114 Chemical and related process operatives	22	49,866	176	41,360	205	-8,506	347	-17.1	355
8139 Assemblers and routine operatives nec	22	40,767	209	33,813	242	-6,954	341	-17.1	356
8121 Paper and wood machine operatives	22	29,218	257	24,234	282	-4,984	328	-17.1	357
8127 Printing machine assistants	22	16,067	311	13,327	330	-2,741	310	-17.1	358
8137 Sewing machinists	22	32,924	245	27,307	269	-5,616	332	-17.1	359
8111 Food, drink and tobacco process operatives	22	146,617	69	121,607	85	-25,010	362	-17.1	360
8126 Water and sewerage plant operatives	22	9,102	351	7,549	357	-1,553	292	-17.1	361
8134 Weighers, graders and sorters	22	18,305	301	15,183	319	-3,123	313	-17.1	362
4214 Company secretaries	13	42,673	199	28,013	264	-14,660	354	-34.4	363
4215 Personal assistants and other secretaries	13	246,277	27	161,671	70	-84,605	368	-34.4	364
4212 Legal secretaries	13	49,071	179	32,214	248	-16,858	355	-34.4	365
4217 Typists and related keyboard occupations	13	51,276	170	33,660	243	-17,615	357	-34.4	366
4216 Receptionists	13	260,076	24	170,730	63	-89,346	369	-34.4	367
4211 Medical secretaries	13	79,908	118	52,457	179	-27,451	365	-34.4	368
4213 School secretaries	13	74,379	131	48,827	185	-25,552	364	-34.4	369

Source for all the 4 digit tables: M:\IE\Projects\WorkingFutures\data\workbooks\FourDigit\4DigitAnalysisTemplate.xlsm (Tables 4.10-4.15).

Table C.6: Top 20 4 digit occupations based on Replacement Demand, 2014-2024 (000s)

sector specific		Employment		Employment		Change 2014-2024				replacement demand		
Occ(369) Name	Occ(25)	2014	rank	2024	rank	000s	rank	%	rank	000s	rank	%
7111 Sales and retail assistants	20	1,215,436	1	1,154,502	1	-60,934	367	-5.0	288	429,603	1	35.3
6145 Care workers and home carers	18	846,220	2	981,446	2	135,226	1	16.0	39	388,183	2	45.9
2231 Nurses	4	667,365	4	763,831	3	96,466	2	14.5	83	287,090	3	43.0
4159 Other administrative occupations nec	12	670,606	3	643,088	5	-27,518	366	-4.1	273	280,626	4	41.8
9233 Cleaners and domestics	25	644,345	5	668,271	4	23,926	28	3.7	216	242,429	5	37.6
2315 Primary and nursery education teaching profess	5	475,437	7	523,584	7	48,147	8	10.1	172	209,986	6	44.2
2314 Secondary education teaching professionals	5	461,616	9	508,364	8	46,748	10	10.1	170	203,881	7	44.2
4122 Book-keepers, payroll managers and wages clerks	12	454,154	11	435,519	12	-18,636	358	-4.1	271	190,049	8	41.8
9272 Kitchen and catering assistants	25	486,734	6	504,808	9	18,073	41	3.7	219	183,129	9	37.6
3545 Sales accounts and business development manag	11	474,350	8	541,635	6	67,285	3	14.2	115	181,905	10	38.3
6125 Teaching assistants	18	394,859	12	457,958	11	63,099	5	16.0	34	181,132	11	45.9
9260 Elementary storage occupations	25	458,817	10	475,854	10	17,037	45	3.7	203	172,626	12	37.6
6141 Nursing auxiliaries and assistants	18	350,411	14	406,406	14	55,996	6	16.0	42	160,742	13	45.9
1190 Managers and directors in retail and wholesale	1	366,638	13	430,258	13	63,619	4	17.4	13	141,333	14	38.5
8211 Large goods vehicle drivers	23	306,805	15	312,876	17	6,070	122	2.0	244	131,092	15	42.7
4216 Receptionists	13	260,076	24	170,730	63	-89,346	369	-34.4	367	118,515	16	45.6
1121 Production managers and directors in manufactur	1	300,229	16	352,325	15	52,096	7	17.4	9	115,733	17	38.5
2211 Medical practitioners	4	266,034	19	304,489	19	38,454	12	14.5	84	114,444	18	43.0
4215 Personal assistants and other secretaries	13	246,277	27	161,671	70	-84,605	368	-34.4	364	112,227	19	45.6
1259 Managers and proprietors in other services nec	2	230,206	30	254,667	24	24,461	23	10.6	162	110,260	20	47.9

Source for all the 4 digit tables: M:\IE\Projects\WorkingFutures\data\workbooks\FourDigit\4DigitAnalysisTemplate.xlsm (Tables 4.10-4.15).

Annex D: Trends in employment and output by nation of the UK and region of England, 2014-2024

D.1   Introduction

This chapter presents the results from the Working Futures 6 labour market projections for the nations of the UK (England, Wales, Scotland and Northern Ireland) and the regions of England for the period 2014 to 2024. The projections are placed within the context of the recent past (2004 to 2014).

The period 2004 to 2014 was turbulent. It saw the UK move from rapid economic expansion through a short slowdown in 2005-6 to the economic crisis of 2007/8, followed by the longest and deepest recession experienced since the 1930s. The economy has been in recovery since 2012, but the recovery is much weaker and more uncertain than the recoveries which followed earlier recessions. The ten years from 2014 are likely to experience further economic volatility.

Previous Working Futures exercises have revealed a pattern of geographical differences within the UK, with economic inequality between the most prosperous regions of London and the south and east of England and the north of England and the other nations of the UK increasing over time. Employment change was also most favourable in the south and east of the UK. This chapter explores whether these trends are likely to continue between 2014 and 2024.

The chapter is structured as follows:

- D.2 Changes in employment and gross value added (GVA)

- D.3 Comparative trends in total employment, 1994-2024

- D.4 Change in employment by gender and status

- D.5 Comparative trends in GVA, 1994-2024

- D.6 Comparative trends in GVA per job, 1994-2024

- D.7 Changing industrial structure of employment, 2014-2024

- D.8 Changing occupational structure of employment, 2014-2024

- D.9 Changing qualification profile of employment, 2014-2024

- D.10 Replacement and net labour demand, 2014-2024

- D.11 Change in other labour market measures, 2004-2024

D.2   Changes in employment and gross value added (GVA)

Table D.1 presents headline changes in employment and gross value added (GVA) (a measure of output) by nation of the UK and region of England.

Employment:

- Is projected to grow between 2014 and 2024, but at a slower annual average rate than between 2004 and 2014.

- Employment increases are projected for all parts of the UK.

- The fastest rates of increase are projected for London and the East of England, while the projected rate of growth in employment is slowest in Yorkshire and the Humber, the North West, Wales, Scotland and Northern Ireland.

- The north-south and England/rest of the UK differentials in employment growth are projected to continue to exist between 2014 and 2024, but are narrower than in the previous decade.

- The projected rate of employment growth is higher in 2014-24 than in 2004-14 for Yorkshire and the Humber, the North East and Northern Ireland.

- Elsewhere, projected growth rates are projected to be lower. The largest decrease compared with the previous decade is projected for London.

Table D.1: Annual average percentage change in employment and output by nation and region, 2004-2024

	Gross Value Added (GVA)		Employment	
	2004-2014	2014-2024	2004-2014	2014-2024
London	2.6	2.5	1.9	0.7
South East	1.6	2.3	0.8	0.6
East of England	1.0	2.2	0.7	0.7
South West	1.0	2.2	0.9	0.6
West Midlands	0.6	2.1	0.6	0.5
East Midlands	1.2	2.1	0.8	0.5
Yorks & the Humber	0.4	2.0	0.1	0.4
North West	0.5	2.0	0.7	0.4
North East	0.3	2.0	0.2	0.5
England	1.3	2.2	0.9	0.6
Wales	0.6	2.0	0.7	0.4
Scotland	0.5	1.8	0.4	0.4
Northern Ireland	0.5	2.0	0.2	0.4
United Kingdom	**1.2**	**2.2**	**0.8**	**0.5**

Gross Value Added

- Output is projected to increase nearly twice as fast between 2014 and 2024 as in the preceding ten years.

- London is projected to experience the fastest growth in output, with rates of growth declining within England with distance from the south and east.

- Scotland is projected to experience the slowest rate of growth. The rates of growth for Wales and Northern Ireland are projected to be close to those for the northern regions of England.

- Regional differentials in annual average rate of growth in GVA are projected to be much narrower for 2014-24 than for 2004-14.

- The projected rate of GVA growth for 2014-24 is higher than the 2014-24 rate of growth in all parts of the UK except London, which is projected to have a marginally lower rate of growth during 2014-24 than over the preceding decade.

- Improvements in projected growth rates compared with the previous decade are greatest for the northern and midland regions of England and the other nations of the UK.

Hence for employment and GVA the picture projected is one of geographical convergence at the scale of nations and broad regions.

London and neighbouring regions are still projected to have the most favourable performance on employment and output growth between 2014 and 2024 (Figure D.1).

Northern Ireland, Wales and Scotland are projected to experience the slowest rates of growth in both employment and output.

Figure D.1: Projected change in GVA and employment by region, 2014-2024 (average annual percentage change)
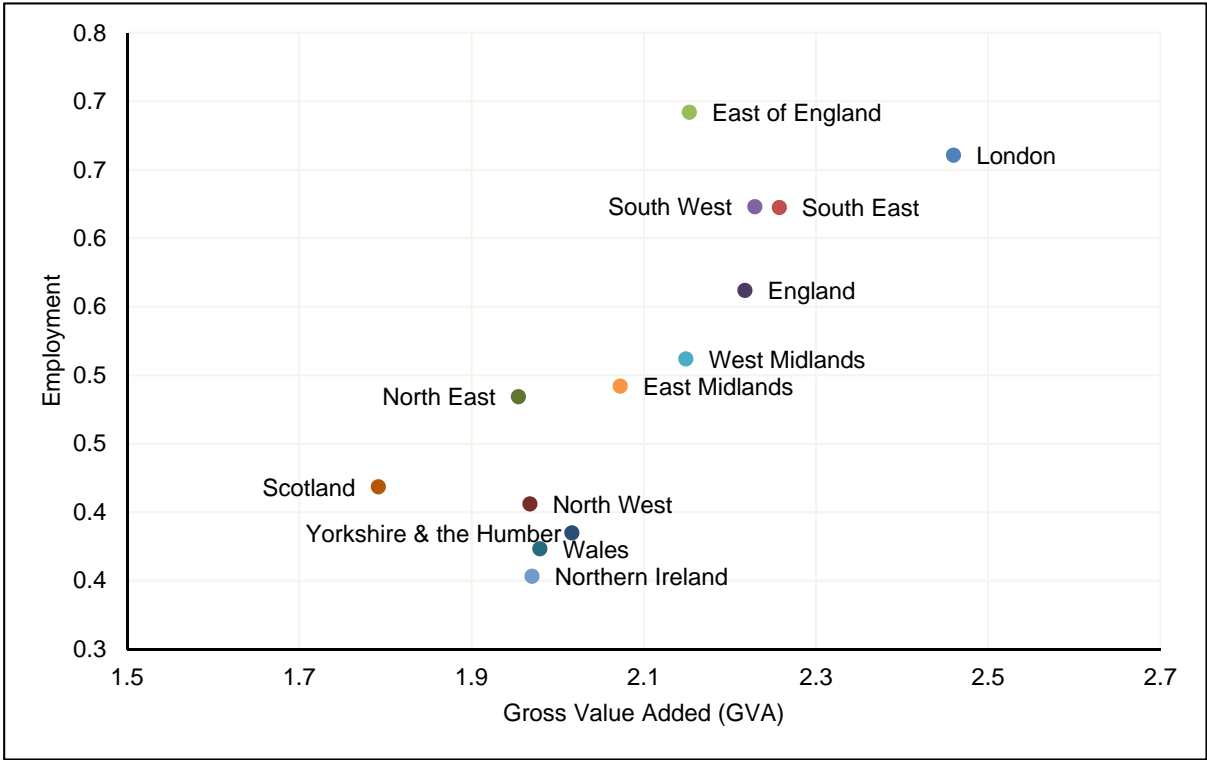
D.3 Comparative trends in total employment, 1994-2024

Overall, employment grew in all nations of the UK and regions of England from 1994 to 2014 (Figure D.2). However, the rate of growth has varied over time and geographically.

Employment for most regions has increased since the 1980s, but prolonged recession during the 1980s depressed employment substantially in regions like the North East. This region has experienced some of the weakest employment growth since the early 1990s, and is projected to continue to grow slowly between 2014 and 2024.

The recession of the early 1990s had a severe impact on employment in London, but the subsequent employment recovery was strong. An even stronger employment recovery is evident following the 2008-9 recession, when employment growth was more muted in other parts of the UK.

The South East, East and South West regions have consistently recorded the highest rates of employment growth after London.

Northern Ireland experienced employment growth from the early 1980s, and rapid growth in the early 2000s, but the 2008-9 recession had a deeper and longer impact on employment here than elsewhere in the UK. Employment is projected to increase but more slowly than in the UK as a whole.

Scotland and the West Midlands have experienced weak employment performance over recent years, and are projected to see slow employment growth over the next decade.

Wales and Yorkshire and the Humber experienced marked employment declines in the recession of 2008-9, but this was followed by quite rapid employment growth. They are projected to gain employment more slowly than the UK average.

Figure D.2: Employment relative to 1994 for each nation of the UK and region of England
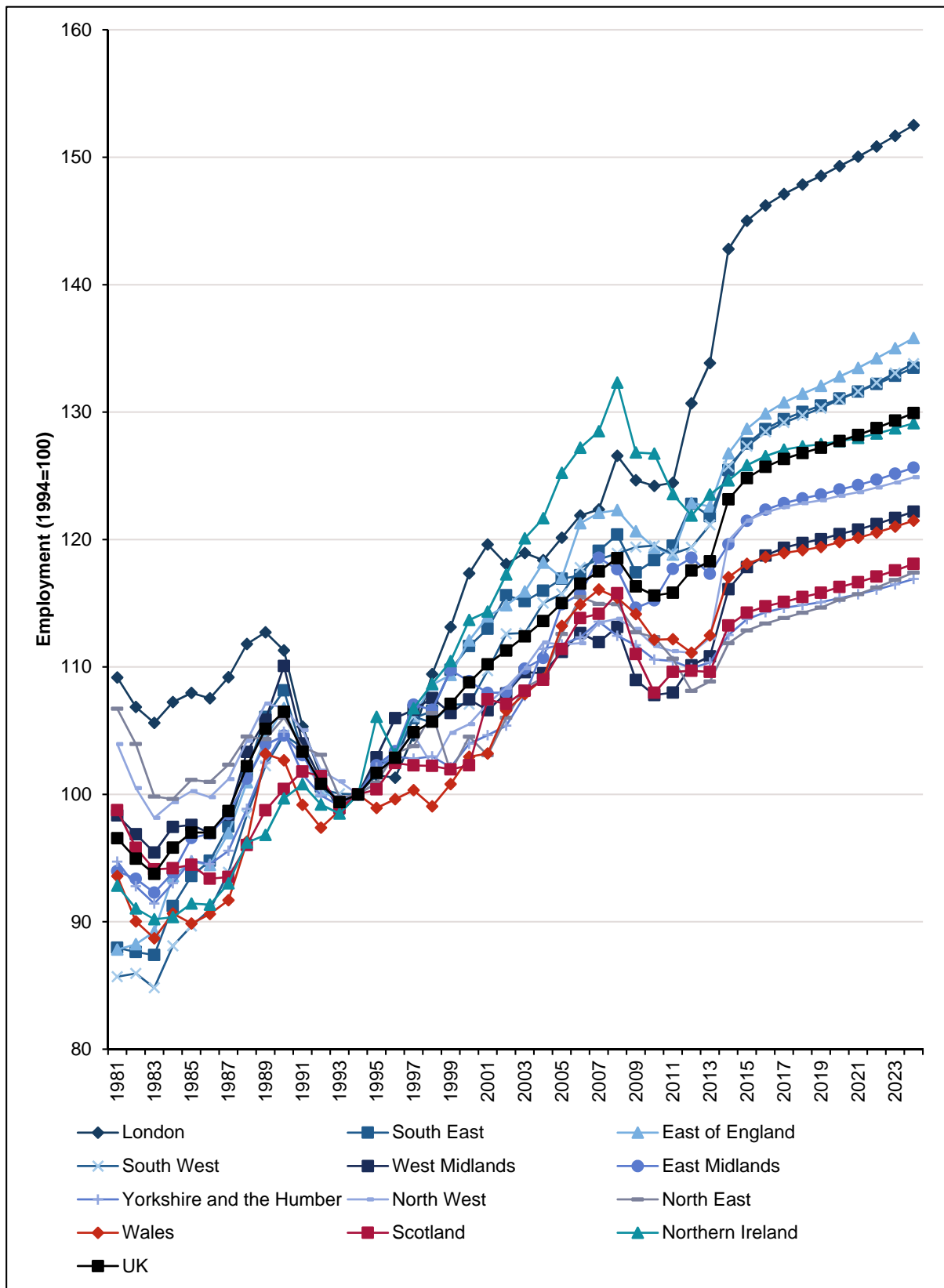
Figure D.3 demonstrates the marked geographical contrasts in rates of employment growth before and after 2014.

- In the period 2004 -2014, London stands out as having much faster employment growth than the rest of the UK. The south and east of the UK gained employment fastest. The English midlands and north, Wales, Scotland and Northern Ireland saw slowest employment growth, although, of these, the midlands, Wales and the North West saw growth closest to the UK average.

- There is much less geographical variation in projected rates of annual employment change for 2014 to 2024. The fastest rate of growth is projected for the East of England.

