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Preface and acknowledgements

The authors are grateful to the UK Commission for Employment and Skills (UK Commission) the Learning and Skills Council (LSC) for sponsoring this research. Special thanks are due to the project Steering Group, comprising Rob Cirin and Tracy Mitchell (LSC), Richard Garrett, Mark Spilsbury and Genna Kik (UK Commission), and to the East Midlands Regional Development Agency and the South West Regional Development Association for their comments.

This report has been a team effort, involving a large number of people. Rachel Beaven, Andrew Holden, Peter Millar and Luke Bosworth all made important contributions to the data analysis and processing. The responsibility for any remaining errors is the authors.

The projections are presented at a variety of different sectoral levels. The main focus in this report is on definitions based on the 2003 Standard Industrial Classification (SIC). Information is presented for broad sectoral and industry categories based on groups of 6, 14 or 27 sectors, each defined precisely by SIC codes. These preserve the traditional manufacturing, services and public sector groupings of the economy. They are hierarchically related, with the 6 broadest sectors being a more aggregated grouping of the 14 industries, and so on. Underlying these results are more detailed estimates for a 41 fold and 67 fold breakdown of employment, again based on SIC codes.

Results based on SSC categories have also been developed, although they are not reported here. Please contact the Research team of your relevant SSC for more details.¹

The projections should be regarded as indicative of likely trends given a continuation of past patterns of behaviour and performance, rather than precise forecasts of what will inevitably happen. They were produced before the dramatic events in financial markets in the autumn of 2008 occurred. They present a view of medium to longer term trends (5-10 years ahead), based on the assumption that the economy recovers from the impact of the short term shock instigated by the “credit crunch” relatively quickly, and that the employment patterns revert to longer-term trends. These issues are elaborated in more detail in the main body of the report. 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. The opinions expressed in this report are those of the authors and do not necessarily reflect the views of the LSC, UK Commission, Research Development Associations nor individual SSCs.

UK Commission for Employment and Skills

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¹ SSC descriptions and contact details are provided in Annex C

Foreword

Launched on 1st April 2008, the UK Commission for Employment and Skills is a key recommendation in Lord Leitch's 2006 review of skills *Prosperity for All in the Global Economy: World Class Skills*. The UK Commission aims to raise UK prosperity and opportunity by improving employment and skills. Its ambition is to benefit individuals, employers, government and society by providing independent advice to the highest levels of the UK Government and Devolved Administrations on how improved employment and skills systems can help the UK become a world class leader in productivity, in employment and in having a fair and inclusive society.

Research and policy analysis plays a fundamental role in the work of the UK Commission and is central to its advisory function. In fulfilling this role, the Research and Policy Directorate of the UK Commission is charged with delivering a number of the core activities of the UK Commission and has a crucial role to play in:

- Assessing progress towards making the UK a world-class leader in employment and skills by 2020;
- Advising Ministers on the strategies and policies needed to increase employment, skills and productivity;
- Examining how employment and skills services can be improved to increase employment retention and progression, skills and productivities.
- Promoting employer investment in people and the better use of skills.

We will produce research of the highest quality to provide an authoritative evidence base; we will review best practice and offer policy innovations to the system; we will undertake international benchmarking and analysis and we will draw on panels of experts, in the UK and internationally, to inform our analysis.

Sharing the findings of our research and policy analysis and engaging with our audience is very important to the UK Commission. Our Evidence Reports are our chief means of reporting our detailed analytical work. Our other products include Summaries of these reports; Briefing Papers; Thinkpieces, seminars and an annual Research and Policy Convention. All our outputs are accessible in the Research and Policy pages at www.ukces.org.uk

This second Evidence Report provides projections of employment by occupation and sector for the UK and its constituent geographical areas. The projections are provided on a common and comparable basis and as such provide a sound statistical basis for the deliberations of all those with an interest in the supply of and demand for skills including individuals, employers and Governments. This report will be followed in the coming months by other Evidence Reports on major projects in our Business Plan. We hope you find the report useful and informative in building the evidence we need to achieve a more prosperous and inclusive society.



Professor Mike Campbell
Director of Research and Policy Directorate



Lesley Giles
Deputy Director and Head of Research

WORKING FUTURES 2007-2017

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Summary

BACKGROUND

Recent events in financial markets have brought to a head the implications of the so called “credit crunch”. Immediate prospects are for a sharp downturn in economic growth across the world. These projections were completed before these events unfolded. The focus here is on medium to long-term projections, 5-10 years ahead. Assuming that the economy returns fairly quickly to its long term growth path, these results should provide a robust picture of likely developments in employment and skill patterns. The report does not discuss developments over the next year or two, since recent developments in financial markets and the world economy have made it more difficult than usual to generate reliable estimates of employment change over the short term. More discussion of these matters is provided in Section 1.8.

Over the longer term, the key drivers of employment are expected to re-assert themselves. In particular, technological change, including its implications for economic, social and political structures, is expected to continue to fuel globalisation and world economic growth. Together with a number of key domestic drivers, including demography and government policy, it will continue to have significant implications for the demand for and supply of skills over the coming decade.

The case for a regular and systematic assessment of future skills needs has become increasingly well recognised. The need for such work has now been set out in the European Council’s conclusions on “Anticipating and matching labour market needs”. All Member States have been charged with contributing to such assessment and anticipation of future skills requirements. The *Working Futures* series is a key element in the UK’s response to this demand.

Working Futures 2007-2017 is the third in a series of reports which provide a comprehensive review of the implications of technological change, changes in

government policy and legislation, and changes in other economic and social drivers for the UK labour market. It presents a detailed analysis by industry and spatial area of the changing demand for labour. The projections are set into an historical context in order to compare the outlook for the next decade or so with recent experience.

The report fills an important gap. No other publication provides such a comprehensive picture of the UK labour market. Although a number of other public and private organisations produce reviews of economic conditions and develop short- and medium-term forecasts, few are focused on the labour market, and none provides such a detailed analysis of prospects for occupations by industry and geographical/spatial area.

The analysis focuses upon the future patterns of demand for skills as measured by occupation. The prime focus here is on the national (UK) picture. However, a summary of the implications for the individual countries and English regions which make up the UK is also provided. A separate *Technical Report* provides details of sources and methods.

The results are intended to provide a sound statistical foundation for the deliberations of all those with an interest in the supply of and demand for skills, including individuals, employers, education and training providers, as well as the various agencies and departments of government. The latter include the Treasury, the Department for Innovation, Universities and Skills (DIUS), the Sector Skills Councils (SSCs), Regional Development Agencies (RDAs), as well as the report’s main sponsors, the Learning and Skills Council (LSC) and the UK Commission for Employment and Skills (UK Commission).

The future cannot be predicted with precision or certainty. Individuals and organisations all make plans for the future (even if it is simply that the future will be little different from the present and the recent past). In doing so, they adopt (implicitly at

least) assumptions about what it might be like. Hence, the key question is not whether projections and forecasts need to be undertaken, but rather how this should be done. The rationale behind *Working Futures* is that a comprehensive, systematic, consistent and transparent set of projections provides useful information for **all** the participants in the labour market.

One of the rationales for producing forecasts is to provide some indication to policy makers and other labour market participants about likely developments in an uncertain world. The uncertainties facing the UK economy and labour market have been immense during the second half of 2008. When the *Working Futures* results were first commissioned there was some discussion of the possibility of a slowdown in the world and UK economies. By the time they were ready for publication, there had been a global financial crisis unprecedented in recent times, with a virtual collapse of some aspects of the financial system, and government interventions across the world intended to shore up the banking system and to restore confidence to financial markets.

In such circumstances producing robust economic and labour market projections is particularly difficult. The present results have been finalised at a time when the full implications of the crisis for world and UK economies remain far from clear, a situation that is likely to persist for some time. A significant impact on the real economy seems now to be inevitable, with a recession rather than just a slowdown being the most likely outcome.

The actual baseline macroeconomic forecast that underlies the present results was developed in the first half of 2008, before the extent of the economic slowdown became fully apparent. The forecast almost certainly underestimates the likely short term downturn that will affect certain parts of the economy.

Despite these uncertainties, the current projections can still be used to explore longer term developments in the demand

for skills. Changing patterns of employment by occupation are largely dominated by longer-term trends rather than the cyclical position of the economy. The present results present a plausible picture of future developments in the structure of employment, assuming that the economy reverts reasonably quickly to its longer term growth path. However they will underestimate the effects of the slowdown on employment levels over the next 2-3 years.

It is also important to emphasise that the views presented here are not the only possible future. They represent a benchmark for debate and reflection. The detailed projections present a carefully considered view of what the future might look like, assuming that past patterns of behaviour and performance are continued over the longer term. Although any short-term downturn can be expected to impact on overall employment levels, previous experience suggests that longer term trends in the pattern of demand for skills (as measured by occupations) are soon re-established.

The results should be regarded as indicative of general trends and orders of magnitude and are not intended to be prescriptive. If policies and patterns of behaviour are changed then alternative futures might be achieved. Particular sectors and groups may consider alternative scenarios more realistic, but the results presented here raise questions about how such alternatives might be achieved.

The results are based on the use of a *multi-sectoral, regional macroeconomic model*, combined with *occupational, replacement demand* and *qualification* modules. The main projection period covered is 2007 to 2017, although the analysis provides a complete profile of both historical and projected years.

Because of the interest of the LSC and the UK Commission, as well as the SSCs, in detailed sectoral prospects, together with the focus of the LSC and RDAs on developments at a local and regional level, a very detailed analysis is required. The

present set of projections comprise well over half a million time series consistently estimated and projected for employment alone.

The results take account of the latest data from the Annual Business Inquiry (2006) and the Labour Force Survey (2007), as well as the 2001 Census of Population and various other sources. Together these highlight a number of new features in the changing pattern of occupational employment in the British economy.

The present document provides an overview and summary for the whole of the UK. Chapter 5 - Spatial Perspectives also gives a summary of the main implications for the individual devolved nations within the UK and the English regions.

Results for individual sectors and industries are also presented. Much more detailed information is available, including estimates for 67 2-3 digit level Standard Industrial Classification (SIC) categories. These results can be used in conjunction with employment forecasts developed by the SSCs and others to assess the changing demand for skills by sector. Contact details for the SSCs are given in Annex C.

Other Annexes provide technical information about how the projections have been produced. A separate *Technical Report* describes in much greater detail the data sources and methods used to generate all the results. This includes a detailed description of the macroeconomic and other models used to generate the projected demand for skills as well as the treatment of labour supply.

MACROECONOMIC CONTEXT

Economic activity and the effects of the "credit crunch"

Before outlining economic and labour market prospects, it is important to set these results into context. At the time of writing there is still considerable pessimism about the state of the UK and world economies. The collapse of both financial and housing markets in the UK and elsewhere is bound to have an impact

on employment in the immediate future, as economic activity slows in response to such global events. Producing robust economic and labour market projections in the face of such uncertainty is extremely difficult. The results presented here were finalised before the full implications of all this have become clear.

Even before these momentous events, escalating commodity price inflation, including a record price for oil, in combination with the fallout from the credit crunch, during the Autumn of 2008, had resulted in a very uncertain short-term outlook for the UK economy. Growing competitive pressures, especially from the Far East, meant that UK producers were already facing a very difficult period ahead.

All of this means that the risk of a significant recession is now much higher. The macroeconomic forecast that underlies the results was developed in the first half of 2008, before the degree of the economic slowdown became fully apparent. This scenario is therefore not factored into the current results, which assume a more modest slowdown. The forecast assumes that, following a slowdown in the short term, a recovery in confidence will bring about renewed growth in the UK economy, and that will sustain employment growth in the longer-term (2007-2017). This will return the economy and labour market to something like their long-term trends.

It is likely that this forecast underestimates the effects the downturn will have on certain areas of the economy, especially in the short term, and most notably perhaps in the banking and finance sector and in construction. Based on these results the economy is assumed to stage a reasonably prompt recovery and to settle down in the medium term to a pattern of modest growth, with only moderate rates of inflation. Measures of economic output such as *Gross Domestic Product (GDP)* and *Gross Value Added (GVA)* are projected to display long-term growth rates of just below 2½ per cent per annum.

GENERAL LABOUR MARKET PROSPECTS

Despite the short-term uncertainties in both the world and domestic economies, a more optimistic picture is projected for the labour market over the longer term to 2017:

Employment is projected to continue to rise over the decade as a whole, driven by a significant increase in population levels. The long-term rate of employment growth (jobs) is expected to be just under ½ a per cent per annum, resulting in almost 2 million additional jobs over the decade.

- The majority of the additional jobs are expected to be taken by *men*; although females are also expected to benefit. Males are projected to take up an increasing share of employment in many parts of the economy previously dominated by female employment;
- The *working age population* and the *workforce* are projected to rise significantly;
- Labour market participation rates, defined as those economically active (i.e. those in employment or actively searching for work) expressed as a percentage of the working age population (aged 16+), are projected to fall slightly (reflecting the overall aging of the population and declining trends for males offset by some increases amongst females);
- Over a decade as a whole, the level of *claimant unemployment* is expected to remain stable, although some increases in the short term are now inevitable;
- On an ILO basis (i.e. those actively searching for work), the unemployment rate is around twice as high as the claimant measure, but this is projected to follow a similar profile over time to reach around 6 per cent by 2017;
- Over this longer term period, for most people, unemployment will remain a transitory experience, although a minority will continue to suffer long duration unemployment.

SECTORAL PROSPECTS

Changing patterns of employment by sector are largely dominated by longer-term trends in the demand for goods and services. While the slowdown in the economy is likely to disrupt these trends in the short-term, the results from the current set of projections can still be used as a useful guide to longer term developments. In some sectors the effect of the slowdown on employment levels over the next 2-3 years will be underestimated. This is likely, to affect certain parts of the banking and financial system as well as construction and some other sectors. For most others, the results for 2007-2017 present a plausible picture of future developments, assuming that the coming slowdown is relatively speedily overcome.

Projections of output by sector

The prospects for growth in output up to 2017 in the 6 broad sectors identified in the analysis are as follows:

- *Primary & utilities* is projected to see only modest output growth over the decade. This obscures sharp declines for *mining & quarrying*, offset by somewhat better prospects for *electricity, gas & water*, and in *agriculture, etc.*;
- *Manufacturing* output growth is projected to average just below 1½ per cent per annum. There is faster growth in some technology and R&D-related industries, such as parts of *chemicals* and *engineering*, but other sectors such as *textiles, clothing* and *metals & metal goods*, etc. are expected to perform much less strongly, reflecting continuing intense international competition;
- *Construction* is projected to exhibit modest growth, over the medium to long-term, despite the immediate uncertainties in the housing market, due to strong demand for major infrastructure projects. Output growth is projected to average around 2 per cent per annum;
- *Distribution, transport, etc.* includes a diverse range of industries. *Transport*

& *communications* output is projected to grow most rapidly, by around 3½ per cent per annum. *Communications* is the sub-sector displaying the strongest growth per cent per annum. Output in *distribution, retailing*, and in *hotels & restaurants* is forecast to grow by around 2½ and 2 per cent per annum, respectively;

- *Business and other services: Business services* (which includes *computing services*) is likely to be hit hard by the fall out from the credit crunch and other factors. Despite this it is projected to grow by around 3 per cent per annum over the longer term, much slower than in the recent past. Within this broad sector *Financial services* are hit hardest. *Other services* are also expected to see slower rates of growth in output;
- *Non-marketed services* comprise public administration and defence, as well as health and education services. Output in *Public admin & defence* is projected to increase by about 2 per cent per annum and Education services by a similar amount. *Health & social work* are also expected to see somewhat more rapid growth at around 2½ per cent per annum.

Projections of employment by sector

Employment prospects to 2017 also depend upon how rapidly productivity rises in each broad sector. While productivity growth is a key element in maintaining competitiveness and reducing costs, it also has a direct impact on employment levels. All else being equal, increases in productivity imply fewer people employed.

- The *primary & utilities* sector (which includes *agriculture, etc* and *mining & quarrying; electricity, gas & water*) is expected to continue to experience significant job losses in the next decade of around 2 per cent per annum (around 110 thousand jobs in total);
- Long-term decline in employment in *manufacturing* is expected to continue, with a loss of over 400 thousand jobs between 2007 and 2017 (a rate of

change of around 1½ per cent per annum). *Textiles & clothing* displays one of the largest job losses but there are significant declines in many other industries as well;

- *Construction* is projected to benefit from positive features such as the public expenditure on projects such as the 2012 Olympics, but it will be hard hit by the fall out from the credit crunch. Over the longer term, employment is projected to increase slightly by 170 thousand jobs between 2007 and 2017 (just under 1 per cent per annum);
- Employment in *distribution, transport* etc, is projected to increase by over half a million jobs between 2007 and 2017 (just over ½ per cent per annum), with most of the growth accounted for by jobs in *distribution, retailing* and *hotels and restaurants*.
- Employment in *business & other services* is projected to increase by around 1.3 million by 2017 (a rate of growth of just under 1½ per cent per annum. *Other business services* (which includes *computing services*) is expected to see the fastest growth;
- Employment in *non-marketed services* is expected to increase by around half a million between 2007 and 2017 (just over a ½ per cent per annum). Within this broad grouping, most of the projected employment growth is accounted for by *education* and, most especially, in *health & social work*. *Public administration & defence* is forecast to see a slight fall in employment.

CHANGES IN OCCUPATIONAL STRUCTURE

Projections of employment by occupation

Changing patterns of employment by occupation are largely dominated by longer-term trends rather than the cyclical position of the economy. The results from the current set of projections can therefore be used as a robust guide to likely future developments in the structure of employment, even though the effect of the

slowdown on employment levels over the next 2-3 years may be underestimated.

The results take full account of the latest information on changing patterns of occupational employment structure from the LFS and other sources. These results suggest some changes in likely prospects for the next ten years compared to previous projections, but the main trends are very similar to those identified in earlier *Working Futures* reports.

In general, there is a much slower pace of change in occupational employment structure expected between 2007 and 2017 than was the case over the previous two decades.

The groups that are expected to show the most significant increases in employment over the next decade (2007-2017) are higher level occupations such as:

- managers & senior officials (+872 thousand, 1.7 per cent per annum);
- professional occupations (+643 thousand, 1.5 per cent per annum);
- associate professional & technical occupations (+654 thousand, 1.4 per cent per annum);

Personal service occupations and Sales & customer service occupations are the other main beneficiaries of employment growth, with projected increases of 443 (1.7 per cent per annum) and 104 thousand (0.4 per cent per annum), respectively.

Administrative, clerical & secretarial occupations are projected to see significant further job losses of around 400 thousand jobs (-1.1 per cent per annum), although this category will still employ over 3 million people in 2017.

Declining employment levels are projected for:

- skilled trades occupations (-226 thousand, -0.7 per cent per annum);
- machine & transport operatives (some -117 thousand, -0.5 per cent per annum);

In general, these patterns are similar to those in *Working Futures 2004-2014*. There are however, a few notable differences. The main changes compared to the previous projections are as follows.

Faster growth is now indicated for:

- managers, some professional and many associate professional occupations;
- protective service occupations and culture /media/ sports occupations;
- caring personal service occupations.

More rapid declines than previously measured in *Working Futures 2004-2014* are projected for:

- administrative, clerical & secretarial occupations;
- skilled manual & electrical trades;
- other skilled trades.

Elementary occupations are now projected to see a much less rapid rate of job loss as the service sector in particular generates more such jobs. This polarisation of demand for skills, with growth at both top and bottom ends of the skills spectrum, appears to be an increasingly common feature across developed economies.

On the other hand, the continued restructuring of the retail and distribution sectors appears to be leading to a much less optimistic picture for many lower level sales occupations.

Replacement Demand

The projections summarised above focus on the net growth (or decline) in occupational employment. Such estimates provide a useful indication of likely 'gainers' and 'losers' from employment change. This has traditionally been referred to as *expansion demand*, although for some occupations it can be negative.

However, employers will often need to replace those workers who leave due to mortality, retirement, career moves, or related reasons. Such *replacement demand* can easily outweigh any losses resulting from structural changes.

For all occupations together, replacement demand is about 6 times larger than the net changes projected between 2007 and 2017. Over the decade there is expected to be a net requirement of about 13½ million job openings. Retirements are the principal component in this estimate. This excludes job openings created by people transferring from one occupation to another (some of which will be filled by similar means) or other outflows.

Two broad groups of occupations with different patterns of expansion and replacement demand are identifiable. For some groups, positive replacement demand

outweighs negative expansion demand. This applies, for example, to administrative, clerical, secretarial & related occupations; skilled metal & electrical trades; and process, plant and machine operatives.

For many others, expected retirements will add to positive expansion demand to create even higher net requirements for new entrants. This applies, for example, to corporate managers; teaching & research professionals; health & social welfare associate professionals; business & public service associate professionals; caring personal services; and customer service occupation.

1. Introduction and Macroeconomic and General Labour Market Context

Key Messages

- *Working Futures 2007-2017* is the third in a series of detailed and comprehensive employment projections, covering the whole of the UK.
- The main focus of the analysis is the changing structure of employment and, in particular, the implications for the demand for skills as measured by occupations.
- The need to anticipate changing skills needs in a regular and systematic way is now widely accepted, while recognising the uncertainties associated with this.
- It is emphasised that the current set of results should not be seen as inevitable nor prescriptive, they simply map out the most likely future scenario if past trends and patterns of behaviour continue.
- These new projections take into account the latest data from various official sources including the Labour Force Survey and the Annual Business Inquiry.
- They were produced at a time of considerable economic uncertainty. Consequently, the focus here is on prospects over the medium to longer term (2007-12 and 2007-17).
- Financial markets remain volatile, with uncertainty about whether all the losses associated with the credit crunch have been uncovered. Despite these short-term problems, the central projection presented here is for a recovery in the medium term and a much more positive outlook for employment and jobs over the decade as a whole.
- The UK population is projected to increase substantially, mainly driven by net inward migration. The economically active labour force will also increase substantially.
- The increase in the number of people above pensionable age by 2017 is projected to be even larger than the increase in the number of children. This will increase the dependency ratio.
- The increase in the pensionable age of women from 60 to 65 will result in an increase in the working-age population in the last five years of the forecast, but this will not match the increases in non-active groups.
- The new *Working Futures* projections for 2007-2017 suggest an increase in the numbers employed of around 1.65m over the period.
- In terms of jobs, almost 2 million additional jobs are projected by 2017. The majority of the additional jobs will be part-time. About a third will be full-time with the remaining increase coming from self-employment.
- The unemployment rate is expected to rise by about ½pp over the decade as a whole. This will affect both males and females. Unemployment is likely to rise more significantly in the short term before falling back.
- The main uncertainties in the macroeconomic forecast relate to: continuing uncertainty in financial markets; the problems in the housing market (and related effects on the confidence of domestic consumers); the impact of high oil prices on worldwide levels of economic activity; and the impact of exchange rates on trade performance.

1.1 Background

Working Futures 2007-2017 provides the most comprehensive picture available for the UK of future patterns of demand for skills. This is the third in a series of detailed projections of employment. It covers the period from 2007 to 2017 and focuses upon medium to long term employment prospects (2012-2017) by sector, for all of the regions and devolved nations within the UK. It presents detailed results for 27 industries.

The case for a regular and systematic assessment of future skills needs has become increasingly well recognised. The need for such work has now been set out in the European Council's conclusions on "Anticipating and matching labour market needs".¹ It is argued there that a comprehensive assessment of future skills requirements at EU level can make a key contribution to the identification of labour market trends and skills shortages, at both national and European levels. This should take account of the impacts of technological change and ageing populations and anticipate future needs, although it is recognised that there are many uncertainties inherent in any long term forecasts. Such initiatives are seen as helping to contribute to a better matching between labour market needs and skills supply developments. More effective anticipation and matching of labour market needs, it is argued, can contribute to the promotion of better labour utilisation and higher labour productivity, and therefore to growth and jobs, helping to reduce both frictional and structural unemployment.² All Member States have been charged with contributing to such an assessment and

anticipation of future skills requirements. The *Working Futures* series is a key element in the UK's response to this demand.

This new set of forecasts updates the *Working Futures 2004-14* projections.³ It was commissioned by the Learning and Skills Council (LSC) and the UK Commission for Employment and Skills to provide a high quality and sound statistical foundation for the deliberations of policy makers and others operating in the skills and employment arena. Its prime focus is on the future demand for skills as measured by occupation. The work can be used as a resource by Sector Skills Councils (SSCs), government departments such as the Department for Innovation, Universities and Skills (DIUS) and the Treasury, Regional Development Agencies (RDAs), as well as partners across the UK, such as the Scottish Executive, Welsh Assembly Government and the Department for Employment and Lifelong Learning in Northern Ireland.

The results include detailed analyses for each of the areas covered by the 9 English Regional Development Agencies (henceforth RDAs), as well as the other constituent devolved countries within the UK, although there is only space here for a brief summary of this spatial detail.

Finally, a detailed account of sources and methods is provided in a separate *Technical Report*.⁴

1.2 Rationale

There is on-going concern amongst those in Government working in the skills and employment policy arena, to ensure that the UK has the appropriate skills base, now and in the future, to sustain economic

¹ For details see: http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lisa/101012.pdf

² Frictional employment refers to people in a temporary state of unemployment as they make the transition from one job to another in a relatively short space of time.

³ See Wilson *et al.* (2005a and b). These results are henceforth referred to as *Working Futures 2004-2014*.

⁴ *Technical Report 2007-2017* (Wilson *et al.*, 2008).

growth and compete internationally. This means keeping abreast of changes in the economy and considering their implications for future skills demand and skills provision. Such information is of interest not just for policy makers but for all those having to make decisions about education and training, including individuals making careers choices, as well as education and training providers.

Nobody can predict the future with certainty. Most people can and do make plans, and in doing so adopt assumptions about what the future might be like. The rationale behind *Working Futures* is that there are advantages in examining future skills and employment demand using a single, multi-sectoral, economy-wide model, rather than relying on organisations and individuals to develop their own views independently. These advantages include the fact that this approach can provide a comprehensive, methodical, consistent and transparent set of results. It also benefits from economies of scale

This is not to say that the view developed here is the only one possible. Indeed, individual partners will still often find it useful to develop their own tailored forecasts, as several of the SSCs have done.⁵ The value of the *Working Futures* forecasts is that they provide a common and consistent economy wide overview, of skill needs, allowing detailed comparisons across sectors. This is based on a transparent, specific set of macroeconomic assumptions and economic relationships, affecting the whole economy and its structure. As such, the analysis is grounded in an understanding of the key drivers impinging upon the economy. It serves to act as an objective, economy-wide, explanatory tool to facilitate the examination of the changing pattern of skills demand.

Some users may prefer alternative scenarios, especially for particular sectors. However, the *Working Futures* results raise questions about what needs to be done to achieve such alternative scenarios and how they fit into a broader macroeconomic context covering all sectors in a consistent, systematic and comparable manner. This is a fundamental objective of developing the set of projections presented here.

The results presented here should be regarded as indicative of general trends and orders of magnitude, given the assumptions set out below, rather than precise forecasts of what will necessarily happen.⁶ Rather, they indicate the most likely future, given a continuation of past patterns of behaviour and performance. If policies and patterns of behaviour are changed then alternative futures might be achieved. The present results are intended to provide a consistent and systematic benchmark view across the whole economy and labour market that can form the basis for an ongoing debate.

Despite the degree of economic uncertainty under which these results have been produced, they present a quite robust picture of the longer term developments in patterns of employment by occupation, which from past experience are not very sensitive to the cyclical position of the economy. The uncertainties associated with the short-term effects of the credit crunch and other external economic shocks may result in a rather more pessimistic short-term outlook than that presented here. However, longer term changes in employment patterns are likely to reassert themselves, assuming the economy makes a reasonably rapid recovery from the negative effects of the recent crisis. While the long term projections for 5-10 years ahead are considered no less robust than previous

⁵ See for example the individual sector forecasts developed by Construction Skills, e-skills UK and SEMTA and others.

⁶ See Wilson and Briscoe (2002) for further discussion on this point.

Working Futures projections, short term projections over the next couple of years have not been presented here. Recent developments in the economy, and especially in the financial sector, make generating reliable estimates of employment change over the short term unwise or difficult at best and virtually impossible at worst. More detail discussion of these issues is presented in Section 1.8.

The focus on industrial and spatial detail pushes the available data to the limits for which it was originally collected.⁷ The results provide a useful benchmark for debate and policy deliberations about underlying employment trends. However, they should not be regarded as more precise than the general statements in the text. Many years of international research have demonstrated that indicative manpower planning is not a practicable proposition.

It is important to appreciate that the purpose of the projections is not to make precise and detailed forecasts of employment **levels**. The aim is to provide policy analysts and other labour market participants with useful information about the general nature of **changing employment patterns** and their implications for skill requirements.

Such results can be both informative and thought provoking. However, it must be emphasised that, for a variety of reasons, the detailed projections, especially those at a local level, should not be regarded as inevitable fact. They map out one possible (likely) future. They should be seen as a starting point for discussion rather than the end of the story. They should be used in conjunction with a variety of other sources of LMI.

The views expressed in this report are those of the authors. They do not necessarily reflect the views of the UK Commission for Employment and Skills and the LSC, nor those of their partners.

1.3 General Approach

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. Therefore, 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. To do this a multi-sectoral macroeconomic model is required.⁸

The projections are based on the use of the Cambridge Econometrics (CE) multi-sectoral, regional macroeconomic model (RMDM), which provides the general economic scenario. This is discussed further in this chapter. This information is combined with occupational employment and replacement demand models developed by the Institute for Employment Research (IER) to generate the occupational projections.

The approach uses 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 future skills provision. They reflect, in a manner which more partial approaches cannot, how individual sector developments “fit together” into an overall economy wide picture.

⁷ For further details of the sources and methods used and the limitations of the data and estimates, see the *Technical Report 2007-2017* (Wilson *et al.*, 2008).

⁸ This is regarded as standard practice in developing employment scenarios across the world. For further discussion see Wilson *et al.* (2004c), Wilson and Briscoe (2002) and Wilson (1994).

As well as macroeconomic factors, the model also deals with other important issues, such as sub-contracting and technological changes, that have been important features of much recent structural change. *Working Futures* therefore sets out a carefully considered view of what the future might look like. It is not intended to be prescriptive.

RMDM solves as a single system in which macroeconomic results are built up from the more detailed results at sectoral and regional level.⁹ The long-term growth rate for the economy therefore reflects the expected performance of individual industries. This includes their rates of productivity growth and the demands for their output (including their international trade performance).¹⁰ The model is a combination of orthodox time-series econometric relationships and cross-sectional input-output relationships.

Aggregate demand is modelled in a Keynesian manner, with a consumption function and investment equations. However, the model also includes equations for average earnings by industry and region. Other aspects of the supply side come in through the export and import equations, in which capacity utilisation affects trade performance. 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.

The demand for labour is therefore seen as a derived demand which depends critically on developments in the markets for goods and services and the technologies used to produce them.

General industrial prospects are analysed in Chapter 2. A more detailed analysis is presented in Chapter 4 for each of the 25 Industry Groups.

In order to meet the needs of all users, the present analysis is at a very detailed level, exploiting the 41 industries used in RMDM, which are defined by reference to the availability of data on input-output flows. To meet the needs of sectoral users all the two-digit categories of the 2003 Standard Industrial Classification (SIC2003) have been distinguished, as well as some other, more detailed categories, resulting in 67 industries in total. In addition, results have been developed for 47 Local Learning and Skills Council (LLSC) areas. This results in the most detailed and extensive set of employment projections available for the UK. Further details of sources and methods are given in Annex A and in the accompanying *Technical Report*.¹¹

The approach also includes analysis to consider changes in occupational employment and replacement demand. The latter takes into account those who leave employment due to retirement and the like, as well as the growth and decline

⁹ A comprehensive account of an earlier version of the model is given in Barker and Peterson (1987). This book, along with a series of updates in CE's *Industry and the British Economy*, remains the main reference on the workings of the CE macro-economic model. A full description of the current approach to developing the employment projections can be found in Wilson *et al.* (2006b).

¹⁰ This contrasts with a 'top down' approach, in which the long-term rate of growth in UK Gross Domestic Product (GDP) is made as an assumption, which then drives projections for sectoral output and employment growth, which in turn drive projections for regional performance.

¹¹ *Technical Report 2007-2017* (Wilson *et al.*, 2008)

in sectors. These are described in more detail in the next section.

1.4 Occupational Employment Projections and Replacement Demands

The present report provides detailed projections of industrial and **occupational employment levels**. The occupational model is built around a series of employment matrices distinguishing the 67 detailed industries (SIC92/2003) and the 25 sub-major occupational groups based on the SOC 2000 occupational classification. A brief summary of the methods used to generate these projections are given below. Further technical information on sources and methods can be found in the supporting annexes and in the separate *Technical Report*.¹²

The occupational projections are developed using largely extrapolative methods, based on data from the 2001 Census of Population and Labour Force Survey (LFS) releases up to 2007. The occupational results are summarised in Chapter 3.

Changes in occupational employment levels between years are also analysed to show changes due to **replacement demand**. This takes into account the need to replace those who leave their jobs because of retirement or other reasons. These 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 recruitment requirement. These estimates are based on quite limited data on age structures and flow rates from the LFS. They should again be regarded as indicative rather than precise indications of the likely scale of replacement demands. These results are presented in Chapter 3. The key message here is that replacement demands are

likely to be much more significant in terms of education and training requirements than expansion demand, even where the latter is quite large.

1.5 Data Sources

The results incorporate the latest sectoral employment data from ONS, including the 2006 Annual Business Inquiry. They also take account of the latest LFS information (2007 Q4 release), as well as the 2001 Census. These new data provide insights into recent trends in sectoral employment, as well as other aspects of employment structure, such as the gender and status mix of employment and changing occupational shares.

Based on these data, the latest results reflect a number of emerging features including:

- higher than previously estimated historical levels of employment;
- faster increases in the male share of employment than previously estimated;
- revised assessments of the prospects for a number of occupational categories in the light of the latest LFS and other data.

The results do not include a full analysis of the uncertainties associated with the short-term impact of the credit crunch and other related external shocks to the economy.

Further information about data sources and methods is presented in Annex A of the present document and in greater detail in the separate *Technical Report*.¹³

1.6 Macroeconomic and General Labour Market Context

The macroeconomic prospects for the UK provide the context for the detailed forecasts of employment examined in

¹² *Technical Report 2007-2017 (Wilson et al., 2008)*

¹³ *Technical Report 2007-2017 (Wilson et al., 2008)*

subsequent chapters of this report, including the prospects for individual sectors which are summarised in this chapter. A detailed multi-sectoral dynamic macroeconomic model (MDM)¹⁴ was used to produce these macroeconomic projections.

The design of the model does not impose market-clearing in the labour market, rational or consistent expectations, or a policy reaction function in response to outcomes for target indicators. The model is therefore capable, in principle, of producing scenarios in which certain combinations of assumptions produce an unsustainable outcome (e.g. steadily increasing budget or trade deficits).

However, the case adopted as the basis for these projections represents a sustainable and plausible medium term outcome on the basis of the experience of the recent past and longer term trends. It draws on the long-term forecasts prepared by Cambridge Econometrics (CE) as part of its regular commercial forecasting services. These projections have been presented and discussed with subscribers to CE's forecasting services. Together, these represent a broad range of private and public sector organisations.

Table 1.1 summarises the main features. The economy is assumed to stage a reasonably prompt recovery and to settle down to a pattern of modest output growth, with only moderate rates of inflation. Over the decade to 2017 measures of economic output such as *Gross Domestic Product (GDP)* and *Gross Value Added (GVA)* are projected to display average growth rates of just below 2½ per cent per annum.

The main exogenous variables in the macroeconomic model are:

- world growth in GDP;

- world inflation (GDP deflators and prices of traded goods including oil);
- UK population and natural resources (including coal, oil and natural gas);
- current and capital spending of the UK government;
- UK tax rates and allowances;
- the sterling-dollar and other exchange rates;
- UK and US interest rates.

In many cases these assumptions are developed at a very detailed level, distinguishing different commodities and types of spending and many parts of the world. In combination, these assumptions drive the path of demand for the output of goods and services produced by the UK at a very disaggregated level.

World Economy and Other External Drivers

At the time of preparing these projections (the summer of 2008), the economic outlook for the world economy was very uncertain. It remains unclear whether the losses associated with the credit crunch have fully worked their way through the world financial system or still more might be uncovered. Following the virtual collapse of the world financial system prospects remain depressed. Considerable uncertainty remains about prospects for the world economy and its implications for the UK.

The slowdown resulting from the credit crunch has been compounded by inflationary pressure in the world's major economies. The greatest inflationary pressure has come from the increasing cost of oil, reinforced by increases in the cost of foodstuffs. For other fuels, raw materials and produce, rising demand from developing nations such as China and India is likely to mean that, while inflationary pressure may weaken to some extent, higher inflation relative to that experienced over the past ten years is likely to continue into the medium term.

¹⁴ For a detailed technical description of MDM see the separate *Technical Report* (Wilson *et al.*, 2008)

This situation of simultaneously stagnating growth and rising inflation presents central banks throughout the world with a difficult problem to resolve. Most central banks employ a monetarist approach to macro-economic management which sees manipulation of the interest rate as almost the sole device by which the economy is steered. However, adjusting the interest rate cannot combat both slowing growth and rising inflation simultaneously. This reduces governments' room for manoeuvre and may prolong any downturn.

In addition, attempting to stimulate the economy by reducing the interest rate can only be effective if those reductions are passed on to the consumer in the form of lower charges for credit. Banks remain reluctant to pass on central bank reductions in interest rates as, in some cases, they wish actually to deter borrowing in order to prevent further exposure at a time of uncertainty.

Table 1.1: Macroeconomic Indicators for the UK

	Historical Trends		Projections	
	1997-02	2002-07	2007-12	2012-17
GDP at Market Prices (% pa)	2.9	2.6	2.4	2.5
GVA at Basic Prices (% pa)	2.9	2.8	2.4	2.5
excl. Extra-Regio (% pa)	2.9	2.9	2.4	2.6
Manufacturing Output (% pa)	-0.2	0.8	1.1	1.4
Household Expenditure (% pa)	3.9	2.6	2.4	2.6
Employment (jobs, millions)	30.0	31.4	32.4	33.4
Unemployment (claimants, millions)	0.9	0.9	1.0	1.0
CPI Inflation (% pa)	1.2	1.9	1.9	1.9
BP/GDP (%)	-1.6	-4.8	-2.7	-2.2
PSNCR/GDP (%)	1.8	2.7	2.3	2.3

Source: CE/IER estimates; CE projections MDM C81F9A (revision 900) Chapter2 Tables_Charts.xls, (Table 2.1).
Notes:

(a) GDP = Gross Domestic Product

(b) GVA = Gross Value Added

(c) Extra-Regio = includes contribution to GVA of UK embassies abroad, UK forces stationed overseas and elements relating to activities taking place on the continental shelf.

(d) RPIX = Retail price index excluding mortgage interest payments

(e) The balance of payments (BP) and the public sector net cash requirements (PSNCR) are expressed as a percentage of GDP at current prices

(f) Employment, unemployment, RPIX, BP/GDP and PSNCR/GDP refer to the last year of the period concerned.

(g) Employment is total workplace employment (jobs) and includes HM Forces.

(h) Unemployment is the claimant measure. Some other tables use an ILO definition.

1.7 General Labour Market Prospects

Employment

Employment can be defined and measured in a variety of ways:

- jobs;
- numbers of people in employment (heads);
- by area of workplace; and
- by area of residence.

In most of *Working Futures 2007-2017*, the term employment is used to refer to the number of jobs located in a particular area (generally where the workplace is located). This corresponds to the definitions used in *Working Futures 2004-2014*. Box 1.1 provides more detailed definitions.

Between 2007 and 2017, the total employment (head count) in the UK labour market (including H.M. Forces) is projected to rise from an estimated 28½ million to 30¼ million (see Table 1.2). The total number of jobs is projected to rise by just under 2 million.

Employment by Gender and Status

Females account for just under half of total employment, but their increasing share has slowed recently. Figures 1.1 and 1.3 illustrate that the majority of additional jobs over the coming decade are expected to be taken up by men. In particular, there will be a relatively large increase in the number of part-time employed men. For women, the new jobs are expected to be more equally distributed between full-time and part-time.

Self employment currently accounts for about 13 per cent of all jobs. Self-employment among men is expected to rise slightly over the coming decade. However, there is expected to be a somewhat larger increase in the number of self-employed women over the same period. Figure 1.2 shows the proportions of total employment by status for men and women in the UK in 2007. Figure 1.3

presents projected changes in employment in the UK by status for the decade to 2017.

Population and the Labour Force

Over the period 2002-2007, the UK total resident population increased by 1.7 million (2.8 per cent) to 60.9 million (see Table 1.2). A proportionately larger increase of 4.1 per cent occurred in the working-age population, attributable in part to net inward migration. This was reflected in a 3.6 per cent increase in the size of the labour force to 30 million in 2007. Overall labour market participation, or activity rates, over this period remained unchanged at around 61 per cent. The female activity rate rose slightly, while for males it fell by about 1.5 pp. Consequently, while the male labour force increased by just over 2½ per cent, the female labour force increased by about 5 per cent (see Table 1.2).

Similar patterns are expected over the next decade. The demographic assumptions embodied in the forecast are based on the official 2006-based UK population projections which were published in October 2007. The UK population is projected to rise from just under 61 million in 2007 to 65 million in 2017, a rate of growth of just under ¾ per cent per annum.

The workforce is projected to grow somewhat less rapidly than the working age population up to 2017, partly because the population of working age is expected to grow more slowly than the total population (see Figure 1.4). By 2017, the overall labour market participation rate is projected to be very similar to what it is currently of just over 60½ per cent.

Since 1999, there has been a fall in the number of children in the population alongside a continuing steady rise in the number of pensioners. Over 2002-07, the number of children declined by 2.3 per cent while the number of pensioners rose by 6 per cent.

The fall in the number of children has been slowing in recent years, and the number is expected to start rising again by 2010, so that by 2017, the number of children is projected to be almost 6 per cent (650,000) higher than in 2007. At the same time, the number of people of pensionable age is expected to have risen by over 20 per cent (more than 2m).

The rise in males of pensionable age is expected to be faster than the rise in females. In the long term, the female pension age is being raised gradually towards the present male pension age of 65 (this will take place between 2010 and 2020). This will, of course, reduce the number of females of pensionable age during the last five years of the forecast period. The effect is also to increase the rate of growth of the population of working age after 2010 and result in a slight increase in the female activity rate. The increase in women's pensionable age has been incorporated in the model at both national and regional levels.

Employed Residents (head count) and ILO Unemployment

Over the period 2002-2007, the number of residents in employment (head count) increased by 1 million (3½ per cent). This rise was about the same as that seen in the labour force over the period, and so

the numbers unemployed (ILO definition) remained relatively unchanged (see Table 1.2). Box 1.1 provides more detailed definitions of the terms.

For females, the number of employed residents (head count) increased from 12.7 million in 2002 to about 13.2 million over the same period, while the corresponding figure for males increased slightly more slowly, from 14.8 million to 15.2 million.

The employment head count is expected to rise by over 1.6 million between 2007 and 2017, with the number of females rising most (by just under a million).

The male unemployment rate (ILO definition) fell by about 0.3 per cent over the 2002-07 period whereas, in contrast, the female unemployment rate (ILO definition) increased by 0.3 per cent.

Over the next decade to 2017, in the case of both male and female ILO unemployment rates, an increase of about ½ per cent is expected, taking male unemployment to about 6 per cent and female unemployment to 5½ per cent. However, this disguises what is likely to be a much more substantial increase in the short term, followed by a recovery.

Box 1.1: Definitions of Employment and Related Labour Market Indicators**Alternative Definitions**

There are various ways of looking at employment. For example, a distinction can be made between the number of people in employment (head count) and the number of jobs. These two concepts represent different things, as one person may hold more than one job. In addition, a further distinction can be made between area of residence and area of workplace.

Similarly there are various different definitions of unemployment, the labour force, workforce and population. In *Working Futures 2007-2017* the following definitions are used:

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

Workplace basis: measured at place of work (as in the Annual Business Inquiry (ABI)).

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

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

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

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

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

Labour Force: employed residents plus ILO unemployment.

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

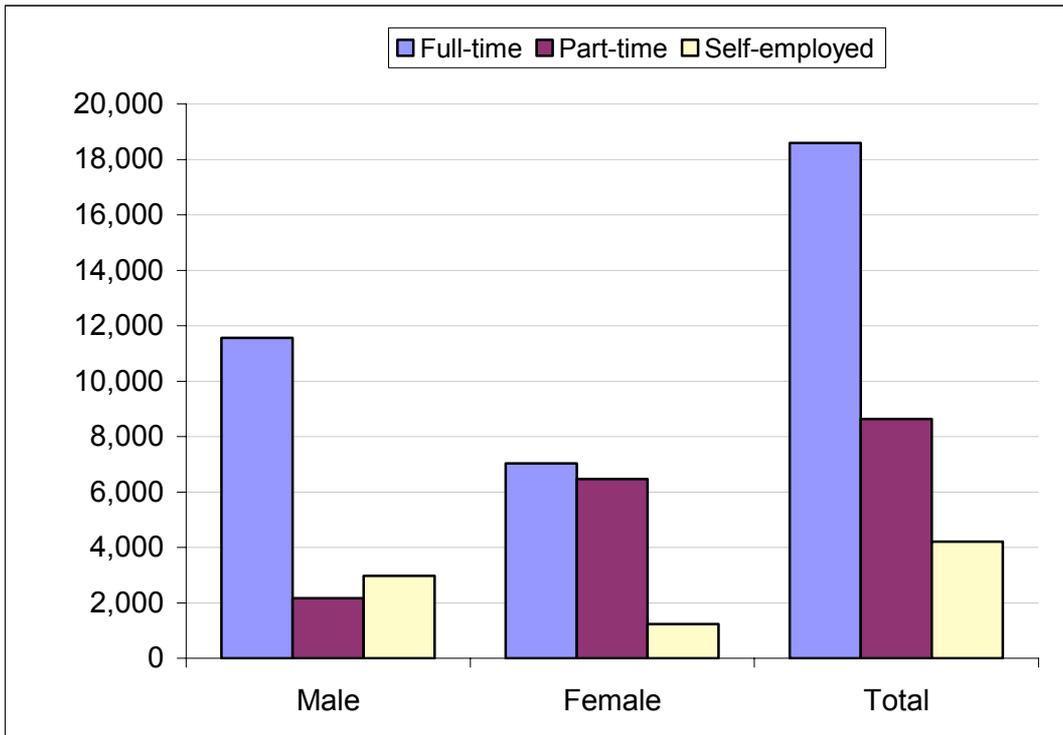
Labour Market Accounts Residual: workplace employment minus Residence employment. The main cause of the residual at national level is "double jobbing". At a more disaggregated spatial level, net commuting across geographical boundaries is also very significant. The difference will also reflect data errors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

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

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

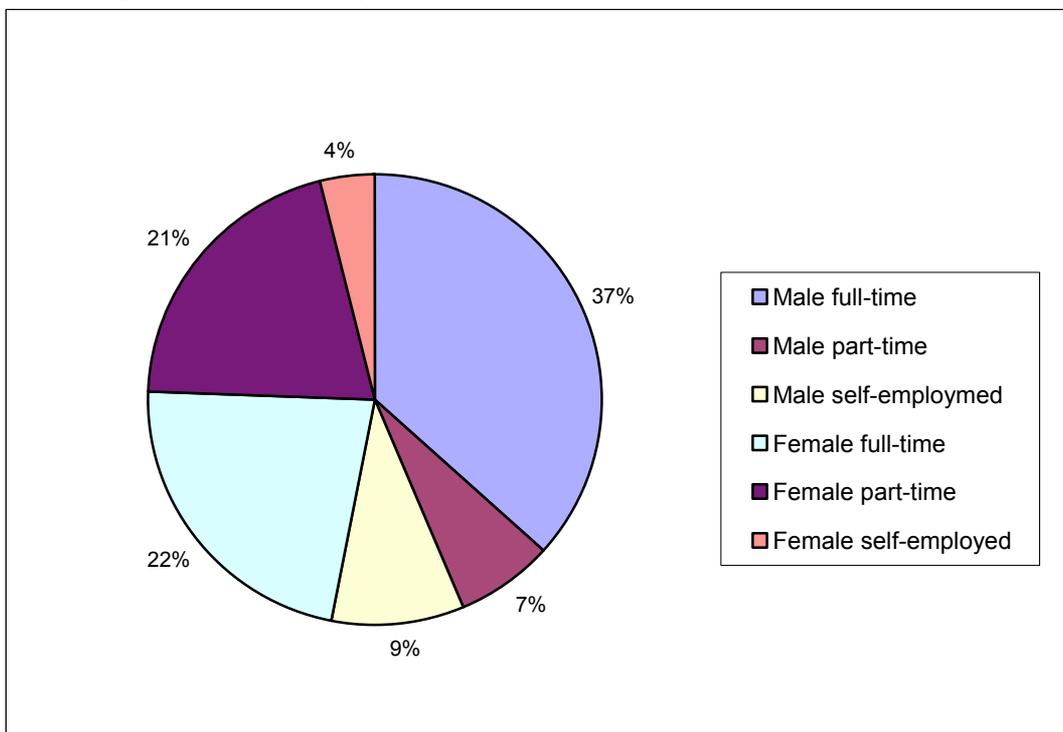
Working-age population: the total number of people aged 16-65 (males) or 16-60 (females), (residence basis).

Figure 1.1: Employment Status in the UK, 2007 (000s)



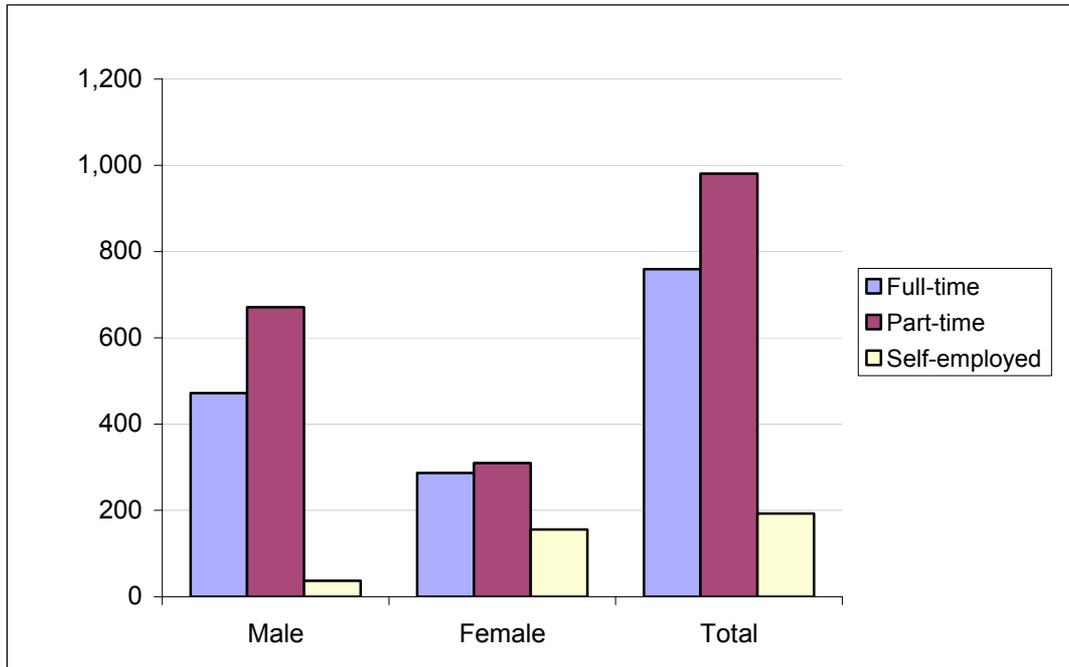
Source: CE/IER estimates; CE projections MDM C81F9A (revision 900), Chapter2 Tables_Charts.xls, (Figures 2.1-2.6).

Figure 1.2: Employment Status in the UK, 2007 (% shares)



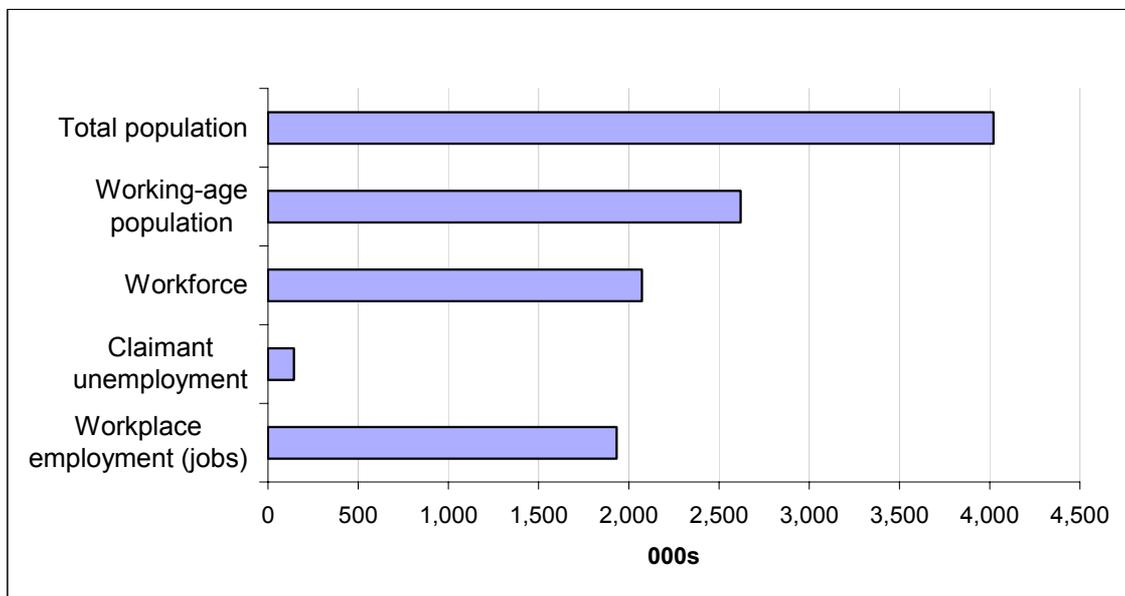
Source: CE/IER estimates; CE projections MDM C81F9A (revision 900), Chapter2 Tables_Charts.xls, (Figures 2.1-2.6)

Figure 1.3: Changes in Employment in the UK by Status, 2007-17 (000s)



Source: CE/IER estimates; CE projections MDM C81F9A (revision 900), Chapter2 Tables_Charts.xls, (Figures 2.1-2.6).

Figure 1.4: Changes in Key Labour Market Indicators for the UK, 2007-17 (000s)



Source: CE/IER estimates; CE projections MDM C81F9A (revision 900), Chapter2 Tables_Charts.xls, (Figures 2.1-2.6).

Table 1.2: Population and Labour Force in United Kingdom

Male	000s						percentage change over period		
	2002	2007	2012	2017	2002-07	2007-12	2012-17		
Population	28,964	29,914	31,027	32,122	3.3	3.7	3.5		
Population 16+	22,927	24,017	25,050	25,904	4.8	4.3	3.4		
Labour force	15,734	16,125	16,517	16,933	2.5	2.4	2.5		
Activity rate (%)	68.6	67.1	65.9	65.4	-1.5	-1.2	-0.5		
ILO Unemployment	901	874	1,051	1,019	-3.0	20.2	-3.0		
ILO Unemployment rate (%)	5.7	5.4	6.4	6.0	-5.3	17.4	-5.4		
Employment (head count)	14,834	15,251	15,467	15,914	2.8	1.4	2.9		
Labour market residual	1,102	1,448	1,810	1,965					
Female									
Population	30,360	31,077	31,958	32,889	2.4	2.8	2.9		
Population 16+	24,611	25,463	26,259	26,950	3.5	3.1	2.6		
Labour force	13,308	13,960	14,664	15,064	4.9	5.0	2.7		
Activity rate (%)	54.1	54.8	55.8	55.9	0.7	1.0	0.1		
ILO Unemployment	615	684	822	799	11.1	20.2	-2.8		
ILO Unemployment rate (%)	4.6	4.9	5.6	5.3	5.9	14.5	-5.4		
Employment (head count)	12,693	13,276	13,842	14,266	4.6	4.3	3.1		
Labour market residual	1,356	1,457	1,271	1,220					
Total									
Population	59,324	60,991	62,984	65,011	2.8	3.3	3.2		
Population 16+	47,539	49,480	51,309	52,853	4.1	3.7	3.0		
Labour force	29,042	30,085	31,181	31,998	3.6	3.6	2.6		
Activity rate (%)	61.1	60.8	60.8	60.5	-0.3	0.0	-0.3		
ILO Unemployment	1,516	1,558	1,873	1,818	2.8	20.2	-2.9		
ILO Unemployment rate (%)	5.2	5.2	6.0	5.7	-0.8	16.0	-5.4		
Employment (head count)	27,527	28,527	29,308	30,180	3.6	2.7	3.0		
Labour market residual	2,458	2,905	3,081	3,185					

Source: CE/IER estimates; CE projections MDM C81F9A (revision 900), Chapter2 Tables_Charts.xls, (Table 2.2)

(1) Levels are in thousands except for the activity rate, which is in percentages.

Changes are percentage difference over the period except for the activity rate which are percentage points.

(2) Labour Market Residual is the difference of employment (number of jobs) and head count employment

1.8 Macroeconomic Uncertainties

There are a number of areas of uncertainty affecting the macro-economic forecast. These relate to the fall out from the financial crisis, including impacts on the housing market, upward pressures on oil and other commodity prices, and the weakness of the dollar. The current economic circumstances make forecasting a particularly difficult task.

Sharper correction to the housing market

The economy has been hit by a barrage of financial and economic problems simultaneously. The Bank of England's room for manoeuvre is very much limited by the fact that a slowdown is occurring at the same time as increasing inflation. The Bank must be wary not to over compensate and reduce interest rates too far in an attempt to stimulate the economy, as this could lead to even further inflationary problems over the medium term. Similarly, the scope for the government to stimulate the economy through fiscal means is limited due to the currently high level of government borrowing.

Continued pressure on oil prices and the prolonging of the dollar's weakness

Despite the recent volatility, it is likely that higher oil and commodity prices are here to stay. Some analysts claim that peak oil production has already passed, while many others suggest that if this is not already the case it will shortly be so. At the same time, demand from developing nations, in particular China, is increasing rapidly meaning that there will be heightened demand for a dwindling supply of oil. It is by no means inconceivable that the price of oil could reach \$200 a barrel at some point between 2007 and 2017, although a much smaller increase in the oil price of about 1½-2 per cent per annum, from the current high levels, is regarded as the most likely scenario.

The Credit Crunch

The uncertainties associated with the global credit crunch make it a particularly challenging time to make economic forecasts. The current economic crisis makes it especially difficult to manage the economy, in that interest rates, which are the main central bank tool employed for steering the economy are not as effective as they would be normally. This is for two reasons. Firstly, the economy is suffering a period of slowdown and increased inflation simultaneously, rendering it very difficult to combat both at the same time using a single instrument (the interest rate). Secondly, the banks were still, in some cases, failing to pass on central bank reductions in the interest rate.

This second problem relates to a further feature of the current difficulties which makes it very difficult to predict how long they will persist. A significant part of the financial problems associated with the credit crunch arises from a loss of trust. Banks do not trust that other banks have disclosed the true extent of their losses associated with sub-prime lending, or do not trust that other banks are even totally aware of the extent to which they are exposed to these.

For this reason, not only have central bank reductions in the interest rate not been passed on to consumers in their entirety, they have also failed to bring about greater inter-bank lending to some extent as a result of this loss of trust. This situation will only be completely eased when banks are confident that all other banks have become aware of and disclosed the full extent of their losses associated with sub-prime lending. However, it is difficult to predict when this will be the case.

For such a recovery to occur it is not only necessary for the loss of trust in the banking sector to dissipate but also for consumer confidence to return. The longer the effects of the credit crunch persist the greater the impact on house prices and, as a result, consumer confidence.

A more recent macro forecast, developed by Cambridge Econometrics after the main scenario for *Working Futures* was completed, suggested a slower rate of GVA growth for the UK as a whole of just 1.7 per cent in the short term (2007/08) compared to 3.1 per cent in the present results. As a result employment (job) growth in the short term in this scenario is just 0.2 per cent per annum (compared to 0.6 per cent in the current projections). However, the longer-term prospects remain much the same as in the scenario presented here.

1.9 Comparison with Previous Forecasts

Working age population

The previous *Working Futures* forecast suggested that the working-age population would increase by just over 1¾ million between 2004 and 2014. The current forecast, by contrast, suggests that the working-age population will now increase by rather more than 2½ million between 2007 and 2017. The current forecast incorporates ONS 2006-based population projections in which projected population growth has been revised upwards, due principally to assumed higher levels of net in-migration.