Figure D.3: Map of rates of employment change by region, 2004-14 and 2014-24
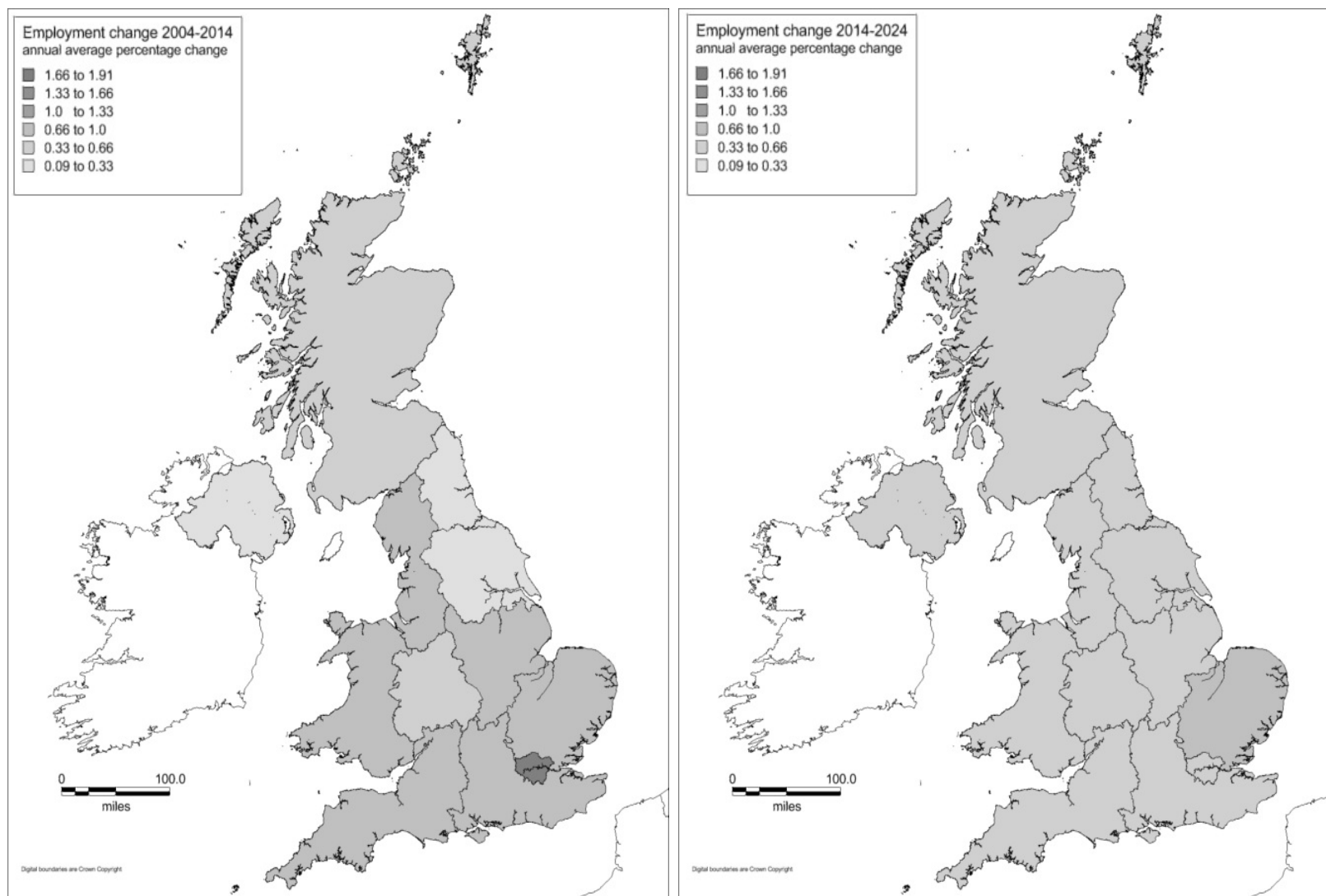
D.4   Change in employment by gender and status

Change

Employment is projected to grow in all parts of the UK between 2014 and 2024, but there are marked contrasts by gender and type of work (Figure D.4).

Figure D.4: Projected change in employment by gender, part-time and self-employment by nation of the UK and region of England, 2014-2024
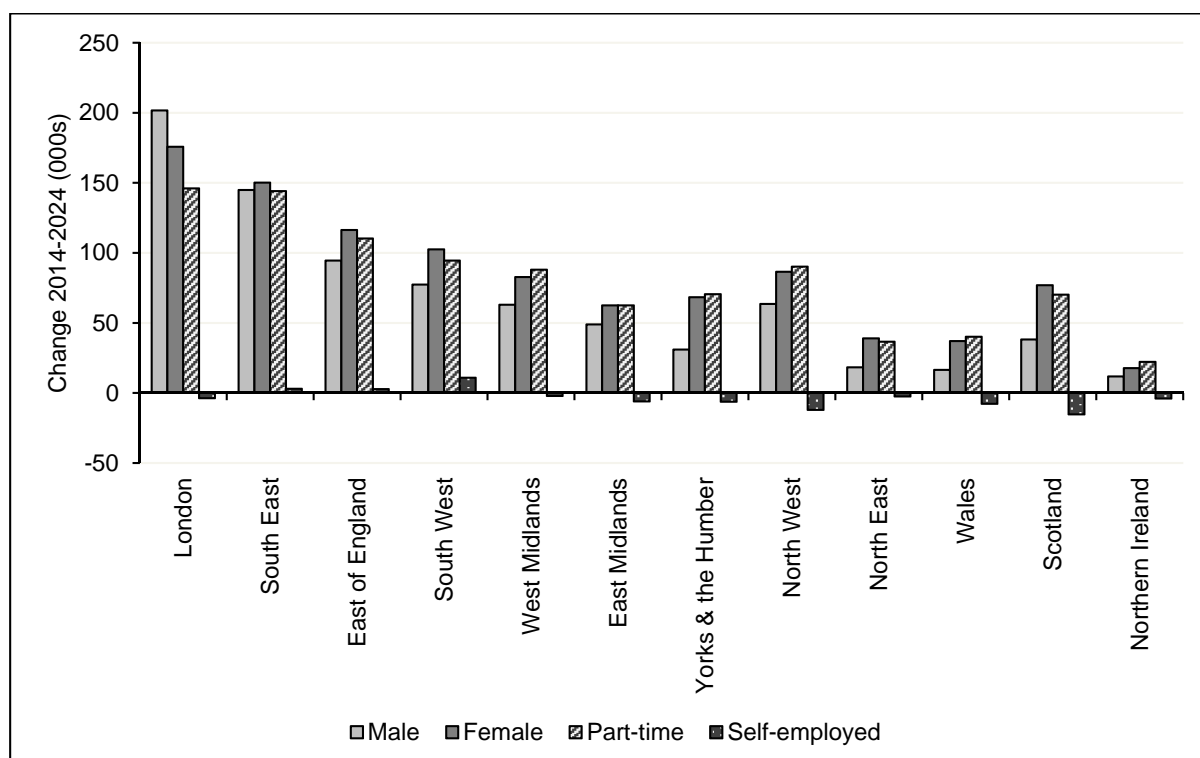
- The projected change in numbers employed broadly reflects the size of the employed labour force, being largest in London and smallest in Northern Ireland, Wales and the North East.

- Male employment is projected to increase in all parts of the UK. The largest increase in male employment is projected for London, with other large projected increases in the South East, East and South West. The smallest absolute increases are projected for Northern Ireland, Wales and the North East (reflecting the small size of these areas).

- Female employment is also projected to increase in all parts of the UK, with a similar geographical pattern to male employment.

- However, the growth in female employment is projected to exceed that of male employment everywhere except London. The female:male differential is particularly large in Yorkshire and the Humber and Scotland.

- The pattern of projected part-time employment change is very similar to that of female employment. In the North West, West Midlands and Yorkshire and the Humber in England and in Wales and Northern Ireland, projected part-time employment growth exceeds that of female employment.

- The number self-employed is only projected to increase in the South East, East and South West. The South West is projected to experience the largest increase. The projected decline is largest in Scotland and the North West.

Rate of increase

The projected rate of increase in female employment between 2014 and 2024 is somewhat lower than that seen in the previous ten-year period. Self-employment is projected to fall slightly, contrasting with the strong growth which occurred during 2004-2014. In contrast, part-time employment is projected to grow more strongly than during 2004-2014 (Table D.2).

Table D.2: Annual average percentage change in female and part-time employment and self-employment by nation and region

UK Nation or region of England	2004-14			2014-2024		
	female	part-time	self-employed	female	part-time	self-employed
London	2.1	2.1	4.3	0.7	1.2	0.0
South East	0.8	0.8	1.9	0.7	1.3	0.0
East of England	0.9	1.6	2.0	0.8	1.4	0.1
South West	1.0	0.6	3.0	0.7	1.3	0.2
West Midlands	0.6	1.2	2.4	0.6	1.3	-0.1
East Midlands	0.6	0.5	2.1	0.6	1.1	-0.2
Yorkshire & the Humber	0.1	0.0	1.9	0.6	1.1	-0.2
North West	0.6	0.6	2.4	0.5	1.0	-0.3
North East	0.2	0.3	3.2	0.7	1.2	-0.2
England	0.9	0.9	2.6	0.6	1.2	0.0
Wales	0.6	0.6	3.3	0.5	1.1	-0.4
Scotland	0.2	0.3	2.9	0.6	1.0	-0.5
Northern Ireland	0.6	1.1	-0.9	0.4	1.0	-0.4
United Kingdom	0.8	0.9	2.6	0.6	1.2	-0.1

- There is little variation in the projected rate of change in female or part-time employment between the nations of the UK or English regions.

- Female employment is projected to grow fastest in the East of England and most slowly in Northern Ireland.

- The fall in the projected rate of female employment growth in 2014-24 relative to 2004-14 is largest in London. The largest increases relative to the previous decade occurred in the North East, Yorkshire and the Humber and Scotland.

- Part-time employment is projected to grow fastest in the East of England and most slowly in Scotland and Northern Ireland.

- Self-employment is projected to remain stable or decline slightly in most of England, with rates of decline highest in northern England. However, increases are projected for the South West and East of England.

- The projected relative decline in self-employment is greatest in Scotland, Wales and Northern Ireland.

Share

The share of women in employment is projected to be only 0.5 percentage points higher in 2024 than 2014 (Table D.3).

Table D.3: Share of women, part-time workers and self-employment in all employment by nation and region, 2014-2024

UK Nation or region of England	Percentage female		Percentage part-time		Self-employment as a percentage of all employment	
	2014	2024	2014	2024	2014	2024
London	46.7	46.7	31.5	33.2	14.0	13.1
South East	47.3	47.5	35.4	37.7	14.9	14.1
East of England	47.3	47.8	37.0	39.5	15.4	14.4
South West	48.7	49.2	36.7	39.1	17.3	16.6
West Midlands	46.6	47.1	36.8	39.6	12.0	11.3
East Midlands	47.1	47.5	36.1	38.5	12.6	11.8
Yorkshire & the Humber	47.7	48.5	37.1	39.7	12.6	11.8
North West	47.6	48.0	35.3	37.6	12.3	11.5
North East	49.0	49.9	36.4	39.1	10.9	10.2
England	47.4	47.8	35.3	37.6	13.8	13.0
Wales	48.3	49.1	38.6	41.3	14.6	13.5
Scotland	48.5	49.3	35.6	37.9	11.8	10.8
Northern Ireland	48.2	48.6	39.7	42.5	13.5	12.6
United Kingdom	47.5	48.0	35.6	37.9	13.7	12.9

- The female share of employment is projected to be highest in the North East, Scotland, South-West England and Wales, and lowest in London and the West Midlands.

- The increase in the female share of total employment is projected to be greatest in the North East, Yorkshire and the Humber, Wales and Scotland.

- The percentage share of part-time workers in total employment is projected to increase everywhere. The smallest projected percentage point increase is for London.

- The geographical contrast by region/nation in the part-time share of employment is therefore projected to increase from 8.2 per cent in 2014 to 9.3 per cent in 2024. In 2024, more than two-fifths of employment is projected to be part-time in Northern Ireland and Wales, compared with a third in London.

- The percentage of self-employed in total employment is projected to fall in all parts of the UK between 2014 and 2024. Self-employment was most common in the South West and East of England in 2014.

- The decline in the percentage self-employed between 2014 and 2024 is projected to be greatest in Wales, Scotland and the East of England. The smallest declines are projected for the South West, West Midlands and North East of England.

- The geographical pattern of self-employment is projected to be similar in 2024 to that in 2014. The South West is projected to continue to have the highest percentage self-employed in 2024, while the lowest percentage share is projected for North East England.

D.5   Comparative trends in GVA 1994-2024

Output trends within the UK have been diverging by nation of the UK and region of England over the recent past. Contrasts in GVA growth rates are projected to widen by 2024 (Figure D.5).

- The impact of the 2008-9 recession was particularly severe in the North East and West Midlands. The impact of the recession lasted longer in the Midlands and North of England and the other nations of the UK than in southern England and this is reflected in lower projected growth rates for 2014-2024.

- London's output in 2024 is projected to be 2.3 times that of 1994. In contrast, the GVA of Scotland is projected to be only 1.5 times greater.

- The fastest growth in GVA outside London is projected for the South East, South West and East of England.

- Wales and most of the other regions of England display a similar performance, with projected GVA about 1.7 times the 1994 level in 2024.

Figure D.5: GVA (relative to 1994) by nation of the UK and region of England (1994=100)
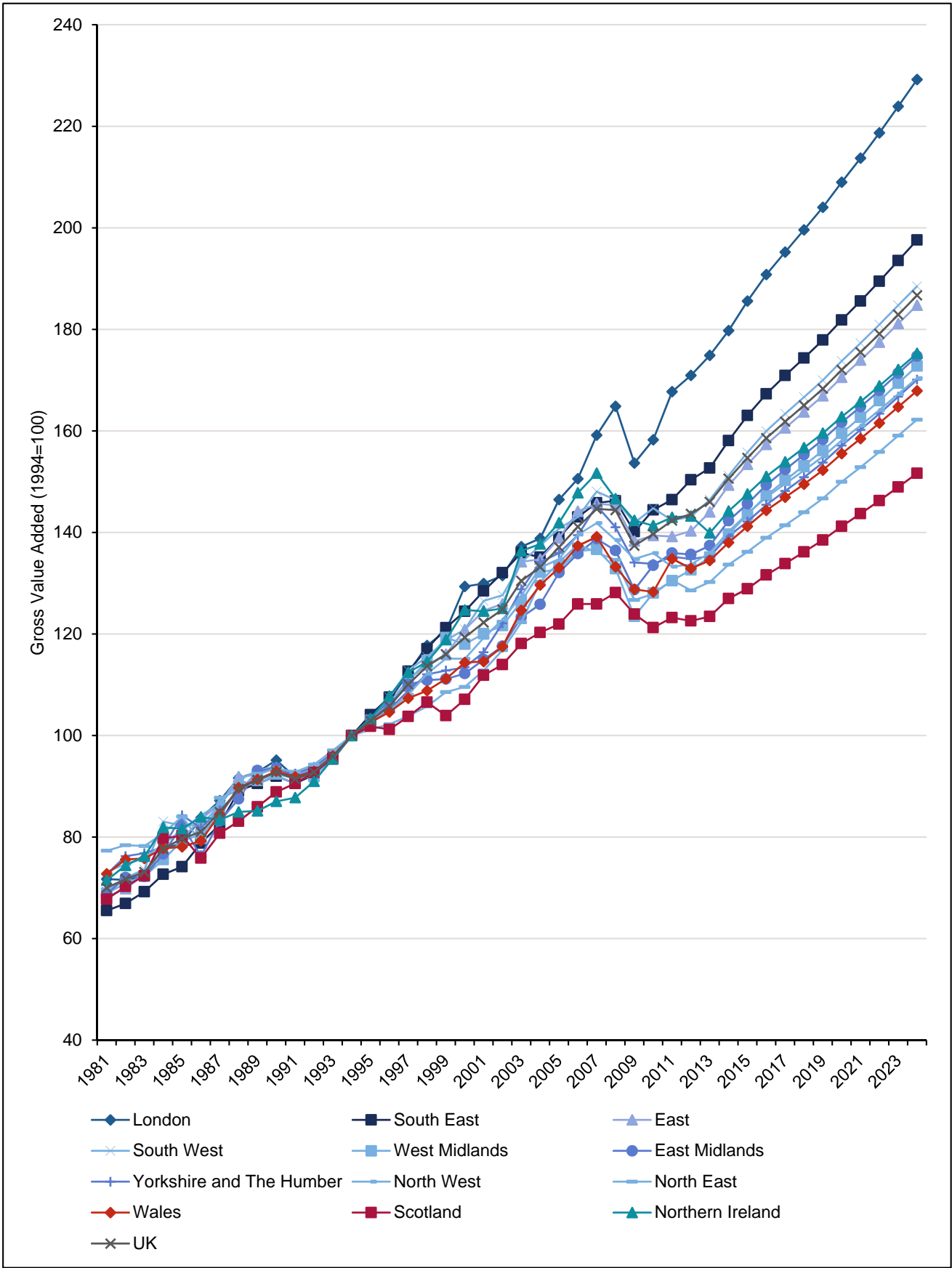
2004-2014 Annual average percentage change in GVA by sector

The annual average rate of change in GVA was negative for the primary & utilities, manufacturing and construction sectors and positive for the service sectors between 2004 and 2014 (Table D.4).

Table D.4: Annual average percentage change in GVA by region and sector, 2004-2014

	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services
London	0.0	-1.9	2.0	1.0	3.7	1.9
South East	-0.3	-0.9	0.2	1.3	3.1	1.1
East of England	0.3	0.6	-0.3	0.3	2.1	1.3
South West	-1.4	0.9	-0.6	0.9	2.1	0.8
West Midlands	-0.8	-0.4	-1.9	0.8	1.9	0.5
East Midlands	-0.4	0.4	-1.8	1.5	2.5	1.8
Yorkshire & the Humber	-0.7	-0.6	-1.4	-0.3	2.1	0.7
North West	-1.2	-1.4	-1.2	-0.2	2.8	0.6
North East	-2.0	-0.4	-1.7	-0.4	1.9	0.7
England	-0.6	-0.4	-0.4	0.7	3.0	1.1
Wales	-1.5	0.7	-1.0	-0.2	2.6	0.4
Scotland	-1.9	-0.1	-1.0	0.3	2.4	0.2
Northern Ireland	-3.9	0.9	-4.3	1.0	2.5	0.3
United Kingdom	**-1.0**	**-0.3**	**-0.5**	**0.6**	**2.9**	**1.0**

- GVA in the primary sector and utilities grew slowly in the East of England and declined elsewhere, most rapidly in Northern Ireland, the North East and Scotland.

- Manufacturing sector GVA contracted fastest in London and the North West, and grew fastest in the South West and Northern Ireland.

- Construction sector GVA contracted outside London and the South East, most rapidly in Northern Ireland, the East and West Midlands and the North East.

- Output in the trade, accommodation and transport sector grew in the southern half of England, most rapidly in the East Midlands and South East. Elsewhere, only Northern Ireland and Scotland experienced growth and there were slow declines in Wales and the northern regions of England.

- GVA in the business and other services sector grew at an average of 2.9 per cent per annum. The growth of London was well above average, and the South-East grew just faster than average. However, the growth rate was below average elsewhere. Wales and Northern Ireland saw faster GVA growth than most of the remainder of England and the North East and West Midlands experienced particularly slow growth.

- The GVA of the non-market services sector increased by 1 per cent per annum, and growth occurred in all parts of the UK. London and the East Midlands saw growth at nearly twice the UK average rate. GVA grew much more slowly in Scotland, Northern Ireland and Wales, and only slightly faster in the West Midlands. This probably reflects the greater impact of austerity in the public sector following the 2010 General Election upon local government and the devolved administrations than upon UK central government departments.

2014-2024 Annual average percentage change in GVA

Over the period 2014-2024, UK output is projected to increase in all sectors, most rapidly in the construction and business services sectors (Table D.5).

Table D.5: Annual average percentage change in GVA by region and sector, 2014-2024

	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services
London	1.8	1.7	2.8	1.8	2.8	2.1
South East	2.2	1.8	3.9	2.2	2.2	2.0
East of England	2.6	1.7	3.7	2.3	1.9	1.8
South West	1.9	1.9	3.8	2.3	2.3	1.7
West Midlands	1.9	2.1	2.9	2.3	2.0	2.0
East Midlands	1.9	2.2	3.0	2.2	1.9	1.8
Yorkshire & the Humber	1.8	1.3	3.0	2.2	2.2	1.8
North West	1.8	1.3	2.5	2.1	2.2	1.8
North East	2.0	1.2	2.6	2.4	2.3	1.6
England	2.0	1.7	3.2	2.1	2.4	1.9
Wales	2.1	1.7	2.5	2.5	2.0	1.6
Scotland	-0.3	2.1	1.6	1.9	2.2	1.6
Northern Ireland	1.2	1.4	3.5	2.3	2.5	1.3
United Kingdom	**1.6**	**1.8**	**3.1**	**2.1**	**2.4**	**1.8**

- GVA in the primary and utilities sector is projected to grow in all parts of the UK except Scotland. The East of England, Wales and North East are projected to grow fastest. Northern Ireland is also projected to experience growth well below the UK average.

- Manufacturing GVA is projected to grow fastest in the East and West Midlands and Scotland. Northern England and Northern Ireland are projected to experience the slowest growth rates.

- Construction is projected to be the fastest, or equal fastest growing sector, in all parts of the UK except Scotland. The fastest rates of GVA growth are projected for the South East, South West and East of England, while in Scotland output is projected to grow most slowly.

- There is little geographical variation projected for change in GVA in the Trade, accommodation and transport between 2014 and 2024. Growth is projected throughout the UK, but London and Scotland are projected to see slower output growth than the UK average, while Wales and the North East are projected to grow fastest.

- GVA in Business and other services is projected to grow much faster in London than in the rest of the UK. Beyond London, only Northern Ireland is projected to grow faster than the UK average. The slowest growth is projected for the East of England and East Midlands.

- Non-market services are projected to grow fastest in London, the South East and West Midlands and much slower than average in Northern Ireland.

Annual average percentage GVA change

The radar chart in Figure D.6 depicts variations in projected annual average percentage GVA change between 2014 and 2024 by nation of the UK or region of England and industry sector simultaneously. It highlights similarities and differences in the pattern of change by sector.

- Scotland is shown to be distinctive in its poor prospects for primary and construction sector output growth.

- The stronger projected performance of manufacturing in the East and West Midlands as well as Scotland is apparent.

- Construction output is highlighted as being projected to grow faster in southern England than elsewhere.

- The higher projected growth of business services in London and Northern Ireland is highlighted.

- The weaker projected performance of non-market services outside England is evident.

- Trade, accommodation and transport GVA is projected to grow fastest in Wales, Northern Ireland and the North East.

Figure D.6: Annual average rate of GVA change, 2014-2024
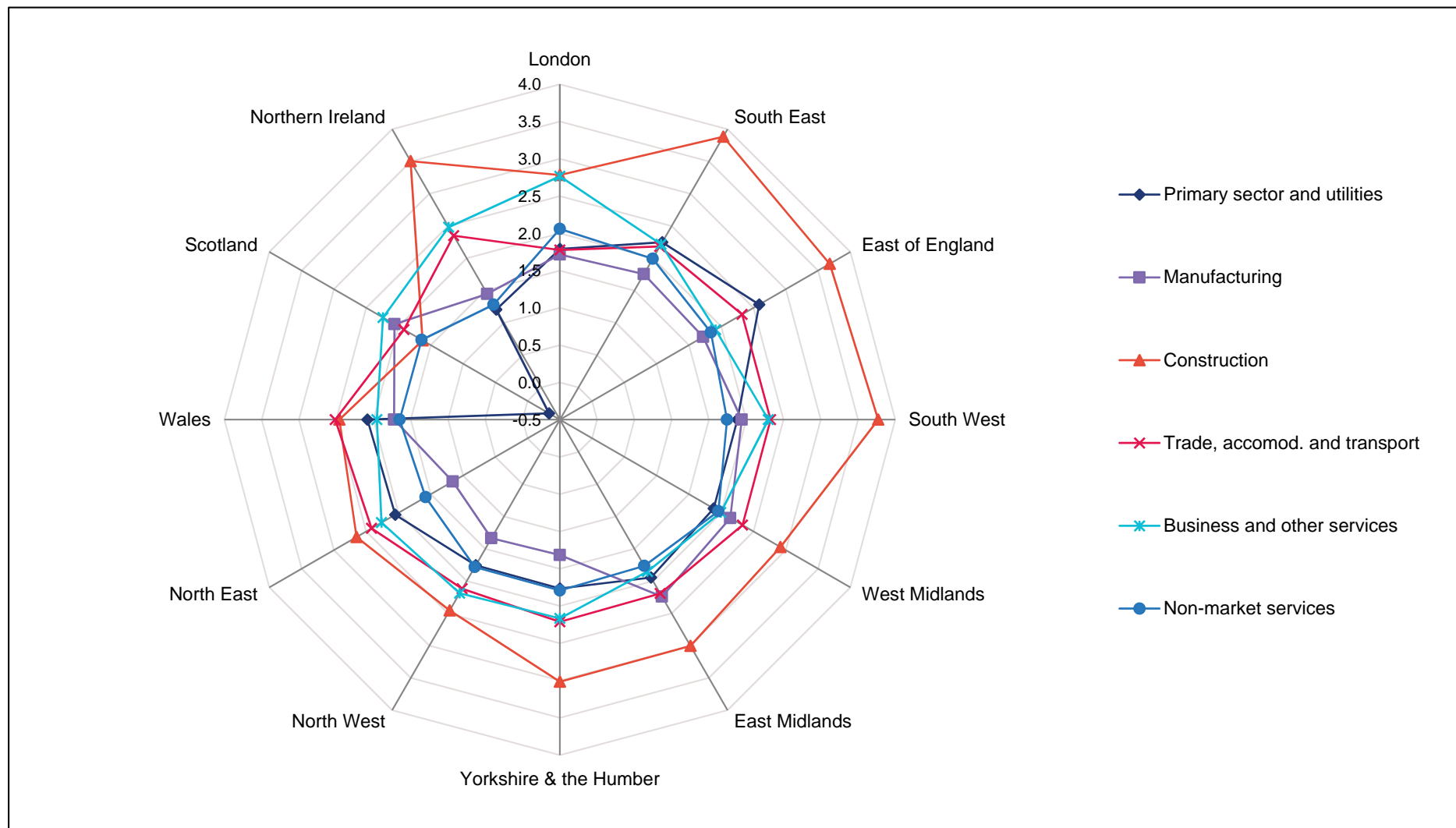
D.6 Comparative trends in GVA per job, 1994-2024

This section combines information on GVA with employment trends in order to provide an indication of national and regional differentials in output per job. The section compares GVA per job in 2014 and 2024 by nation/region and industry sector.

Geographical contrasts in output per job and change in this indicator are presented in Figure D.7.

- Output per job is highest in both years in London and the South East. Within England, it is highest in the south and east, and declines the further north and west a region is.

- Output per job in Scotland is higher than for regions in the midlands and north of England, while that for Northern Ireland is similar to the midlands and north of England. Wales displays the lowest output per job.

- Output per job is projected to increase between 2014 and 2024 in all parts of the UK.

Figure D.7: GVA per job for nations of the UK and regions of England, 2014 and 2024
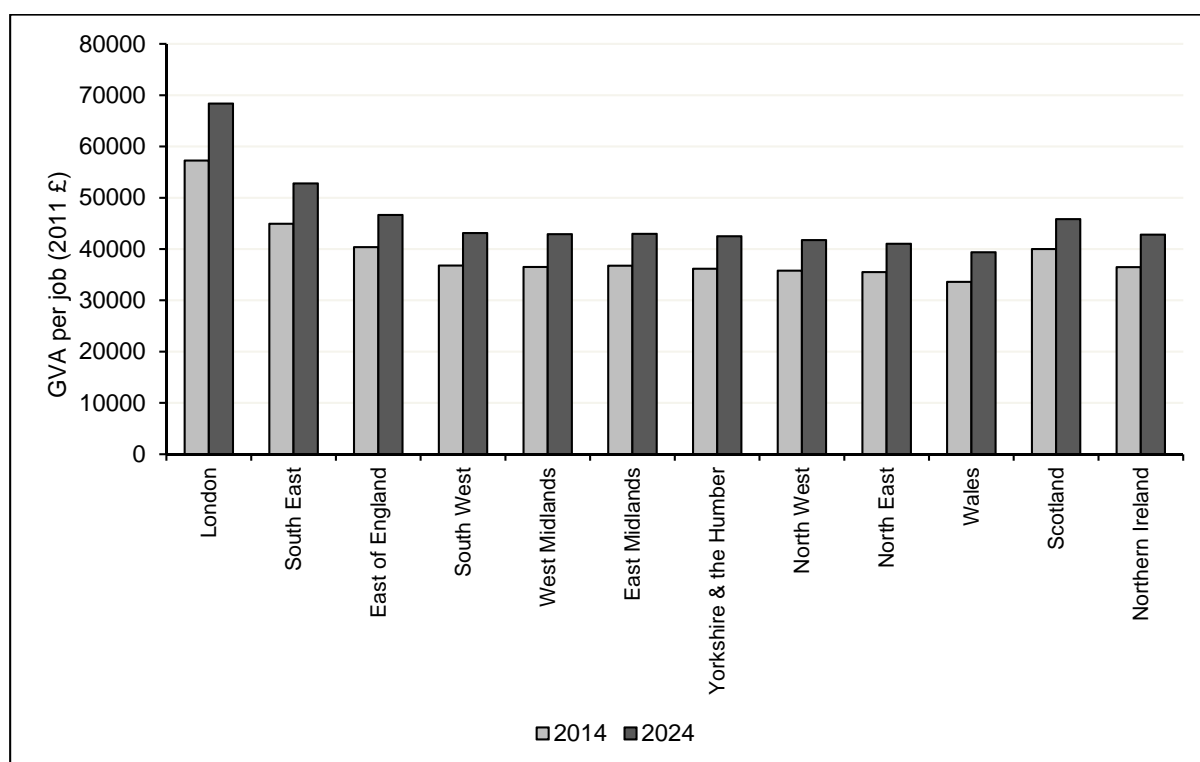
The trend in GVA per job relative to 1994 is presented in Figure D.8. The projected rate of increase from 2014 to 2024 indicates a strong return to growth following a long period of slow recovery from the 2008/9 recession.

- London displays the highest growth in GVA per job over the whole period from 1994 to 2024.

- Output per job grows most slowly in Scotland.

- The projected trajectory of growth from 2014 to 2024 is similar in each nation and region and there is little variation between the two extremes.

- The regions of southern and eastern England display higher levels of output per job relative to 1994 than the midlands and north.

Figure D.8: GVA per job relative to 1994 for each nation of the UK and region of England
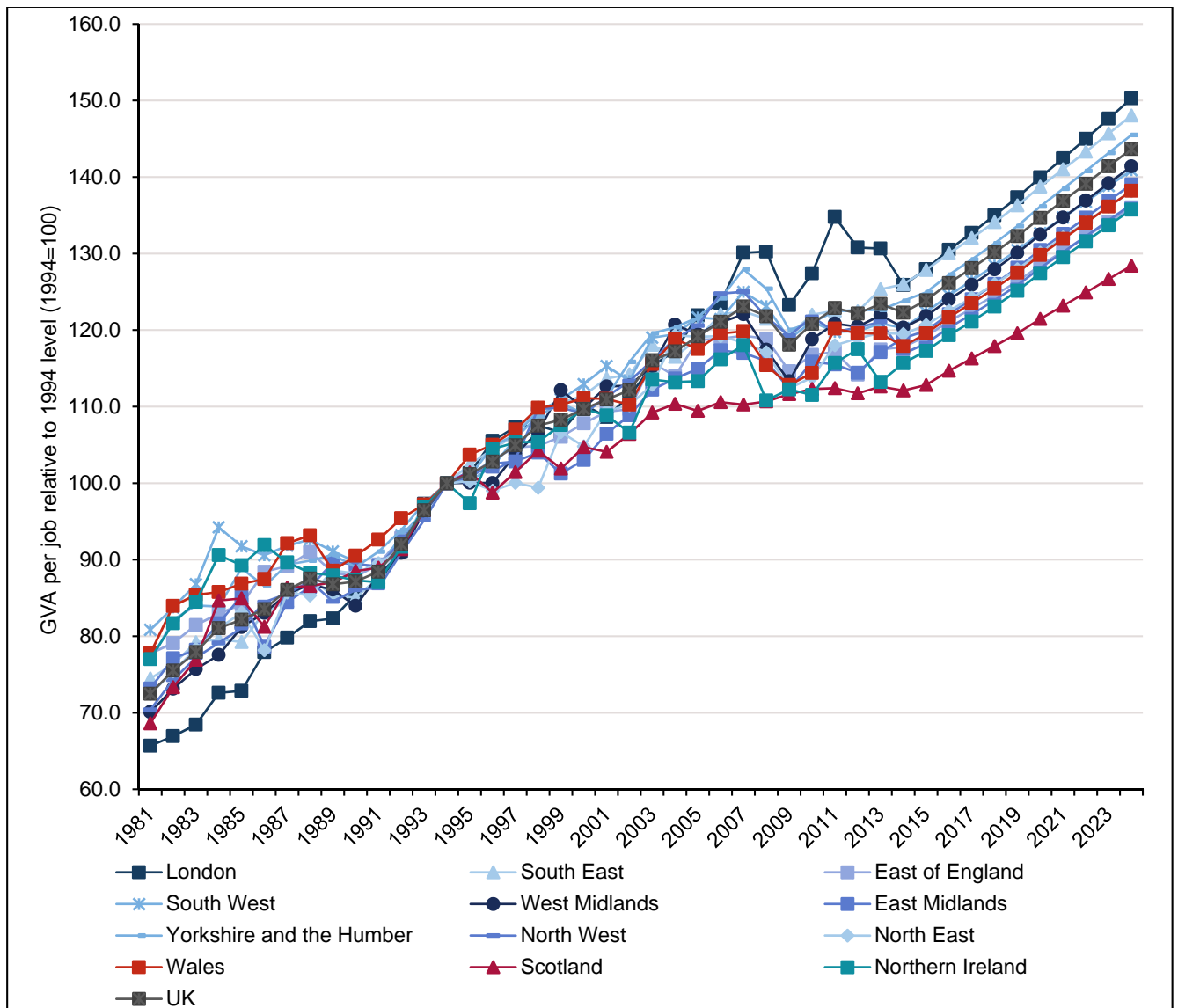
2014 GVA per job varied from £33.6 thousand in Wales to £57.3 thousand in London (Table D.6). Increases to £39.4 thousand in Wales and £68.4 thousand in London are projected for 2024 (Table D.7).

- In the primary and utilities sector, London, the North East and the South East display the highest values in both 2014 and 2024. There is very large differential between these regions and Northern Ireland in both years.

- Manufacturing output per job was highest in 2014 and is projected to remain highest in 2024 in the South East, Scotland and East of England. The lowest ratios of output to employment in 2014 and projected for 2024 are in Yorkshire and the Humber, the West Midlands, Northern Ireland and Wales.

- Construction output per job was highest in 2014 and is projected to be highest in 2024 in London, Higher levels are found in both 2014 and 2024 in the south and east of England, East Midlands, Yorkshire and the Humber and Scotland. Output per job is lowest in both years in Wales and Northern Ireland.

- Trade, accommodation and transport output per job in 2014 was highest in London and the South East and lowest in Wales and the North East and is projected to remain so in 2024.

- In business and other services, output per job was highest in 2014 and is projected to be highest in London and South East England in 2024, with the lowest values in both years occurring in the East Midlands. Outside London and the South East, output per job is highest in Scotland in both years.

- In non-market services, London displays the highest output per job in 2014 and is projected to remain the highest ranked region in 2024. The second highest value occurred in Northern Ireland in 2014, but is projected to be in South East England in 2024. There is relatively little variation in output per job across the remainder of the UK.

Table D.6: GVA per job by nation and region and industry sector, 2014 (2011 £000s)

UK Nation or region of England	All sectors	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services
London	57.3	135.7	55.0	56.3	40.3	73.1	40.2
South East	44.9	61.3	67.1	47.6	37.9	52.6	34.2
East of England	40.4	53.2	64.6	48.8	33.5	43.9	32.0
South West	36.8	45.4	57.4	38.8	29.1	40.6	32.4
West Midlands	36.5	59.3	49.4	40.0	32.9	38.0	30.1
East Midlands	36.7	61.3	53.7	43.0	33.6	33.2	31.9
Yorkshire & the Humber	36.2	52.4	48.3	42.2	30.0	38.6	32.1
North West	35.8	42.4	59.7	39.7	28.6	38.8	30.0
North East	35.5	64.2	56.5	38.7	26.6	36.3	32.7
England	41.6	56.1	56.9	44.0	33.1	49.8	33.3
Wales	33.6	36.3	51.7	32.7	26.2	37.2	30.3
Scotland	40.0	65.2	65.3	42.0	29.6	44.9	33.5
Northern Ireland	36.5	21.5	51.4	34.2	33.1	39.4	35.5
United Kingdom	**42.2**	**58.5**	**56.8**	**45.2**	**33.7**	**50.8**	**33.3**

Table D.7: Projected GVA per job by nation and region and industry sector, 2024 (2011 £000s)

UK Nation or region of England	All sectors	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services
London	68.4	146.0	71.0	66.1	45.5	86.8	49.2
South East	52.8	81.7	91.3	58.1	43.5	59.8	40.9
East of England	46.6	77.9	85.0	57.3	38.6	48.8	36.3
South West	43.1	62.9	74.5	45.6	33.8	46.7	37.1
West Midlands	42.9	76.9	66.9	46.9	37.7	42.4	36.0
East Midlands	42.9	77.5	68.4	50.5	38.8	37.0	37.4
Yorkshire & the Humber	42.5	66.7	64.4	49.6	35.1	44.0	37.4
North West	41.8	54.8	75.9	46.6	32.9	43.9	36.0
North East	41.0	78.1	74.2	45.4	31.0	41.4	37.0
England	48.8	72.0	74.7	52.1	38.0	57.3	39.1
Wales	39.4	51.9	67.8	38.4	30.7	41.1	35.2
Scotland	45.8	69.9	85.2	49.4	34.5	50.1	38.3
Northern Ireland	42.8	31.4	67.1	40.2	38.2	44.3	40.9
United Kingdom	**49.7**	**76.6**	**74.5**	**53.5**	**38.7**	**58.7**	**39.4**

Tables D.8 and D.9 present this information on GVA per job in the form of ratios for the nation or region relative to the UK average for 2014 and 2024, respectively.

- The broad south-east/north-west contrast within the UK is repeated across all six industrial sectors.

- London and the South East display ratios well above average for all sectors (with the exception of manufacturing) in both years.

- London is strongest relative to the rest of the UK in the primary and utilities, business and other services and construction sectors and weakest in manufacturing.

- The South East performs most poorly in the primary and utilities and business and other services sectors.

- The East of England performs strongly in the manufacturing, construction and primary and utilities sectors.

- The South West and North West have above average output per job in manufacturing in both years.

- The East and West Midlands both display above average output in the primary and utilities sectors in both years.

- In the North East, output per job is above or close to the UK average in the primary and utilities and manufacturing sectors in both 2014 and 2024.

- In the other nations of the UK and regions of England, output per job was below the UK average in all sectors in 2014 and is projected to remain below average in 2024 (except for non-market services in Northern Ireland).

- Differentials in output per job within the UK are widest in the primary and utilities sector and narrowest in non-market services.