Overall prospects for employment

The previous set of *Working Futures* forecasts for 2004-2014 were for an increase in employment (head count) of around 1 million over that period. The present projections suggest a larger increase in employment (head count) of just about 1.65 million between 2007 and 2017.

Similarly, the alternative measure of employment rates, workplace employment (jobs), was previously forecast to increase by about 1¼ million between 2004 and 2014, whereas between 2007 and 2017 it is now forecast to increase by just less than 2 million (see Figure 1.3).

The faster employment growth in the latest projections, despite an overall more

pessimistic short-term outlook, is the result of several factors:

i) Greater level of population and faster population growth

In 2006, UK population is now estimated as some 280,000 higher than it was when *Working Futures 2004-2014* was carried out, while the working-age population is some 310,000 higher, indicating that the increase is concentrated in the part of the population more likely to be economically active. Higher levels of population create greater demand for goods and, especially, for services. The larger size of the working-age population also creates a pool of workers for companies to draw upon. The official change in retirement age for women will also have an impact on economic activity rates. Likewise, some older men who were previously expected to retire earlier may decide to remain economically active (although these will probably be mainly employed in part-time jobs).

The population and working-age population are also projected to grow faster than in the previous projections (reflecting the latest official UK 2006-based projections). These incorporate the latest data on higher net- (in) migration, higher fertility rates and longer expectation of life.

ii) Historical Employment Estimates have been revised upwards

The estimate of employment (jobs) for 2006 in *Working Futures 2007-17* is about 650,000 higher, with employment in services about 850,000 higher, than in *Working Futures 2004-2014*. This will imply higher shares for part-time employment. Revisions in employment (jobs) also result from the inclusion of second jobs for self-employed, which were not included in the past. This will have some impact on part-time jobs.

Employment growth has also been more rapid in many sectors in recent years than previously estimated notably in business

and other services. In principle, this may have an impact on the model via re-estimated employment equations. However, the net impact in terms of the resulting increase in employment (jobs) over 2002-2007 is 880,000, which is virtually identical to that predicted in *Working Futures 2004-14*.

iii) Better medium term output prospects

Working Futures 2007-17 also has faster output growth than in *Working Futures 2004-14* for the projection period, despite the gloomier short-term outlook. The output growth rates used in the latest projections are higher than the 2004-14 projections by between 0.1 and 0.2 per cent per annum over the period 2010-14. This faster growth overall is mainly due to faster output growth projected in service sector industries such as business and other services. The present projections also take account more explicitly of major infrastructure developments such as the Thames Gateway and, the Cross Rail projects, and the 2012 Olympics.

Prospects by gender and employment status

Male employment (head count) is expected to increase by about $\frac{3}{4}$ million over the next decade. In contrast, in the previous projections it was expected to increase by about $\frac{1}{2}$ million between 2004 and 2014. Female employment (head count) was similarly expected to increase by about $\frac{1}{2}$ million between 2004 and

2014, but now is projected to increase by around 1 million between 2007 and 2017.

The increase in male employment between 2007 and 2017 is expected to be in the form of part-time employment in the majority of cases. Just over a third of the increase in male employment between 2007 and 2017 is forecast to be for full-time employees. By contrast, the increase in female employment forecast for the period is expected to be more evenly distributed between full-time and part-time employment.

In contrast, in *Working Futures 2004-14*, full-time male employment was projected to increase by more than part-time employment while the opposite was forecast for females. For both genders, the number of self-employed was projected to fall between 2004 and 2014.

The modelling of the split between full-time and part-time by industry is slightly different than in *Working Futures 2004-14*. The basic approach of extrapolating forward recent patterns of change at a detailed sectoral level remains unchanged, but the results have been scrutinised in order to avoid some problems that were identified with the *Working Futures 2004-14* results. This involved smoothing out some odd results in particular sectors. These reflected statistical “noise” rather than real change. In addition, the latest data from the 2006 ABI suggest a more marked shift in favour of males than the previous trends based on ABI data up to 2003.

2. Sectoral Employment Prospects

Key Messages

- Following the effects of the “credit crunch”, the short-term outlook over the next 2-3 years is uncertain. This set of projections focuses on medium to longer term trends.
- Sectoral prospects depend upon the changing patterns of demand for the goods and services that they produce and provide. The key factors underlying these developments (technological change, globalisation and international competition) are summarised in this chapter.
- The results suggest a continuation of the long established trend away from employment in primary and manufacturing industries and in favour of the knowledge economy and services more generally.
- The changing patterns of employment by gender and employment status are also examined.
- In contrast to recent trends the rising share of females in employment is projected to flatten out, with females accounting for just under half of all jobs.
- Part-time working is projected to continue to grow in importance in terms of the share and overall number of jobs.
- The picture for self employment is much more mixed with growth in some sectors but declining shares in others (the latter often linked to tax and other regulatory changes).

2.1 Introduction and Context

This chapter presents an overview of sectoral employment change, highlighting the key drivers, the main features of these developments and implications for the structure of employment. The projections are presented at a variety of different sectoral levels. The present chapter focuses upon broad sectoral prospects. A more detailed analysis of industrial prospects can be found in Chapter 4, which explores occupational changes within more detailed industry categories.¹⁵

The categories used preserve the traditional manufacturing, services and public sector groupings of the economy and are consistent with those adopted in previous *Working Futures* projections. They are hierarchically related, with the 6 broadest sectors being a more aggregated grouping of the 14 sectors and these being disaggregated into 27 industries. These are all defined by the 2003 Standard Industrial Classification (SIC 2003).

¹⁵ Some of the 27 industry groups were too small to enable a robust analysis. Mining & quarrying and Electricity, gas & water and Wood & paper and Printing & publishing have therefore been aggregated together here and in Chapter 6 to give 25 industries. Where the data are sufficiently robust, detail for the sub-component categories is provided.

Section 2.2 begins with a brief review of the patterns of change for the 6 **broad sectors** over the past few years and their prospects for the next decade. A more detailed analysis of sectoral prospects for output is presented in Section 2.3. This presents results for 14 **sectors**. Section 2.4 focuses upon employment for the same sectors.¹⁶ The discussion then goes on to draw out the prospects for the more detailed **industries** (although these are discussed at greater length in Chapter 4). Section 2.5 presents an overview of changing employment patterns by gender and status within the **broad sectors**.

The reasons for the changing fortunes of different sectors are complex and inter-related. **Box 2.1** sets out some of the main drivers of sectoral changes over the past few decades and how these have affected different parts of the economy. Many of these factors are expected to continue to exert their influence over the coming decade. This is encapsulated in the projections from the multi-sectoral macroeconomic model.

¹⁶ As used by ONS for reporting at regional level. In practice, this has sometimes been extended here to 16 categories, by providing additional detail within manufacturing.

Box 2.1: Key Drivers of Sectoral Change

Key Drivers: There have been major changes in the structure of employment across all developed economies over the past half-century. This has been the consequence of a complex mix of interdependent factors. These include: technological change; productivity growth; international competition; globalisation; specialisation and sub-contracting; regulatory and legislative changes; economic growth and the associated increases in real incomes; and related shifts in patterns of expenditure.

Technological change, and in particular the integration, and rapid and widespread use, of information and communication technologies (ICT) has heightened competition through effectively 'collapsing' time and space. It also transforms competitive advantage, speeds up the process of economic change, and changes the organisation of work and how goods and services are produced. It has led to the development of a huge range of new processes, products and services, including the internet, e-commerce and other advanced forms of telecommunication. This has had major implications for industrial employment structure, benefiting computing and other business services and to a lesser extent the manufacturing of electronic products. The impact of ICT in financial services is an example of a more negative impact, as ways of producing and delivering the services have changed dramatically, resulting in some sharp job losses as productivity levels have soared. ICT has also resulted in increased demands for IT skills across all sectors and occupations.

Productivity growth is the key to maintaining competitiveness and long-term sustainable economic growth, representing as it does, the growth in the value of the goods and services produced per person employed.

International competition has been a key feature of recent structural change, with many industries failing to keep pace with developments in other countries or to combat the cost advantages of low wage producers from overseas such as India and China. The overall decline of the UK textile industry is a good example of this phenomenon.

Globalisation has become a major factor in recent years, with many companies operating across international boundaries. The process of globalisation is increasingly opening up local and regional economies and integrating them into both the national and the international economies. This integration takes the form of increasing connections and interdependency through: increased international trade (and inter-regional and inter-locality trade); increased international capital movements, including foreign direct investment (which also increases regional and local integration); and increased inter-firm collaboration in technology and product development. The development of global brands is one important aspect of this process. This increases both competitive pressures and opportunities, by progressively eliminating barriers to competition and widening the sphere within which market competition takes place. This then increases market opportunities but penalises those unable to compete effectively on this wider playing field. It makes it exceptionally difficult for relatively high wage economies to compete on costs and prices and has resulted in an increasing shift to higher value added, higher productivity goods and services in the more developed economies that have high information, knowledge, creativity and / or innovation components that are less easily replicated in lower wage economies. Globalisation homogenises the availability of factors of production over time, leaving the skills and capacities of the workforce as the key differentiating factor in competitiveness. It forces adaptation to changing market conditions and increases the importance of skills as a differentiating feature in competitive markets, especially if an area or nation is moving up the 'value added' chain in order to compete effectively.

Globalisation can both accentuate or moderate the forces of international competition, depending upon the locational choices made by such companies. The decisions of Toyota and Nissan to build factories in the UK (as well as the involvement of other international players such as Ford and BMW) was a key factor in stemming the downward trend in the UK motor vehicles industry, which was in imminent danger of collapse only a few years ago.

Specialisation and sub-contracting, including extension of supply chains, is also a key issue, with both international and domestic dimensions to it. Many functions such as cleaning and catering, as well as higher level activities such as research and development and design, have been hived off from the mainstream activities of many producers. This has at the same time accelerated the decline of employment in sectors such as manufacturing, while contributing to the growth of many parts of the service sector.

Regulatory and legislative changes, as well as other aspects of public policy, can also play an important role in changing the patterns of demand for goods and services and patterns of competitive advantage. Environmental legislation and rules, health and safety, as well as the more obvious rules and regulations under which international trade is conducted, can all play a significant role. More generally, much public policy, at least in the advanced economies, is aimed at supporting the rapid innovation and diffusion of technology and the process of globalisation. For example, the continuing development of the European Union, including the process of establishing free internal trade, the free flow of capital and for some countries at least, a single monetary policy, currency and exchange rate, are designed to strengthen and deepen the process of economic integration in Europe.

Economic growth and the associated increase in real disposable incomes have had a significant affect on patterns of expenditure. Many basic items now take up only a small part of most consumers' budgets whereas there is more scope for spending on the other goods (including leisure and tourist activity).

Changing patterns of expenditure have resulted from all the above factors. These include large shifts in the pattern of *international trade*, as low cost producers from the Far East have captured larger shares of domestic markets, as well as shifts in the patterns of *consumer demand*. The growth in real incomes has been a key driver of the latter but these patterns have also been influenced by technological changes, for example the dramatic growth in air travel, as well as the developments of new products and services linked to IT.

Together, these changes have resulted in the demise of many major areas of employment in the UK. In particular, there have been dramatic job losses in: agriculture, forestry and fishing; coal mining; and most parts of manufacturing. While these industries remain important in terms of output levels and in providing the foundation upon which much tertiary activity is based, they no longer employ large numbers of people. In contrast, there have been major increases in employment in many other areas. These include, especially, those sectors involved in processing and handling information, and those providing services to both consumers and businesses. Personal services, associated with tourism, leisure & the media, and health & education services have been particularly important for consumers, while for businesses, financial and accountancy services, as well as research design and development activities, have been key areas of growth.

The complex mix of phenomena that have resulted in these past patterns of structural change is reflected in the detailed multi-sectoral model used to project future trends. The model reflects the various sources of demand for goods and services. It also incorporates the various technical linkages between different sectors, including the impact of technological change on productivity levels, as well as the effects of changes in the way activities are classified as a result of the sub-contracting out of many functions. The model explains these phenomena by a complex set of behavioural equations. These relate the derived demand for labour to the prospects for output growth in each sector and the relative costs of labour and other inputs. For further details see Annex A.

2.2 General Prospects by Broad Sector

Overview of the results

Tables 2.1 and 2.2 and Figures 2.1-2.3 summarise the long-term forecasts for six **broad sectors** within the economy, focusing on developments in aggregate output and employment over the decade to 2017.

The top panel of *Table 2.1* shows how the structure of the economy has changed over the past two decades in terms of output. The second two panels show the historical patterns of change in output and the expected future prospects. The middle panel presents annual growth rates, while the lower panel shows the total percentage change over the period covered. *Figure 2.1* also shows the annual rates of growth over the three decades.

Table 2.1: Output by Broad Sector, 1987 – 2017

Shares (%)	1987	1997	2007	2012	2017
Primary & utilities	4.0	3.5	2.8	2.5	2.3
Manufacturing	20.6	18.7	13.9	13.1	12.3
Construction	7.5	6.8	6.2	6.0	5.8
Distribution, transport etc	21.4	22.5	24.5	24.7	25.0
Business & other services	24.4	28.2	34.8	36.0	37.2
Non-marketed services	22.1	20.3	17.9	17.8	17.4
Total	100	100	100	100	100

Growth (% pa)	1987-97	1997-07	2007-12	2012-17	2007-17
Primary & utilities	1.2	0.8	0.4	0.9	0.7
Manufacturing	1.3	0.3	1.1	1.4	1.3
Construction	1.3	2.3	1.8	2.0	1.9
Distribution, transport etc	2.8	4.2	2.7	2.8	2.7
Business & other services	3.7	5.5	3.1	3.3	3.2
Non-marketed services	1.4	2.0	2.3	2.2	2.3
Total	2.3	3.3	2.5	2.6	2.5

Growth (% total)	1987-97	1997-07	2007-12	2012-17	2007-17
Primary & utilities	12.2	8.1	2.2	4.5	6.8
Manufacturing	13.6	3.0	5.8	7.1	13.3
Construction	13.5	25.6	9.3	10.4	20.7
Distribution, transport etc	31.7	50.2	14.1	14.9	31.2
Business & other services	44.3	70.7	16.8	17.5	37.2
Non-marketed services	14.7	21.8	12.1	11.6	25.2
Total	25.1	38.2	12.9	13.7	28.4

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725output.xls (Table 3.1).

Notes: a. The Broad Sectoral groupings are defined in Annex, Table A.8.

b. Non-marketed services and the total include H.M Forces which are excluded from most other tables.

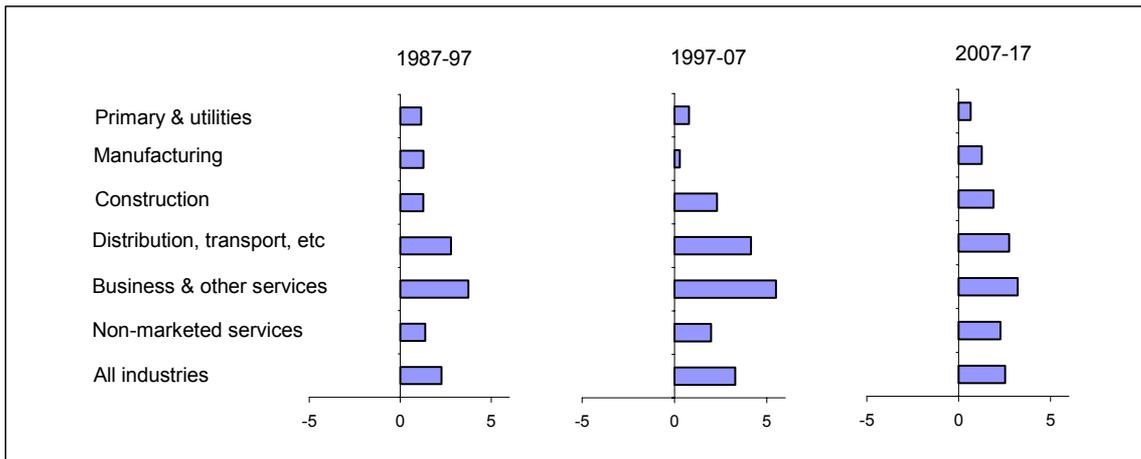
Table 2.2: Employment by Broad Sector, 1987-2017

	1987	1997	2007	2012	2017
Levels (000s)					
Primary sector & utilities	1,106	814	633	564	503
Manufacturing	5,165	4,473	3,181	2,957	2,750
Construction	1,990	1,730	2,187	2,285	2,361
Distribution & transport	7,419	8,203	8,881	9,138	9,418
Business & other services	5,102	6,604	8,573	9,208	9,879
Non-marketed services	5,859	6,404	7,780	8,049	8,273
Total	26,642	28,227	31,234	32,200	33,184
Shares (%)					
	1987	1997	2007	2012	2017
Primary sector & utilities	4.2	2.9	2.0	1.8	1.5
Manufacturing	19.4	15.8	10.2	9.2	8.3
Construction	7.5	6.1	7.0	7.1	7.1
Distribution & transport	27.8	29.1	28.4	28.4	28.4
Business & other services	19.2	23.4	27.4	28.6	29.8
Non-marketed services	22.0	22.7	24.9	25.0	24.9
Total	100.0	100.0	100.0	100.0	100.0
Growth (% pa)					
	1987-1997	1997-2007	2007-2012	2012-2017	2007-2017
Primary sector & utilities	-3.0	-2.5	-2.3	-2.2	-2.3
Manufacturing	-1.4	-3.3	-1.5	-1.4	-1.4
Construction	-1.4	2.4	0.9	0.7	0.8
Distribution & transport	1.0	0.8	0.6	0.6	0.6
Business & other services	2.6	2.6	1.4	1.4	1.4
Non-marketed services	0.9	2.0	0.7	0.6	0.6
Total	0.6	1.0	0.6	0.6	0.6
Change (000s)					
	1987-1997	1997-2007	2007-2012	2012-2017	2007-2017
Primary sector & utilities	-293	-180	-70	-60	-130
Manufacturing	-692	-1,291	-224	-207	-432
Construction	-260	456	98	76	175
Distribution & transport	784	678	257	280	537
Business & other services	1,502	1,969	635	671	1,306
Non-marketed services	545	1,375	269	224	494
Total	1,585	3,008	966	984	1,949

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6UK.xls (Table 3.2).

Notes: a. The Broad Sectoral groupings are defined in Annex, Table A.8.

b. The totals here including those for non-marketed services include H.M Forces. These are excluded from most other tables.

Figure 2.1: Changes in Output by Broad Sector, 1987-2017 (per cent p.a.)

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725output.xls, (Figure 3.1).
 Note: The Broad Sectoral groupings are defined in Annex, Table A.8.

Table 2.2 presents the corresponding changes in employment. Output and employment are linked by productivity (output per head). This is driven by technological change. The latter helps to create new markets but also reduces labour requirements.

The net outcome of this complex set of interdependent forces is summarised in the following sections, which set out the expected trends in sectoral output and employment for the UK economy.

Outlook for output

The short-term outlook over the next 2-3 years is uncertain. The credit crisis and its impact on confidence in the real economy have yet to play out. Even though interest rates were cut in 2008, household spending on durables can be expected to slow as households increase their savings in response to the current economic uncertainty. Investment demand is likely to weaken, too.

Despite the current squeeze on household spending as a result of the credit crunch and rising prices, a recovery is expected in the medium to longer term as inflation moderates and borrowing becomes easier.

Over the medium to longer-term (5-10 years), growth in household expenditure and the recovery of key export markets, especially those in Europe is expected. This should see renewed manufacturing output growth (albeit with continued loss of jobs). Marketed services are expected to continue to show strong growth. In manufacturing, the strongest growth is projected in high-tech industries such as *electronics and pharmaceuticals*. High-tech areas such as *communications and computing services* are also likely to exhibit above-average performance.

The latest estimates indicate that the *Primary and utilities* sector now accounts for less than 3 per cent of total output and just 2 per cent of total employment in the UK. Output growth is expected to be weakest in mining, as UK oil and gas fields become exhausted and a larger share of demand is met by imports.

The estimates in Table 2.1 indicate that manufacturing accounted for around 14 per cent of total output in 2007. Compared to the performance in the 1997-2007 periods, output growth in manufacturing is expected to improve slightly over the period 2007-17. However, the share of manufacturing in total output is expected to continue to fall over the

forecast period, albeit at a much slower pace than in the past.

Construction's share of total output is expected to continue its slow decline over 2007-17, although output growth in the sector is forecast to be around 2 per cent per annum on average over the coming decade.

Over 2007-17, it is marketed services that are expected to be the main source of output growth. Both *Distribution, transport, etc.* and *Business & other services* are expected to grow at almost twice the rate of *Manufacturing*, thereby increasing their already large shares of output. Driven by strong industrial demand, the fastest growth is expected to be in the *Communications* sub-sector of Business and Other Services.

The share of *Non-Marketed Services* in total output broadly matched that of manufacturing for much of the past two decades. It has seen a decline but at a slower rate than in manufacturing, especially in recent years. This broad sector is expected to maintain its share of total output over 2007-17, but the trends for its sub-sectors (public administration, health & education) are expected to differ, as outlined below.

The remainder of this section discusses more detailed sectoral prospects. In some cases, reference is made to the prospects for detailed categories distinguished in the macroeconomic model.¹⁷ For the most part, the focus is at a broader level, such as the 14 **sectors** used by ONS, and the more detailed 27 **industries**. The main results are presented in *Tables 2.3 to 2.6* and in *Figure 2.4*. They are discussed in the order of the six **broad sectors** within which they fall. Output prospects are presented in this section while section 3.4 focuses on employment prospects.

Primary & utilities

Growth in output in *agriculture, etc* in the longer term, is expected to be around 1 per cent per annum, but this remains significantly lower than the rate for the rest of the economy.

The *energy and utilities* sector is a complex mix consisting of three distinctly different types of industry: extraction, fuels manufacture and utility services. Domestic extraction has been in decline in the UK over recent years and this is projected to continue.

In *mining & quarrying* the decline of the UK coal industry is set to continue, while no change is expected in the level of output in Other Mining. The decline in UK oil and gas output that began around 2000 is not forecast to change much over the decade to 2017. Although high energy prices promote the extraction of oil and gas in previously unprofitable areas, the volatility of the oil price, uncertainty over reserves and poor reservoir performance undermine investment in discovery and extraction.

Output from the coal industry is forecast to contract further as demand for coal from the power generation sector is reduced due to environmental legislative pressures, such as the EU Emission Trading Scheme (ETS) and the Large Combustion Plant Directive (LCPD). The LCPD, an EU directive to reduce sulphur dioxide emissions across Europe, has meant that one-third of the UK's coal-fired power stations will only be able to operate limited hours in the next seven years before closing in 2015.

In 2006, approximately 42 per cent of primary fuel production in the UK was natural gas. Oil comprises another 42 per cent, and the remaining 16 per cent was made up of coal and nuclear fuel.¹⁸ In the much longer term (after 2020), nuclear

¹⁷ These relate to the 41 industries used in MDM as defined in Annex A.

¹⁸ See BERR's Energy Trends (<http://www.berr.gov.uk/energy/statistics/publications/trends/index.html>) for more information.

fuel could contribute a much larger share of both energy consumption and production, following the announcement in January 2008 by central government to allow new nuclear power stations in the UK. Energy consumption in the UK is currently dominated by oil, coal and gas, while renewable energy sources are only a small, but growing, share of energy consumption.

Energy suppliers face a number of key challenges: responding to climate change mitigation legislation, industry competition (and regulation) and increasing global energy prices.

Over the decade, output growth in electricity is expected to remain stable, as government policies to increase end-use energy efficiency are implemented. After falling in the late 1990s and then stabilizing in the first 5 years of the new decade, water supply output is expected to grow weakly until 2017. Stronger output growth is expected in gas supply, driven by power generation and household demand.

Manufacturing

Despite the short-term difficulties, output growth in *Manufacturing* is projected to average at 1-1¼ per cent per annum over 2007-17, with the expectation of an acceleration in the second half of the decade to 2017 as the economy picks up.

Manufacturing output growth stalled in 2007 as market conditions deteriorated towards the end of the year. Confidence weakened with following the credit crisis with consumer spending hard hit. The biggest slowdowns in spending were for furniture and domestic appliances. At the same time, investment growth slowed, not helped by slowing activity in the housing market. The demand for machinery and equipment also weakened.

Conditions for manufacturing generally should improve as the economy recovers and output growth is projected to pick up over the medium term, with

Pharmaceuticals leading the way. Some other manufacturing industries are less sheltered from the economic cycle. Household spending on durable goods is forecast to recover on the back of stronger growth in real disposable income over the medium-term. Investment growth is also expected to pick up.

Construction

Output growth in *Construction* is estimated to average to 3 per cent per annum over the last 5 years to 2007, due mainly to strong growth in financial and business services that stimulated demand for offices, and to the continued rise in public works and buoyant housing market. The credit crunch and concerns about a decline in house-prices and has severely dented confidence.

Growth in commercial and industrial demand is expected to stall in the short-term and the cooling of the housing market is likely to be reflected also in a slowdown in repair and refurbishments to housing. As a result, output growth is expected to be much more modest over 2007-17, construction output growth is expected to average around 2 per cent per annum over the period 2007-17, somewhat below the average growth rate for the whole economy.

Distribution, transport, etc.

This sector generally enjoyed strong growth in recent years, but a slowdown is now projected. As consumers become more cautious in the wake of the credit crunch and slowing housing market.

Output growth in the transport services sector is forecast to slow as activity in the wider economy and consumers rein in their spending, before picking up in the medium-term. *water transport* and *air transport* remain especially sensitive to economic conditions elsewhere in the world. This is also true to a lesser degree for *land transport* in relation to the through flow of people and cargo through port and terminal facilities.

Growth in *communications* is expected to slow in the short and medium term, but it is still average just under 6 per cent per annum. This will be driven by the continued uptake of broadband internet, the switchover to digital TV and the opening up of the radio spectrum to allow greater competition and new services.

Output growth in most sub-sectors is projected to accelerate in the medium term. Household spending and retail sales are expected to recover as confidence returns on the back of a recovery in the housing market and stronger growth in real disposable income. This pick-up will underpin the recovery forecast for the consumer service industries generally. Nevertheless, the next few years will be a trying time for operators in *hotels & restaurants*. Margins will come under pressure from sharp increases in food prices and increased price-sensitivity among consumers. Growth in *distribution, transport, retailing and hotels & restaurants* as a whole is projected to average just under 3 per cent per annum over the period 2007-2017.

Business and other services

The *business services* sector comprises *computing services, professional services* and *other business services*. It is the largest sub-sector of market services, accounting for 33 per cent of all marketed services output. Despite the current slowdown in economic activity, the prospects for *other business services* are still comparatively good.

The immediate prospects for *financial services* (which includes *banking & finance* and *insurance*) depend on the unwinding of the effects of the credit crisis. The expectation is for a sharp slowdown, followed by a gradual recovery.

Output growth in financial services as a whole is forecast to average just under 3 per cent per annum over 2007-17. However, if the current economic uncertainty drags out and confidence drops sharply, the slowdown could be

more severe and prolonged in some of the industries that make up the sector.

The *business services* sector will also be affected by current uncertainties in the short-term. The immediate outlook is for overall growth in this sub-sector to be much weaker over the next couple of years, but to recover well beyond then.

In the longer term, output growth is projected to average well over 3½ per cent per annum, supported by robust productivity growth while allowing for the expansion of the workforce.

Professional services experienced strong output growth in 2007, but the long period of growth in the commercial property sector appears to have ended, and longer term prospects look much more uncertain.

One sub-sector of *professional services* is expected to experience strong growth is that for outsourced R&D, and this can be expected to continue in the medium term, driven by government targets on R&D spending.

Non-marketed services

Substantial real increases in government spending since 1997 have helped boost output growth in *Non-marketed services* in recent times, but growth in government spending is expected to have now peaked.

The focus of any additional spending will reinforce past spending priorities, with *education, health & social work* and public transport continuing to be major beneficiaries. In addition, public services are expected to benefit from the impact of rigorous efficiency improvements.

In the long term, government spending on *Public administration & defence* is expected to continue to rise at a modest rate of just under 2 per cent per annum, and output is forecast to rise similarly. This will be in conjunction with continued pressures to improve productivity and cut costs, so employment is projected to fall slightly.

Slightly higher growth in government spending is expected in *education* in the long term, although it will slow to 2 per cent compared with previously higher rates. The growth in output in *education* is expected to slow in line with spending.

Recent government strategies set out an agenda for innovation in delivery mechanisms, assisted by technological solutions. While these may not be realised until the end of the current planning period, it would seem that the opportunities for employment growth in the long term will be modest. Some employment growth is however projected, amounting to around 100 thousand jobs over the decade 2007-2017.

Health & social work is expected to see the strongest growth in government spending over the period 2007-2017. This is aimed at continuing the recent improvements in terms of real benefits to the number of people on hospital waiting lists and other quality indicators. Such improvements have come about as a consequence of increasing co-operation between the public and private sectors, including various private finance initiatives (PFI). This in turn has led to greater competition among private healthcare operators, with overseas providers increasing their presence in the UK and forcing domestic providers to lower their costs. Output in *health & social work* is expected to grow by around 2½-3 per cent per annum over 2007-17.

Prospects for employment

Short-term uncertainties

Before discussing longer-term prospects, it is helpful to set out the short-term context. At the time of writing there is still considerable pessimism about the state of the economy and its immediate prospects. When the *Working Futures* results were first commissioned there was a possibility of a slowdown in the world and UK economies. Between that time and

publication, there has been a global financial crisis with a virtual collapse in some aspects of the financial system. In response, governments across the world have made clear their intentions to shore up the banking system and to restore confidence to financial markets.

Employment growth is expected to slow in 2008 as conditions in the UK labour market weaken. Indications now are that labour market conditions are weakening significantly as economic activity slows in response to global events.

Producing robust economic and labour market projections in the face of such uncertainty is particularly challenging. The results presented here have been finalised at a time when the full implications of the crisis for the UK and world economies remain largely unknown. Contrary to the outlook held when these results were first commissioned, a recession rather than a slowdown, is now the most likely outcome.

The actual baseline macroeconomic forecast that underlies the present results was developed in the first half of 2008, before the degree of the economic slowdown became fully apparent. The forecast assumes that growth will be renewed through recovered confidence after a short-term slowdown in the UK economy. This will result in sustained employment growth in the longer term (2007-2017). It is almost certain that this forecast underestimates the effects the downturn will have on certain areas of the economy.

Despite uncertainty in the short-term outlook, the current projections deliver more robust forecasts for the longer term. Changing patterns of employment by sector and occupation are largely dominated by longer-term trends rather than the cyclical position of the economy. Overall the present results can indicate likely future developments in the structure of employment even though they may underestimate the effects of the slowdown on employment levels over the next 2-3 years.

It should be held in mind, that in some cases, however, there may be a more negative impact on the longer-term trends in employment patterns. This is especially the case for certain parts of the banking and financial system. For most other sectors however, assuming that the economic slowdown is overcome relatively quickly, the current set of projections present a reasonable picture of future developments.

Employment: prospects over the medium to longer -term

The key features of projected employment change across the broad sectors are summarised in *Table 2.2* and *Figures 2.2* and *2.3*. *Figures 2.2* and *2.3* present net changes in employment for the period 1987-2017. They show annual percentage growth rates and actual levels, respectively.

The *Primary & utilities* sector is expected to continue to experience job losses with a reduction of 130 thousand jobs over the decade to 2017. Agriculture is expected to struggle to recover following the various health scares and other crises of recent years. Prospects in mining and quarrying will be dominated by the gradual running down of North Sea oil and gas reserves. Utilities are expected to witness further job losses, as pressures to reduce costs continue, albeit at a much slower rate than in recent years.

Employment in *Manufacturing* has continued to its long-term trend decline in recent years. This has affected almost all manufacturing industries, reflecting restructuring and pressures to improve productivity in the presence of technological change and significant international competition. In the long term, a decline in manufacturing employment overall of around 1½ per cent per annum is expected as firms seek to maintain competitiveness. Employment in UK manufacturing is expected to fall by about 1-1½ per cent per annum over the period 2007-2012. Over 400 thousand

manufacturing jobs are expected to be lost over the next ten years.

Despite falling employment numbers, these first two sectors will continue to play a crucial role in the economy however, their role as a source of employment is likely to continue to diminish.

In *Construction*, public sector spending is expected to help boost employment, with a number of major projects, including the Olympics. This is unlikely to offset the negative effects of the fall out from the credit crunch and its impact on the housing market in the short-term. This is expected to help drive up productivity. The overall outcome is projected to be a modest increase in employment of around 175 thousand jobs over the next decade.

In *Distribution, transport, etc.* the largest job growth is expected to be in retailing. Many of the jobs created are expected to be part-time. Employment in hotels & restaurants is also expected to increase as international tourism begins to recover. In the longer term, over 500 thousand additional jobs are expected in the sector.

In *Business and other services*, the outlook is mixed. Prospects are much less favourable for financial services than in other areas of business services. Given the uncertainty in financial markets for the whole sector, prospects are more buoyant longer-term, with many other services, aimed at businesses in particular, growing quite rapidly. A total of about 1.3 million extra jobs are projected between 2007 and 2017.

In *Non-marketed services*, the outlook is also somewhat mixed. There are pressures to reduce the number of people employed in public administration & defence. Government spending on central and local administration and related services is expected to continue to rise at a modest rate, but much slower than the average for the economy as a whole. As a result, a decrease in employment is forecast to continue in the long term. However, this is offset by continued

growth in education and health services, which are both expected to grow quite quickly. In total, around 500 thousand additional jobs are estimated for the sector as a whole. These results assume no change in present government policies. A change of government and related policies could result in a slower growth in both public expenditure and in employment for this broad sector.

The outlook for employment in the various sectors depends upon the balance between the demand for the goods and services produced in the sector (summarised in its prospects for output growth) and the impact of productivity gains (allowing more output to be produced by fewer people). This balance is accounted for in the macroeconomic model through the estimated relationship between employment and output in each individual industry.

The key features of projected employment change across the 14 ONS *sectors* are summarised in *Figure 2.4* and *Tables 2.3-2.6*. *Figure 2.4* presents annual changes between selected years over the period 1997-2017. *Table 2.3* presents further details at the same broad level of aggregation. *Table 2.4* gives projections for individual industrial groups for the key years 2012 and 2017. *Tables 2.5* and *2.6* summarises results for the 25 Industry Groups which are dealt with in detail in Chapter 4.

Primary & utilities

Employment is expected to continue to decline in the *Primary & utilities* sector. Employment in *agriculture, etc* will continue to decline as smaller farms close and larger farms continue to substitute labour with machines (e.g. larger and more sophisticated combine harvesters, etc).

Another factor leading to employment decline is the diversification from food producing to other activities in the rural economy. Many who used to work in farming may continue working in the same

place, but in different activities, related, for example, to leisure and tourism.

In the long term, productivity growth is expected to outpace output growth, and so employment is expected to fall by 2 -2½ per cent per annum.

The UK *mining & quarrying* industry is going through an uncomfortable period of retrenchment. The rate of job loss in the industry is expected around 1½ per cent per annum over the decade.

In *electricity, gas & water*, the decline in employment is expected to continue in the long term, at a rate of around 2 per cent per annum. Most of the recent job losses have reflected the very substantial productivity gains achieved following privatisation. Such restructuring is expected to continue, and productivity growth in Electricity, gas & water supply will remain healthy, but well below the rates achieved in the 1990s.

Manufacturing

The *Manufacturing* sector is projected to expand slightly over the period 2007-2017 in output terms, but strong productivity growth means that employment will continue to fall rapidly.

Engineering is expected to see some of the fastest rates of decline, with *food, drink & tobacco* and other parts of manufacturing being less hard hit.

Employment in *motor vehicles* is also set to continue to decline, following major plant closures, and as manufacturers face increased pressure to cut costs to offset the impact of rising raw material prices. It is expected that the remaining UK *motor vehicles* industry will maintain its competitiveness, and higher levels of investment are forecast, but overall employment will continue to decline.

The sector, has experienced a sustained period of restructuring in the face of increasing globalisation. While this is likely to remain a feature, the impact and pace of future restructuring is likely to be less

severe as adjustment to the globalised economy proceeds. Over the long term, output growth in manufacturing could accelerate slightly, driven by a shift into higher value added activities associated with productivity gains.

Construction

Employment in *Construction* has increased strongly in recent years, by almost 3 per cent per annum between 2002 and 2007. Immediate prospects are for a sharp decline by employment growth albeit more subdued is projected over the medium term, the sector recovers. Over 2007-17, the drive to boost productivity is expected to lead to a further increase in the use of factory-built (prefabricated) components. As a result of these pressures to raise productivity and reduce costs, employment in Construction is expected to grow by just under 1 per cent per annum over the period 2007-2017.

Distribution, transport, etc.

The largest job gains are expected to be in *retailing*, although continued restructuring and pressures to reduce costs are expected to moderate the growth compared to recent trends. Many of the jobs created are expected to be part-time.

In *hotels & restaurants*, it is a similar story. Productivity growth is expected to offset rising output, resulting in only a moderate increase in employment levels

In *transport & storage*, the pressures to control costs on the rail network, and the restructuring of travel intermediaries' activities, have acted as a counterweight to any jobs growth in urban transport systems. Over the long term, employment growth is expected to average around 2 per cent per annum.

In *communications*, cost cutting is expected to contribute to the slight fall in employment projected, as restructuring of postal communications and technological development in ICT continue reduce the demand for labour.

Business & other services

Output growth in *financial services* is expected to weaken as the economy slows, but employment is expected to increase over the longer-term as company returns improve. In the long term, productivity growth is expected to be slightly weaker than it was over recent years but still be strong enough to offset much of the beneficial impact of projected higher output levels. Hence, employment growth is expected to average no more than 1 per cent growth per annum over 2007-2017 as a whole.

The trend in off-shoring jobs contributed to a fall in employment in *insurance* in recent years. However, employment is projected to grow modestly over the decade. In the long term, productivity growth is expected to average 1¼ per cent per annum, and employment is forecast to increase by around ½ per cent per annum.

In *professional services*, output growth is also expected to weaken, but it is projected to remain above the rate for the rest of the economy. The industry will continue to be shaped by globalization and consolidation. As a result of all these trends, employment growth is expected to average just under 2 per cent per annum over 2007-17.

In *computing services*, the off-shoring of services and the slowdown of the economy will weaken labour demand. Over the longer term, recovering output levels are projected to average more than offset productivity gains, resulting in higher employment levels. Employment growth is projected to be slow in the short period until 2009, thereafter it is projected to average around 2½ per cent per annum.

Non-Marketed services

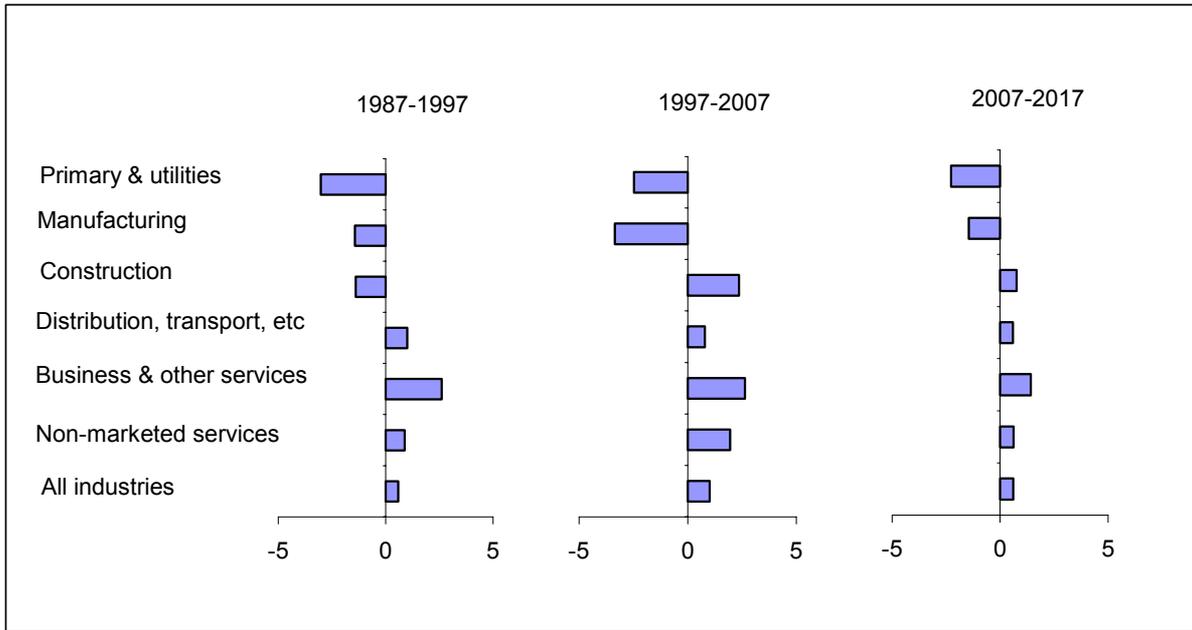
Employment in *public administration & defence* is set to fall slightly as the Government seeks to cut costs.

In *education*, there has been a steady rise in the number of teachers in service since 1997, accompanied by a much sharper rise in the number of support staff, particularly teaching assistants and special needs support staff.

Recent strategies set out an agenda for innovation in delivery mechanisms, assisted by technological solutions. While these may not be realised until the end of the current planning period, it would seem that the opportunities for employment growth in the long term will be modest. The projections are for an average annual rate of growth of less than ½ per cent.

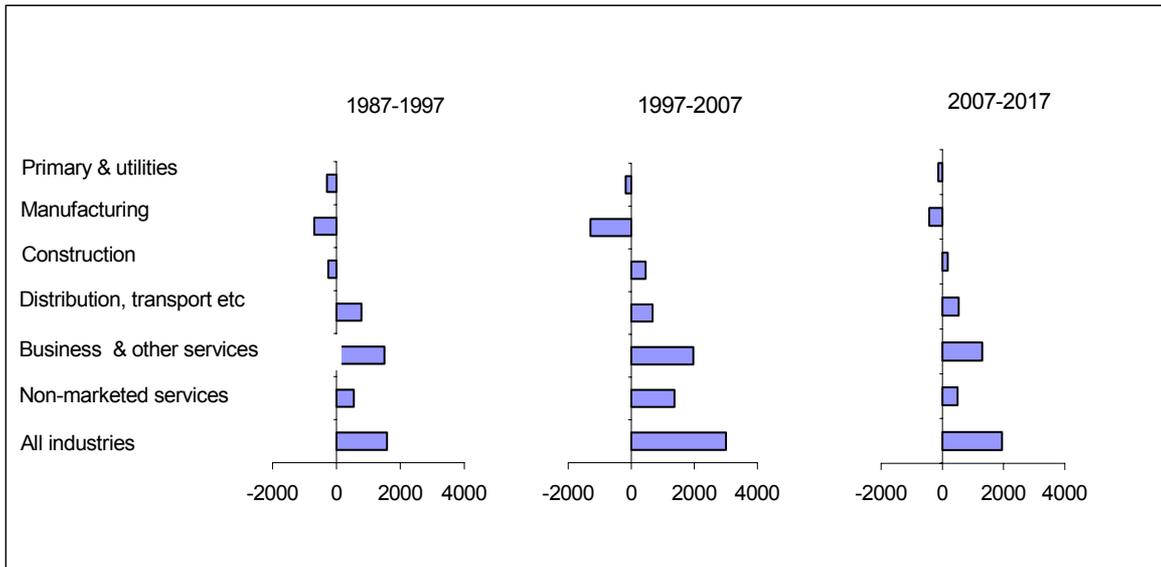
In *health & social work*, the substantial increases in employment seen over the last decade are not expected to be repeated, although the overall number of jobs will continue to grow. The demand for health and social care will be driven by a number of long-term factors, such as the aging population, rising expectations and average incomes. The demographic trends will stimulate demand from both government and individuals. This is expected to lead to long-term output growth in the industry of just under 3 per cent per annum. Despite the considerable initiatives to raise productivity in the sector, the nature of the industry will limit what can be achieved. As a result, employment is projected to rise by around 1 per cent per annum over 2007-17.

Figure 2.2: Change in Employment by *Broad Sector*, 1987-2017 (per cent p.a.)



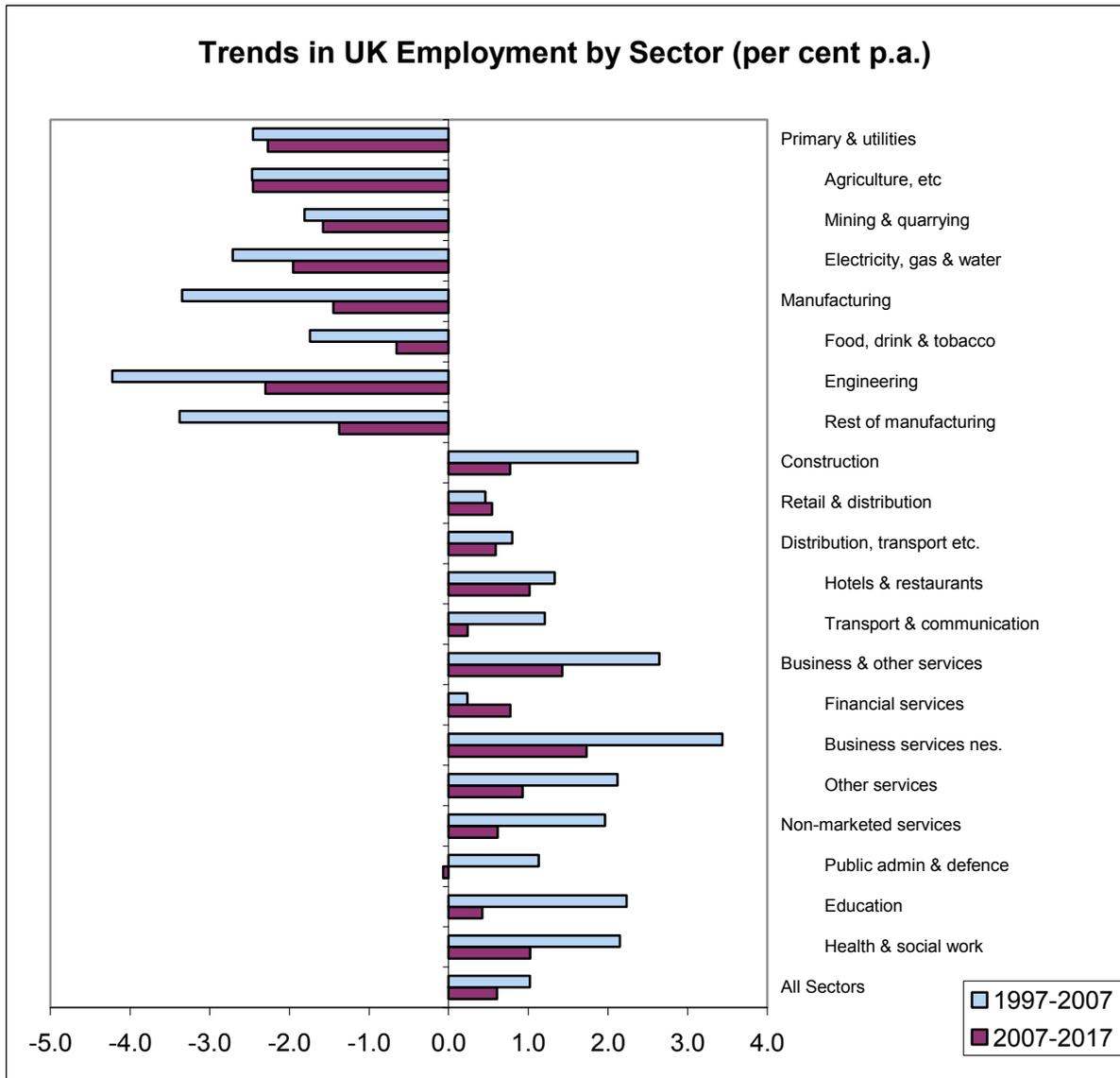
Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6UK.xls, (Figure 3.2).
 Note: The Broad Sectoral groupings are defined in Annex, Table A.8.

Figure 2.3: Change in Employment Structure by *Broad Sector*, 1987-2017 (000s)



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6UK.xls, (Figure 3.3).
 Note: The Broad Sectoral groupings are defined in Annex, Table A.8.

Figure 2.4:



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725Output.xls, (Figures 3.4 and 3.5).
 Notes: The Broad Sectoral groupings are defined in Annex, Table A.8.

Table 2.3: Projections of Changes in Output and Productivity by Detailed Sector (per cent p.a.)

	Output				Productivity			
	1997-2002	2002-2007	2007-2012	2012-2017	1997-2002	2002-2007	2007-2012	2012-2017
<i>Primary & utilities</i>	1.3	0.3	0.4	0.9	5.8	0.9	2.8	3.2
1. Agriculture, etc	1.3	1.2	0.4	0.9	7.0	0.8	3.0	3.4
2. Mining & quarrying	-3.9	-2.1	-1.2	-1.2	-1.6	-0.8	0.1	0.6
4. Electricity, gas & water	2.6	0.1	0.7	1.2	3.9	4.4	2.7	3.2
3. <i>Manufacturing</i>	-0.2	0.8	1.1	1.4	2.7	4.8	2.6	2.9
Food, drink & tobacco	0.2	0.6	0.9	0.9	1.6	2.7	1.4	1.7
Engineering	-0.8	1.4	1.1	1.2	2.7	6.8	3.3	3.8
Rest of manufacturing	-0.2	0.7	1.2	1.5	2.9	4.7	2.7	2.9
5. <i>Construction</i>	1.5	3.1	1.8	2.0	-0.3	0.2	0.9	1.3
<i>Distribution, transport etc.</i>	4.6	3.7	2.7	2.8	3.2	3.4	2.1	2.2
6. Retail & distribution	3.7	3.4	2.5	2.5	2.8	3.4	1.9	1.9
7. Hotels & restaurants	2.9	4.8	2.1	1.8	1.4	3.6	1.0	0.9
8. Transport & communication	6.8	3.8	3.2	3.6	4.3	3.8	3.1	3.3
<i>Business & other services</i>	4.9	6.1	3.1	3.3	1.8	3.7	1.7	1.8
9. Financial services	3.7	7.8	3.0	2.7	2.2	8.8	2.0	2.1
10. Business services nes.	6.1	6.7	3.6	3.8	2.6	3.0	1.7	2.1
11. Other services	3.1	1.8	1.9	2.0	0.1	0.6	1.1	0.9
<i>Non-marketed services</i>	1.8	2.2	2.3	2.2	0.2	-0.1	1.6	1.7
12. Public admin & defence	0.6	1.9	1.8	1.9	-0.2	0.5	2.0	1.8
13. Education	1.3	0.7	2.0	1.9	-0.7	-1.7	1.5	1.6
14. Health & social work	3.1	3.6	2.9	2.6	1.3	1.0	1.7	1.7
All Sectors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.9	3.6	2.5	2.6	1.9	1.9	2.6	1.8	2.0
All Sectors (net of AFS)	3.2	3.5	2.5	2.6	2.1	2.5	1.8	2.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725output.xls, (Table 3.3).

Notes: a) The Sectors are defined in Annex A, Table A.7. The 14 Sectors (numbered 1-14) are as used by ONS, but expanded to include some detail within manufacturing.

b) Broad sectors are indicated by italics, The Broad Sectoral groupings are defined in Annex A, Table A.8.

c) Output per person.

d) AFS After adjustment for double counting in financial services.

Table 2.4: Projections of Changes in Employment by Detailed Sector

	Employment (%)		Employment (000s)		2012-2017	2007-2012	2002-2007	2012-2017	2007-2012	2002-2007
	1997-2002	2002-2007	1997-2002	2002-2007						
<i>Primary & utilities</i>										
1. Agriculture, etc	-4.2	-0.7	-2.3	-2.2	-158	-22	-70	-60		
2. Mining & quarrying	-5.3	0.4	-2.5	-2.4	-140	9	-55	-45		
4. Electricity, gas & water	-2.3	-1.3	-1.3	-1.8	-9	-5	-4	-6		
3. <i>Manufacturing</i>	-1.3	-4.2	-1.9	-2.0	-9	-26	-10	-10		
Food, drink & tobacco	-2.9	-3.8	-1.5	-1.4	-609	-683	-224	-207		
Engineering	-1.4	-2.1	-0.5	-0.8	-34	-48	-11	-17		
Rest of manufacturing	-3.4	-5.0	-2.1	-2.5	-151	-180	-63	-65		
5. <i>Construction</i>	-3.0	-3.8	-1.4	-1.3	-423	-454	-150	-126		
<i>Distribution, transport etc.</i>	1.8	2.9	0.9	0.7	165	292	98	76		
6. Retail & distribution	1.3	0.3	0.6	0.6	562	116	257	280		
7. Hotels & restaurants	0.9	0.0	0.5	0.6	224	2	135	147		
8. Transport & communication	1.5	1.2	1.1	0.9	134	112	111	100		
<i>Business & other services</i>	2.4	0.0	0.1	0.3	203	2	12	32		
9. Financial services	3.0	2.3	1.4	1.4	1,044	926	635	671		
10. Business services nes.	1.5	-1.0	0.9	0.6	81	-57	53	36		
11. Other services	3.4	3.5	1.8	1.7	702	865	504	520		
<i>Non-marketed services</i>	3.0	1.2	0.8	1.1	261	117	78	115		
12. Public admin & defence	1.6	2.3	0.7	0.6	540	836	269	224		
13. Education	0.8	1.4	-0.2	0.0	58	105	-13	2		
14. Health & social work	2.0	2.5	0.5	0.3	209	297	64	45		
All Sectors	1.8	2.5	1.2	0.9	272	433	218	177		
	1.1	1.0	0.6	0.6	1,543	1,465	966	984		

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725output.xls, (Table 3.3).

Note: a) The Sectors are defined in Annex A, Table A.7. The 14 Sectors (numbered 1-14) are as used by ONS, but expanded to include some detail within manufacturing.

b) Broad sectors are indicated by italics, The Broad Sectoral groupings are defined in Annex A, Table A.8.

Table 2.5: Projections of Employment by 25 Industry Groups

Absolute levels and changes (000s)

	Levels		Changes			
	2007	2012	2017	2007-2012	2012-2017	2007-2017
Agriculture etc	453	398	353	-55	-45	-100
Mining, quarrying & utilities	180	165	150	-15	-15	-30
Food, drink & tobacco	429	418	402	-11	-17	-27
Textiles & clothing	137	110	94	-26	-17	-43
Wood, paper & publishing	509	480	467	-29	-13	-42
Chemicals & non-metal minerals	540	501	456	-40	-44	-84
Metal & metal goods	421	389	361	-32	-29	-61
Engineering	615	552	487	-63	-65	-128
Transport equipment	326	304	276	-22	-28	-50
Manufacturing nes & recycling	204	203	208	-1	4	4
Construction	2,187	2,285	2,361	98	76	175
Distribution relating to motors	644	654	663	11	9	19
Wholesale distribution nes	1,275	1,302	1,324	26	22	48
Retailing distribution nes	3,142	3,239	3,356	97	117	214
Hotels and catering	1,989	2,100	2,200	111	100	211
Transport and storage	1,346	1,370	1,406	23	37	60
Post & telecommunications	484	473	468	-12	-4	-16
Banking & insurance	1,107	1,160	1,196	53	36	89
Professional services	863	868	879	4	11	16
Computing & related services	581	629	706	48	77	125
Other business services	4,020	4,472	4,903	452	431	883
Public admin and defence	1,543	1,530	1,532	-13	2	-11
Education	2,553	2,617	2,662	64	45	109
Health & social work	3,684	3,902	4,079	218	177	395
Miscellaneous services	2,001	2,080	2,194	78	115	193
Total	31,234	32,200	33,184	966	984	1,949

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls, (Table 3.4a).

Notes: a) Because of their small size in terms of total employment, *Mining & quarrying* and *Utilities* and *Wood & paper* and *Printing & publishing* have been combined for most of the reporting. Separate results are presented where the data are sufficiently robust, as is the case here.

Table 2.6: Output, Productivity and Employment Changes for the 25 Industry Groups

	% changes in the periods shown											
	Output					Productivity					Employment	
	2002-2007	2007-2012	2012-2017	2002-2007	2007-2012	2012-2017	2002-2007	2007-2012	2012-2017	2002-2007	2007-2012	2012-2017
1. Agriculture etc	6.3	1.8	4.8	4.2	15.9	18.1	2.0	-12.1	-11.3	2.0	-14.7	-9.2
2. Mining, quarrying & utilities	-1.4	2.3	4.4	15.6	11.5	14.9	-14.7	-8.3	-9.2	-14.7	-8.3	-9.2
3. Food, drink & tobacco	2.9	4.7	4.7	14.4	7.4	9.0	-10.1	-2.5	-4.0	-10.1	-2.5	-4.0
4. Textiles & clothing	-14.6	-11.8	-2.0	52.8	9.3	15.4	-44.1	-19.2	-15.1	-44.1	-19.2	-15.1
5. Wood, paper & publishing	-7.4	3.8	6.0	6.6	10.2	8.9	-13.1	-5.8	-2.6	-13.1	-5.8	-2.6
6. Chemicals & non-metal minerals	7.1	10.1	11.9	26.4	18.9	22.8	-15.2	-7.4	-8.9	-15.2	-7.4	-8.9
7. Metal & metal goods	3.1	3.2	3.1	22.9	11.7	11.3	-16.1	-7.6	-7.3	-16.1	-7.6	-7.3
8. Engineering	7.2	5.5	6.3	38.6	17.5	20.5	-22.7	-10.3	-11.7	-22.7	-10.3	-11.7
9. Transport equipment	19.3	7.8	7.8	40.5	15.6	18.8	-15.1	-6.8	-9.3	-15.1	-6.8	-9.3
10. Manufacturing nes & recycling	4.2	8.2	8.0	21.1	8.6	5.8	-14.0	-0.3	2.1	-14.0	-0.3	2.1
11. Construction	16.6	9.3	10.4	1.1	4.6	6.8	15.4	4.5	3.3	15.4	4.5	3.3
12. Distribution relating to motors	10.9	10.1	9.9	13.5	8.3	8.5	-2.3	1.7	1.3	-2.3	1.7	1.3
13. Wholesale distribution nes	14.4	14.7	14.6	16.1	12.4	12.7	-1.5	2.1	1.7	-1.5	2.1	1.7
14. Retailing distribution nes	23.5	12.5	13.3	22.1	9.2	9.3	1.2	3.1	3.6	1.2	3.1	3.6
15. Hotels and catering	26.2	10.8	9.5	19.1	4.9	4.6	6.0	5.6	4.8	6.0	5.6	4.8
16. Transport and storage	20.4	9.3	10.0	12.9	7.4	7.1	6.7	1.7	2.7	6.7	1.7	2.7
17. Post & telecommunications	21.1	30.3	32.6	41.6	33.6	33.8	-14.4	-2.5	-0.9	-14.4	-2.5	-0.9
18. Banking & insurance	45.4	15.7	14.2	52.8	10.4	10.8	-4.9	4.8	3.1	-4.9	4.8	3.1
19. Professional services	35.1	15.8	17.4	17.1	15.2	15.9	15.3	0.5	1.3	15.3	0.5	1.3
20. Computing & related services	41.7	32.8	34.1	33.4	22.7	19.4	6.2	8.2	12.3	6.2	8.2	12.3
21. Other business services	39.3	16.6	17.6	14.5	4.9	7.2	21.7	11.2	9.6	21.7	11.2	9.6
22. Public admin and defence	10.0	9.4	9.7	2.5	10.3	9.5	7.3	-0.9	0.2	7.3	-0.9	0.2
23. Education	3.7	10.3	10.1	-8.4	7.6	8.3	13.2	2.5	1.7	13.2	2.5	1.7
24. Health & social work	19.1	15.2	13.9	5.1	8.8	9.0	13.3	5.9	4.5	13.3	5.9	4.5
25. Miscellaneous services	9.5	9.9	10.6	3.1	5.8	4.8	6.2	3.9	5.5	6.2	3.9	5.5
Total	19.5	12.9	13.7	13.9	9.5	10.3	4.9	3.1	3.1	4.9	3.1	3.1
Total (including adjustment for financial services)	19.0	12.9	13.7	13.4	9.5	10.3	4.9	3.1	3.1	4.9	3.1	3.1

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725output.xls, (Table 3.6).

2.3 Changing Patterns of Employment by Status and Gender

Employment by gender and status has changed dramatically over the past few decades. Women now make up almost half of the workforce, and there has been a significant shift towards part-time jobs.

Many of these changes can be linked to changes in the industrial composition of employment. Reduction in employment opportunities in the *primary & utilities* and *manufacturing* sectors, in particular, has led to the loss of many full-time jobs, traditionally held by men. The growth of jobs in the services sector, by contrast, has created many employment opportunities for women, particularly those wishing to work part-time.