Table D.8: GVA per job by nation and region and industry sector relative to UK average, 2014 (UK=100)

UK Nation or region of England	All sectors	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services
London	135.6	231.9	96.9	124.5	119.4	144.0	120.6
South East	106.4	104.8	118.2	105.4	112.5	103.6	102.5
East of England	95.6	90.9	113.8	108.0	99.3	86.4	96.0
South West	87.1	77.5	101.1	85.9	86.3	80.0	97.1
West Midlands	86.4	101.3	87.0	88.4	97.5	74.9	90.4
East Midlands	87.0	104.8	94.6	95.1	99.6	65.4	95.6
Yorkshire & the Humber	85.6	89.6	85.0	93.3	89.1	76.0	96.3
North West	84.7	72.5	105.2	87.8	84.7	76.4	90.1
North East	84.0	109.7	99.5	85.6	78.7	71.5	98.0
England	98.4	95.9	100.2	97.4	98.1	98.0	99.8
Wales	79.5	62.1	91.0	72.3	77.6	73.3	90.8
Scotland	94.7	111.4	115.0	93.0	87.7	88.4	100.5
Northern Ireland	86.3	36.7	90.5	75.7	98.0	77.6	106.5
United Kingdom	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table D.9: Projected GVA per job by nation and region and industry sector relative to UK average, 2024 (UK=100)

UK Nation or region of England	All sectors	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services
London	137.4	190.6	95.4	123.6	117.6	147.9	124.9
South East	106.2	106.7	122.5	108.5	112.5	101.8	103.8
East of England	93.8	101.8	114.1	107.2	99.7	83.2	92.2
South West	86.7	82.2	100.1	85.2	87.2	79.6	94.1
West Midlands	86.3	100.4	89.8	87.8	97.4	72.3	91.4
East Midlands	86.3	101.2	91.8	94.4	100.3	63.1	95.0
Yorkshire & the Humber	85.4	87.1	86.5	92.7	90.7	75.0	94.9
North West	83.9	71.6	101.8	87.1	84.9	74.9	91.3
North East	82.5	102.0	99.6	85.0	80.1	70.5	94.0
England	98.2	94.0	100.2	97.5	98.3	97.6	99.3
Wales	79.2	67.7	91.0	71.8	79.3	70.1	89.4
Scotland	92.1	91.2	114.4	92.3	89.0	85.5	97.2
Northern Ireland	86.0	41.0	90.1	75.1	98.7	75.4	103.9
United Kingdom	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

D.7 Changing industrial structure of employment, 2004-2024

2004-2014

This section is concerned with the pattern of change in employment in six broad industrial sectors, placing the projections for 2014 to 2024 within the context of the pattern of change over the preceding ten years.

The pattern of annual average percentage changes in employment between 2004 and 2014 by industry sector and UK nation or region of England is presented in Table D.10.

Table D.10: Annual average percentage employment change 2004-2014 by nation/region and industry sector

UK Nation or region of England	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation. and transport	Business and other services	Non-market services
London	4.1	-2.9	1.4	1.1	2.6	2.2
South East	0.3	-2.9	0.7	0.3	1.5	1.6
East of England	0.4	-2.5	-1.1	0.3	1.4	2.3
South West	3.9	-1.4	0.4	0.2	1.5	1.7
West Midlands	1.8	-2.8	-0.5	0.6	1.7	1.4
East Midlands	1.9	-1.7	-1.4	0.0	2.9	1.3
Yorkshire & the Humber	6.0	-1.9	-1.2	-0.7	1.2	0.7
North West	5.7	-2.5	-0.1	0.2	2.0	1.1
North East	1.8	-2.9	1.0	0.2	1.5	0.3
England	2.6	-2.4	0.0	0.3	1.9	1.5
Wales	2.3	-1.5	2.6	-0.1	1.6	1.1
Scotland	3.7	-2.9	-0.3	0.1	1.4	0.3
Northern Ireland	-1.0	-0.7	-2.4	0.0	1.6	0.7
United Kingdom	**2.5**	**-2.3**	**0.0**	**0.3**	**1.9**	**1.3**

Employment in the primary and utilities sector grew by 2.5 per cent per annum across the UK. The fastest growth was in Yorkshire and the Humber and the North West, followed by London and the South West. Employment declined by 1 per cent per annum in Northern Ireland and grew very slowly in the East of England and South East.

Manufacturing employment continued to contract overall, at an annual average rate of 2.3 per cent across the UK. Employment declined least quickly in Northern Ireland, the South West and Wales. The rate of decline was fastest in London, the South East, the North East and Scotland.

UK construction employment remained stable over the decade, but this stability disguised growth in some areas (particularly Wales, London and the North East) and decline in others (including Northern Ireland and the East Midlands).

The trade accommodation and transport sector increased employment at an average rate of 0.3 per cent in the UK as a whole, with little variation by region/nation. The fastest increase was in London and the fastest decline in Yorkshire and the Humber. Employment declined in Yorkshire and the Humber and Wales.

Business services employment grew by 1.9 per cent per annum in the UK as a whole. The fastest annual average growth rates were in the East Midlands, followed by London. Employment grew most slowly in Yorkshire and the Humber.

Employment in non-market services grew by 1.3 per cent per annum in the UK overall, and employment grew in all regions/nations of the UK. The fastest rates of increase were in the East of England and London. Employment grew most slowly in the North East, Scotland and Yorkshire and the Humber.

2014-2024

The projected annual average rate of change in employment by sector for the decade 2014-2024 is presented for the nations of the UK and regions of England in Table D.11.

Table D.11: Projected annual average percentage employment change 2014-2024 by nation/region and industry sector

UK Nation or region of England	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation. and transport	Business and other services	Non-market services
London	1.1	-0.9	1.1	0.5	1.0	0.0
South East	-0.6	-1.3	1.8	0.8	0.9	0.2
East of England	-1.3	-1.0	2.0	0.9	0.8	0.6
South West	-1.4	-0.7	2.1	0.8	0.9	0.4
West Midlands	-0.7	-0.9	1.3	0.9	0.9	0.2
East Midlands	-0.4	-0.2	1.4	0.7	0.7	0.1
Yorkshire & the Humber	-0.7	-1.6	1.4	0.6	0.8	0.3
North West	-0.8	-1.1	0.8	0.7	0.9	0.0
North East	0.1	-1.6	1.0	0.8	0.9	0.3
England	-0.7	-1.0	1.5	0.7	0.9	0.2
Wales	-1.5	-1.0	0.8	0.9	0.9	0.1
Scotland	-1.0	-0.6	0.0	0.4	1.1	0.3
Northern Ireland	-2.6	-1.2	1.9	0.9	1.3	-0.2
United Kingdom	-0.9	-1.0	1.4	0.7	0.9	0.2

Employment in the primary and utilities sector is projected to decrease by 0.9 per cent per annum in the UK as a whole. However, employment is projected to increase quite strongly in London, while declining elsewhere. There are marked differences in rates of change. The fastest rate of decline is projected for those Northern Ireland, much faster than the next highest rates of decline in Wales, the South West and the East of England (all with large agriculture sectors).

Manufacturing sector employment is projected to decline slightly faster than primary activities for the UK as a whole. The sector is projected to lose employment in all parts of the UK, but there are marked variations. The East Midlands is projected to decline slowest, followed by Scotland, the South West and London. For the rest of the UK, the rate of employment decline is equal to or faster than the UK average, projected decline being fastest in the Yorkshire and the Humber, the North East and South East.

Construction is projected to experience the fastest annual average employment growth rate of any sector in the UK as a whole. All parts of the UK are projected to gain employment. The fastest rates of projected growth are in the South West, East of England, North East, Northern Ireland and South East. Employment is projected to stagnate in Scotland and grow most slowly in Wales and the North West.

Employment in the trade, accommodation and transport sector is projected to increase slowly in the UK, with little variation in growth rates across the UK. It is projected to grow fastest in Wales, Northern Ireland, the West Midlands and East of England and grow most slowly in Scotland and London.

UK employment in the business and other services sector is projected to exhibit the second fastest rate of growth in employment. There is little variation across the UK in projected rates of growth. The highest rates of growth are projected for Northern Ireland and Scotland, with the lowest rate projected for the East Midlands.

UK employment in the non-market services sector is projected to grow very slowly. Growth is projected to be fastest in the East of England and South West. Employment is projected to decline in Northern Ireland and no change in employment is projected for London and the North West.

Projected change in employment by sector between 2014 and 2024 for the nations of the UK and regions of England is depicted in the form of a radar chart in Figure D.9. This highlights the similarity of change in the trade, accommodation and transport and business and other services sectors across all parts of the UK. The primary sector and utilities is projected to grow fastest in London and contract fastest in Northern Ireland, with declines across the other parts of the UK. The manufacturing sector is projected to decline everywhere, but the poorer performance of northern England and the better performance of the East Midlands, Scotland and the South West stands out.. The faster projected growth in the construction sector in the southern part of England and in Northern Ireland is apparent.

Figure D.9: Projected annual average rate of change in employment by nation of the UK, region of England and industry sector, 2014-2024
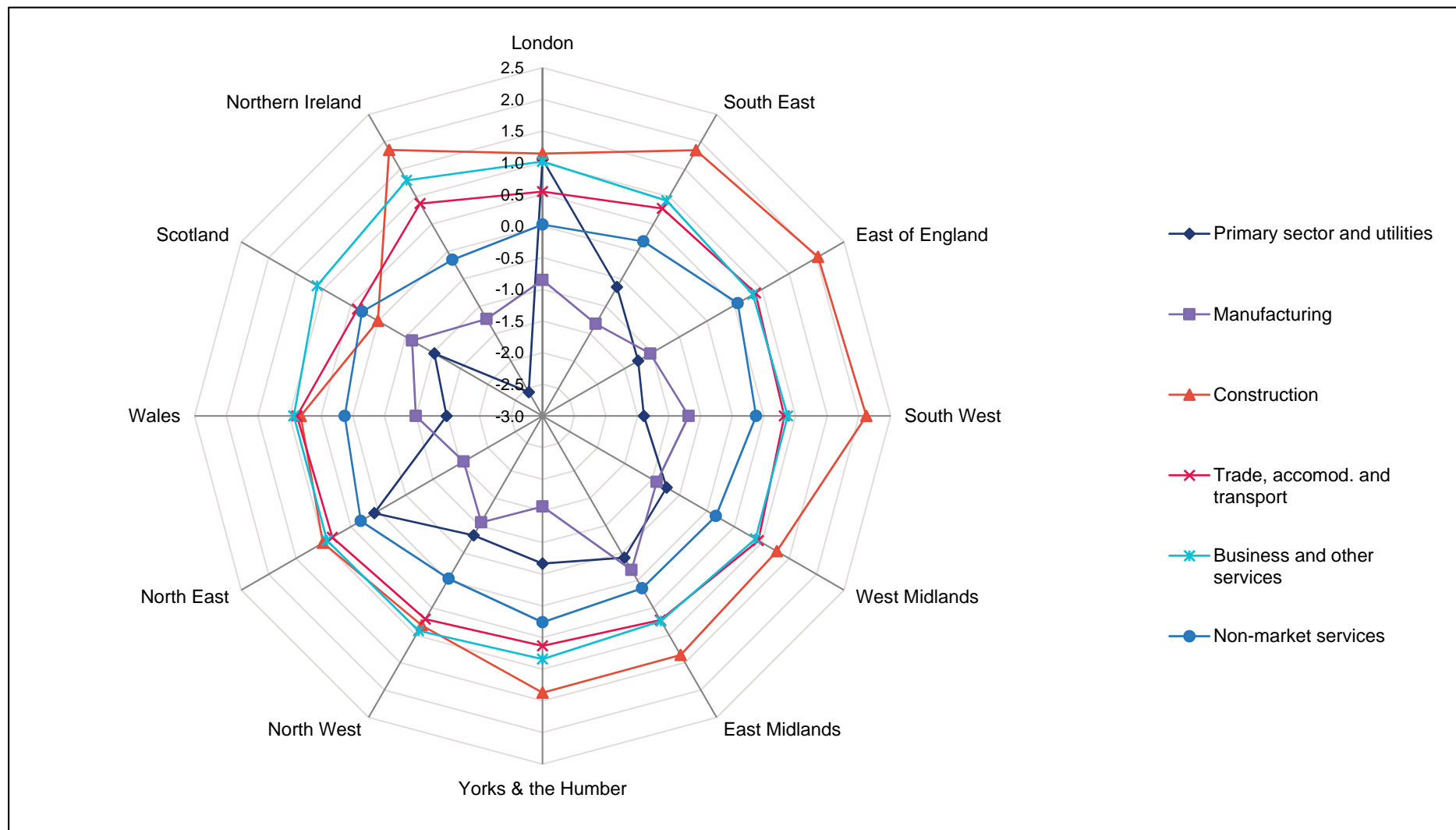
The profile of employment by industry sector in 2014 is presented for the UK nations and regions of England in Table D.12. The service sector accounted for 88.9 per cent of all employment in the UK, with business and other services employing a third and trade, accommodation and transport and non-market services employing a quarter each. The percentage employed in the manufacturing sector was slightly higher than that in construction.

Table D.12: Percentage of employment in each industry sector by UK nation and region of England, 2014

UK Nation or region of England	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services	Services
London	0.6	2.6	5.1	24.1	46.3	21.4	91.7
South East	2.2	5.9	6.8	26.5	34.2	24.4	85.1
East of England	2.4	7.8	7.1	27.0	31.2	24.4	82.7
South West	3.5	8.4	7.0	26.8	27.7	26.6	81.1
West Midlands	2.4	11.3	6.1	26.9	27.4	25.9	80.3
East Midlands	2.5	12.0	6.0	26.1	28.4	24.9	79.4
Yorkshire & the Humber	2.7	10.7	6.2	26.5	26.3	27.7	80.5
North West	2.2	9.0	6.2	26.6	29.6	26.4	82.5
North East	2.4	9.6	6.3	25.2	25.3	31.1	81.6
England	2.5	7.8	6.3	25.9	31.7	25.7	83.4
Wales	4.0	11.0	7.1	24.1	22.4	31.4	77.8
Scotland	4.9	6.8	6.6	25.7	28.5	27.5	81.8
Northern Ireland	5.2	10.1	6.6	25.2	20.6	32.3	78.1
United Kingdom	2.1	7.7	6.2	26.1	32.8	25.0	83.9

- The primary and utilities sector share of total employment was largest in Northern Ireland, Scotland and Wales and smallest in London.

- The manufacturing sector employed nearly an eighth of all workers in the East Midlands and more than a tenth in the West Midlands, Wales, Yorkshire and the Humber and Northern Ireland. The percentage working in this sector was well below the UK average in London and the South East.

- The share of employment in the construction sector varied little within the UK, but was largest in Wales and smallest in London.

- The percentage employed in the trade, accommodation and transport sector was above the UK average in most of England, and highest in the East of England, West Midlands and South West. The sector's share of employment was lowest in London and Wales, and below the UK average in the North East, Northern Ireland and Scotland.

- The most marked geographical variation in employment shares was for the business and other services sector. This sector accounted for nearly half of employment in London and more than a third of jobs in the South East. Elsewhere, the percentage of total employment in this sector was below the UK average. It accounted for just over a fifth of jobs in Northern Ireland and Wales and a quarter in the North East.

- The pattern is almost reversed for the non-market services sector. In Northern Ireland, Wales and the North East, this sector accounts for nearly a third of all employment. In London, just over a fifth of all jobs are in this sector, despite the location of the UK government in the capital. The percentage share of employment is lower than average in the south and east of England and above average in the South West, West Midlands and northern England.

- The service sector as a whole (Trade, accommodation and transport, Business and other services and Non-market services) accounted for more than three-quarters of all jobs in all parts of the UK, with the highest percentage in London and the South East and the lowest percentage in Wales and Northern Ireland.

Projected change in the industrial profile of employment of the nations of the UK and regions of England between 2014 and 2024 is summarised in Table D.13, which presents the percentage point difference in the percentage of regional employment in each sector. In the UK as a whole, a slow shift away from employment in the manufacturing and primary and utilities sectors towards the construction and private service sectors is projected. The share of employment in non-market services is projected to decline, under the pressure of continued spending constraints on the public sector. A strong shift towards employment in business and other services is projected, with a smaller increase in the shares of construction and trade, accommodation and transport.

Table D.13: Change in percentage of total employment in each industry sector by UK nation and region of England, between 2014 and 2024

UK Nation or region of England	Primary sector and utilities	Manufacturing	Construction	Trade, accommodation and transport	Business and other services	Non-market services	Services
London	0.0	-0.4	0.2	-0.3	1.7	-1.3	0.1
South East	-0.3	-1.0	0.9	0.4	1.0	-1.0	0.4
East of England	-0.4	-1.2	1.0	0.5	0.5	-0.3	0.7
South West	-0.6	-1.0	1.1	0.5	0.7	-0.7	0.6
West Midlands	-0.3	-1.5	0.5	1.2	1.0	-0.9	1.3
East Midlands	-0.2	-0.8	0.5	0.6	0.7	-0.8	0.5
Yorkshire & the Humber	-0.3	-1.9	0.6	0.7	1.2	-0.3	1.5
North West	-0.3	-1.2	0.3	0.8	1.5	-1.1	1.2
North East	-0.1	-1.8	0.3	0.9	1.2	-0.5	1.5
England	-0.3	-1.1	0.5	0.5	1.3	-0.9	0.9
Wales	-0.7	-1.4	0.3	1.3	1.3	-0.8	1.8
Scotland	-0.7	-0.7	-0.3	-0.1	2.0	-0.3	1.6
Northern Ireland	-1.3	-1.5	1.0	1.3	2.0	-1.6	1.8
United Kingdom	-0.3	-1.1	0.6	0.5	1.2	-0.9	0.8

- The share of the primary and utilities sector in employment is projected to fall most in Northern Ireland, Wales, Scotland and the South West, and hardly change in London and the North East.

- The decline in the percentage of people working in the manufacturing sector is projected to be greatest in Yorkshire and the Humber and the North East, and to be smallest in London and Scotland.

- The share of the construction sector in employment is projected to increase in all parts of the UK except Scotland. The increase is projected to be greatest in the South West and East of England and least in London, Wales and the two northernmost regions of England.

- The share of the trade, accommodation and transport sector in employment is projected to be lower in 2024 than in 2014 in London and Scotland. Increases in this sector's share of employment are projected to be greatest in Northern Ireland, Wales and the West Midlands and least in southern England outside London.

- The percentage of employment in the business and other services sector is projected to increase in all parts of the UK. The increase is projected to be greatest in Scotland, Northern Ireland and London and above the UK average in the North West and Wales. The smallest increases are projected for the East of England, South West and East Midlands.

- The share of employment in the non-market services sector is projected to decline in all parts of the UK. The decrease in percentage share is projected to be greatest in Northern Ireland, London and the North West. The decrease is projected to be smallest in the East of England, Yorkshire and the Humber and Scotland.

D.8 Changing occupational structure of employment, 2014-2024

This section is concerned with projected change in the occupational profile of employment from 2014 to 2024, using the nine Major Groups of the 2010 Standard Occupational Classification (SOC). Projected changes from 2014 to 2024 are placed within the context of change between 2004 and 2014.

Table D.14 presents the annual average percentage change in employment between 2004 and 2014 for each nation of the UK and region of England. In the UK as a whole, employment grew fastest in caring, leisure and other services, professional occupations, managers, directors and senior officials and associate professional and technical occupations. Employment contracted fastest for administrative and secretarial occupations, process, plant and machine operatives and skilled trades occupations. Employment in sales and customer service occupations grew more slowly, while the decline in employment in elementary occupations was the slowest amongst the occupations seeing employment decline.
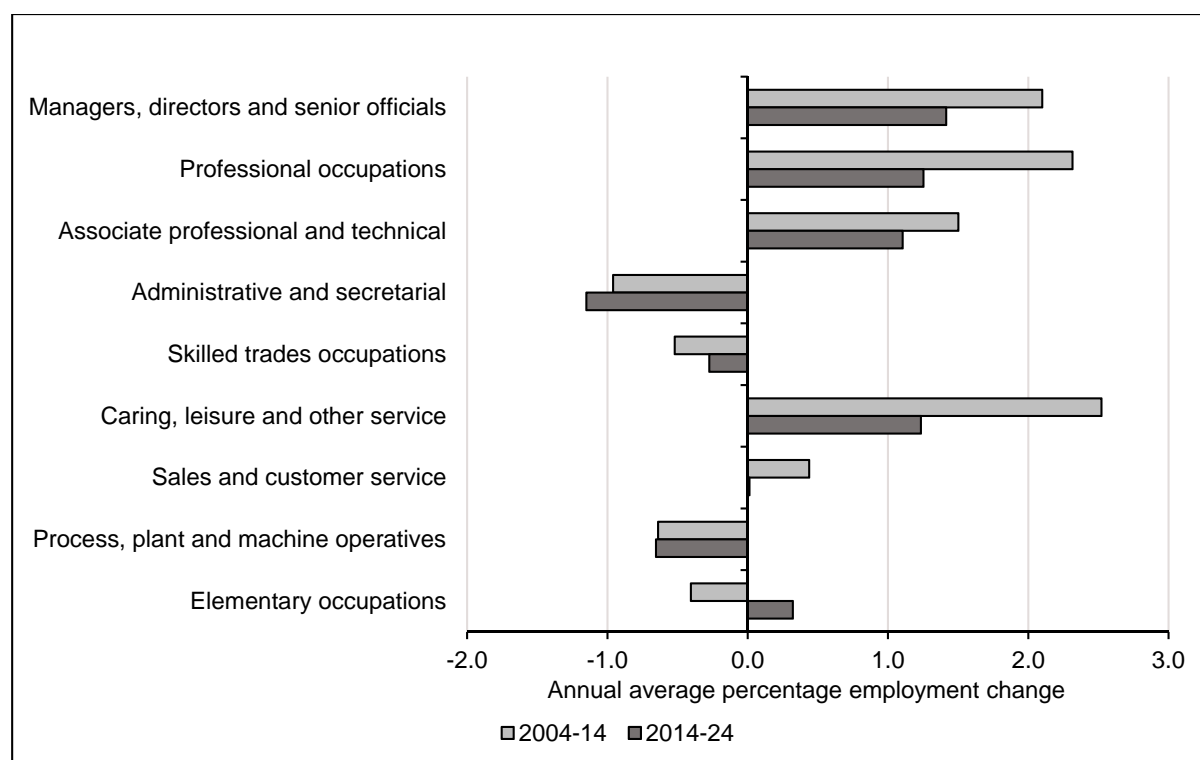
Table D.14: Annual average percentage change in employment by SOC major group, 2004-2014

UK nation or region of England	Managers directors and senior officials	Professional occupations	Associate professional and technical	Administrative and secretarial	Skilled trades occupations	Caring, leisure and other service	Sales and customer service	Process, plant and machine operatives	Elementary occupations
London	3.1	3.7	2.8	-1.7	0.7	2.7	0.9	0.4	0.3
South East	2.3	2.1	1.2	-1.6	-0.2	2.8	0.3	-1.0	-0.2
East of England	1.9	2.0	1.0	-1.4	-1.1	3.4	0.2	-0.3	0.4
South West	2.7	2.5	1.5	-1.0	0.0	2.8	-0.3	-0.7	-0.7
West Midlands	1.7	2.1	1.4	-0.5	-1.2	2.8	0.9	-1.0	-0.8
East Midlands	1.8	2.4	1.5	-0.9	-1.3	3.4	0.0	-0.6	0.1
Yorkshire & the Humber	1.2	1.3	0.6	-0.5	-1.1	1.9	-0.4	-1.1	-1.2
North West	1.4	1.9	1.0	0.0	-0.9	2.6	1.2	-0.4	-0.7
North East	1.6	1.5	0.7	-0.8	-0.8	1.5	1.1	-1.0	-1.4
England	2.2	2.4	1.6	-1.0	-0.6	2.7	0.4	-0.6	-0.4
Wales	1.9	2.2	1.3	-0.3	0.8	2.2	-0.2	-0.2	-1.7
Scotland	1.6	1.5	1.0	-1.0	-0.4	0.8	0.5	-1.1	0.0
Northern Ireland	0.9	1.8	1.1	-0.5	-1.7	2.0	0.8	-1.4	-1.2
United Kingdom	2.1	2.3	1.5	-1.0	-0.5	2.5	0.4	-0.6	-0.4

- Employment in the managers, directors and senior officials major group increased in all parts of the UK. The rate of increase was fastest in London, the South West and the South East. Northern Ireland, Yorkshire and the Humber and the North West displayed the slowest rate of increase.

- The rate of growth of employment in professional occupations was much faster than elsewhere in London. In the rest of the UK, the South West and East Midlands displayed the fastest rates of increase, followed by Wales and the South East.

- Employment in associate professional and technical occupations again grew fastest in London. There was little variation in rates of employment growth across the rest of the UK, but employment grew slowest in Yorkshire and the Humber and the North East.

- The rate of employment decline in administrative and secretarial occupations was fastest in London, the South East and East of England. The rate of decline was slowest in the North West and Wales.

- Employment in skilled trades occupations grew in Wales and London, was static in the South West and declined most slowly in the South East. The annual average rate of employment decline was fastest in Northern Ireland, the East Midlands and the West Midlands.

- The growth of employment in caring, leisure and other service occupations was fastest in the East of England and East Midlands and slowest in Scotland.

- Employment in sales and customer service occupations grew fastest in the North West and North East, but declined in Yorkshire and the Humber, the South West and Wales.

- London was the only part of the UK in which employment in process, plant and machine operative occupations increased, while the rate of decline was least in Wales and the East of England.

- Employment in elementary occupations grew in the East of England, London and the East Midlands. It declined most quickly in Wales, the North East, Northern Ireland and Yorkshire and the Humber.

The projected pattern of employment change between 2014 and 2024 is presented in Table D.15. There is less variation in projected annual average rates of change by occupation than for the previous ten-year period (Figure D.10). In the UK as a whole, employment of managers, directors and senior officials is projected to increase slightly faster than that of professional occupations and caring, leisure and other service occupations, with the number of associate professional and technical jobs also projected to grow at more than 1 per cent per annum. Employment in elementary occupations is projected to grow slowly, while the number of sales and customer service jobs is projected to remain stable. Employment declines are projected for administrative and secretarial, process, plant and machine operative and skilled trades occupations. There is much less variation between the nations of the UK and regions of England in projected rates of employment change than was evident for 2004-2014.

Figure D.10: Annual average percentage change in UK employment for each SOC major group, comparing 2004-2014 with 2014-2024

Table D.15: Annual average percentage change in employment by SOC major group, 2014-2024

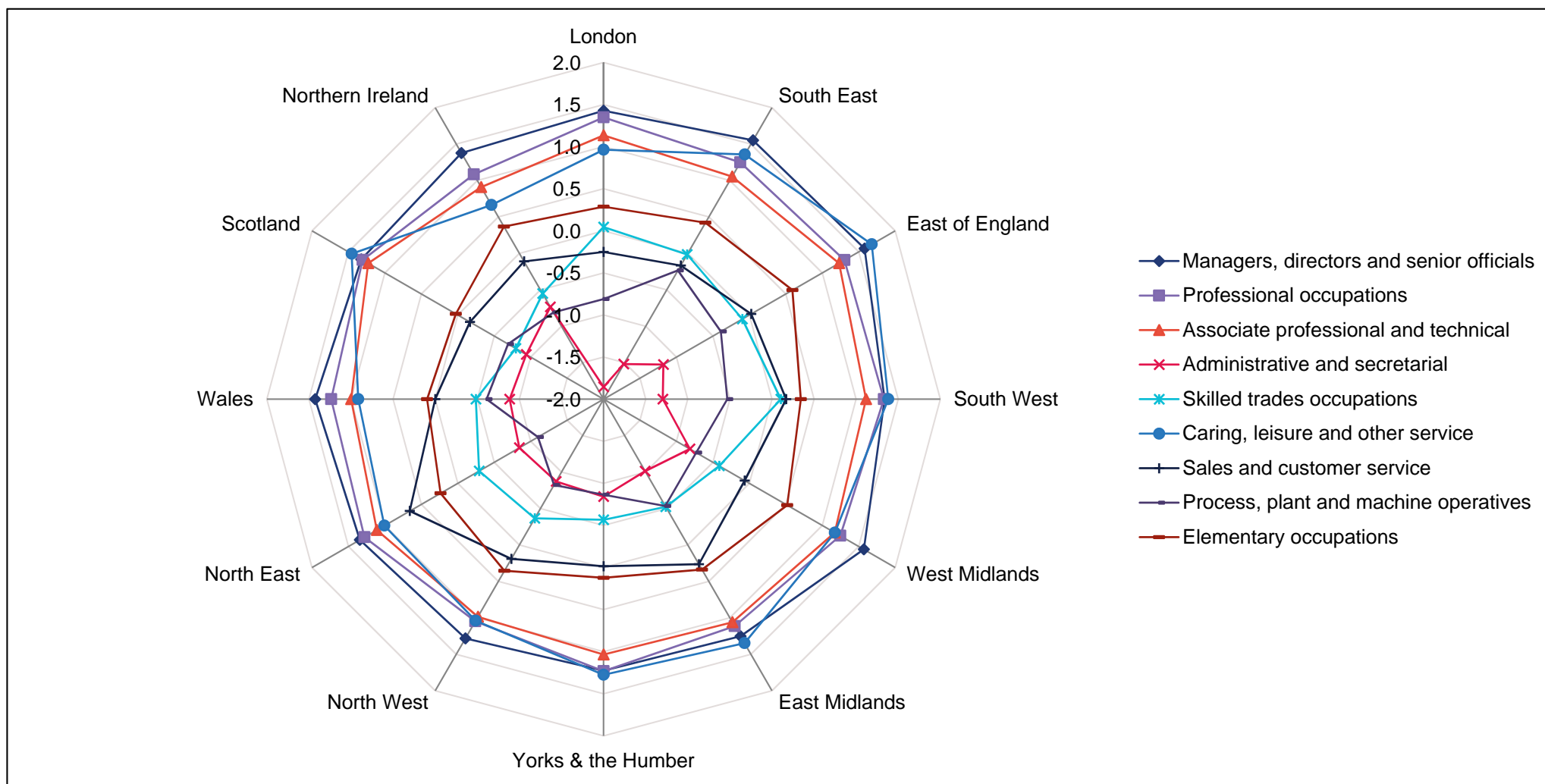| UK nation or region of England	Managers directors and senior officials	Professional occupations	Associate professional and technical	Administrative and secretarial	Skilled trades occupations	Caring, leisure and other service	Sales and customer service	Process, plant and machine operatives	Elementary occupations
London	1.4	1.3	1.1	-1.9	0.0	1.0	-0.3	-0.8	0.3
South East	1.6	1.2	1.1	-1.5	0.0	1.4	-0.2	-0.2	0.4
East of England	1.6	1.3	1.2	-1.2	-0.1	1.7	0.0	-0.4	0.6
South West	1.3	1.3	1.1	-1.3	0.1	1.4	0.2	-0.5	0.3
West Midlands	1.6	1.2	1.2	-0.8	-0.4	1.2	-0.1	-0.7	0.5
East Midlands	1.3	1.1	1.1	-1.0	-0.5	1.3	0.3	-0.5	0.3
Yorkshire & the Humber	1.2	1.2	1.0	-0.8	-0.6	1.3	0.0	-0.9	0.1
North West	1.3	1.0	1.0	-0.9	-0.4	1.0	0.2	-0.8	0.4
North East	1.3	1.3	1.1	-0.8	-0.3	1.0	0.7	-1.1	0.2
England	1.4	1.3	1.1	-1.2	-0.2	1.3	0.0	-0.6	0.4
Wales	1.4	1.2	1.0	-0.9	-0.5	0.9	0.0	-0.6	0.1
Scotland	1.3	1.3	1.2	-0.9	-0.8	1.5	-0.2	-0.7	0.0
Northern Ireland	1.4	1.1	0.9	-0.7	-0.6	0.7	-0.1	-0.8	0.4
United Kingdom	1.4	1.3	1.1	-1.1	-0.3	1.2	0.0	-0.7	0.3

- Employment of managers, directors and senior officials is projected to increase fastest in the South East, East of England and West Midlands, and most slowly in Yorkshire and the Humber.

- There is very little variation in projected rates of employment change for professional occupations, but the North West stands out as having the slowest projected rates of increase.

- Employment in the associate professional and technical SOC major group is projected to grow fastest in the East of England, Scotland and West Midlands and most slowly in the North West and Northern Ireland.

- There is more variation in projected employment changes for administrative and secretarial occupations. The fastest declines are projected for London, the South East, South West and East of England, with the slowest projected rates of decline in Northern Ireland, the West Midlands and North East.

- Employment in skilled trades occupations is projected to increase slightly in the South West and remain stable in London and the South East. Projected rates of decline are highest in Scotland, Northern Ireland and Yorkshire and the Humber.

- Employment in caring, leisure and other services occupations is projected to increase in all parts of the UK. The fastest growth is projected for the East of England, Scotland and the South East, with slowest growth projected for Northern Ireland and Wales.

- Sales and customer service occupation jobs are projected to grow fastest in the North East, with slow growth or stability across most of the UK. The fastest projected employment declines are for London, the South East and Scotland.

- Employment in process, plant and machine operative occupations is projected to decline across the whole of the UK, most quickly in the North East and Yorkshire and the Humber. With the exception of London, projected rates of decline are lowest in southern England.

- Jobs in elementary occupations are projected to increase in nearly all parts of the UK. The rate of increase is projected to be quite slow in all parts of the UK, with little variation. The fastest projected rates of growth are for the East of England and West Midlands, while no growth is projected for Scotland.

Figure D.11 graphically demonstrates geographical contrasts between SOC major groups in projected rates of employment change between 2014 and 2024. The outer rings are the faster growing occupations and the inner rings the declining occupations.

- There is little systematic geographical variation in projected rates of employment change in the most rapidly growing occupations.

- The innermost ring is administrative and secretarial occupations, which are projected to contract most in London, the South East and South West.

- Skilled trades occupations are projected to decline least in the southern and eastern regions of England.

- Sales and customer service occupations are projected to grow faster than average in the North East and East Midlands.

Figure D.11: Projected annual average rate of employment change by SOC major group, 2014-2024

The occupational structure of employment in the nations of the UK and regions of England in 2014 is presented in Table D.16. In the UK as a whole, the largest category was professional occupations, accounting for nearly a fifth of employment, followed by associate professional and technical occupations. Elementary occupations, skilled trades occupations, administrative and secretarial occupations, managers, directors and senior officials and caring, leisure and other service occupations each accounted for around a tenth of employment. The smallest major group in terms of employment was process, plant and machine operatives.

- There is a clear geographical gradient north and west away from the south-east corner of England in the percentage of employment accounted for by managers, directors and senior officials. This percentage was highest in London and lowest in the North East and Wales.

- Professional occupations represented more than a quarter of all jobs in London, and around a fifth in most of southern England. This percentage was lowest in Yorkshire and the Humber and the East and West Midlands.

- The share of associate professional and technical occupations was also highest in London, followed by the South East and lowest in Wales and the North East.

- The percentage of employment in administrative and secretarial occupations was highest in the North West and Yorkshire and the Humber, and lowest in London.

- The percentage of employment in skilled trades occupations was highest in Northern Ireland and Wales, followed by the South West. The percentage share for London was lowest, well below the UK average.

- The percentage share of caring, leisure and other service occupations in total employment was highest for Northern Ireland and the East Midlands and also higher than average in the South West and the midland and northern regions of England. It was lowest in London and Scotland.

- The percentage of employment accounted for by sales and customer service occupations was highest in the North East and North West and lowest in London.

- The percentage of employment in process, plant and machine operative occupations was highest in Wales and the East Midlands, and lowest in London and the South East.

- The share of employment in elementary occupations was highest by far in Scotland and lowest in London. The percentage of jobs in elementary occupations was quite similar in the remainder of the UK.

Table D.16: Percentage of employment in each SOC major group, 2014

UK nation or region of England	Managers, directors and senior officials	Professional occupations	Associate professional and technical	Administrative and secretarial	Skilled trades occupations	Caring, leisure and other service	Sales and customer service	Process, plant and machine operatives	Elementary occupations
London	11.7	25.5	19.9	8.7	8.1	6.3	6.3	3.9	9.5
South East	11.8	20.6	14.6	10.4	10.3	9.4	7.2	4.7	10.9
East of England	10.6	19.0	13.4	10.5	11.0	9.6	7.8	6.3	11.8
South West	10.6	19.0	12.8	10.1	12.4	10.8	8.0	5.5	10.7
West Midlands	8.9	17.6	12.8	11.8	12.0	10.4	7.8	7.9	10.6
East Midlands	9.8	17.8	12.2	10.3	10.7	11.5	8.0	8.2	11.5
Yorkshire & the Humber	9.1	17.2	11.9	12.2	11.7	10.3	8.4	8.0	11.2
North West	8.6	18.2	12.1	12.4	10.7	10.6	9.1	7.3	11.0
North East	7.8	18.4	11.7	11.3	11.9	10.0	10.2	7.4	11.5
England	10.3	20.0	14.3	10.6	10.6	9.5	7.8	6.1	10.8
Wales	7.5	18.5	11.3	10.9	13.6	10.8	8.1	8.5	10.7
Scotland	8.5	19.5	12.5	11.5	11.8	7.8	8.2	6.3	13.9
Northern Ireland	7.9	19.1	12.3	11.7	13.7	11.8	8.3	5.4	9.9
United Kingdom	10.0	19.9	14.0	10.7	10.9	9.4	7.8	6.2	11.0

Differences in the percentages of employment in each SOC major group are presented in Figure D.12. This diagram demonstrates that employment is projected to grow most in SOC major groups 1 to 3, which together are expected to increase their share of UK employment from 43.9 per cent (inner ring) to 47.1 per cent (outer ring) between 2014 and 2024.