Such changes in demand side factors have been complemented by changes on the supply side, reflecting women's increasing propensity to take an active role in the formal economy. More recently, there have been some signs of change in such trends, as the previous continual decline in men's employment shares begins to reverse, with increases in men's employment shares in some parts of the service sector, especially those that are continuing to grow rapidly.

The numbers of those classified as self-employed in broad sectors such as *construction, distribution, transport, etc.* and in *business & other services*, significantly increased in the 1980s and early 1990s. This was attributed to various factors, including tax incentives, reactions to high unemployment levels, and increasing entrepreneurial activity. This trend has reversed more recently, especially in construction, as the Inland Revenue has tightened up regulations related to self-employment status. The decline of many small businesses in distribution, in the face of competition from large chains, has also been an important factor.

Table 2.7 summarises the current patterns of employment by status and gender for the entire UK workforce. It also indicates

how these are expected to change over the next decade. *Table 2.8* presents the data in terms of the percentage shares of each gender status group, whilst *Table 2.9* shows the same information in terms of changes in absolute numbers.

Gender shares

The female share of employment is expected to change very little over the next decade. The number of females in employment is projected to rise by around $\frac{3}{4}$ million over the coming decade, whilst the number of males in employment is expected to increase by 1.2 million. By 2017, females are expected to account for just under 47 per cent of all jobs, which is marginally lower than in 2007.

As illustrated in the relevant tables and figure, these patterns vary significantly across sectors, but the underlying trends are common across almost all industries. The main difference compared to previous assessments is that males are now finding employment in many more parts of the service sector than was previously the case. This has mitigated the previously observed sharp decline in male employment shares.

Part-time/full-time working

The relative importance of part-time employment is expected to continue to grow. Significant increases are projected for males in many sectors. In total, nearly 1 million additional jobs are projected over the decade to 2017. A significant increase in the number of full-time jobs is also projected, to the benefit of both males and females (see *Table 2.9*).

Again, although the overall patterns vary across sectors, the underlying trend towards an increasing employment share for part-time working is common across most sectors (see *Table 2.10*).

Self-employment

For many years, self-employment rose as a share of total employment. The upward trend in self-employment over much of the 1980s and 1990s is illustrated in *Table*

2.10. The growth in self-employment is especially apparent in the data for construction over the historical period and also for business and financial services.

More recently, changes in rules and regulations in relation to self-employment status and the liability to pay income taxes and national insurance contributions have halted the strong growth trend in some of these industries (especially in construction). Trends in business services have remained more buoyant. However, the projections show flat or declining future trends in self-employment, especially within construction and the broad sector which includes distribution, hotels, restaurants, transport and communications.

Overall, the share of self-employment is projected to continue its recent decline over the next decade, particularly so for males. This decline in shares is expected to be less rapid than observed over the last few years. The recent restructuring of employment status that has affected construction appears to have reached its limit. The share of self-employment

amongst employed females is expected to rise slightly over the forecast period. Sectors such as business and other services are the main areas where this appears to be significant.

Differences by broad sector

The patterns for six *broad sectors* are also summarised in *Table 2.10*. These results highlight both the marked differences in structure of employment and the common trends that apply in most industries.

Employment in the three service sectors is dominated by females (see the bottom half of *Table 2.10*). These 3 broad sectors are projected to show strong total employment growth over the decade to 2017. The number of part-time jobs is also much higher in these sectors than in other parts of the economy. Distribution, hotels & restaurants, miscellaneous services and health & education services have the greatest concentrations of part-time jobs. Employment levels in these industries are projected to continue to grow strongly in the future.

Table 2.7: Employment Status for the UK
000s

2007				
Employment by Gender	FT	PT	SE	Total
Male employment	11,384	2,163	2,973	16,520
Female employment	7,018	6,465	1,231	14,715
Total employment	18,402	8,628	4,204	31,234
2012				
Employment by Gender	FT	PT	SE	Total
Male employment	11,626	2,483	2,997	17,106
Female employment	7,164	6,624	1,305	15,094
Total employment	18,791	9,107	4,303	32,200
2017				
Employment by Gender	FT	PT	SE	Total
Male employment	11,875	2,834	3,010	17,719
Female employment	7,303	6,775	1,387	15,465
Total employment	19,178	9,609	4,397	33,184

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls, (Table 3.5).

Table 2.8: Shares by Employment Status for the UK
%

2007				
Employment by Gender	FT	PT	SE	Total
Male employment	36.4	6.9	9.5	52.9
Female employment	22.5	20.7	3.9	47.1
Total employment	58.9	27.6	13.5	100.0
2012				
Employment by Gender	FT	PT	SE	Total
Male employment	36.1	7.7	9.3	53.1
Female employment	22.2	20.6	4.1	46.9
Total employment	58.4	28.3	13.4	100.0
2017				
Employment by Gender	FT	PT	SE	Total
Male employment	35.8	8.5	9.1	53.4
Female employment	22.0	20.4	4.2	46.6
Total employment	57.8	29.0	13.3	100.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls, (Table 3.6).

Table 2.9: Changes in Employment Status for the UK
000s

2007-2012				
Employment by Gender	FT	PT	SE	Total
Male employment	243	320	24	587
Female employment	146	159	74	379
Total employment	389	479	98	966
2012-2017				
Employment by Gender	FT	PT	SE	Total
Male employment	248	351	13	612
Female employment	139	151	81	371
Total employment	387	502	94	984
2007-2017				
Employment by Gender	FT	PT	SE	Total
Male employment	491	671	37	1,199
Female employment	285	310	156	750
Total employment	776	981	193	1,949

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls, (Table 3.7).

Table 2.10: Composition of Employment by Broad Industrial Sector^a, 1987-2017

	Shares of total employment (%)				
	1987	1997	2007	2012	2017
Primary sector & utilities, of which:	4.2	2.9	2.0	1.8	1.5
Female employees	20.5	20.6	24.6	29.4	31.6
Self-employed	27.6	36.1	35.9	38.2	39.2
Part-time employees	9.0	10.7	10.4	10.6	10.5
Manufacturing, of which:	19.4	15.8	10.2	9.2	8.3
Female employees	32.4	29.8	26.9	25.0	24.6
Self-employed	4.9	6.7	7.7	8.9	9.6
Part-time employees	9.4	8.3	7.6	6.8	6.8
Construction, of which:	7.5	6.1	7.0	7.1	7.1
Female employees	9.1	10.7	9.7	9.8	9.8
Self-employed	36.6	49.4	39.3	41.0	39.9
Part-time employees	3.6	3.9	4.3	4.3	4.4
Distribution, transport etc, of which:	27.8	29.1	28.4	28.4	28.4
Female employees	43.9	45.0	45.9	44.4	44.0
Self-employed	15.0	12.9	9.7	9.5	8.8
Part-time employees	28.1	33.7	36.4	36.4	37.4
Business & other services, of which:	19.2	23.4	27.4	28.6	29.8
Female employees	45.4	46.8	43.6	44.3	43.3
Self-employed	14.1	16.4	15.7	16.1	16.2
Part-time employees	18.5	19.4	22.3	22.5	22.9
Non-marketed services, of which:	22.0	22.7	24.9	25.0	24.9
Female employees	63.7	71.7	70.0	70.4	70.3
Self-employed	3.9	5.9	5.4	6.2	6.4
Part-time employees	35.1	40.8	38.8	39.2	39.6

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6UK.xls, (Table 3.8).

- Note: (a) The sectoral groupings are defined in Annex, Table A.2.
 (b) Percentages of total employment. The shares differ from those in Table 3.2 because the latter includes HM forces in non-marketed services.
 (c) Percentages of employment within the sector

3. Changing Occupational Structure and Replacement Demands

Key Messages

- Changes in occupational employment structure are largely driven by longer term trends. Although the fallout from the “credit crunch will have some short-term impact the longer term patterns revealed here are likely to remain robust.
- The latest evidence suggests that the occupational structure of employment is continuing to change in favour of white collar and more skilled occupations, although there are still a large number of opportunities for less skilled workers.
- The current projections incorporate the latest Labour Force Survey (LFS) and other data. These suggest even faster growth for managers, some professional and many associate professional occupations than in previous forecasts.
- Other occupations expected to do well include protective service occupations; culture /media/ sports occupations; caring personal service occupations and customer service occupations.
- In contrast, sharp declines are projected for: administrative, clerical & secretarial occupations and machine and transport operatives.
- Elementary occupations are now projected to experience less rapid job losses than in previous projections, but sales occupations are expected to see fewer job opportunities now.
- There are some variations in the general patterns of occupational employment by gender and status. These reflect existing pattern of ‘gender segregation’ in the labour market.
 - Males are expected to benefit most from the growth in job opportunities for professionals and associate professionals. An increasing proportion of such jobs will be part-time.
 - Females are also expected to see significant growth amongst managerial and personal service occupations, as well as the professional/associate professional area. These will be both full-time and part-time jobs.
 - Male, full-time workers are expected to bear the brunt of the job losses occurring in the machine & plant operative and other skilled manual occupations.
 - For women the main job losses are expected to be concentrated amongst administrative, clerical & secretarial occupations.
- It is important to take into account the need to replace those in the workforce who will be leaving because of retirement or other factors. This is termed replacement demand. The key message from this analysis is the need for both policy analysts and other actors in the labour market to focus not just on the projected changes in occupational employment levels but on replacement needs, including the important education and training requirements that arise for them.
- Such outflows typically account for about a third or more of current employment levels over a 10 year period and outweigh any projected employment declines. There will be a need to recruit and train new entrants into such jobs to replace those leaving. Where employment is projected to rise, such replacement demand elements will lead to even greater requirements.
- There may be good job opportunities for new entrants, into many areas where initial impressions, based on projected changes in employment levels, are quite pessimistic.

3.1 Introduction and General Approach

The first part of this chapter presents new projections of occupational employment at a UK level,¹⁹ looking forward to 2017. These cover all industries. The projections are based on categories defined using the SOC 2000 occupational classification. Sections 3.9 and 3.10 present and discuss projections of replacement demand by SOC sub-major group.

In the occupational employment projections, the main focus is on the 25 sub-major occupation groups, but for presentational purposes much of the discussion here is at a broader major group level (the nine 1-digit level categories of SOC).²⁰ The results reflect the latest information available from the Labour Force Survey.

Such data provide a useful indicator of changing patterns of demand for skills. However, it is important to focus not just on projections of changing levels of employment by occupation, but also on replacement demands. Projections of the structural change in employment levels provide only part of the picture of how the demand for skills is changing. Estimation of replacement demands recognises the need to replace those retiring from the existing workforce. This is discussed later on in this chapter. The discussion indicates that, despite projected declines in employment for many occupations, there will be significant demand for the skills concerned to replace those leaving the current workforce because of retirement, etc.

The reasons for the changes in occupational employment structure are complex. Some of the most important factors are summarised in **Box 3.1**. A key driver is structural change in the economy which affects sectoral patterns of employment. The changing fortunes of different sectors, which depend on a complex combination of economic and technological forces taken into account by the multi-sectoral macroeconomic model which projects those sectors likely to gain or lose jobs. The other main factors driving occupational employment, such as technological and organisational change which affects the way work is done, are represented by changing occupational mix within sectors.

Section 3.2 provides a brief summary of recent historical developments in occupational employment structure. Section 3.3 presents the main projections, focussing on changes between 2007 and 2017. Some patterns vary significantly across gender and employment status. These are highlighted in Sections 3.4 and 3.5. As discussed earlier in this report, the current projections were created during a time of exceptional economic uncertainty and upheaval. Section 3.5 discusses the sensitivity of the projections to recent events in the economy, as well as considering other scenarios that differ from the main set of assumptions underlying the current projections. Section 3.6 presents a more detailed discussion at the 2 digit level of SOC (the 25 sub-major groups). Section 3.7 presents an analysis of the main components of change using shift-share methods. The chapter continues in Section 3.8 with a summary of detailed occupational changes within industries. Sections 3.9 and 3.10 conclude, by emphasising the importance of replacement demands, presenting detailed estimates by occupation.

¹⁹ This requires an extensive reclassification of historical data. Details are given in the Annex and the accompanying *Technical Report* (Wilson *et al.*, 2008).

²⁰ Full detail of these classifications is provided in Annex A.

Box 3.1: Factors Influencing Occupational Change

Drivers of change: Skill requirements are a derived demand. The focus in this chapter is on occupational employment patterns as opposed to qualifications or some other measure of skill. These demands are influenced by a range of factors, which vary over time and across sectors. The key factors can be broadly categorised into two groups: those which are **external** to the organisation and those which are primarily **internal**. These are reflected in the shift-share analysis used: industry effects can be regarded as primarily external; occupational effects are mainly driven by internal influences.

External skills drivers: influence the pattern of goods and services produced and therefore the Sectoral structure of employment. These drivers include: technological change, globalisation, other factors influencing the patterns of demand for goods and services, and public policy (including legislative and regulatory frameworks). These developments are taken into account by the multi-sectoral macroeconomic model and are summarised in Chapter 1. Those sectors that benefit from such changes will see employment grow. Conversely those that fail to keep pace will experience job losses. Occupations concentrated in the former sectors will gain employment in contrast to those concentrated in declining sectors (**industry effects**).

Internal skills drivers: produce significant changes in the patterns of employment within particular industries, including major restructuring of the way work is organised (**occupational effects**). Skill requirements within organisations are driven by the business strategies they adopt. These reflect choices about what products or services to deliver and where and how to pitch that delivery. Some may focus on product differentiation in a high value added, premium markets while others may choose a low specification product or service, where the emphasis is keeping price and costs down. The former generally require higher skills, including the use of specialised and distinctive competencies, compared with strategies that focus on low level specifications. Organisations facing technological changes or trying to move up-market, usually need to upgrade their skills. The introduction of new products and services, major changes in equipment and in working methods or workforce organisation often require the deployment of new skills.

Both internal and external drivers are influenced by technology (especially ICT) and other general factors. For example, ICT has led to the displacement of many clerical and secretarial jobs previously concerned with information processing using paper technology (internal effect). On the other hand, information technology has opened up many new product markets where information services can be provided which were previously not feasible (external effect). These new businesses often require jobs of a professional, associate professional and managerial nature. The application of IT in other areas such as such as robots in motor manufacturing has led to the loss of many jobs for skilled workers.

Other factors have also been important. These include the drive for efficiency in response to global competition, increased emphasis on customer service and product quality and related changes in production methods and the management of human resources. The income elasticity of demand for different products and services, together with changes in tastes and preferences is altering the patterns of demand towards an emphasis on high value added, higher quality, high specification goods and services. There is a major restructuring of production to meet these needs. Many of these products and services require expert knowledge as well as customer care, personal attention and face-to-face human interaction, (for example, leisure, hospitality, travel, personal care), increasing the need for such generic skills.

Box 3.1 (continued): Factors Influencing Occupational Change

Changing patterns of industrial specialisation (industry effects) have had profound implications for the demand for different occupations as well as playing a key role in determining differences across spatial areas. The decline of employment in primary and manufacturing industries has resulted in a dramatic reduction in the need for many skills associated with the production of the output of these industries. For example: the agricultural sector now requires many fewer labourers; the coal industry now employs only a handful of skilled miners; the manufacturing sector no longer requires the same number of skilled engineering and other types of specific craft skills that were the foundation of its success in the past; utilities and transport now require far fewer workers than previously.

In contrast, the growth of the service sector has led to an increase in employment in many occupations. The growth of non-marketed, public service, employment, for example, has led to substantial additional jobs for: professional, managerial and clerical workers in public administration; for doctors and nurses in health services; and for teachers in education services. Similarly, growth in marketed, private sector, services has resulted in many new jobs for: leisure and other personal service occupations (in hotels and other services); sales occupations in distribution; and for professional, associate professional, clerical and secretarial in business and financial services.

Future Influences on Occupational Change

The combination of globalisation and technological change often increases skill requirements as work organisation and the nature of competitive advantage become more complex. Increasingly, the source of competitive edge in products and in processes is information and knowledge content. The increased emphasis on higher level skills and the associated decline in demand for unskilled workers has been attributed to the expansion of international trade (especially with developing economies) and the continuing process of technological change (particularly related to ICT). On balance, the evidence seems to suggest that the latter has become increasingly important, with changes within sectors being of most significance. This is reflected in the shift-share analysis presented here, which suggests that occupational shifts within sectors are growing in importance compared to previous decades (occupational effects). Nonetheless, it seems likely that both technology and growing trade will continue to raise the demand for higher level skills and drive down the demand for lower level skills.

The projected patterns of occupational change for the next decade are expected to mirror those of the recent past. The same basic forces are expected to operate. Changes in the industrial structure of employment in favour of the service sector (industry effects) will tend to favour white collar, non-manual occupations, while the continued loss of jobs in manufacturing and primary industries will result in yet further job losses for many manual blue collar jobs.

The impacts of information technology and other related organisational changes are likely to further reduce the demand for clerical and basic secretarial skills across all industries (occupational effects). Similarly, the introduction of new technologies in manufacturing will tend to displace many skilled workers. Conversely, the management and operation of the new technologies will require greater shares in employment for managerial, professional and associate professional occupations, including technicians of various kinds. In some factories there will be an increased need for machine operatives of various types who need some training, but not the long apprenticeship required of traditional apprentice-based craft skills.

3.2 Changes for Broad Occupational Groups: Historical Perspective

Table 3.1 and Figure 3.1 present historical information on employment trends for the 9 SOC 2000 major groups over the past two decades.

The key features have been:

- rising employment levels and shares for higher level, white-collar groups such as:
 - managers & senior officials;
 - professional; and
 - associate professional & technical occupations;
- rapid increases for leisure related and other personal service occupations;
- growth and then decline in employment for administrative, clerical & secretarial occupations;
- declining employment levels and shares for most blue collar/manual occupations.

The latest LFS data confirms that these trends continue unabated.

3.3 Projections to 2017

Table 3.1 and Figures 3.1 and 3.2 present employment projections for the 9 major occupations in the period to 2017. A rather slower pace of change in occupational structure is expected overall than was the case over the previous decade (see Figure 3.1).

The groups that are expected to show significant increases in employment over the next decade are managers & senior officials, professional occupations, and associate professional & technical occupations. Personal service occupations have also exhibited strong growth since the early 1980s and this is projected to continue over the next decade but at a slower rate.

The sales & customer service occupation group is the other beneficiary of employment growth, but job losses are now projected for the less skilled sales occupations sub-category.

Administrative, clerical & secretarial occupations have seen significant job losses since the early 1990s. The use of computers and IT systems has resulted in significant job losses for this group. This is projected to continue at an even faster pace over the next decade. Further job losses of around 400 thousand jobs are projected, although this category will still employ over 3 million people even by 2017.

Declining employment levels are projected for skilled trades occupations and machine & transport operatives, with the former bearing the brunt with the loss of over 200 thousand jobs by 2017.

Also amongst the groups where employment is projected to decline are elementary occupations. However, based on the latest evidence, these are not now expected to see such large absolute reduction in numbers, as many more industries, especially within the service sector, appear to be finding a need for such occupations.

These projections largely continue the historical trends highlighted earlier. As noted above, employment has been increasing most amongst non-manual occupations and those which derive employment opportunities from the services sector of the economy. For most manual / blue collar occupations (especially those tied to traditional manufacturing and the primary sector) there has been a sharp decline in employment levels.

3.4 Differences by Gender and Status

Gender

There are some significant differences in occupational employment prospects for males and females as Figures 3.3 -3.6 shows.

For men the largest employment increases are expected in the managerial, professional and associate professional occupations, where between 200 and 400 thousand new

jobs are projected between 2007 and 2017 for each occupational category.

For women the occupations providing the largest number of new jobs are the same three categories, plus personal service occupations. The four categories are each projected to account for around 300-400 thousand additional jobs between 2007 and 2017.

Women are expected to bear the brunt of the significant job losses projected for administrative, clerical & secretarial occupations.

Employment Status

In addition to separate analyses by gender, detailed projections by full-time and part-time status and for self-employment have also been produced. These are summarised in Figures 3.3-3.6. They indicate significant differences in the pattern of change for different occupational and status categories. There are also some notable differences in the patterns for males and females. These reflect structural differences in terms of the demands for different sectors and different trends in the patterns of gender and employment status mix within sectors.

For managers & senior officials (SOC major group 1), the main growth is for full-time workers. Self-employment is expected to decline (reflecting negative trends in construction and the distribution and related sectors, with the demise of many small businesses).

Amongst professional occupations a substantial increase in part-time working is projected, although full-time work is also projected to rise. Self-employment numbers are not expected to change much, although these patterns vary significantly within different sectors, with business and other services presenting a much more optimistic prospect.

For associate professionals the main growth is expected to be for full-time workers. Smaller increases are expected

for part-time workers and for self-employment.

Amongst administrative, clerical & secretarial occupations there are sharp declines, especially amongst full-time females.

For personal service occupations and for sales & customer service occupations, the main growth is for part-time jobs.

For skilled trades occupations, and for machine and transport operatives, there is a marked decline in full-time jobs.

The patterns by gender are generally similar for most of the status categories, but the occupational segregation of females and males into certain jobs results in some notable differences. For example, a much sharper growth in employment is expected for women than for men in personal service occupations, while men get the lion's share of jobs in the managers and senior official category.

More detailed results by sector and region are presented in Chapters 4 and 5.

3.5 Sensitivity to Alternative Scenarios

The results do not incorporate any direct link between occupational structure and the economic cycle but reflect longer term trends.

The caveats set out earlier in this report are also important in the case of the occupational projections. It is difficult to engage in forecasting during 'turning points' in economic conditions. When the project was initiated at the beginning of 2008, there was some discussion of the possibility of a slow down in economic activity. By the time the analysis had been completed and reports drafted this had turned to the possibility of recession. Between then and the time of publication, the credit crunch has led to the virtual collapse of financial markets worldwide, and unprecedented interventions by

central banks across the globe, to shore up the banking system and to attempt to restore calm and certainty to markets.

It remains unclear how successful these efforts will be, and how significant an impact all this will have on the real economy. It seems clear that a more pessimistic picture will unfold for the UK economy and labour market in the immediate future than is set out in the macroeconomic scenario that underlies the current set of projections.

However, past experience suggests that economies do recover from such 'shocks' and that longer term trends are generally re-established relatively quickly. Sharp recessions often hasten the structural changes going on the economy, resulting in the more rapid decline of struggling sectors and the birth of new ones. The increasingly inter-connected nature of the global economy may help to hasten this process. Analysis of previous recessions suggest that, while the impact on employment levels can be quite severe as the downturn accelerates, the effect on patterns of labour demand by sector and skill are much less marked, and that the underlying trends in such shares are quite robust.

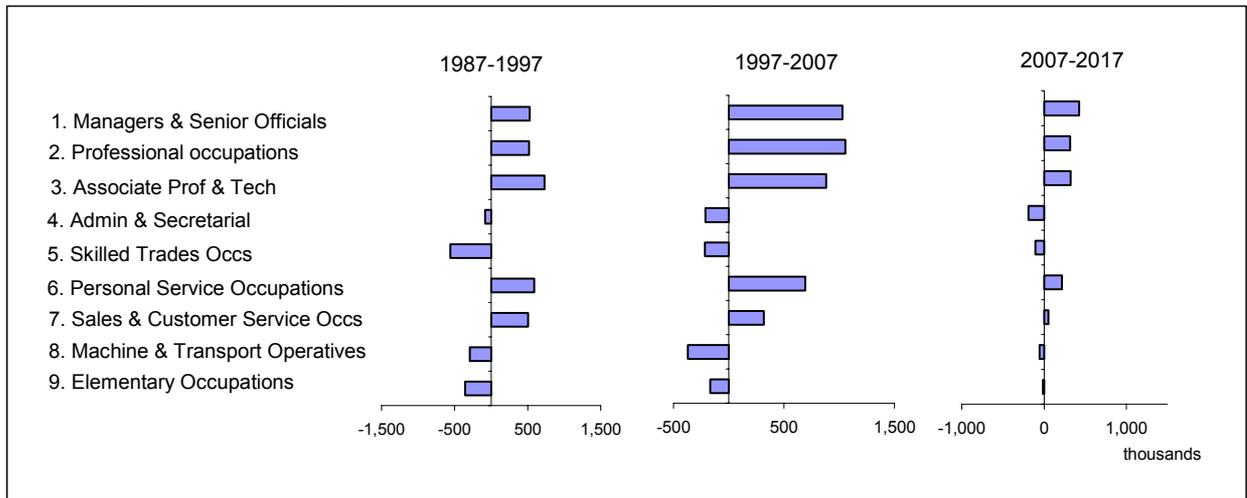
Figure 3.2 shows the impact of the recession of the early 1990s on employment shares by occupation. This shows some modest cyclical downturns for certain occupations, but a much less dramatic impact on employment patterns, than might be expected, given the effects on overall numbers. The underlying trends show the 1990's recession as having only

a modest impact. If the recession that is now likely to arise following the recent crisis has a similar impact on the relative demands for different occupations, then the underlying, longer term trends that are built into the *Working Futures* projections can be expected to still provide a useful guide to longer term developments in the demand for skills.

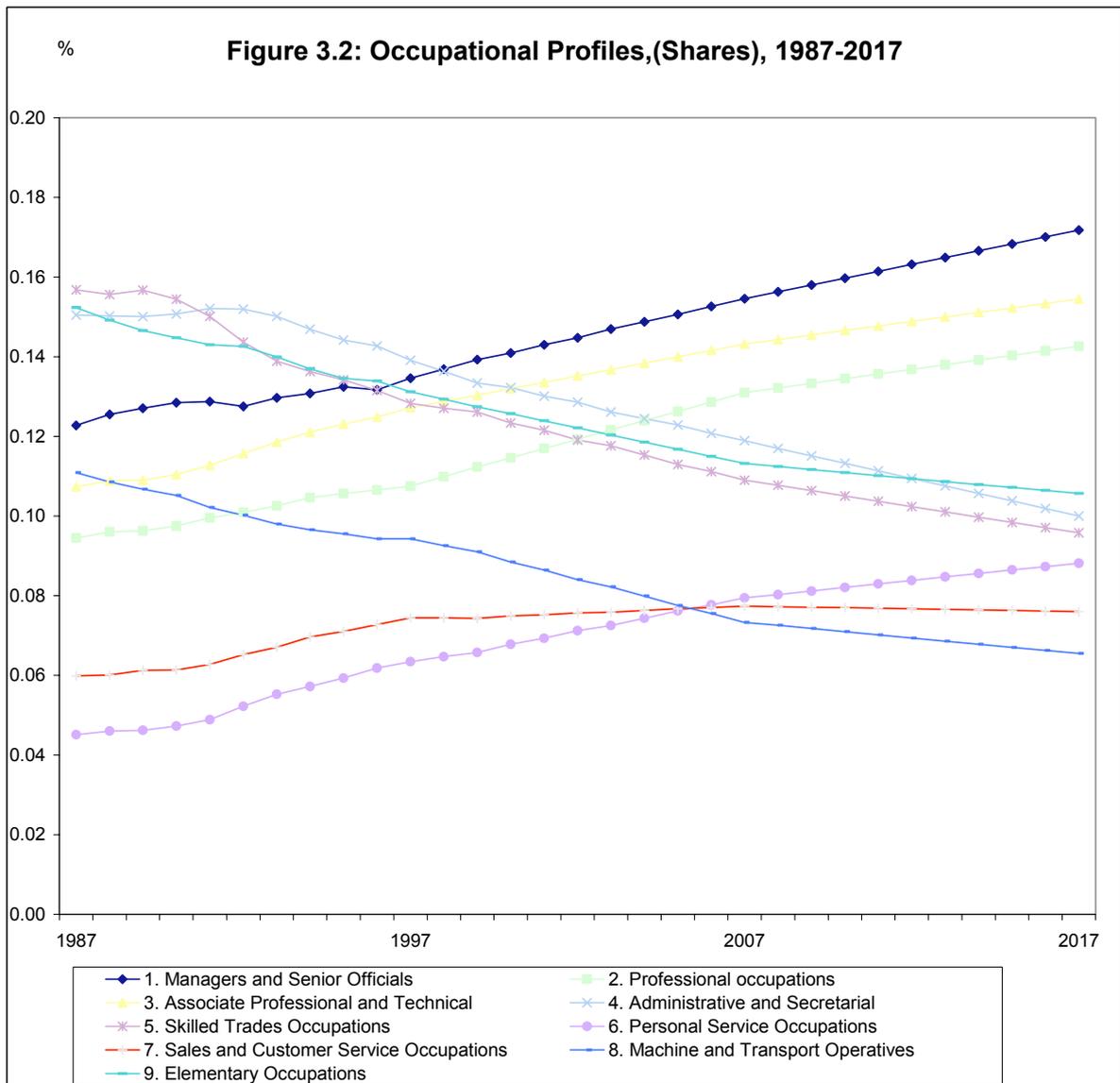
The results of the present set of projections are therefore presented with these caveats in mind, focussing on developments over a 5-10 year time horizon (leading up to 2017, rather than what might happen in the next 2-3 years). It seems likely that the impact of recent events will result in a more marked cyclical downturn for numbers in employment in most occupations in the period 2007-2010 than shown in Figure 3.2.

Assuming that the tranche of measures introduced by governments across the world have the desired effect, the economy is likely to recover, and the impact on occupational employment shares in the long term remains likely to follow broadly the path set out in Figure 3.2. It will, of course, be important to monitor developments closely, and to consider when it is necessary to undertake a more detailed reassessment of how the financial crisis and subsequent events in the real economy impact on the patterns of demand for skills. A deeper recession over the short-term than projected here, based on past experience, might be expected to have a particularly hard impact on skilled trades, elementary occupation and also managers.

Figure 3.1: Changes in Occupational Employment Structure, 1987-2017



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls (Figure 4.1.1)



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls, (Figure 4.1a).