Figure D.12: The UK occupational structure in 2014 (inner ring) and 2024 (outer ring)
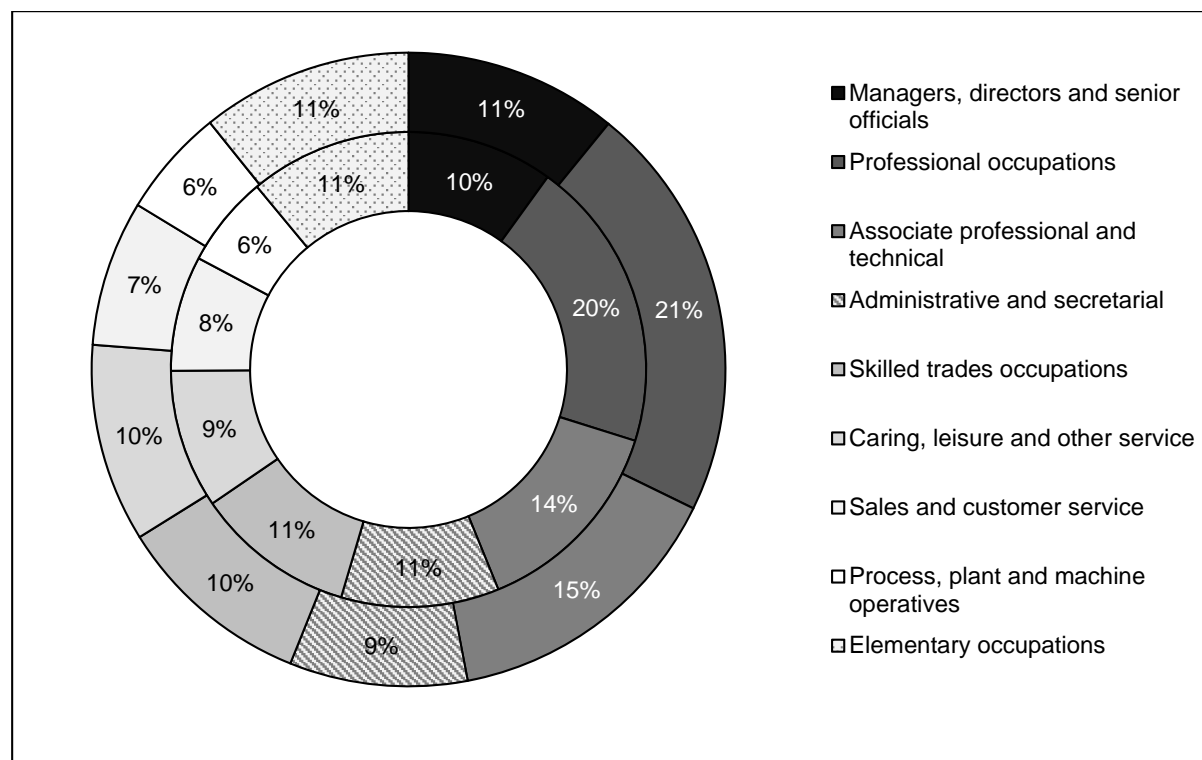
The projected occupational profile of the nations of the UK and regions of England in 2024 is presented in Table D.17. Professional occupations are projected to be the largest major group in 2014, accounting for 21.4 per cent of employment. The second largest is projected to be associate professional and technical occupations, followed by managers, directors and senior officials and elementary occupations.

- The percentage of managers, directors and senior officials is projected to be highest in the South East, followed by London and the East of England. Wales and the North East display the lowest percentages.

- Professional occupations are projected to account for nearly a fifth of employment in all parts of the UK, and more than a quarter in London. The difference between this percentage share in London and that for the South East is much larger than the differences between other parts of the UK.

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- A similarly large differential between London and the rest of the UK is projected for associate professional and technical occupations. Their share of employment is projected to be highest in London and lowest in Wales.

- The share of administrative and secretarial occupations in total employment is projected to be highest in the North West and Yorkshire and the Humber, with their lowest share in London.

- The percentage of employment in skilled trades occupations is projected to be highest in Wales and Northern Ireland and lowest in London.

- The share of caring, leisure and other service occupations in employment is projected to be highest in the East Midlands and Northern Ireland and lowest in London and Scotland.

- The projected share of sales and customer service occupations is projected to be highest in the North East and lowest in London.

- The percentage share of process, plant and machine operative jobs is projected to be highest in the East Midlands and lowest in London.

- The percentage of employment accounted for by jobs in elementary occupations is projected to be highest in Scotland and lowest in London.

Table D.17: Percentage of employment in each SOC major group, 2024

UK nation or region of England	Managers directors and senior officials	Professional occupations	Associate professional and technical	Administrative and secretarial	Skilled trades occupations	Caring, leisure and other service	Sales and customer service	Process, plant and machine operatives	Elementary occupations
London	12.6	27.3	20.9	6.8	7.6	6.5	5.8	3.4	9.2
South East	13.0	21.9	15.2	8.4	9.7	10.1	6.6	4.3	10.6
East of England	11.6	20.2	14.2	8.7	10.2	10.6	7.3	5.6	11.7
South West	11.4	20.4	13.4	8.3	11.8	11.6	7.7	4.9	10.4
West Midlands	9.9	19.0	13.7	10.3	11.0	11.1	7.4	7.0	10.6
East Midlands	10.6	18.9	13.0	8.8	9.7	12.5	7.8	7.4	11.4
Yorkshire & the Humber	9.8	18.7	12.7	10.8	10.6	11.2	8.1	7.1	10.9
North West	9.4	19.3	12.8	10.9	9.9	11.3	8.9	6.5	11.0
North East	8.5	19.9	12.4	9.9	11.0	10.5	10.3	6.3	11.2
England	11.2	21.4	15.1	8.9	9.8	10.1	7.4	5.4	10.6
Wales	8.4	20.2	12.0	9.6	12.5	11.4	7.8	7.7	10.4
Scotland	9.3	21.3	13.6	10.0	10.4	8.6	7.7	5.6	13.4
Northern Ireland	8.7	20.5	13.0	10.5	12.5	12.1	8.0	4.8	9.9
United Kingdom	10.9	21.4	14.8	9.1	10.0	10.1	7.4	5.5	10.8

Table D.18 presents the percentage point change in percentage share of employment for each nation of the UK and region of England. In the UK as a whole, the share of employment is projected to increase most for professional occupations, while that of managers, directors and senior officials, associate professional and technical occupations, and caring, leisure and other service occupations is also projected to increase. The shares of all other SOC major groups are projected to fall, to the greatest extent for administrative and secretarial occupations.

- The share of employment accounted for by managers, directors and senior officials is projected to increase by around 1 percentage point in all parts of the UK. The largest increases are projected for the South East and East of England and the smallest for the North East.

- There is more variation in the projected increase for professional occupations. This is projected to be greatest in London, Scotland and Wales and lowest in the East Midlands.

- The projected increase in employment share of associate professional and technical occupations is projected to be largest in London, Scotland and the West Midlands, and smallest in the South East and South West.

- The share of administrative and secretarial occupations in employment is projected to decline in all parts of the UK. The largest decreases are projected for London and the South East and the smallest decreases are projected for Northern Ireland and Wales.

- The share of skilled trades occupation in employment is also projected to fall across the whole of the UK. The projected fall is greatest in Scotland and Northern Ireland and least in London.

- The percentage of employment in caring, leisure and other service occupations is projected to increase in all parts of the UK. The projected differences between 2014 and 2024 are no more than 1 per cent for any nation or English region. The lowest increase is for London.

- The share of sales and customer services occupations in employment is projected to fall in all parts of the UK except the North East. The largest projected decline is for London.

- The share of employment in process, plant and machine operative occupations is projected to fall in all parts of the UK, with the largest fall in the North East. The smallest projected fall is in the South East.

- The percentage of employment in elementary occupations is projected to fall slightly in all parts of the UK except the West Midlands and Northern Ireland. The largest fall is projected for Scotland.

**Table D.18: Percentage point change in percentage share of employment by SOC major group, 2014-2024**

UK nation or region of England	Managers, directors and senior officials	Professional occupations	Associate professional and technical	Administrative and secretarial	Skilled trades occupations	Caring, leisure and other service	Sales and customer service	Process, plant and machine operatives	Elementary occupations
London	0.9	1.8	1.0	-2.0	-0.5	0.2	-0.6	-0.5	-0.3
South East	1.1	1.3	0.6	-2.0	-0.6	0.7	-0.5	-0.4	-0.2
East of England	1.0	1.2	0.7	-1.8	-0.8	1.0	-0.5	-0.6	-0.1
South West	0.8	1.4	0.6	-1.8	-0.6	0.8	-0.4	-0.6	-0.3
West Midlands	1.0	1.3	0.9	-1.5	-1.1	0.7	-0.4	-0.9	0.0
East Midlands	0.8	1.1	0.7	-1.4	-1.0	1.0	-0.2	-0.8	-0.2
Yorkshire & the Humber	0.8	1.5	0.8	-1.4	-1.1	0.9	-0.3	-0.9	-0.3
North West	0.8	1.2	0.7	-1.5	-0.8	0.7	-0.2	-0.9	-0.1
North East	0.7	1.5	0.8	-1.4	-0.9	0.5	0.2	-1.1	-0.3
England	0.9	1.4	0.8	-1.7	-0.8	0.7	-0.4	-0.7	-0.2
Wales	0.8	1.7	0.7	-1.3	-1.1	0.6	-0.3	-0.8	-0.3
Scotland	0.8	1.8	1.0	-1.5	-1.4	0.8	-0.5	-0.7	-0.5
Northern Ireland	0.8	1.4	0.7	-1.2	-1.2	0.4	-0.4	-0.6	0.0
United Kingdom	0.9	1.5	0.8	-1.7	-0.8	0.7	-0.4	-0.7	-0.2

D.9   Changing qualification profile of employment, 2014-2024

There are marked contrasts within the UK in the educational attainment of the workforce, which are projected to widen over the period 2014-2024. Tables D.19 and D.20 present the percentage of the workforce within each of eight broad classes of highest qualification or no formal qualifications for 2014 and 2024.

- In 2014, 29.4 per cent of UK employees had a first degree or higher as their highest qualification, and 41.2 per cent were qualified above RQF3. Only 5.4 per cent had no qualification (Figure D.13).

- The percentage qualified to degree level and above is projected to increase to 39.7 per cent with more than half (54.2 per cent qualified above RQF3). The percentage without qualifications is projected to fall to 1.9 per cent.

Figure D.13: Percentage of employment qualified to first degree level and above by UK nation and region of England, 2014 and 2024
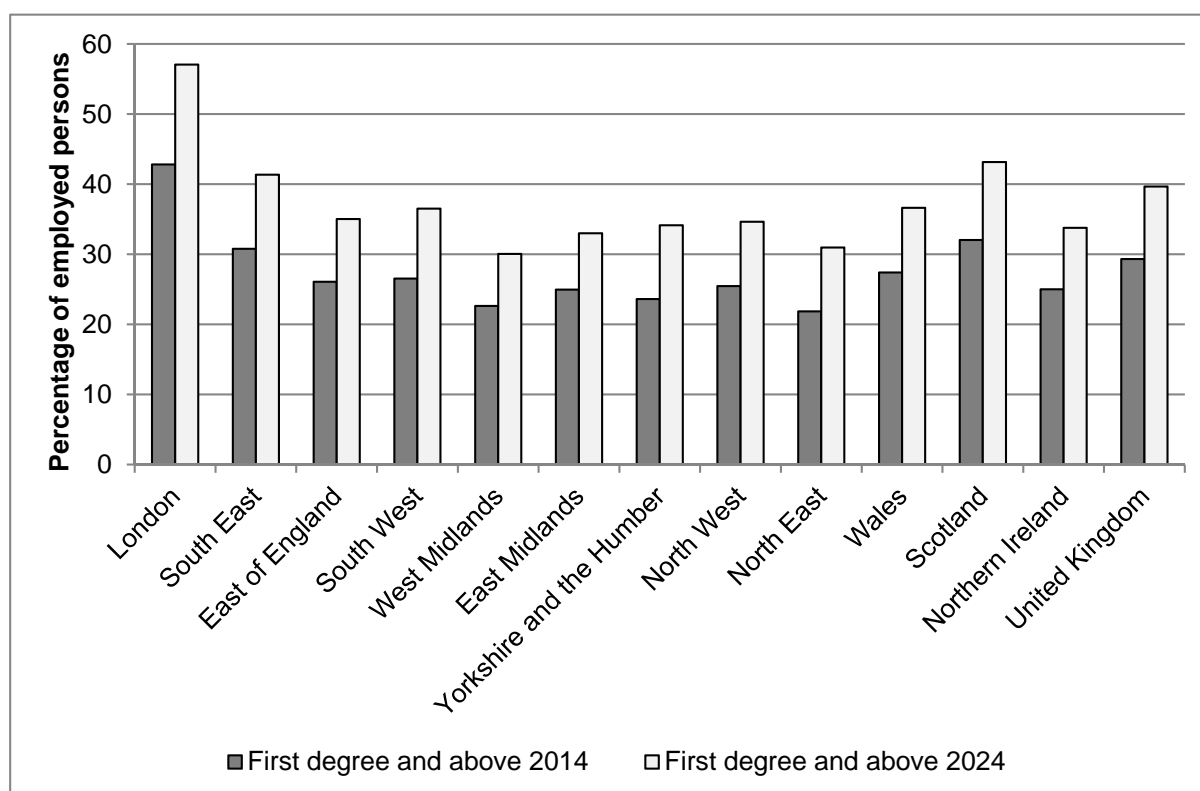
The projected percentage of employed persons with each level of highest educational qualification in 2024 is presented for each UK nation and region of England in Figure D.14 and Table D.20.

- The percentage with a doctorate is projected to be 1.5 per cent for the UK, with the highest percentage in London and the lowest percentage in the West Midlands.

- The percentage with a first degree or higher is projected to be highest in London, followed by Scotland. It is lowest in the midlands and northern England.

- The percentage projected to have highest qualifications of RQF 2, 3 and 4 is lowest in London and Scotland, and highest in the North East, West Midlands and East Midlands.

- Only 1.9 per cent of employed persons are projected to have no qualification, but this percentage is more than double the UK average in Northern Ireland and close to double in the West Midlands.

Figure D.14: Projections of qualification profile of employment (highest qualification held) by UK nation and region of England 2024
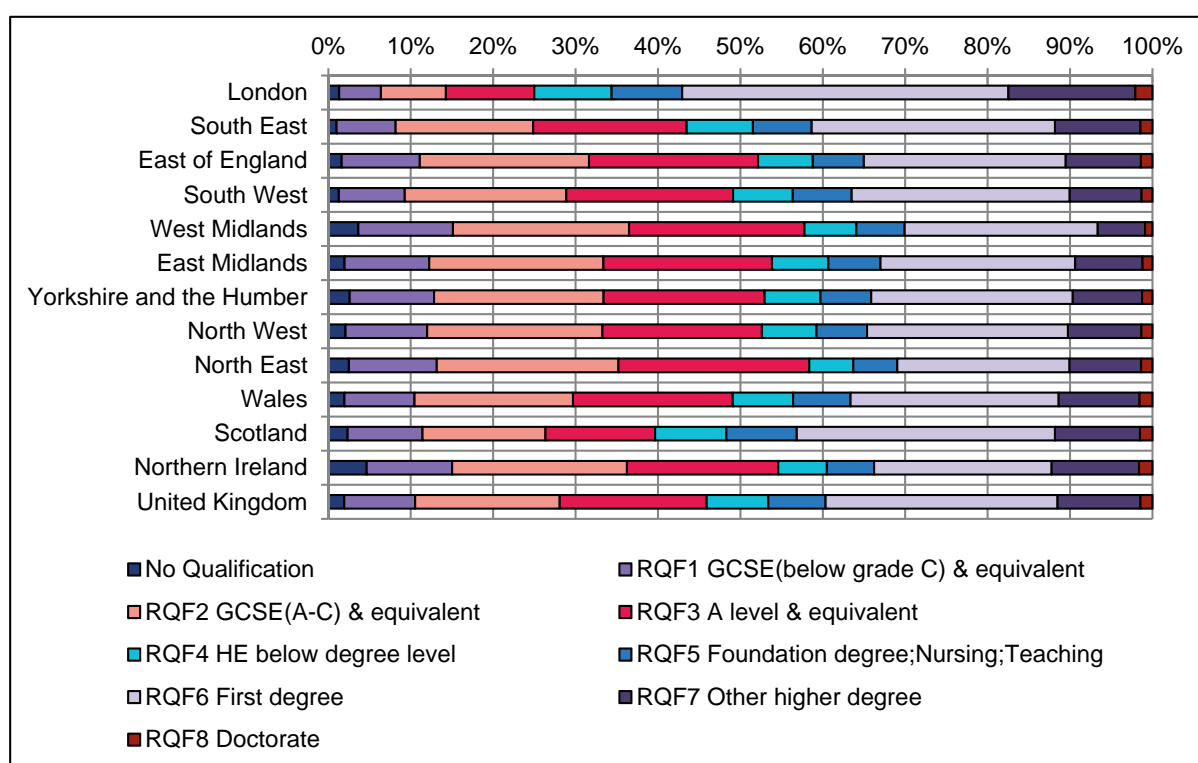
The number of people with highest qualifications above RQF3 is projected to increase between 2014 and 2024, while the number with highest qualifications at or below this level is projected to fall (Table D.21).

- The number with first degrees is projected to grow at an annual average rate of 4.1 per cent. There is little variation within the UK, with the highest rates (4.5 per cent) occurring in the South West, Yorkshire and the Humber and Wales. Northern Ireland displays the lowest rate of increase (3.1 per cent per annum).

- The North East has the highest projected rate of increase in the number of people with doctorates and other higher degrees as their highest qualification.

- The number with foundation degrees and nursing or teaching qualifications is projected to grow by 1.7 per cent per annum, most rapidly in London and the southern regions of England.

- The projected growth rate for those with Higher Education below degree level (RQF4) is also highest in London, just exceeding the growth rate for Yorkshire and the Humber and the South West. The rate of increase is slowest in Northern Ireland and Scotland.

- The number of people with highest qualification of RQF1 to RQF3 is projected to decline fastest in London. The number of people with RQF2 as their highest qualification is projected to increase slightly in the South West and West Midlands, while the number qualified to RQF 4 is projected to increase in the East of England, West Midlands and Northern Ireland.

- The number with no qualifications is projected to decline by 9.3 per cent across the UK. The most rapid projected decline is in southern and eastern England and in Wales, and the slowest in the West Midlands.

Table D.19: Qualification profile of employment (highest qualification held) by UK nation and region of England, 2014 (percentage of national or regional total)

Highest qualification	London	South East	East of England	South West	West Midlands	East Midlands	Yorkshire and the Humber	North West	North East	Wales	Scotland	Northern Ireland	United Kingdom
RQF8 Doctorate	1.7	1.2	1.1	1.1	0.8	1.0	0.9	1.0	1.0	1.5	1.2	1.1	1.2
RQF7 Other higher degree	12.9	8.4	7.4	7.3	5.5	7.1	6.3	6.9	6.0	9.1	7.9	7.4	8.2
RQF6 First degree	28.2	21.2	17.6	18.2	16.3	16.8	16.4	17.5	14.9	16.8	23.0	16.4	20.0
RQF5 Foundation degree;Nursing;Teaching	7.2	6.2	5.5	6.2	5.4	5.5	5.4	5.7	5.3	6.3	7.8	6.3	6.2
RQF4 HE below degree level	6.7	6.1	5.1	5.3	4.8	5.3	4.8	5.1	4.2	5.3	6.9	4.8	5.6
RQF3 A level & equivalent	14.4	20.7	21.1	23.6	21.8	21.6	21.7	20.9	23.1	21.2	17.8	18.6	20.0
RQF2 GCSE(A-C) & equivalent	13.3	20.2	22.3	20.4	21.2	22.1	22.3	23.3	24.2	20.5	17.4	22.2	19.9
RQF1 GCSE(below grade C) & equivalent	11.0	12.4	14.5	14.6	15.9	15.0	16.3	13.7	15.5	12.7	11.9	12.4	13.5
No Qualification	4.6	3.7	5.4	3.3	8.2	5.5	6.0	5.8	5.9	6.5	6.2	10.7	5.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table D.20: Projections of qualification profile of employment (highest qualification held) by UK nation and region of England, 2024 (percentage of national or regional total)

Highest qualification	London	South East	East of England	South West	West Midlands	East Midlands	Yorkshire and the Humber	North West	North East	Wales	Scotland	Northern Ireland	United Kingdom
RQF8 Doctorate	2.1	1.5	1.4	1.3	0.9	1.2	1.3	1.3	1.4	1.6	1.5	1.6	1.5
RQF7 Other higher degree	15.4	10.4	9.1	8.7	5.7	8.2	8.4	8.9	8.7	9.8	10.3	10.6	10.1
RQF6 First degree	39.6	29.5	24.5	26.5	23.4	23.6	24.4	24.4	20.9	25.3	31.3	21.5	28.1
RQF5 Foundation degree;Nursing;Teaching	8.6	7.1	6.2	7.1	5.9	6.3	6.2	6.1	5.3	7.0	8.6	5.7	7.0
RQF4 HE below degree level	9.4	8.0	6.6	7.2	6.3	6.9	6.8	6.6	5.4	7.3	8.6	5.9	7.5
RQF3 A level & equivalent	10.7	18.6	20.5	20.2	21.3	20.4	19.5	19.3	23.1	19.4	13.3	18.4	17.8
RQF2 GCSE(A-C) & equivalent	7.9	16.7	20.5	19.6	21.4	21.1	20.6	21.3	22.1	19.2	14.9	21.2	17.5
RQF1 GCSE(below grade C) & equivalent	5.1	7.2	9.5	8.0	11.5	10.3	10.2	9.9	10.7	8.5	9.1	10.4	8.6
No Qualification	1.3	1.0	1.6	1.3	3.7	2.0	2.6	2.1	2.5	1.9	2.3	4.7	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table D.21: Annual average percentage change in employment by qualification level and UK nation or region of England, 2014-2024

| Highest qualification	London	South East	East of England	South West	West Midlands	East Midlands	Yorkshire and the Humber	North West	North East	Wales	Scotland	Northern Ireland	United Kingdom
RQF8 Doctorate	2.6	2.7	3.0	2.5	1.3	2.3	3.4	2.9	4.2	1.2	3.1	4.1	2.7
RQF7 Other higher degree	2.5	2.8	2.9	2.5	1.0	1.9	3.4	3.0	4.3	1.1	3.1	4.0	2.6
RQF6 First degree	4.1	4.0	4.1	4.5	4.2	4.0	4.5	3.8	3.9	4.5	3.6	3.1	4.1
RQF5 Foundation degree;Nursing;Teaching	2.5	2.0	2.0	2.0	1.3	1.8	1.8	1.2	0.5	1.4	1.4	-0.5	1.7
RQF4 HE below degree level	4.0	3.5	3.4	3.8	3.2	3.2	3.9	3.0	3.0	3.7	2.7	2.4	3.5
RQF3 A level & equivalent	-2.3	-0.4	0.4	-0.9	0.3	-0.1	-0.6	-0.4	0.5	-0.5	-2.5	0.2	-0.6
RQF2 GCSE(A-C) & equivalent	-4.4	-1.3	-0.1	0.2	0.6	0.0	-0.4	-0.5	-0.4	-0.3	-1.1	-0.1	-0.7
RQF1 GCSE(below grade C) & equivalent	-6.8	-4.7	-3.5	-5.2	-2.7	-3.3	-4.2	-2.8	-3.2	-3.6	-2.3	-1.4	-3.9
No Qualification	-11.3	-11.7	-10.8	-8.6	-7.3	-9.2	-7.7	-9.4	-7.7	-11.1	-8.9	-7.7	-9.3
All levels	0.7	0.6	0.7	0.6	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5

D.10 Replacement and net labour demand, 2014-2024

The employment data presented in previous sections of this report have been concerned with expansion demand. This section is concerned with the total demand for labour ('net requirement'), which includes replacement demand over the period 2014 to 2024 – the need to replace workers who leave the labour force within the projection period (e.g. due to retirement). The relationship of replacement demand to expansion demand by occupation is depicted in Figure D.15. Negative values for the ratio of replacement demand to expansion demand occur where expansion demand is negative.

- Overall, replacement demand is 7.2 times the overall change in employment.

- The highest ratio is for elementary occupations, in which projected replacement demand is 12.2 times the projected expansion demand.

- The negative bars illustrate the fact that there is a demand for replacement workers even in occupations in which the overall demand for labour is projected to fall (e.g. administrative and secretarial and skilled trades occupations and process, plant and machine operatives).

- The value '0' is presented for sales and customer service, because the ratio of replacement demand (947 thousand) to expansion demand (3 thousand) is too large to be displayed on the same scale as the other SOC major groups.

**Figure D.15: Ratio of replacement demand to expansion demand by occupation, 2014-2024, UK**
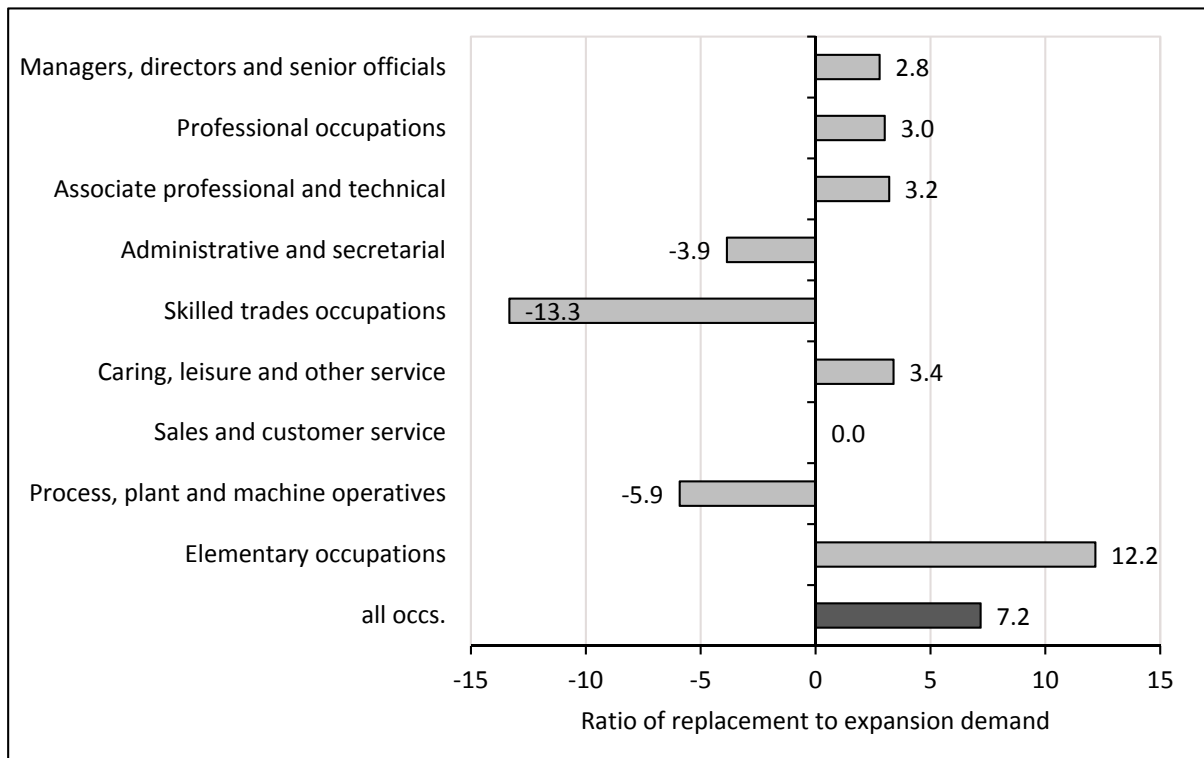
Note: The value '0' is presented for sales and customer service, because the ratio of replacement demand (947 thousand) to expansion demand (3 thousand) is too large to be displayed on the same scale as the other SOC major groups.

The pattern of net labour requirement by nation of the UK and region of England is presented in Figure D.16. The size of these bars largely reflect the size of the working population in each nation of the UK and region of England.

- The largest net requirements (over 2 million workers in each case) are in London and the South East, followed by the North West.

- These regions also display the highest levels of replacement and expansion demand.

- The lowest net requirement and replacement demand is projected for Northern Ireland, followed by North East England and Wales. (This is as expected reflecting the relatively small size of these areas.)

Figure D.16: Expansion demand and replacement demand and net requirement by UK nation and region of England 2014-2024
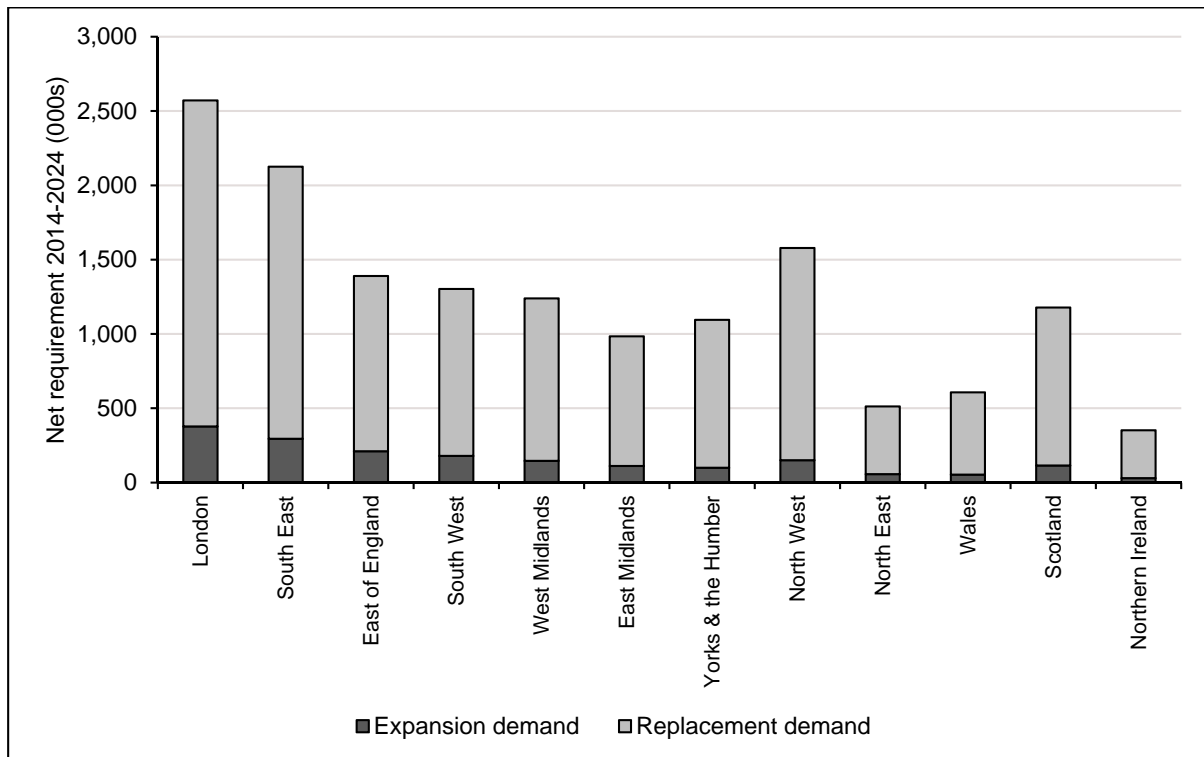
Replacement demand is projected to form 87.8 per cent of net labour requirement over the period 2014-2024 (Table D.22). It exceeds the net labour requirement in those SOC major groups in which expansion demand is projected to be negative (administrative and secretarial, skilled trades and process plant and machine operative) or very small (sales and customer service).

- Replacement demands can be more than 1.5 times the net labour requirement in occupations in which expansion demand is weak or negative; for example, administrative and secretarial occupations in London and South East England.

- In London and the South West, expansion demand as well as replacement demand contributes to the net requirement for skilled trades occupations.

- For most occupations where expansion demand is positive, replacement demand still accounts for around two-thirds to three-quarters of the net requirement in most UK nations and regions of England.

- For elementary occupations, replacement demand accounts for over 92 per cent of the net requirement for labour between 2014 and 2024 across the whole of the UK and nearly all of it in Scotland, Wales and Yorkshire and the Humber.

Table D.22: Replacement demand as a percentage of overall labour requirement by nation of the UK and region of England and SOC major group, 2014-2024

| UK nation or region of England	Managers, directors and senior officials	Professional occupations	Associate professional and technical	Administrative and secretarial	Skilled trades occupations	Caring, leisure and other service	Sales and customer service	Process, plant and machine operatives	Elementary occupations	All occupations.
London	73.1	74.0	76.0	169.9	98.8	81.2	107.7	124.3	93.3	85.3
South East	71.7	74.9	77.1	150.7	100.4	75.5	104.9	106.3	90.4	86.1
East of England	71.4	74.0	74.2	135.4	102.7	71.4	99.3	111.1	86.9	84.8
South West	75.0	73.9	76.2	140.5	97.2	75.3	95.6	116.1	92.0	86.2
West Midlands	71.5	75.0	75.0	122.7	113.1	78.2	101.8	123.9	88.3	88.2
East Midlands	75.7	76.9	76.6	128.9	116.8	75.6	93.4	116.4	92.0	88.7
Yorkshire & the Humber	76.4	75.4	77.2	124.0	118.4	76.7	100.4	129.2	96.9	90.9
North West	75.6	78.2	77.9	124.9	111.1	80.1	95.0	126.3	91.7	90.5
North East	74.9	74.4	75.7	123.9	108.8	80.6	85.2	142.1	94.3	88.8
England	*73.5*	*75.0*	*76.3*	*136.8*	*105.7*	*76.9*	*99.1*	*120.0*	*91.4*	*87.3*
Wales	73.6	75.7	77.8	125.2	115.4	82.1	100.0	120.6	97.6	91.2
Scotland	75.0	74.4	74.1	127.4	127.0	74.1	104.7	122.5	99.3	90.2
Northern Ireland	74.0	77.9	79.2	120.3	117.1	86.4	103.2	127.6	91.2	91.6
United Kingdom	**73.6**	**75.0**	**76.2**	**134.9**	**108.1**	**77.2**	**99.7**	**120.3**	**92.4**	**87.8**

D.11 Change in other labour market measures, 2004-2024

This section shows how the projected changes in employment between 2014 and 2024 relate to projected changes in labour supply. The projected change in unemployment within the UK is also presented.

There are marked contrasts in labour market participation (the percentage of the population aged 16 and over economically active) within the UK and also in trends in participation within the UK (Figure D.17).

- The percentage economically active is highest in England, slightly lower in Scotland, and lowest in Wales and North East England throughout the period 2004-2024.

- Within England, London displays by far the highest percentage economically active (because of the relatively young age profile of its population), and economic activity is higher in the south-eastern corner of England than northern and western regions.

- The percentage economically active in London is higher in 2014, and is projected to be higher in 2024, than 2004. However, rates steadily decline in most other regions of England.

- The only exceptions are the higher rates in 2014 in the South West, Yorkshire and the Humber and North East.

- In Scotland, the percentage economically active is lower in 2014 and projected to decline further by 2024. In Wales and Northern Ireland, the 2014 rate was higher than 2004. While the economic activity rate is projected to be lower in 2024, this will be above the 2004 rate.

- Overall, therefore, the geographical pattern of labour market participation within the UK is projected to remain fairly stable, but the differential between London and the rest of the UK will widen.

Figure D.17: Economic activity rate by nation of the UK and region of England, 2004, 2014 and 2024
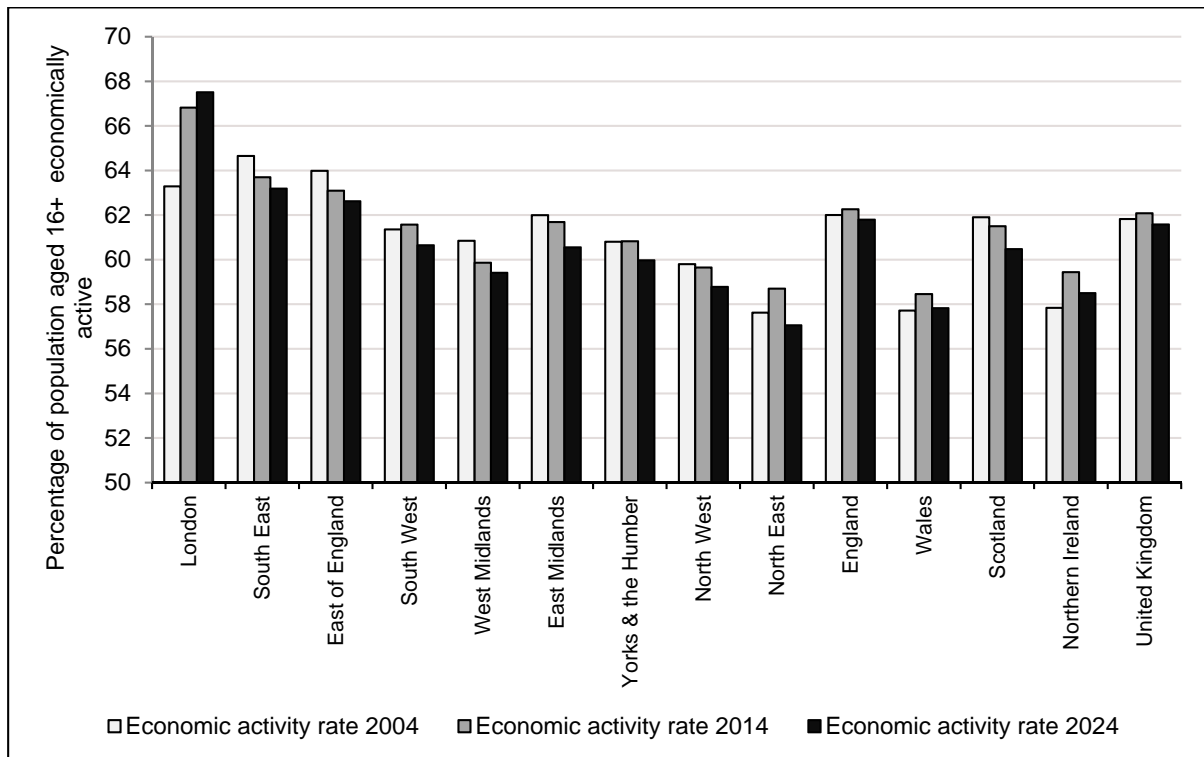
The employment rate is the percentage of the population aged 16 and over who are in employment. The geographical pattern of variation within the UK displays some similarities with the economic activity rate (Figure D.18).