Table 3.1: Occupational Categories SOC 2000 – Major Groups

United Kingdom: All Industry Sectors

Employment Levels (000s)	1987	1997	2007	2012	2017
1. Managers and Senior Officials	3,271	3,799	4,828	5,254	5,700
2. Professional occupations	2,517	3,034	4,091	4,406	4,733
3. Associate Professional and Technical	2,860	3,591	4,472	4,793	5,126
4. Administrative and Secretarial	4,009	3,927	3,715	3,525	3,319
5. Skilled Trades Occupations	4,177	3,620	3,404	3,296	3,178
6. Personal Service Occupations	1,202	1,791	2,482	2,700	2,925
7. Sales and Customer Service Occupations	1,595	2,101	2,418	2,470	2,522
8. Machine and Transport Operatives	2,954	2,661	2,290	2,234	2,173
9. Elementary Occupations	4,058	3,703	3,536	3,523	3,507
Total	26,642	28,227	31,234	32,200	33,184

Percentage Shares

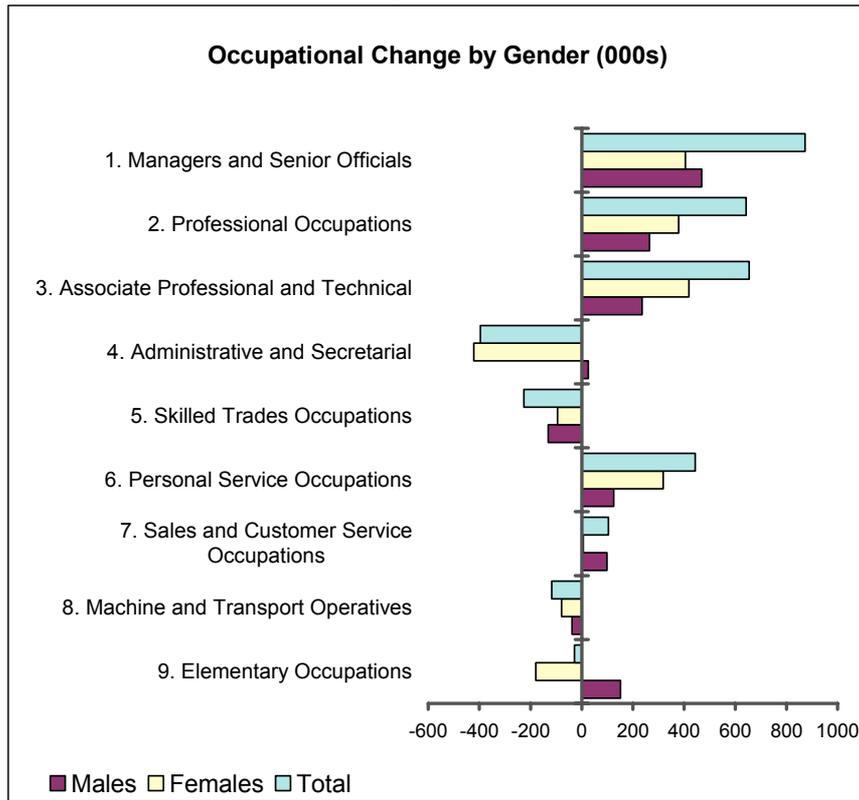
	1987	1997	2007	2012	2017
1. Managers and Senior Officials	12.3	13.5	15.5	16.3	17.2
2. Professional occupations	9.4	10.7	13.1	13.7	14.3
3. Associate Professional and Technical	10.7	12.7	14.3	14.9	15.4
4. Administrative and Secretarial	15.0	13.9	11.9	10.9	10.0
5. Skilled Trades Occupations	15.7	12.8	10.9	10.2	9.6
6. Personal Service Occupations	4.5	6.3	7.9	8.4	8.8
7. Sales and Customer Service Occupations	6.0	7.4	7.7	7.7	7.6
8. Machine and Transport Operatives	11.1	9.4	7.3	6.9	6.5
9. Elementary Occupations	15.2	13.1	11.3	10.9	10.6
Total	100.0	100.0	100.0	100.0	100.0

Net Changes

	1987-1997	1997-2007	2007-2012	2012-2017	2007-2017
1. Managers and Senior Officials	528	1,029	426	446	872
2. Professional occupations	518	1,057	315	328	643
3. Associate Professional and Technical	731	881	321	333	654
4. Administrative and Secretarial	-82	-212	-190	-206	-396
5. Skilled Trades Occupations	-557	-216	-108	-118	-226
6. Personal Service Occupations	589	691	218	226	443
7. Sales and Customer Service Occupations	506	317	52	52	104
8. Machine and Transport Operatives	-293	-371	-56	-61	-117
9. Elementary Occupations	-355	-168	-12	-16	-29
Total	1,585	3,008	966	984	1,949

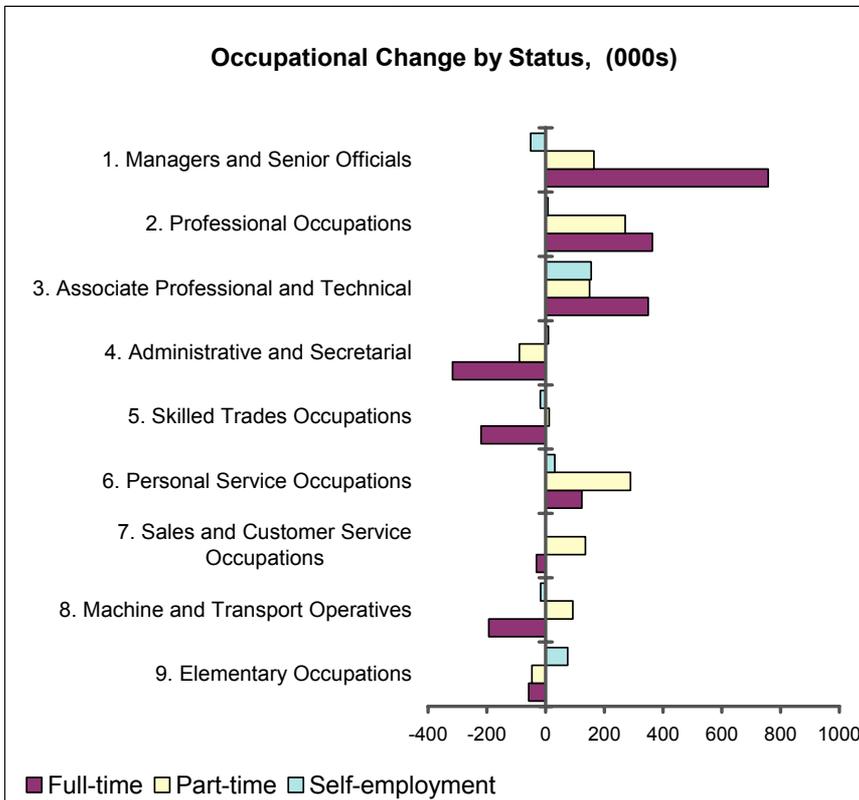
Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls, (Table 4.1T).

Figure 3.3:



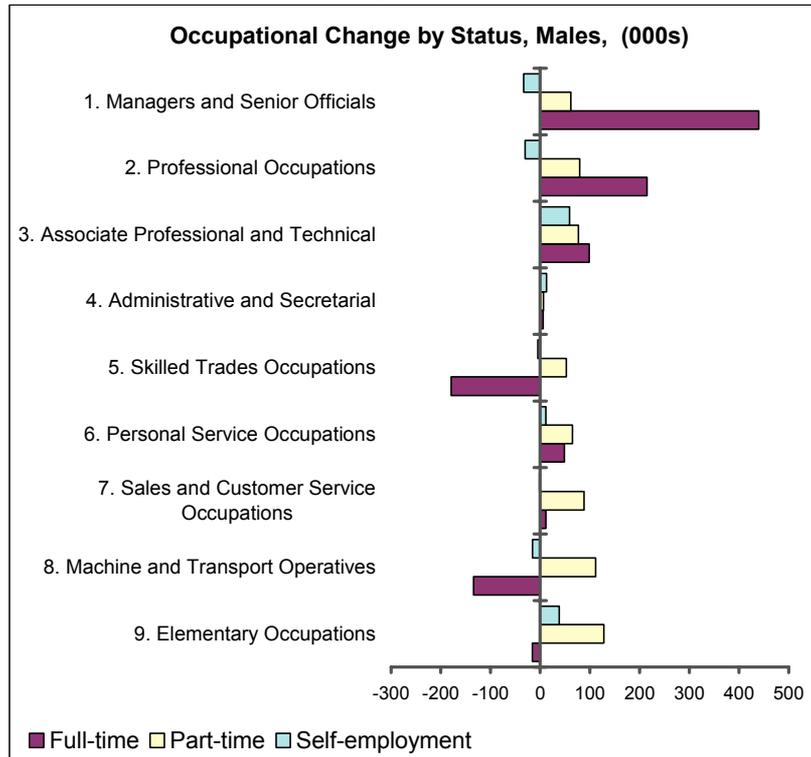
Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), Alluk.xls, (Figures 4.1 to 4.4).

Figure 3.4:



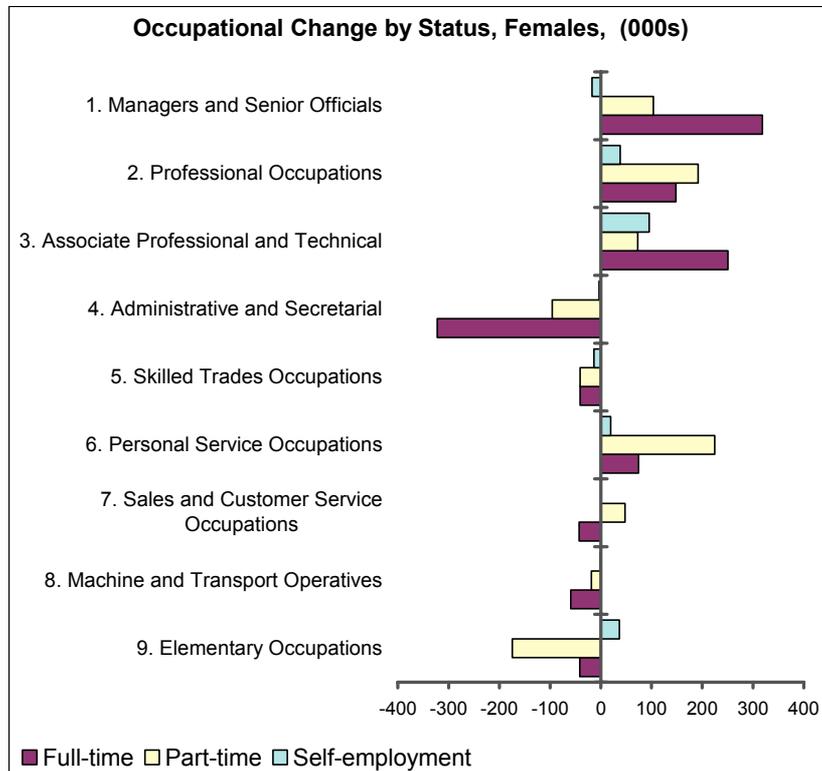
Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), Alluk.xls, (Figures 4.1 to 4.4).

Figure 3.5:



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), Alluk.xls, (Figures 4.1 to 4.4).

Figure 3.6:



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), Alluk.xls, (Figures 4.1 to 4.4)

3.6 Occupational Trends for Sub-Major Groups

Tables 3.2 and 3.3 and Figure 3.7 present a more detailed analysis of occupational projections for the 25 sub-major occupation groups of SOC 2000. These enable identification of prospects for specific occupations which are contained within the broader groups analysed above.

Managers & senior officials

Within the managers and senior officials group, employment for corporate managers has been the main source of employment growth. This is expected to continue in the period to 2017. The latest information suggests that the pace of growth will be even faster than previously anticipated. The extent to which this represents real change as opposed to inflation in occupational titles is impossible to judge from the available data. Casual observation suggests that in many areas individuals are being given job titles including the word manager, while there is often little change in job content.

The reclassification of many jobs in SOC 2000 from managerial to other categories served to moderate somewhat estimates of growth for managers using SOC 1990 categories, especially in the early 1990s. However, the latest Census and LFS data confirm that, despite this, managerial occupations continue to be one of the most rapidly growing areas of employment (see Figure 3.7).

For Managers and Proprietors, the results show a decline in employment between 1997 and 2007. This is the only sub-group of managerial occupations for which there was a decline in employment. However, employment for this group is projected to grow by around 0.7 per cent per annum over the period 2007-17.

Professional occupations

Amongst professional occupations, all sub-major groups have experienced growth. This is projected to continue. The

highest rate of growth is projected for teaching and research professionals. Growth is also projected for business and public service professionals and for science and technology professionals (which includes engineers). All these professional groups will increase their share of overall employment between 2007 and 2017. The very rapid increases amongst health professional observed over the last few years are not expected to continue as the current phase of change in the NHS comes to a conclusion.

Associate professional & technical occupations

Substantial employment growth has been experienced for most of the sub-groups comprising the associate professional and technical occupations. Growth has been slowest for health associate professionals. Employment has grown much faster for associate professionals engaged in the culture, media and sports occupations and for protective service occupations. In terms of the number of jobs, business and public service associate professionals (including those working in computers and in business and finance) have also exhibited robust growth. According to the latest projections, this group witnessed an increase of more than 350 thousand jobs over the decade to 2007. These patterns are expected to continue overall, although at a more moderate pace. Over the period 2007-17, culture, media & sports occupations and business & public service professionals are expected to witness the fastest rates of employment growth. .

Administrative, clerical & secretarial occupations

Amongst the administrative, clerical and secretarial occupations, the latest data suggest a steady decline in employment for this group as a whole. Such job declines are projected to continue, most intensively amongst secretarial and related occupations (secretaries, typists and word processing operators), who are increasingly being displaced by advances in computer technology.

Skilled trades occupations

In the skilled trades group, a loss of nearly 300 thousand jobs in skilled metal & electrical trades has been estimated for the decade to 2007. The loss of a further 144 thousand jobs in this sub-group is projected for the period 2007-17. The number of jobs in other skilled trades is expected to decline by more than 140 thousand over the next 10 years. Only the number of jobs in skilled construction trades is expected to increase in the decade to 2017.

Personal service occupations

Employment growth in personal services occupations is expected to continue over the decade to 2017. The bulk of additional jobs have arisen in caring personal service occupations have been one of the main areas of employment, with an increase of almost 700 thousand jobs over the period 1997 to 2007. This trend is projected to continue with the number of jobs in this sub-group expected to increase by more than 400 thousand over the decade to 2017. The majority of these jobs are expected to be taken by women.

Sales & customer service occupations

Sales occupations comprise primarily occupations such as sales assistants and check-out operators in retail outlets. Females take up the greater part of employment in this occupation group with many working part-time. Customer service occupations represent a much smaller but rapidly growing group. Both saw employment increase over the 1997-2007 period, in combination resulting in almost a third of a million jobs. The former is projected to show little change over the next decade, but customer service occupations are expected to grow much more rapidly at 23.1 per cent for the period 2007-17. In both sub-groups, a higher concentration of businesses and wider use of the Internet and other mechanisms for placing orders is expected to moderate

growth in more traditional occupations, while increasing the demand for more specialist sales and customer care occupations.

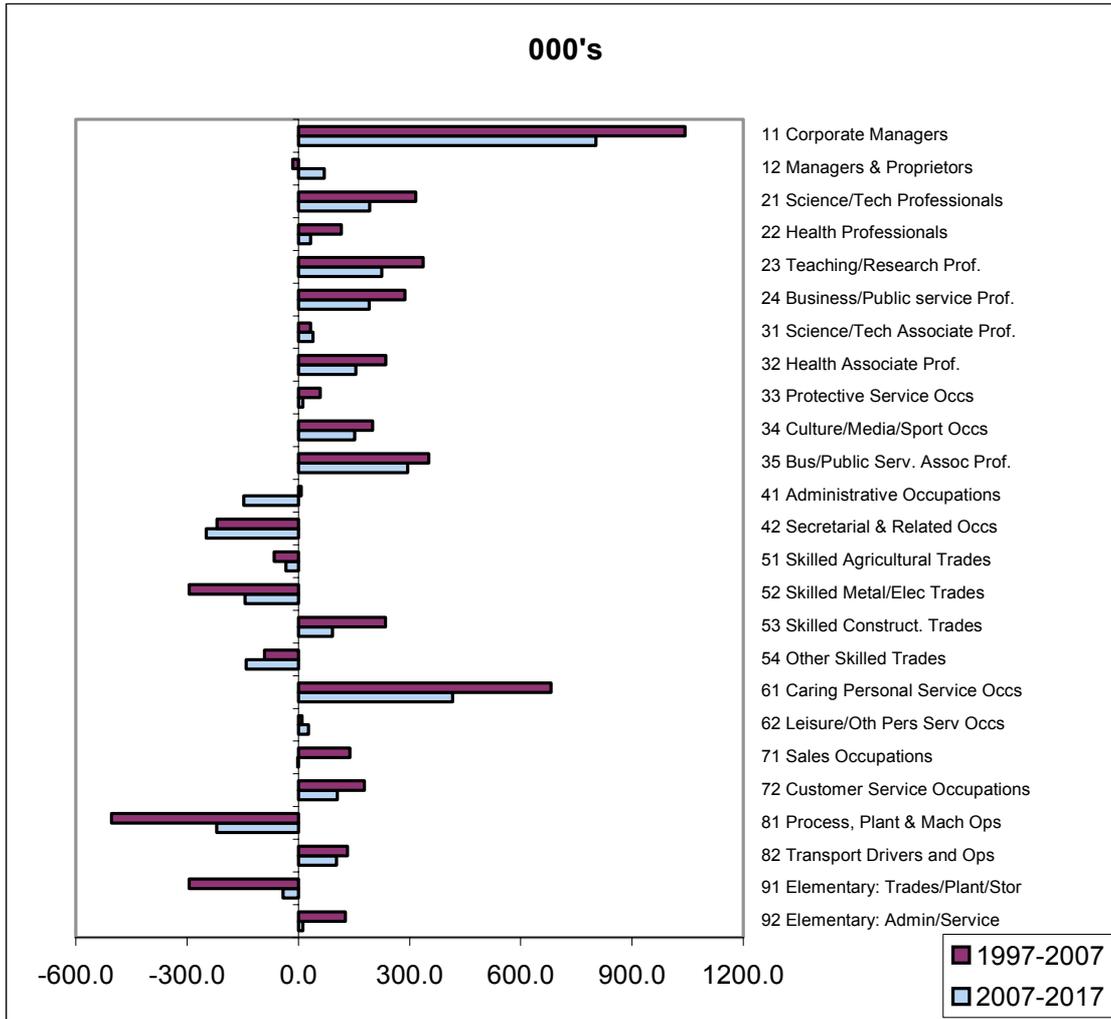
Machine & transport operatives

There is a wide diversity of different occupations within the machine & transport operatives group. Many of these jobs are related to manufacturing, construction and transport activity. Employment declined quite rapidly for process, plant & machine operators over the last decade, with the loss of around half a million jobs between 1997 and 2007. However, there were modest increases amongst the transport drivers group of more than 130 thousand jobs. Over the coming decade, further substantial job losses are expected amongst the plant & machine operators, who work in factories and on construction sites. An increase in employment levels is projected for transport drivers & operators.

Elementary occupations

The final occupational group contains elementary occupations which are not classifiable elsewhere. Employment levels across this group of occupations have been in long-term trend decline for many years, but there are now signs of this changing. The service sector is beginning to generate a number of new jobs in this area. Job losses have occurred both for those unskilled occupations, which are linked to the primary and manufacturing sectors of the economy, (elementary occupations, (trades, plant and machine related)), as well as (to a much lesser extent) for the elementary occupations, (clerical and services related) group. The latter provide low skilled service sector jobs. While this group has borne the brunt of the continuing impact of IT on routine clerical jobs, the development of new opportunities in call centres and fast food outlets now looks set to reverse this trend in some industries. Employment is now projected to fall by only a tiny amount for this group overall between 2007 and 2017.

Figure 3.7: Changes in Occupational Employment Structure by sub-major groups, 1997-2017



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), AllUK.xls (Figure 4.1.2)

Table 3.2: Total Occupational Employment, 1997-2007
United Kingdom: All Industry Sectors

Sub-major group	1997		2007		1997-2007		Components of change 1997-2007				
	000s	% of total	000s	% of total	change		scale effect 000s	occupational effect		industry-mix effect 000s	%
					000s	%		000s	%		
11 Corporate Managers	2,837	10.1	3,881	12.4	36.8	1,043	313	663	23.4	68	2.4
12 Managers & Proprietors	962	3.4	947	3.0	-1.5	-15	104	-186	-19.3	67	7.0
21 Science/Tech Professionals	773	2.7	1,091	3.5	41.1	317	89	174	22.5	55	7.1
22 Health Professionals	236	0.8	352	1.1	49.0	116	25	39	16.7	51	21.5
23 Teaching/Research Prof.	1,196	4.2	1,532	4.9	28.1	336	122	61	5.1	154	12.9
24 Business/Public service Prof.	829	2.9	1,117	3.6	34.6	287	90	100	12.1	97	11.6
31 Science/Tech Associate Prof.	512	1.8	546	1.7	6.5	33	57	-40	-7.9	16	3.2
32 Health Associate Prof.	979	3.5	1,215	3.9	24.1	236	95	39	4.0	102	10.4
33 Protective Service Occs	312	1.1	372	1.2	19.2	60	36	11	3.4	13	4.3
34 Culture/Media/Sport Occs	485	1.7	685	2.2	41.3	200	52	94	19.5	54	11.1
35 Bus/Public Serv. Assoc Prof.	1,303	4.6	1,654	5.3	27.0	352	141	167	12.9	43	3.3
41 Administrative Occupations	2,788	9.9	2,796	9.0	0.3	8	280	-337	-12.1	65	2.3
42 Secretarial & Related Occs	1,139	4.0	920	2.9	-19.2	-219	108	-410	-36.0	82	7.2
51 Skilled Agricultural Trades	374	1.3	308	1.0	-17.6	-66	43	-24	-6.5	-84	-22.5
52 Skilled Metal/Elec Trades	1,516	5.4	1,222	3.9	-19.4	-294	178	-228	-15.0	-245	-16.1
53 Skilled Construct. Trades	1,023	3.6	1,258	4.0	23.0	235	120	88	8.6	27	2.6
54 Other Skilled Trades	708	2.5	616	2.0	-12.9	-91	76	-145	-20.5	-22	-3.1
61 Caring Personal Service Occs	1,218	4.3	1,900	6.1	55.9	681	117	459	37.7	105	8.6
62 Leisure/Oth Pers Serv Occs	572	2.0	582	1.9	1.7	10	58	-63	-11.0	15	2.5
71 Sales Occupations	1,821	6.5	1,960	6.3	7.6	139	183	30	1.6	-73	-4.0
72 Customer Service Occupations	279	1.0	457	1.5	63.7	178	28	146	52.3	4	1.4
81 Process, Plant & Mach Ops	1,603	5.7	1,099	3.5	-31.4	-504	177	-340	-21.2	-341	-21.3
82 Transport Drivers and Ops	1,058	3.7	1,190	3.8	12.6	133	124	109	10.3	-100	-9.5
91 Elementary: Trades/Plant/Stor	1,310	4.6	1,016	3.3	-22.5	-295	148	-256	-19.5	-187	-14.3
92 Elementary: Admin/Service	2,393	8.5	2,520	8.1	5.3	127	244	-151	-6.3	35	1.5
All occupations	28,227		31,234		11	3,008	3,008	0		0	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), tab5a.c81.xls.

**Table 3.3: Total Occupational Employment, 2007-2017
United Kingdom: All Industry Sectors**

Sub-major group	2007		2017		2007-2017		Components of change 2007-2017				
	000s	% of total	000s	% of total	change %	net	scale effect 000s	occupational effect 000s	industry-mix effect 000s	%	
11 Corporate Managers	3,881	12.4	4,683	14.1	20.7	802	253	474	75	12.2	1.9
12 Managers & Proprietors	947	3	1,017	3.1	7.4	70	60	-17	27	-1.8	2.9
21 Science/Tech Professionals	1,091	3.5	1,283	3.9	17.6	192	76	76	40	7	3.7
22 Health Professionals	352	1.1	385	1.2	9.5	34	22	-15	27	-4.3	7.6
23 Teaching/Research Prof.	1,532	4.9	1,758	5.3	14.7	226	89	150	-13	5.8	-0.9
24 Business/Public service Prof.	1,117	3.6	1,308	3.9	17.1	191	71	61	59	5.4	5.3
31 Science/Tech Associate Prof.	546	1.7	586	1.8	7.4	40	37	-5	8	-0.9	1.5
32 Health Associate Prof.	1,215	3.9	1,370	4.1	12.8	155	66	54	35	4.5	2.9
33 Protective Service Occs	372	1.2	384	1.2	3.2	12	26	-17	4	-4.6	1
34 Culture/Media/Sport Occs	685	2.2	837	2.5	22.2	152	43	89	20	13	2.9
35 Bus./Public Serv. Assoc Prof.	1,654	5.3	1,949	5.9	17.8	295	103	155	36	9.4	2.2
41 Administrative Occupations	2,796	9	2,648	8	-5.3	-147	159	-317	11	-11.4	0.4
42 Secretarial & Related Occs	920	2.9	671	2	-27	-249	48	-328	31	-35.7	3.4
51 Skilled Agricultural Trades	308	1	275	0.8	-10.8	-33	21	-3	-52	-1	-16.8
52 Skilled Metal/Elec Trades	1,222	3.9	1,078	3.2	-11.8	-144	88	-147	-85	-12	-7
53 Skilled Construct. Trades	1,258	4	1,350	4.1	7.3	92	91	20	-19	1.6	-1.5
54 Other Skilled Trades	616	2	476	1.4	-22.8	-141	40	-185	4	-30	0.7
61 Caring Personal Service Occs	1,900	6.1	2,316	7	21.9	416	101	291	24	15.3	1.3
62 Leisure/Oth Pers Serv Occs	582	1.9	610	1.8	4.7	27	34	-17	10	-2.8	1.7
71 Sales Occupations	1,960	6.3	1,959	5.9	-0.1	-1	113	-88	-27	-4.5	-1.4
72 Customer Service Occupations	457	1.5	563	1.7	23.1	106	26	75	4	16.5	0.9
81 Process, Plant & Mach Ops	1,099	3.5	879	2.6	-20	-220	75	-211	-84	-19.2	-7.6
82 Transport Drivers and Ops	1,190	3.8	1,294	3.9	8.7	103	85	90	-72	7.5	-6
91 Elementary: Trades/Plant/Stor	1,016	3.3	975	2.9	-4	-41	70	-24	-87	-2.4	-8.6
92 Elementary: Admin/Service	2,520	8.1	2,532	7.6	0.5	12	150	-161	22	-6.4	0.9
All occupations	31,234		33,184		6.2	1,949	1,949	0	0		

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), tab5a.c81.xls

3.7 Components of Occupational Change

The occupational projections and observed historical change can be analysed using shift-share techniques. This provides a description of how the changes can be broken down into three main components: a scale effect, an industrial mix effect and an occupational effect.

- The **scale effect** measures the impact of the overall expansion (or decline) of employment levels in the economy, assuming this applies strictly proportionally to all industries, and occupations.²¹
- The **industrial mix effect** measures the impact of the changing patterns of final demands on the industrial structure of employment, whilst holding constant the occupational composition within the industries.
- The **occupational effect** measures the impact of organisational and technological changes on the occupational structure of employment within the industries.

Tables 3.2 and 3.3 present the results of the shift-share analysis for the historical period 1997-2007 and for the projection period 2007-2017. These tables show the projected net employment changes across each of the 25 sub-major occupations in terms of both absolute levels and percentages. These net changes are decomposed into the 3 component effects.

With a few notable exceptions, the dominant explanation of change for most occupations for the recent historical period is that attributable to occupational effects (see Table 3.2). However, the second most important explanation is the scale effect. All else being equal, this resulted in an increase of just over 11 per cent in each occupational employment level over the past decade.²² In many cases the

occupational effect is of a much greater magnitude. This can of course be positive (as in the case of many white-collar, non-manual occupations) or negative (as is often the case for blue-collar, manual occupations). In recent years the industry mix effect has only a relatively minor impact, although it has been important for a small number of occupations. These effects are negative for those occupations linked to the fortunes of declining sectors such as manufacturing or agriculture.²³ They are positive for those occupations linked most closely to growing service sectors such as culture, media and sports occupations.

The effects rarely all point in the same direction. The scale effect is uniformly positive over both the periods 1997-07 and 2007-17. It reflects the overall employment increases projected across all categories. The other two effects exhibit differing signs across the various occupational groups, summing across all occupations to zero.

For the forecast period the scale and occupational effects are again dominant (see Table 3.3). All else being equal, the scale effect results in an increase of just over 6 per cent in employment levels, for each occupation over the 2007-17 period.²⁴

In absolute terms, the industry mix effect is fairly insignificant in the projections, except in a small number of occupations, such as skilled trades and process plant & machine operatives. These are mainly linked to the declining fortunes of the manufacturing sector. These findings are broadly consistent with the results for the earlier period 1997 to 2007 shown in Table 3.2, although they are much less significant than observed over the previous decade.

During the 1970s and 1980s, industry effects, notably the rapid loss of jobs in the

²¹ In practice, the scale effect is calculated for each gender separately so the scale effect expressed as a percentage of employment in Tables 3.3 and 3.4 varies slightly between occupations because of different gender mix. This percentage is not shown in the table.

²² But see previous footnote.

²³ During the 1980s when employment in primary and manufacturing industries declined especially rapidly, the industry mix effect was of much greater significance.

²⁴ As noted earlier, the scale effect is calculated for each gender separately so the percentage does vary slightly between occupations.

primary and manufacturing sectors and the rapid expansion of employment in services, played an even more significant role in explaining changes in occupational employment patterns. The analysis reported in previous labour market assessments showed large industry effects, both positive and negative. The former tended to benefit white collar, non-manual occupations, in the growing service sectors, while the latter was concentrated on manual, blue collar jobs in industries such as agriculture, mining and many parts of manufacturing.

The industry mix, is strongly significant in only a few occupations for the projected period. It makes a marginal contribution to many of the others. It impacts most significantly in positive fashion for health associate professional and managerial occupations. In the case of skilled trades, process, plant & machine operatives and the elementary occupations, it is a negative feature. These latter occupations are linked together by a dependence on final demand in the manufacturing and construction sectors of the economy.

Over the forecast period, the scale effect, which reflects the overall expansion (or decline) in employment levels, is important for all occupations. It is especially notable compared with the other effects for managers & proprietors, administrative & clerical occupations and sales occupations. Additionally, it also exerts a significant positive impact for secretarial & related occupations and the admin/service elementary occupational sub-major group.

The occupational effect is very strongly positive for most professional and associate professional groups and especially in the case of the caring personal service occupations and for customer service occupations. However, the occupational effect exercises a strong negative impact for managers & proprietors in agriculture and services, administrative & clerical occupations, secretarial & related occupations, as well as in the skilled metal & electrical trades, process, plant & machine operatives and in elementary occupations. In all of these

sub-major groups, significant changes in organisation and technology within the employing industries are expected to have a marked negative impact on employment levels.

The key drivers of occupational employment change over the next decade are therefore expected to be related to changing ways of working within industries and the way in which technological change, especially IT, impacts on the need for different skills. This is in contrast to earlier decades when it has been the changing Sectoral structure of employment that has been a prime driver.

Further shift share analysis is presented in Chapter 4, which shows how these effects have influenced occupational change within individual industries.

The shift-share analysis presented in Tables 3.2 and 3.3 is carried out at a detailed industry level (the 41 industries used in MDM), for the 25 SOC sub-major occupational groups, for males and females separately. The industry and occupational effects, by definition sum to zero when added up across all occupations.

In Chapter 4 a slightly different shift-share analysis is presented. This is based on the data presented there which is for the 25 industries, 9 SOC major groups and for males and females combined. For an individual industry the occupational effects still sum to zero. But the industry effect does not. This shows the change in occupational employment that would have occurred in the industry had its occupational structure remained fixed. These changes can be positive or negative but they are the same percentage change for **every** occupation in the industry (= the % increase in employment for the industry, net of the increase for **all** industries).

If all the industry effects are summed across the 25 industries they will sum to zero across all occupations, but for individual occupations they may be positive or negative. If this analysis were

undertaken at the same level of gender, occupation and industry analysis as in Tables 3.2 and 3.3 the results would be identical to those presented there. Because they are not, minor discrepancies will arise. However, the basic patterns in terms of the industry effect becoming progressively less important, and differences across occupations, are the same in both sets of results.

3.8 Detailed Occupational Changes within Industries

The occupational projections vary considerably within different industries. Figure 3.8 presents an overview of the projections to 2017. The figure illustrates a number of features of the results, focussing in this case, on the 27 industries and the 2 digit SOC sub-major groups.²⁵

Those industries and occupations that are expected to grow or decline most rapidly are highlighted by shading of the row and column headers. Thus dark shading indicates that professional services; computing and related services; and other business services, are projected to grow by 10 per cent or more between 2007 and 2017. Similarly SOC categories 1.1 (corporate managers); 2.1, 2.3 and 2.4 (professionals); 3.2 (associate health professionals); 3.4 (culture, media and sport occupations); 3.5 (business associate professionals); 6.1 (caring personal service occupations); and 7.2 (customer service occupations) are projected to grow by 10 per cent or more.

In contrast, those industries and occupations that are expected to decline by 10 per cent or more are indicated by paler row and column headers. These tend to be the primary and manufacturing industries and blue collar and less skilled occupations.

Within the body of the figure, cells which include 100,000 or more people employed are shaded. These will be areas where there are significant replacement demands.

The cells with the most rapid changes (+ or – 20 per cent or more), are indicated by a + or – symbol. Where such symbols occur in a shaded cell, the changes are most significant in terms of numbers involved.

Variations from last time

At the major group level, the trends over the period since the early 1980s are very similar to those presented in previous *Working Futures* projections.

The latest evidence from the Census and the LFS (2007), have resulted in some reassessment of changes in the pattern of occupational employment over the past decade. This has important implications for projections which are reflected in the results shown here. The main differences compared to the previous projections are as follows.

Compared with earlier projections, faster growth is now indicated for:

- managers, some professional and many associate professional occupations;
- protective service occupations and culture /media/ sports occupations;
- caring personal service and customer service occupations.

More rapid declines than previously measured have been observed for:

- administrative, clerical & secretarial occupations;
- skilled manual & electrical trades;
- other skilled trades;
- sales occupations.

In contrast:

- for elementary occupations there is now evidence of a reversal of trend taking place in many sectors, with a number of new jobs requiring few skills being generated following a period of steady job losses.

²⁵ This issue is also dealt with in detail in Chapter 4, which deals with each sector in turn.

Figure 3.8: Occupational change across the 27 Industries

	Sub-Major Groups																								
	11	12	21	22	23	24	31	32	33	34	35	41	42	51	52	53	54	61	62	71	72	81	82	91	92
Agriculture etc																									
Mining and quarrying																									
Food, drink & tobacco																									
Textiles & clothing																									
Wood and paper products																									
Publishing and printing																									
Chemicals & non-metal minerals																									
Metal & metal goods																									
Engineering																									
Transport equipment																									
Manufacturing nes & recycling																									
Electricity, gas & water																									
Construction																									
Distribution relating to motors																									
Wholesale distribution nes																									
Retailing distribution nes																									
Hotels and catering																									
Transport and storage																									
Post & telecommunications																									
Banking & insurance																									
Professional services																									
Computing & related services																									
Other business services																									
Public admin and defence																									
Education																									
Health & social work																									
Miscellaneous services																									

level of employment in 2007 and/or 2017 is 100000 or greater.
 + growth in employment between 2007 and 2017 is forecast to be 20% or greater.
 - growth in employment between 2007 and 2017 is forecast to be -20% or less.
 growth in employment in the sector or the occupation between 2007 and 2017 is forecast to be 10% or greater.
 growth in employment in the sector or the occupation between 2007 and 2017 is forecast to be -10% or less.

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), SicSocChartColour.xls.

3.9 The Importance of Replacement Demands

The projections of occupational employment, which were summarised in Table 3.3 and Figure 3.7, focus on the total numbers of people that are expected to be employed in such jobs in the future. Although these estimates provide a useful indication of areas of change, highlighting the likely 'gainers' and 'losers', they can give a misleading impression of job opportunities and any related training requirements. Even where the projections indicate significant occupational employment decline into the medium term, there may still be quite good career prospects, with a significant number of job openings. This is because, as long as significant numbers are still likely to be employed in particular jobs in the future, employers will need to replace those workers who leave due to retirement,

career moves, mortality or related reasons. This so-called '*replacement demand*' may often be far more significant than any change which results from growth in employment in an occupational group. Such replacement demand can also easily outweigh any negative changes resulting from projected employment decline.

Traditionally the net change in employment projected in this chapter has been referred to as "expansion demand" although where employment is declining this can be negative. The sum of *expansion demand* and *replacement demand* is referred to as the *net requirement*. Further details of definitions and methods used to calculate the replacement demands and total requirements are given in Box 3.2.

Box 3.2: Replacements Demands: Definitions and Methods**Methodology & Caveats**

The projections described in this chapter define the expansion demand arising from growth or decline in occupational employment. This estimate is the net change in employment between two periods. This is only part of the demand that needs to be met if employers are to maintain their operations. In order to do this they also need to replace those members of their staff who leave.

In principle, four components of replacement demands for occupations can be separately identified:

- losses due to retirement from the workforce, which require positive replacement;
- losses due to mortality;
- net occupational mobility, which, when outward, positively adds to replacement demand; if inward, it reduces such replacement demand;
- geographical mobility, which, when outward, adds to replacement demand.

Total replacement demand is defined as the sum of these four elements. Some of these are net flows. In some instances it may be appropriate to consider just gross outflows. The estimates here use net flows.

When total replacement demand as defined here is added to expansion demand, an estimate of expected net requirements for each occupation is obtained. This measure provides an indication of the number of newly qualified entrants likely to be required in each occupational group over a period of time.

The data used to estimate both the age structure of the workforce and the various flows are based upon very limited information, mostly taken from the Labour Force Survey (LFS). The replacement demand estimates should, therefore, be regarded as indicative rather than precise.

Data on net migration are not readily available, so this is set equal to zero by assumption in all the tables. Net occupational mobility measures based on turnover of those who change occupations within a 12 month period are available from the LFS. These exclude those who remain in the same occupation. They also exclude those who may change jobs more than once in a 12 month period. They are therefore a lower bound estimate of total turnover. These have been used in previous estimates of replacement demands (for example, see those in Wilson, 2001a). However it has proved impossible to develop a consistent set of such estimates for all the detailed specific sectors and geographical areas in the *Working Futures* database using data from the LFS. This is due to the latter's limited sample size. The estimates shown here and in the more detailed tables are therefore based just on estimated losses from retirements and mortality.

The methods for preparing estimates of replacement demands are described in more detail in the separate **Technical Report**. There is a brief summary of this in Annex A.4 of the present document.

3.10 Estimates of Replacement Demands

An analysis of replacement demand for the 25 occupational major subgroups over the period 2007 to 2017, is presented in *Table 3.4* and *Figure 3.9*. In every occupational group, the net requirement for workers is positive, as replacement demand is highly substantial and serves to outweigh negative *expansion demand* in a number of occupations. For all occupations together, replacement demand over the period 2007-2017 is about 6 times larger than *expansion demand*, see *Table 3.4*.

Over the decade as a whole, there is expected to be a net requirement of over 13 million new job openings. Retirements from the workforce are the principal component of this estimate accounting for more than 11.5 million of these jobs.

In many occupations, *expansion demand* is declining. These include occupations such as:

- administrative & clerical and secretarial & related occupations;
- skilled agricultural, metal & electrical and other skilled trades;
- sales occupations;
- process, plant & machine operatives; and
- elementary trades.

In these cases, negative *expansion demand* (projected employment decline) is expected to be offset by positive replacement demand which is mainly related to retirements from the workforce.

Expansion demand is positive in many other occupations, such as:

- corporate managers;
- business and public service associate professionals;
- teaching and research professionals;
- science and technology professionals;
- health associate professionals;
- skilled construction trades; and
- caring personal service occupations.

In such cases, expected retirements will add to positive *expansion demand* to create even higher net requirements for new entrants.

The estimates of outflows presented here are based on quite limited information using data from the Labour Force Survey. They should therefore be treated with some care. Nevertheless, they provide a broad indication of the scale of such flows, compared to the structural changes projected in this chapter.

The results in this chapter indicated that further substantial changes in occupational employment structure are expected over the next decade. In many cases this will result in job losses. Despite this, there will be a need to recruit and train new entrants into such jobs to replace those retiring from the workforce or leaving for other reasons. Where employment is already projected to rise, such replacement demand elements will serve to reinforce this and lead to even greater requirements.

In principle, considerable variations in these patterns might be expected by sector and region, as well as by gender and status. Unfortunately, the information available from the LFS does not make it easy to develop such customised estimates of age structures and flow rates. Nevertheless, an attempt has been made to indicate the potential variation in such flows across these various dimensions. These are considered in even more detail in the next chapters.

In theory, occupational mobility can also influence the magnitude of replacement demands, however, such flows are not nearly as significant as retirement flows. Occupational mobility can have both positive and negative effects. Corporate managers are likely to be most affected by occupational mobility (Wilson, 2001a) as for this group, a clear *inflow* from other occupations is likely to significantly *reduce* replacement demand (due to a negative occupational mobility flow as people move into such occupations as part of a process of natural career progression). Similar,

albeit smaller, impacts may result for business & public service professionals, business & public service associate professionals, and administrative & clerical occupations. In other occupations, the mobility effect can produce an additional outflow and thereby *increasing* replacement demand. From the previous analysis, the occupations with the strongest expected mobility net outflows are for skilled trades, sales occupations and the two elementary sub-major groups.

As outlined above, it was not possible to obtain consistent estimates of such occupational flows for the disaggregated estimates of replacement demands presented elsewhere. Occupational mobility was hence excluded from the estimates presented here in order to facilitate comparisons across areas and industries.

Geographical mobility (in the UK case, international migration) is also excluded from the present results, again reflecting a lack of reliable data rather than reality. Retirement flows almost certainly outweigh geographical flows. Geographical mobility may, in principle, be of greater significance for local areas but the lack of reliable data does not permit these flows to be quantified.²⁶

The fundamental message to highlight is that policy analysts and other actors in the labour market need to focus not just on the projected changes in occupational employment levels but on replacement demands. As individuals retire from the workforce or leave jobs for other reasons, important education and training needs arise. Even in occupations where employment is forecast to decline such needs must be met in order to support existing operations. This also means that there may be good job opportunities for new entrants into many such areas, even where the initial outlook is quite uninviting.

²⁶ For analysts working within SSCs, RDAs or LSCs, who have access to the full dataset underlying the projections, it is possible to impose alternative assumptions about such flows, so as to assess the sensitivity of the results to this assumption.

Table 3.4: Replacement Demand by SOC Sub-Major Group, 2007-2017

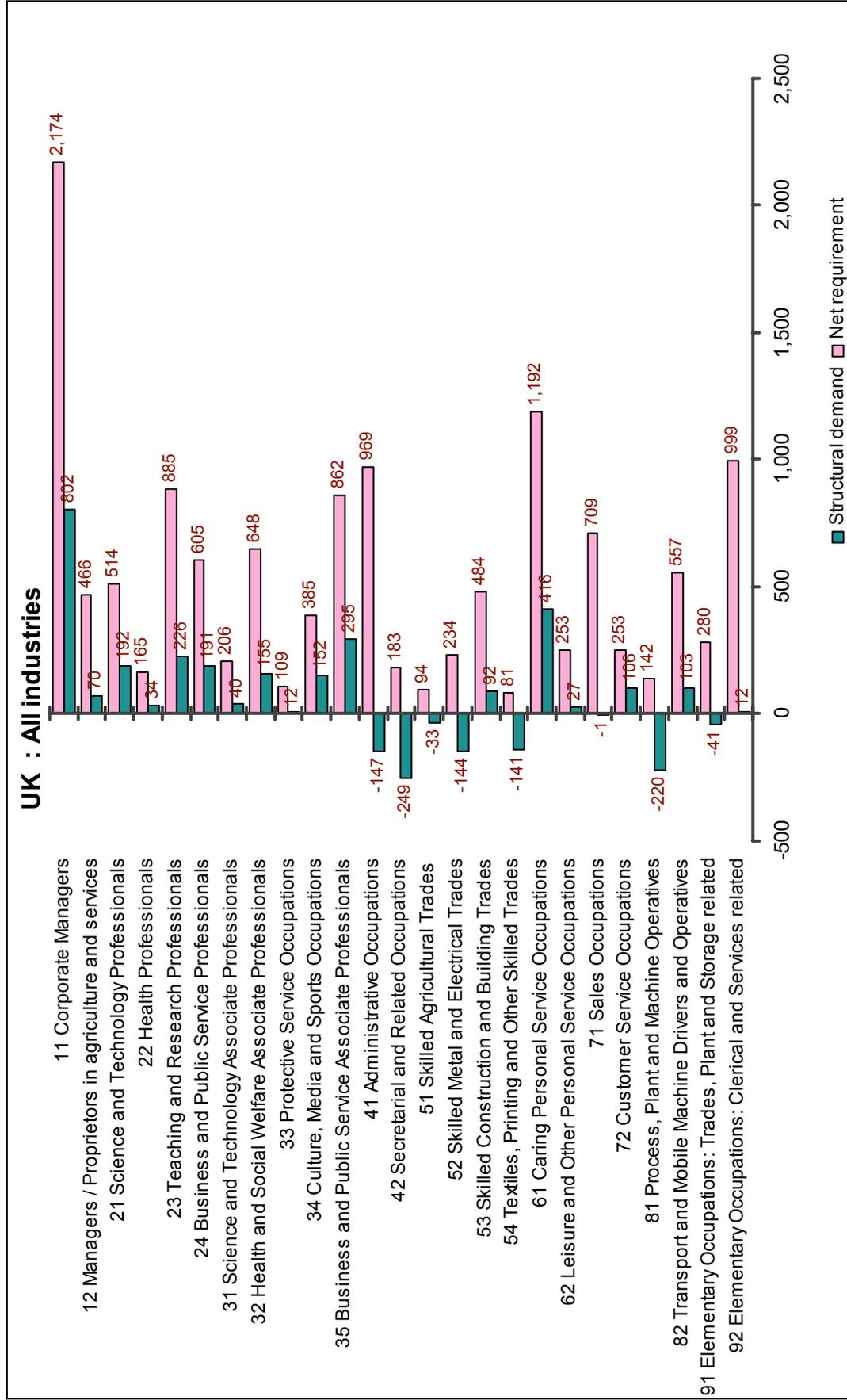
UK, All industries							
(Results in 000s)	Base employment level (2007)	Expansion demand	% of base	Replacement demands (retirements & mortality)	% of base	Net requirement (excluding occupational mobility)	% of base
Corporate Managers	3,881	802	20.7	1,371	35.3	2,174	56.0
Managers & Proprietors	947	70	7.4	396	41.8	466	49.2
Science/Tech Professionals	1,091	192	17.6	322	29.5	514	47.2
Health Professionals	352	34	9.5	131	37.3	165	46.9
Teaching/Research Prof.	1,532	226	14.7	659	43.0	885	57.7
Business/Public service Prof.	1,117	191	17.1	413	37.0	605	54.1
Science Associate Prof.	546	40	7.4	165	30.3	206	37.7
Health Associate Prof.	1,215	155	12.8	493	40.6	648	53.4
Protective Service Occs	372	12	3.2	97	26.1	109	29.3
Culture/Media/Sport Occs	685	152	22.2	233	34.0	385	56.2
Bus/Public Serv. Assoc Prof.	1,654	295	17.8	568	34.3	862	52.1
Admin & Clerical Occupations	2,796	-147	-5.3	1,117	39.9	969	34.7
Secretarial & Related Occs	920	-249	-27.0	432	47.0	183	19.9
Skilled Agricultural Trades	308	-33	-10.8	127	41.2	94	30.4
Skilled Metal/Elec Trades	1,222	-144	-11.8	378	31.0	234	19.2
Skilled Construct. Trades	1,258	92	7.3	392	31.1	484	38.4
Other Skilled Trades	616	-141	-22.8	222	36.0	81	13.2
Caring Personal Service Occs	1,900	416	21.9	776	40.9	1,192	62.8
Leisure/Oth Pers Serv Occs	582	27	4.7	226	38.7	253	43.4
Sales Occupations	1,960	-1	-0.1	711	36.2	709	36.2
Customer Service Occupations	457	106	23.1	147	32.2	253	55.3
Process Plant & Mach Ops	1,099	-220	-20.0	363	33.0	142	12.9
Transport Drivers and Ops	1,190	103	8.7	454	38.1	557	46.8
Elementary: Trades/Plant/Mach	1,016	-41	-4.0	321	31.6	280	27.6
Elementary: Clerical/Service	2,520	12	0.5	987	39.2	999	39.7
All Occupations	31,234	1,949	6.2	11,501	36.8	13,451	43.1

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), ReplacementDemands08.xls, (Table5.1).

Notes: a) Numbers may not sum due to rounding.

b) Occupational and Geographical mobility are assumed to be zero for the purposes of these estimates.

Figure 3.9: Net Requirements by SOC 2000 Sub-major Group, 2007-2017



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), ReplacementDemands08.xls, (RD25).
 Notes: Figures for total requirements exclude replacement demands arising from occupational mobility

4. Detailed Industrial Prospects

Background

This chapter provides further detail of the projections for each of the industries distinguished in Chapter 2. These follow a standard format. In each case, the section begins with a brief qualitative and quantitative description of the industry group and its prospects. This is followed by a summary of key trends in output and productivity. The implications of these for employment, including breaks by gender and status, are then described. This is followed by a presentation of the likely developments in occupational structure, including replacement demands and total future requirements.

The opinions expressed in this chapter are those of the authors and do not necessarily reflect the views of the LSC and its partners, including the UK Commission for Employment and Skills, individual Sector Skills Councils (SSCs) and Regional Development Agencies (RDAs). The results should be regarded as indicative of general trends for the industry group rather than precise forecasts of what will happen, and should be used in conjunction with a variety of other sources of Labour Market Information (LMI).

As discussed throughout this report, the crisis in the financial markets of Autumn 2008. took place after these projections were produced. They do not, therefore, take into account subsequent impacts on the short-term patch of the economy and labour market. They are presented on the assumption that the economy will recover from this shock relatively quickly and that employment patterns will revert to the longer term trends identified here.

The focus here is on 27 industry groups to describe the main sectoral development occurring across the whole economy. These are based on definitions taken from the Standard Industrial Classification (SIC). These groups are defined in Table A.3 in Annex A.

Following this introduction there are 25 sub-sections, one for each industry group. Some of the industry groups are quite small in employment terms. In a few such cases, these have been aggregated together to form the 25 industry groups used for reporting the results. This aggregation is necessary in order to obtain robust estimates. This applies to *Mining & quarrying* and *Gas, electricity & water* and to *Wood pulp & paper* and *Printing & publishing*.

For each of the 25 industries there is:

- a brief description of the industry, including definition in terms of the 2003 SIC code;
- selected key economic indicators;
- a summary of output and productivity trends and their implications for employment;
- expected changes in employment structure by gender and status;
- occupational employment projections;
- a shift-share analysis of changes in occupational employment over time;
- implications for replacement demands.

Measurement of Productivity

The profiles of productivity presented here are based on gross output divided by employment. Output per head is a fairly crude but widely used measure. There are alternative possibilities including output per person hour and total factor productivity. The latter attempts to measure all factor inputs, not just labour but it is not readily available from the present set of results. The measures used here are sensitive to changes in the mix of full-time and part-time employment. This may be quite significant, particularly in some service industries. Part-timers typically work around half the hours of full-time workers.

Implications for Industry Employment

The employment prospects in each industry can be regarded as dependent upon two main factors: demand for the industry's output and projected productivity growth. Prospects for demand for each

industry's output in turn depend upon a whole host of factors (as outlined in more detail in Chapter 2). These include:

- technological change;
- productivity growth;
- international competition;
- globalisation;
- specialisation and sub-contracting;
- economic growth and real incomes;
- shifts in patterns of consumption.

Productivity growth affects the numbers of people that need to be employed to produce the same level of output. This depends upon factors such as changes in technology and the way work is organised (see Chapter 2 for further discussion). The faster output increases relative to productivity, the faster employment will rise (or conversely). In many industries output prospects are quite promising but this is offset (in terms of the implications for jobs) by rapid productivity growth.

Patterns of employment by Gender and status

The results in this chapter also show the historical patterns of change and expected future developments in employment by gender and status in each industry. As described in more detail in Chapter 2, these changes are the consequence of a complex mix of supply and demand side factors. The latter are often specific to particular industries and sectors, while the former are of a more generic nature.

The decline of employment requiring great physical strength in industries such as the primary and manufacturing sector, coupled with the expansion of services, has opened up many more jobs for women, especially of a part-time nature. In contrast, the number of opportunities for full-time work for men has declined. These developments have been reinforced by supply side changes, reflecting the greater propensity of women to want to take part in the formal economy, often in a part-time capacity.

Regulatory changes regarding the tax treatment of self-employment have reinforced other factors such as the falling number of small businesses in sectors such as agriculture and distribution,

resulting in a declining self-employment share. In some other parts of the economy there is, by contrast, a rapid increase in such activity, often linked to IT.

The general trends identified above can be observed within most individual industries although certain parts of the primary, manufacturing and construction sectors have managed to resist the trend towards greater part-time working.

Occupational Change

Many trends in occupational employment structure are also common across most industries, although there are some dramatic differences in the occupational structures across industries. Observed historical and projected future changes reflect ongoing technological and organisational change.

Key drivers of changing skill requirements include:

- *technological change* - especially information and communications technology (ICT), which affects both the range of products and services available and how they are produced;
- *competition and changing patterns of consumer demand* - which have increased the emphasis on customer handling skills and the need for part-time and shift working;
- *structural changes* - including globalisation, sub-contracting and extension of supply chains, emphasising the need for high quality managerial skills (across a greater range and at a greater depth than previously) at various levels;
- *working practices* - such as the introduction of team or cell-based production in engineering, and call centres in financial services, resulting in increased demand for team working and communication skills and more demand for part-timers; and
- *regulatory changes* (as well as increased concern about environmental issues), which have made important skill demands upon staff in some key sectors, including the public sector, construction, and finance, raising the demand for higher level skills.

4.1 AGRICULTURE, ETC

4.1.1 Description of the industry

INDUSTRY 1: AGRICULTURE, ETC		
SIC2003 headings: 01, 02, 05		
Arable farming, livestock production, horticulture and related services, forestry and provision of recreational facilities and roads by forestry units, and commercial sea and inland fishing.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	1.0	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	453,000	31,234,000
Share of total employment (% 2007):	1.5	100
Gender split (male:female) (% 2007):	73:27	53:47
Part-time share (% 2007):	12	28
Self-employment share (% 2007):	47	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.1.2 Industry Commentary

UK agriculture produced about 58 per cent, by value, of all food consumed in the UK in 2006, a decline of about 12 per cent since 1995. This negative trend reflects the high value of sterling, and a combination of crises linked to BSE, foot-and-mouth and other diseases, as well as the impact of weather conditions and a continuing difficult economic climate in terms of competitive pressures and technological developments.

There are two main types of agriculture in the UK: lowland and highland. Agricultural activity in the two zones reacts differently to, and has different prospects in the face of, these crises. The two greatest economic changes that the industry has had to confront are the rise in the prices of many agricultural products (following ten years during which agricultural prices and incomes fell substantially) and the fundamental change in the subsidy regime under the reformed Common Agricultural

Policy (CAP) of the European Union. Fishing is now a small and still declining part of the UK agricultural industry, accounting in 2007 for less than 5 per cent of the total GVA of agriculture, etc.

High commodity prices in world agricultural markets are bringing higher product prices and costs to the UK's farmers and raising the costs of food and drinks producers. CAP subsidies to many UK farmers are being cut, and the viability of many farms is being called into question.

Under these conditions, employment in agriculture has continued to decline steeply, falling by a third over the last 15 years. The decline for paid labour (i.e. excluding farmers, partners, spouses and directors) was even faster.

Livestock farmers have suffered the effects of several outbreaks of serious disease. On the other hand high wheat prices have helped to revive arable

agriculture in the UK and are also driving up the price of farmland. However, seasonal labour shortages and poor weather made the 2007 harvest difficult for many arable farmers. New rules and regulations caused labour shortages in seasonal agricultural labour from outside the UK over the harvest season of 2007, and the tightening of migration entry rules and regulations is likely to exacerbate these problems for many farmers.

Some farmers in the UK are slowly converting their production towards more organic methods, as demand for locally-grown, organic produce rises. This is a consequence of the increasing health-consciousness among consumers and concern about the sources and production of their food.

However, converting production methods is a lengthy process which can be costly and many farmers were caught out by the rise and sudden fall in demand for organic produce in the late 1990s. UK self-sufficiency in organic produce has actually fallen in some areas and supermarkets have had to rely on imports to fill the gap.

In 2007, farming in the UK was in a poor position, with rising utilities costs, delays to the single farm payment and lower subsidies. Flooding in the summer and the outbreaks of Foot and Mouth Disease and Bluetongue have added to the pressures on many farmers. On the other hand the improved prospects for arable farmers will help to sustain modest output growth in the long term.

Ever increasing pressures to improve productivity and other pressures on agriculture will cause significant falls in employment. The difficulties of livestock farmers may force many hill farmers, in particular, out of business. Arable farming has better prospects, but this is much less labour-intensive.

The prospects are therefore for employment to continue to fall, even while agricultural output grows over the medium term. Output growth will be sustained by increases in productivity, better farm management and growing demand for domestic produce.

4.1.3 Productivity and Output Trends

Table 4.1.1: Trends in Output, Productivity and Employment

Indicator	Average change in the period			
	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	1.3	1.2	0.4	0.9
Employment (% pa)	-5.3	0.4	-2.5	-2.4
(000s)	-140	9	-55	-45
Productivity (% pa)	7.0	0.8	3.0	3.4

Source: 6725output.xls (Figure 6.x.1)

- Agriculture has been beset by a range of problems in recent years such as BSE, foot and mouth, etc. This has had a negative impact on the industry and levels of output have only increased modestly. This pattern is projected to continue.
- Productivity increased rapidly over the period 1997-2002 but then slowed. Some further steady growth is projected reflecting continued restructuring of the sector and technological change.
- After falling quite sharply between 1997 and 2002, employment has recently stabilised, but it is soon expected to continue its pattern of long term decline;
- Although the pace of job losses is expected to slow in comparison to the first half of the previous decade, further job losses are anticipated as previous trends reassert themselves.

4.1.4 Employment by Status and Gender

Employment in Agriculture, etc is predominately male, over 7 in 10 jobs being undertaken by men.

Self employment accounts for half of all jobs, and for more than half of all male jobs.

Males in general, are expected to bear the brunt of projected decline in employment. The projections suggest that male employment will fall much faster than that for females.

Self-employment fell sharply in the 1990s but full time employees are projected to be the main casualty of projected job losses.

Table 4.1.2: Employment Levels by Gender and Status, Agriculture, etc

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	138	(30.4)	27	(6)	164	(36.3)	329	(72.7)	-27	-8	-15	-49
Female employment	46	(10.2)	28	(6.3)	49	(10.8)	124	(27.3)	4	-5	-5	-6
Total employment	184	(40.6)	56	(12.3)	213	(47.1)	453	(100)	-23	-12	-19	-55
									2012-2017			
2012												
Male employment	111	(27.8)	20	(5)	150	(37.6)	280	(70.3)	-23	-3	-13	-38
Female employment	50	(12.6)	24	(6)	44	(11.1)	118	(29.7)	2	-4	-5	-7
Total employment	161	(40.4)	44	(10.9)	194	(48.7)	398	(100)	-21	-7	-18	-45
									2007-2017			
2017												
Male employment	88	(25)	17	(4.8)	137	(38.7)	242	(68.5)	-50	-10	-27	-87
Female employment	52	(14.7)	20	(5.6)	39	(11.2)	111	(31.5)	6	-9	-10	-13
Total employment	140	(39.7)	37	(10.4)	176	(49.9)	353	(100)	-44	-19	-37	-100

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.1.5 Projections of Employment by Occupation

Key aspects of occupational structure

Four occupations dominate employment (see Table 4.1.3).

- Managers & senior officials (especially proprietors of small businesses);
- Skilled trades (mainly agriculture trades);
- Plant and transport operatives;
- Elementary occupations (manual jobs).

Skilled trades and elementary occupations remain the most significant numerically. As a proportion of total employment, all of these, other than skilled trades, are projected to see falling employment shares.

Main changes by occupation: recent past & future

These four occupations have borne the brunt of recent job decline:

- Elementary occupations experienced the most significant job losses in absolute and percentage terms. These patterns are projected to continue.
- Job losses in the skilled trades are also expected to continue, although a slowdown in the expected rate of job loss will result in a modest increase in their occupational share.
- Reflecting the increasing emphasis on tourism and leisure as opposed to traditional farming activities, smaller rates of job losses are expected for personal service occupations.