- Employment rates were slightly higher in England than Scotland in all three years, and substantially lower in both Wales and Northern Ireland (the latter slightly higher than Wales).

- The employment rate for England fell between 2004 and 2014 but is projected to increase in the decade to 2024 (albeit remaining below its 2014 starting point). Rates in Scotland and Wales are expected to fall between 2014 and 2024 after also falling between 2004 and 2014. In Northern Ireland the rate is also expected to fall in the decade to 2024 following an increase during the earlier period.

- Within England, the South East, East, South West and East Midlands displayed the highest employment rates in 2004, with the North East, North West and West Midlands having the lowest rates.

- London's employment rate increased substantially between 2004 and 2014 to be the highest in England. It is projected to continue increasing to 2024, when it is expected to remain the highest.

- Regional employment rates in the rest of England fell between 2004 and 2014 and are projected to increase slightly between 2014 and 2024 in all except the East Midlands, Yorkshire and the Humber and the North East.

- The hierarchy of employment rates remains fairly stable outside London, with higher rates in the southern regions and lower rates in the north.

- Overall, the differentials between London and all other parts of the UK which emerged after the 2008/9 recession are projected to widen by 2024.

Figure D.18: Employment rate by nation of the UK and region of England, 2004-2024
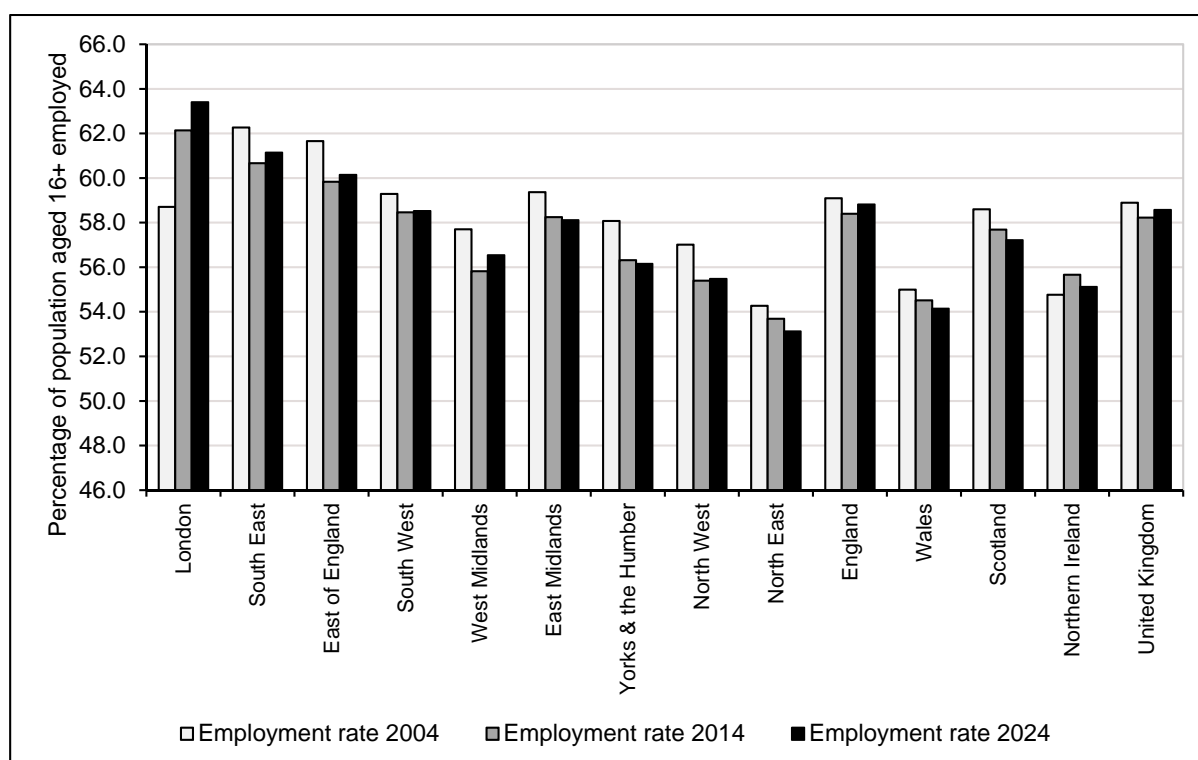
Figure D.19 presents the projected trend in national and regional ILO annual average unemployment rates over the period from 2000 to 2024. The most notable feature of the chart is the impact of the 2008/9 recession on unemployment rates, which rose steeply everywhere, remaining high until 2012, afterwards falling sharply. Over the period 2014-2024 unemployment rates are projected to fall slowly in most parts of the UK, but marked changes in the relative position of UK nations and regions of England have occurred

- London had the highest unemployment rate before 2008, but was less affected by the recession of 2008/9 and is projected to have a lower unemployment rate in 2024 than the North East, Yorkshire and the Humber and Wales.

- The South East, South West, East of England and East Midlands become distinctive in having unemployment rates much lower than the rest of England.

- North East England stands out as having the highest unemployment rate. Its unemployment rate is projected to remain well above that of the early 2000s until 2024.

Figure D.19: Trend in ILO unemployment rate by nation of the UK and region of England, 2000-2024
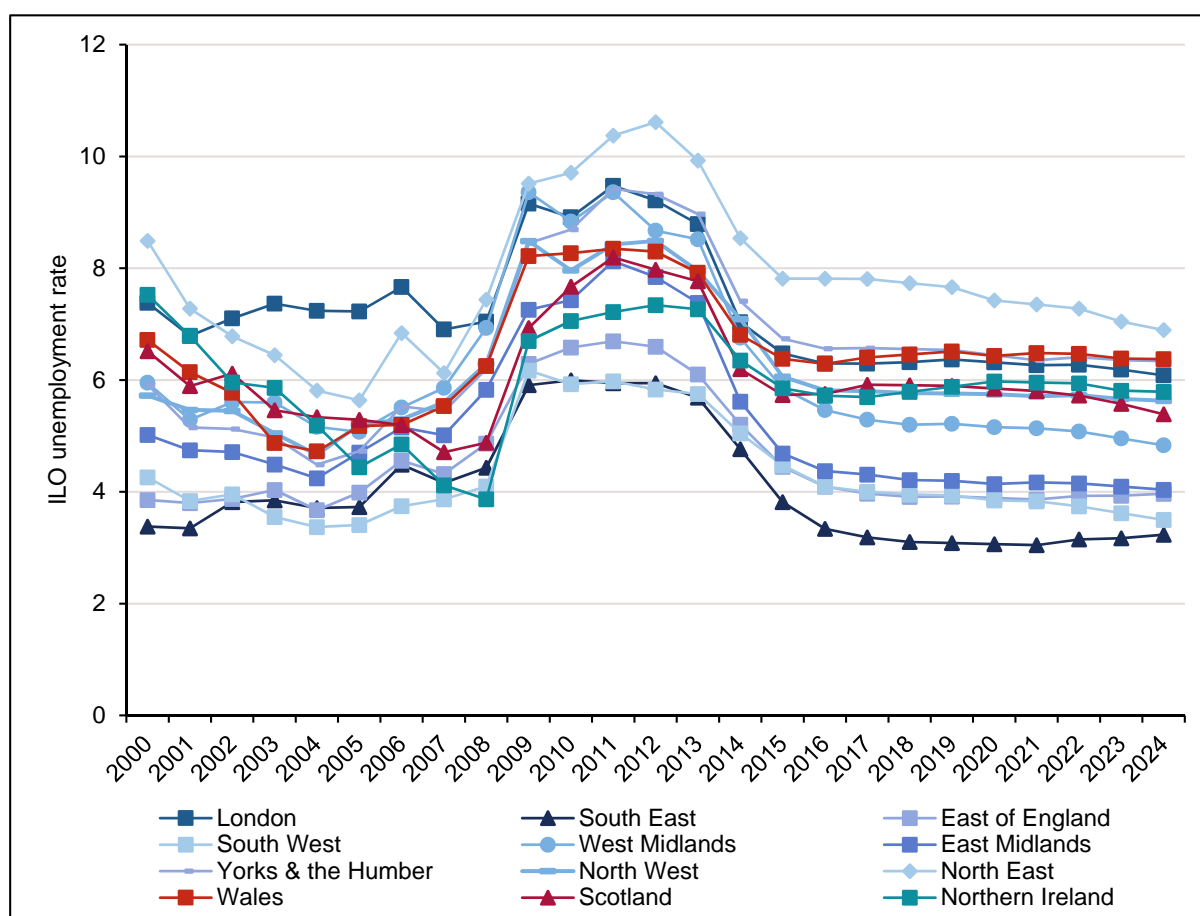

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Figure D.20 presents ILO unemployment rates for the nations of the UK and regions of England for 2004, 2014 and 2024.

- Unemployment rates in each nation of the UK and region of England except London for 2014 were higher than either the rate in 2004 or the projected value for 2024. The lower unemployment rate in London may indicate that it was recovering from recession earlier than the rest of the UK.

- North East England displays the highest rate in 2014 and 2024, and only London had a higher rate in 2004.

- The North East, Yorkshire and the Humber, North West, West Midlands and Wales experienced the largest increases in unemployment rate between 2004 and 2014.

- The relative rankings of nations of the UK and regions of England change little, but those of Wales, Northern Ireland and Yorkshire and the Humber are predicted to deteriorate between 2014 and 2024.

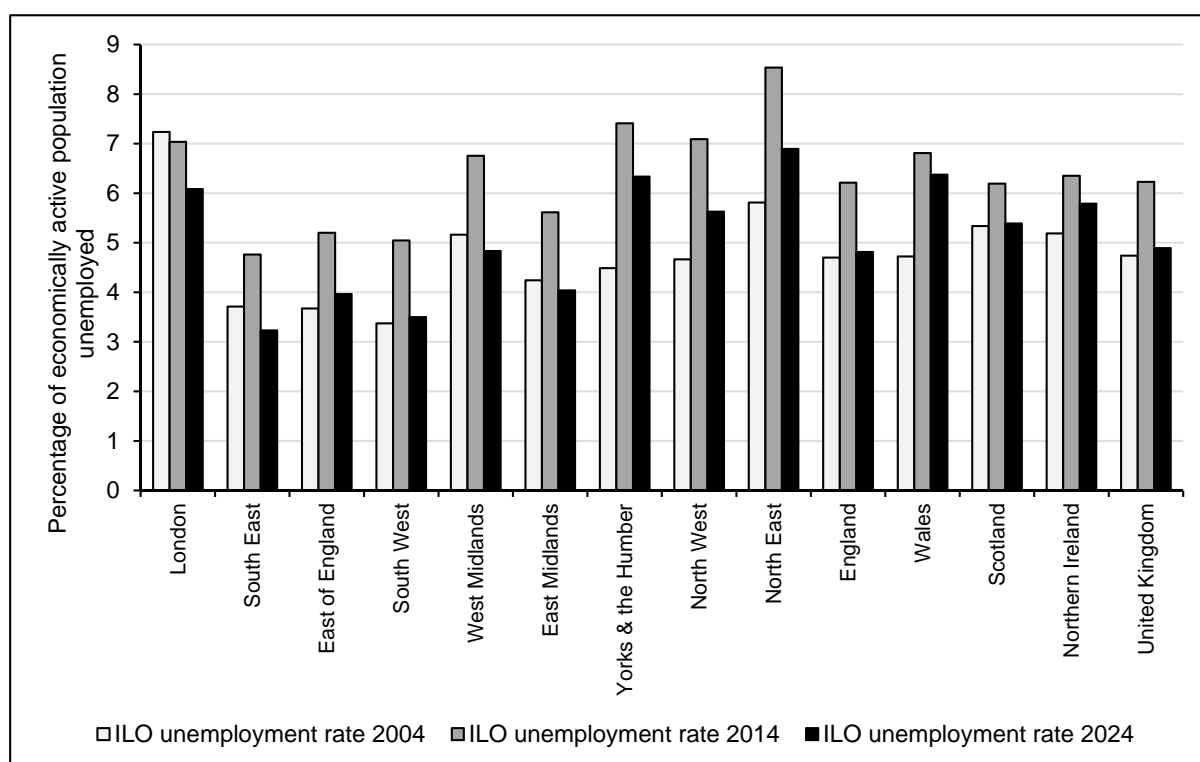**Figure D.20: ILO unemployment rate by nation of the UK and region of England, 2004, 2014 and 2024**

Table D.23 presents the projected change between 2014 and 2024 in a number of labour supply and demand measures.

- The population aged 16 and over is projected to grow by 3.3 million, a quarter of this growth being in London. Substantial growth is projected for Scotland.

- The working age population of the UK is projected to grow by 892 thousand, with the increase largely concentrated into the south and east of England. Declines are projected for Scotland, Wales, the North East and North West of England.

- The labour force is projected to grow about twice as fast as the working age population, with the largest growth in southern and eastern England. Growth is projected for all of the UK except the North East.

- The projected increase in the workforce is nearly 1.5 million, mostly in southern England, but with marked growth in the North West.

- The slower growth in the labour force and workforce than the population aged 16 and over reflects the projected reduction of 0,5 in the percentage economically active (economic activity rate). The projected decline is greatest in the North East, East Midlands, Scotland, Northern Ireland, North West, Yorkshire and the Humber and South West. In contrast, London's rate is projected to be 0.7 per cent higher.

- Projected growth in workplace employment (1.8 million) exceeds workforce growth in all parts of the UK, leading to a labour market residual of 275 thousand (this might reflect a growth of working outside the UK and a reduction in people holding more than one job)

- The number of employed residents is projected to increase by over 2 million, 1.3 million of which is projected for southern and eastern England. The projected increase outside England is about 150 thousand.

- Both ILO and claimant unemployment are projected to fall by around a third of a million; reducing the rate by 1.3 and 1.0 percentage points, respectively. The largest falls in unemployment rate are projected for the North East, Yorkshire and the Humber and Wales (claimant) and West Midlands, East Midlands and North East (ILO).

Table D.23: Change in labour supply and demand measures by UK nation and region of England, 2014-2024

UK nation or region of England	Total Population (000s)	16+ population (000s)	Working age population (000s)	Labour Force (000s)	Workforce (000s)	Economic activity rate (change in %)	ILO unemployed (000s)	ILO unemployment rate (change in %)	Claimant unemployed (000s)	Claimant unemployment rate (change in %)	Employed residents (000s)	Workplace employment (000s)	Market Residual (000s)
London	1059	815	593	595	335	0.7	-6	-0.9	-43	-0.9	602	378	-219
South East	692	552	169	313	265	-0.5	-60	-1.5	-27	-0.6	372	291	-80
East of England	520	401	142	227	188	-0.5	-29	-1.2	-24	-0.9	257	211	-49
South West	374	287	38	132	156	-0.9	-37	-1.5	-18	-0.7	170	174	-5
West Midlands	315	242	47	123	107	-0.5	-47	-1.9	-37	-1.4	169	144	-18
East Midlands	292	226	26	93	86	-1.2	-33	-1.6	-23	-1.1	125	109	-17
Yorkshire & the Humber	263	205	17	85	63	-0.9	-24	-1.1	-36	-1.4	109	99	-10
North West	264	193	-43	64	117	-0.9	-48	-1.5	-32	-0.9	112	149	40
North East	77	57	-45	-3	38	-1.6	-21	-1.6	-19	-1.7	18	57	41
England	*3855*	*2978*	*945*	*1629*	*1354*	*-0.5*	*-305*	*-1.4*	*-258*	*-1.0*	*1934*	*1612*	*-317*
Wales	122	94	-18	38	36	-0.6	-4	-0.4	-16	-1.2	42	53	9
Scotland	218	165	-37	56	86	-1.0	-19	-0.8	-27	-1.0	74	113	39
Northern Ireland	93	77	2	32	15	-0.9	-4	-0.7	-15	-1.8	35	31	-6
United Kingdom	**4288**	**3314**	**892**	**1755**	**1492**	**-0.5**	**-332**	**-1.3**	**-316**	**-1.0**	**2085**	**1809**	**-275**

D.12   Conclusion

Working Futures 6 projects output and employment growth for all parts of the UK between 2014 and 2024. The rate of GVA growth projected is faster than that experienced in the preceding ten-years, reflecting an expectation of recovery from a period of protracted recession. However, employment is projected to grow much less strongly than output.

The broad spatial differentials in employment structure apparent in 2014 are projected to persist. London is projected to experience the most favourable employment trends overall and the other regions of southern and eastern England will continue to perform better than the rest of the UK. Wales, Scotland, Northern Ireland and the north of England will continue to grow more slowly. However, projected differentials for 2014-24 are much smaller than the actual differentials for 2004-2014.

London's employment structure will continue to diverge from the rest of the UK. It will be increasingly focused on business and other services and its occupational structure will be more dominated by the growing high status occupations (but it will also gain jobs in elementary occupations). This will be reflected in a more highly qualified workforce. Scotland benefits from some favourable trends (e.g. for qualifications in the workforce), but overall, the nations of the UK outside England and the northern and midland regions of England are projected to be challenged by decline in traditional employment and weaker performance in growing industries and occupations.

References

Bosworth, D, (2013a) The Changing Qualifications Mix of the UK to 2020, 2013. Report produced on behalf of UK Commission for Employment and Skills: Wath on Dearne. Institute for Employment Research, University of Warwick: Coventry.

Bosworth, D, (2013b) UK Qualifications Projections – Time Series Model: Technical Report, 2013. Report for UK Commission for Employment and Skills: Wath on Dearne. Institute for Employment Research, University of Warwick: Coventry.

Bosworth, D, (2013c) Regional Qualifications Projections – Apportionment Model: Technical Report, 2013, 2013. Report for UK Commission for Employment and Skills: Wath on Dearne. Institute for Employment Research, University of Warwick: Coventry.

Bosworth, D, (2015a) *UK Qualifications Projections – Time Series Model: Technical Report, 2015.* Institute for Employment Research, University of Warwick: Coventry.

Bosworth, D, (2015b) *Four Nations Qualifications Projections – Apportionment Model: Technical Report, 2015.* Institute for Employment Research, University of Warwick: Coventry.

Bosworth, D, (2015c) *Regional Qualifications Projections – Apportionment Model: Technical Report, 2015.* Institute for Employment Research, University of Warwick: Coventry.

Wilson, R, A, I. Woolard and D. Lee, (2004b). Developing a National Skills Forecasting Tool for South Africa, South African Department of Labour: Pretoria.

Wilson, R. A., R Beaven and M. May-Gillings (2014). *Working Futures 2012-2022: Technical Report.* UK Commission for Employment and Skills: Wath on Dearne.

Wilson, R. A., R Beaven and M. May-Gillings (2014). *Working Futures 2012-2022: Main Report.* UK Commission for Employment and Skills: Wath on Dearne.

Wilson, R. A., R Beaven, Mike May-Gillings, Sandy Perkins, Michael Lee and Nick Sofroniou, (2016). *Working Futures 2014-2024: Main Report.* UK Commission for Employment and Skills: Wath on Dearne.

Wilson, R.A., Mike May-Gillings, J. Pirie and R. Beaven (2016). *Working Futures 2014-2024: Technical Report.* UK Commission for Employment and Skills: Wath on Dearne.

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