Shift share analysis

Table 4.1.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment within the UK economy. The impact of the overall decline or growth of this particular industry over the various sub-periods covered is demonstrated in the industry effect. Finally, the occupational effect illustrates the impact of

changes in technology and organisational factors on the occupational structure *within* the industry.

For agriculture, etc, the industry effect has played a major part in declining employment for many occupations. The industry effect was near -16 per cent, in the period 1987-97. This almost doubled in 1997-2007. Over the projection period, the industry effect is projected to moderate slightly to just -28 per cent.

The occupational effects are broadly in line with those across most other industries over the projection period, although much more rapid job losses have been experienced for the managers category, reflecting the closure of many small holdings. This trend is expected to continue. However, it is elementary occupations that are expected to bear the brunt of job losses.

Replacement demands

Table 4.1.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

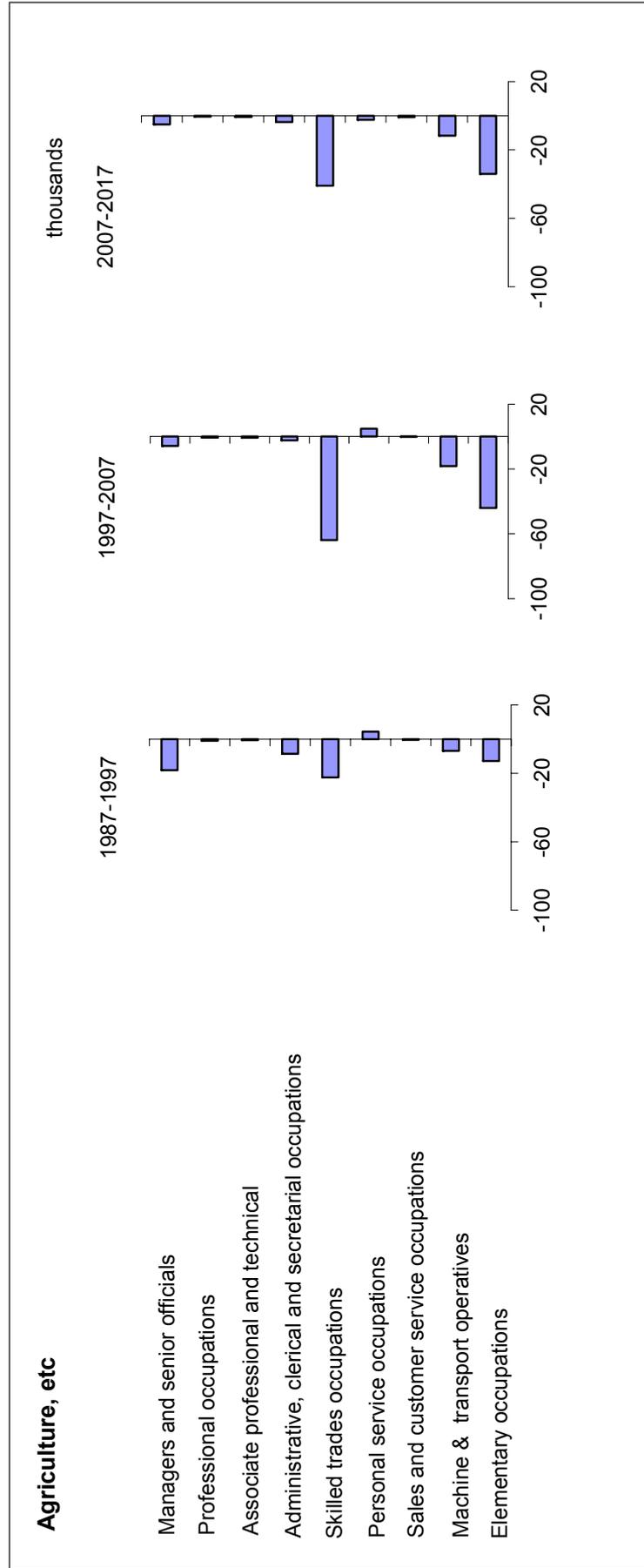
- Despite further expected job losses in the industry, this does not mean there will not be a need to recruit some new workers.
- There are significant replacement demands, especially for skilled trades occupations and elementary occupations. As a consequence, there are important implications for training requirements, especially in the first of these groups.
- Replacement demand is almost double the decline in expansion demand, creating a net need for some 70 thousand new workers in the sector as a whole.
- The largest net requirement projected is for skilled trades. Smaller increases are projected for managers & senior officials and for personal service occupations. The latter reflects the new focus on tourism and leisure, as opposed to more traditional activities.

Table 4.1.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Agriculture etc Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	73	55	49	46	44	-5	20	15
2. Professional Occupations	7	6	5	5	5	-1	2	1
3. Associate Professional & Technical Occupation:	12	11	10	10	10	-1	3	3
4. Administrative, Clerical & Secretarial Occupati	23	14	12	10	8	-4	5	1
5. Skilled Trades Occupations	257	234	170	148	129	-41	70	29
6. Personal Service Occupations	29	34	39	37	36	-2	14	11
7. Sales & Customer Service Occupations	4	4	4	3	3	-1	1	0
8. Machine & Transport Operatives	57	50	32	25	20	-12	11	-1
9. Elementary Occupations	189	176	132	113	98	-34	43	9
Total	651	585	453	398	353	-100	169	69
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	11.3	9.4	10.9	11.7	12.5	-10.2	40.2	30.0
2. Professional Occupations	1.1	1.0	1.2	1.3	1.4	-9.8	34.9	25.2
3. Associate Professional & Technical Occupation:	1.8	1.9	2.3	2.5	2.7	-7.2	33.9	26.7
4. Administrative, Clerical & Secretarial Occupati	3.5	2.4	2.6	2.5	2.3	-31.7	43.3	11.7
5. Skilled Trades Occupations	39.4	40.1	37.6	37.3	36.6	-24.1	41.3	17.3
6. Personal Service Occupations	4.5	5.8	8.5	9.3	10.3	-6.2	35.8	29.6
7. Sales & Customer Service Occupations	0.7	0.7	0.8	0.8	0.8	-22.5	34.2	11.7
8. Machine & Transport Operatives	8.7	8.5	7.0	6.3	5.6	-36.8	34.3	-2.5
9. Elementary Occupations	29.1	30.2	29.2	28.4	27.8	-25.7	32.2	6.5
Total	100.0	100.0	100.0	100.0	100.0	-22.0	37.3	15.3

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.1.4: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

Table 4.1.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s			
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	
1. Managers & Senior Officials	-18	4	-12	-11	-6	6	-18	7	-14	-5	3	-14	-5	3	-14	6	0	6	
2. Professional Occupations	-1	0	-1	0	-1	1	-2	1	-2	-1	0	-2	-1	0	-2	1	0	1	
3. Associate Professional & Technical Occupations	-1	1	-2	1	-1	1	-4	2	-3	-1	1	-3	-1	1	-3	2	1	2	
4. Administrative, Clerical & Secretarial Occupations	-9	1	-4	-6	-2	2	-5	1	-3	-4	1	-3	-4	1	-3	-1	1	-1	
5. Skilled Trades Occupations	-22	15	-41	4	-64	25	-78	-11	-48	-41	11	-48	-41	11	-48	-3	11	-3	
6. Personal Service Occupations	4	2	-5	7	5	4	-11	12	-11	-2	2	-11	-2	2	-11	6	2	6	
7. Sales & Customer Service Occupations	0	0	-1	0	0	0	-1	1	-1	-1	0	-1	-1	0	-1	0	0	0	
8. Machine & Transport Operatives	-7	3	-9	-1	-18	5	-16	-7	-9	-12	2	-9	-12	2	-9	-5	2	-5	
9. Elementary Occupations	-13	11	-30	6	-44	19	-58	-4	-37	-34	8	-37	-34	8	-37	-5	8	-5	
Total	-66	39	-105	0	-131	62	-193	0	-128	-100	28	-128	-100	28	-128	0	28	0	
			% change		% change		% change		% change		% change		% change		% change		% change		% change
1. Managers & Senior Officials	-24.8	6.0	-16.1	-14.6	-10.5	10.7	-33.1	12.0	-28.3	-10.2	6.2	-28.3	-10.2	6.2	-28.3	11.9	6.2	11.9	
2. Professional Occupations	-12.8	6.0	-16.1	-2.6	-10.3	10.7	-33.1	12.2	-28.3	-9.8	6.2	-28.3	-9.8	6.2	-28.3	12.3	6.2	12.3	
3. Associate Professional & Technical Occupations	-5.1	6.0	-16.1	5.1	-6.4	10.7	-33.1	16.0	-28.3	-7.2	6.2	-28.3	-7.2	6.2	-28.3	14.8	6.2	14.8	
4. Administrative, Clerical & Secretarial Occupations	-37.7	6.0	-16.1	-27.5	-16.9	10.7	-33.1	5.5	-28.3	-31.7	6.2	-28.3	-31.7	6.2	-28.3	-9.6	6.2	-9.6	
5. Skilled Trades Occupations	-8.7	6.0	-16.1	1.4	-27.3	10.7	-33.1	-4.9	-28.3	-24.1	6.2	-28.3	-24.1	6.2	-28.3	-2.0	6.2	-2.0	
6. Personal Service Occupations	15.1	6.0	-16.1	25.2	14.2	10.7	-33.1	36.6	-28.3	-6.2	6.2	-28.3	-6.2	6.2	-28.3	15.8	6.2	15.8	
7. Sales & Customer Service Occupations	-8.9	6.0	-16.1	1.3	-5.9	10.7	-33.1	16.5	-28.3	-22.5	6.2	-28.3	-22.5	6.2	-28.3	-0.5	6.2	-0.5	
8. Machine & Transport Operatives	-12.0	6.0	-16.1	-1.8	-36.6	10.7	-33.1	-14.2	-28.3	-36.8	6.2	-28.3	-36.8	6.2	-28.3	-14.8	6.2	-14.8	
9. Elementary Occupations	-6.7	6.0	-16.1	3.4	-25.0	10.7	-33.1	-2.5	-28.3	-25.7	6.2	-28.3	-25.7	6.2	-28.3	-3.7	6.2	-3.7	
Total	-10.2	6.0	-16.1	0.0	-22.4	10.7	-33.1	0.0	-28.3	-22.0	6.2	-28.3	-22.0	6.2	-28.3	0.0	6.2	0.0	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3)

4.2 MINING & QUARRYING; ELECTRICITY, GAS & WATER

4.2.1 Description of the industry

INDUSTRY 2: MINING & QUARRYING ; ELECTRICITY, GAS & WATER				
SIC2003 headings: 10, 11, 12, 13, 14, 40.1,40.2, 40.3, & 41				
Deep coal mines and opencast coal working. Over 70 per cent of consumption is by the electricity industry. Exploration for, and extraction of, mineral oil etc. Provision of services incidental to oil and gas extraction. Mining of uranium & thorium. Metal ores and their preparation; quarrying of stone, sand and clay; production of salt, other mining and quarrying not elsewhere specified.				
Electricity generation, transmission, distribution and supply. Transportation, distribution and supply of gaseous fuels through a system of mains, manufacture of gaseous fuels with a specified calorific value; production of gas for the purpose of gas supply from coal, by-products or waste; production, collection and distribution of steam and hot water for heating, power and other purposes. Collection, purification and distribution of water.				
INDUSTRY PROFILE				
	Total	Mining & Quarrying	Electricity, gas & water	All industries
Share of UK Output (% 2007):	1.8	0.3	1.5	100
Exposure to International Trade:	high			average
Concentration (market share of largest employers):	low			average
Total employment (2007):	180,000	69,000	111,000	31,234,000
Share of total employment (% 2007)	0.6	0.2	0.4	100
Gender split (male:female) (% 2007):	75:25	86:14	68:32	53:47
Part-time share (% 2007):	6	3	9	28
Self-employment share (% 2007):	7	12	4	13

Source: CE/IER estimates, MDM95 C51F8AForecast, 6725output.xls (Figure 6.x.1)

4.2.2 Industry Commentary

Mining & Quarrying

The most significant part of this industry group, both in terms of output and employment, is the Oil & Gas industry. High oil prices are stimulating high levels of investment in the North Sea, but rising costs and the focus in increasingly smaller fields are curbing growth.

The UK's oil reserves are still crucial to the UK's future energy security. Even after 40 years, the UK offshore continues to be an active oil and gas basin. With strong exploration and appraisal activity, the

industry is expected to continue making a crucial contribution to the security of the UK's energy supply for many years to come.

Oil and gas production in the North Sea will fall as reserves become depleted, but high oil prices will bolster short-term investment and output.

As the fields dry up in the North Sea, long-term output is expected to fall despite rising oil prices. Oil & Gas output is expected to decline as it becomes increasingly difficult to find new wells. Domestic demand is expected to rise, but

more slowly than growth in general economic activity, reflecting saturation of demand and the general trend towards more efficient use of energy in goods and services as energy prices rise in real terms.

The remainder of Mining & quarrying covers a range of activities of which coal mining remains one of the most significant. However, in employment terms coal mining has declined significantly. While the industry produced 18½ million tonnes in 2006, it employed just 8,000 people. The future of UK coal production depends on the power generation sector which accounts for over 80 per cent of the UK's total coal consumption (UK-produced and imported coal). The longer-term fortunes of the UK coal industry will depend crucially upon the method chosen for the implementation of the European Commission's Large Combustion Plant Directive.

Other Mining accounts for only a small amount of employment. Relatively strong output growth in the short term is forecast to ease over the longer term. A global downturn could also have an impact, although this would depend upon its geographical incidence.

Utilities: Electricity, Gas and Water

The supply chain by which electricity is provided to the retail market is divided into three parts: the wholesale market, where electricity generators sell electricity to National Grid plc (NG) and directly to large users; transmission of electricity through the grid operated by NG; and the electricity distribution businesses who sell the electricity to suppliers such as Powergen and npower.

Electricity generation in the UK has changed from being predominantly coal-based in the 1990s to a much more even generation mix. Privatisation of the UK electricity industry has had a dramatic impact on employment and skills requirements.

Since the privatisation of the electricity industry in the 1990s, the nature of the

sector has changed dramatically. Generation and supply of electricity is now highly competitive and the natural monopolies that still exist in distribution and transmission are subject to a strong regulatory framework. These changes in the industry have translated to significant changes in the labour market. Competitive and regulatory pressures have forced reorganisation and the downsizing of human resources along with greater expectations of staff performance.

During the 1990s, employment in electricity was falling and it is now less than half what it was in 1990, though the rate of decline has slowed in recent years.

In the long term, output growth is forecast average just under 2 percent per annum. This growth is likely to be driven by increasing domestic demand for electricity to power new appliances that are becoming increasingly common in households.

The structure of the UK gas supply industry; the distribution network, regulation and the major suppliers have changed dramatically over the years. The UK now has one of the most liberalised gas markets in Europe

The gas supply industry has undergone a period of continual change since British Gas was privatised in 1986. This liberalisation has on the whole been of widespread benefit to the UK economy: not only has productivity in the industry increased at least four-fold since privatisation, but lower real gas prices have improved the competitiveness of the rest of UK industry and commerce. However, customers are now directly exposed to fluctuations in the gas price. Recent rises in wholesale prices have fed through to many customers, substantially weakening the positive impact of previous price reductions.

In the medium to long term, output growth is forecast to remain steady at about 2¼ per cent. This will be driven by increased domestic demand for heating in both new and existing housing; and industrial

demand for gas to fuel power stations. Gas will become particularly important in power generation as a number of coal-fired and nuclear power plants are expected to close in the next ten years.

The water industry plays a leading role in sustaining the UK economy, especially the agricultural and domestic sectors. The industry's activities have a multiplier effect on sectors as diverse as construction, engineering, IT and telecommunications. Most of the industry in England and Wales was privatised in 1989, when regional monopolies were introduced under the regulation of the industry watchdog, Ofwat. In December 2005, Ofwat imposed a liberalised water supply licensing regime in England and Wales, under which new actors on the water market were given the opportunity to compete with existing water companies for customers.

The water industry supplies water to the population. It also collects and disposes of

waste water. To comply with environmental regulations, such as the EU Water Framework Directive, these water and sewerage companies have invested more than £50bn in the water and sewerage network including pipes, sewers, reservoirs and treatment works since privatisation. Climate change remains the biggest threat to future water supply in the United Kingdom.

Output in the water supply industry is estimated to have fallen by nearly 2 per cent in 2007 due to floods which damaged infrastructure and lowered the quality of water. At the same time, the below-average temperatures in summer 2007 curbed demand for water.

Productivity growth and consequentially growth in output are both forecast to be steady in the long run. Output is forecast to grow by around $\frac{3}{4}$ per cent per annum. The forecast is for a long-term decline in employment in the water supply industry.

4.2.3 Productivity and Output Trends

Table 4.2.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	1.3	-0.3	0.5	0.9
Employment (% pa)	-1.6	-3.1	-1.7	-1.9
(000s)	-18	-31	-15	-15
Productivity (% pa)	3.0	2.9	2.2	2.8

Source: CE/IER estimates, MDM95 C51F8AForecast, 6725output.xls (Figure 6.x.1)

- The overall trends in output for this group of industries hide a number of offsetting trends, including the slowdown in the discovery and exploitation of North Sea oil and gas, as well as the demise of the coal mining industry.
- Modest growth in output levels are expected over the next decade for the sector as a whole.
- Over the next decade further growth is also projected in productivity, but at a slightly slower rate than recent years.
- Employment is therefore expected to continue to fall, albeit not as rapidly as it did over the 1980s and 1990s, when the coal industry was run down and privatisation of the utilities led to many job losses as new owners sought to reduce costs by cutting workforce levels.

Table 4.2.1a: Productivity, Output & Employment in Component Industries

2. Mining & quarrying				
Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	-3.9	-2.1	-1.2	-1.2
Employment (% pa)	-2.3	-1.3	-1.3	-1.8
(000s)	-9	-5	-4	-6
Productivity (% pa)	-1.6	-0.8	0.1	0.6
4. Electricity, gas and water				
Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	2.6	0.1	0.7	1.2
Employment (% pa)	-1.3	-4.2	-1.9	-2.0
(000s)	-9	-26	-10	-10
Productivity (% pa)	3.9	4.4	2.7	3.2

Source: CE/IER estimates, MDM95 C51F8AForecast, 6725Output.xls (Figures for 27 extras).

- The most severe employment losses have been in mining and quarrying, the coal industry being the main casualty.
- Following the restructuring after privatisation, employment has also fallen rapidly in utilities.
- The growth of productivity is projected to continue to outweigh projected increase in output, as the search for further efficiency gains and cost savings continues. The utility sector is projected to see especially rapid growth in productivity.

4.2.4 Employment by Status and Gender

Jobs in these industries are still primarily held by males. They account for 3 out of every 4 jobs.

Fewer than 1 in 10 jobs are accounted for by self-employment, although this is increasing in importance.

Part-time workers account for a similar share of total employment, and this is rising, especially in the utilities industries.

The brunt of job losses has been borne by males. This pattern is expected to continue over the coming decade.

Self-employment and part-time shares remain relatively small, but have grown. These two types of employment are jointly expected to account for fewer than 30

thousand jobs in 2017 (out of a total of around 150 thousand).

Gender status shares in component industries

While not detailed in Table 4.2.2, there are a number of observations about the gender and status shares of employment in the component industries that can be made. These observations include:

- Employment in Mining & quarrying is predominantly male.
- For both parts of the industry group, full-time employment is the norm. However, part-time employment is projected to become slightly more important in Utilities.
- Self employment is projected to rise in importance for Mining & quarrying.

Table 4.2.2: Employment Levels by Gender and Status, Mining & quarrying; Electricity, gas & water

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007												
Male employment	121	(67.5)	2	(1)	12	(6.6)	135	(75)	-15	0	1	-15
Female employment	34	(18.9)	10	(5.5)	1	(0.7)	45	(25)	-2	1	0	0
Total employment	155	(86.3)	12	(6.5)	13	(7.2)	180	(100)	-17	1	1	-15
2012												
Male employment	106	(64.3)	1	(0.9)	13	(7.6)	120	(72.8)	-16	0	0	-16
Female employment	32	(19.4)	11	(6.9)	2	(0.9)	45	(27.2)	-1	1	0	0
Total employment	138	(83.7)	13	(7.7)	14	(8.5)	165	(100)	-17	1	1	-15
2017												
Male employment	91	(60.4)	1	(0.9)	13	(8.5)	105	(69.8)	-31	0	1	-30
Female employment	31	(20.5)	13	(8.4)	2	(1.3)	45	(30.2)	-3	3	1	0
Total employment	121	(80.9)	14	(9.3)	15	(9.7)	150	(100)	-34	2	2	-30

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.2.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Skilled trades are the most important occupation in the industry numerically, accounting for around 20 per cent of all jobs, whilst transport and machine operatives and elementary occupations together account for another 23 per cent;
- Administrative, clerical and secretarial occupations account around 16 per cent of total employment;
- Managerial, professional and associate professionals, each account for about 12 per cent of all jobs.

Main change by occupation

- The next decade is expected to see much less dramatic change after a period of rapid job loss. (see Figure 4.2.1).
- The main burden of jobs losses falls upon skilled trades and, to a lesser extent, administrative, clerical and secretarial and transport and machine operatives, but employment is projected to decline for almost all occupations
- Sales occupations are expected to see a small increase;
- Other occupations such as managerial, professional and associate professionals, and personal service occupations are projected to increase their shares of a declining total number of jobs.

Shift share analysis

Table 4.2.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment within the UK economy. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational

factors on the occupational structure *within* the industry.

For this group of industries the industry effect has played a major part in declining employment for all occupations. In the period 1987-97, the industry effect was 55.7 per cent, resulting from the impact of privatisation and the running down of coal mining. The industry effect fell somewhat in 1997-2007, but was still -32 per cent, reflecting continued efforts to cut costs and raise productivity. Over the projection period, the industry effect is projected to moderate to just under -23 per cent.

The occupational effects, over the projection period, are broadly in line with those across all industries but there is a notably large positive effect for sales & customer service occupations. Skilled trades and elementary occupations experienced especially rapid job losses during the historical periods shown.

Replacement demands

Table 4.2.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

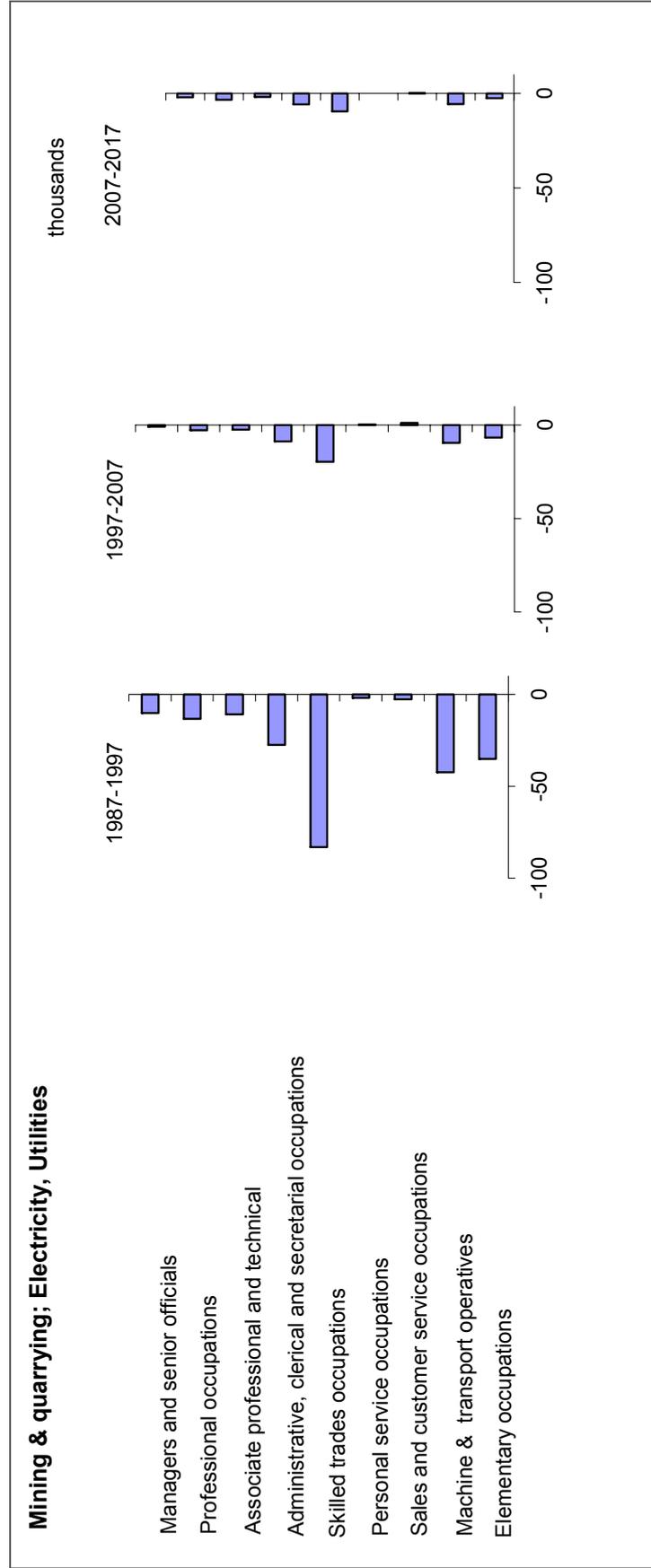
- The pattern of replacement demands is very different from that for expansion demand. A projected decline of over 30 thousand becomes a positive net requirement of a similar order of magnitude.
- Administrative, clerical & secretarial and skilled trades are the most significant categories for replacement demand.
- A number of other occupational groups have rapid increases in total requirements in percentage terms, including personal service occupations and sales & customer service occupations.
- Managerial, professional and associate professional groups are all projected to require significant numbers of replacements. These amount to 30 per cent or more of current employment levels.

Table 4.2.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Mining, quarrying & utilities Employment Levels (000s)	2007-2017					Total Requirement	
	1987	1997	2007	2012	2017		Net Change
1. Managers & Senior Officials	34	23	23	22	21	8	6
2. Professional Occupations	38	25	22	20	18	7	4
3. Associate Professional & Technical Occupations	31	21	18	17	16	6	4
4. Administrative, Clerical & Secretarial Occupations	64	37	28	25	22	11	5
5. Skilled Trades Occupations	137	54	35	30	25	11	1
6. Personal Service Occupations	6	4	4	4	4	2	2
7. Sales & Customer Service Occupations	11	8	10	10	10	0	4
8. Machine & Transport Operatives	78	35	26	23	20	9	3
9. Elementary Occupations	57	22	16	15	13	5	3
Total	456	229	180	165	150	61	31
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes	
1. Managers & Senior Officials	7.4	10.2	12.5	13.1	13.7	-8.9	25.2
2. Professional Occupations	8.3	10.7	12.1	12.1	12.3	-15.3	16.4
3. Associate Professional & Technical Occupations	6.9	9.0	10.0	10.4	10.9	-9.5	22.2
4. Administrative, Clerical & Secretarial Occupations	14.1	16.0	15.6	15.1	14.8	-20.6	19.3
5. Skilled Trades Occupations	30.1	23.6	19.2	18.1	16.8	-27.4	4.0
6. Personal Service Occupations	1.2	1.6	2.2	2.4	2.7	1.4	39.6
7. Sales & Customer Service Occupations	2.5	3.7	5.3	5.9	6.6	3.3	37.7
8. Machine & Transport Operatives	17.1	15.4	14.3	14.1	13.4	-21.9	12.4
9. Elementary Occupations	12.6	9.7	8.7	8.8	8.8	-15.5	17.0
Total	100.0	100.0	100.0	100.0	100.0	-16.7	17.3

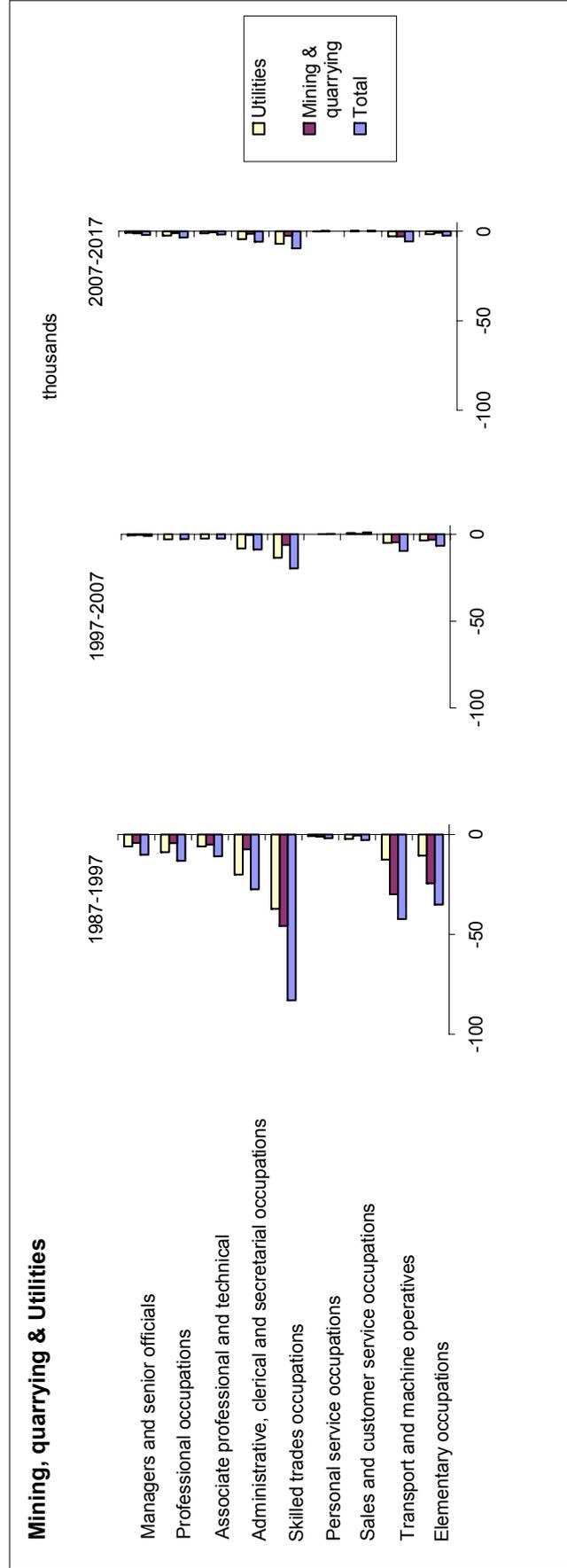
Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.2.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Figure 4.2.1a: Changing Composition of Employment by Occupation in Component Industries

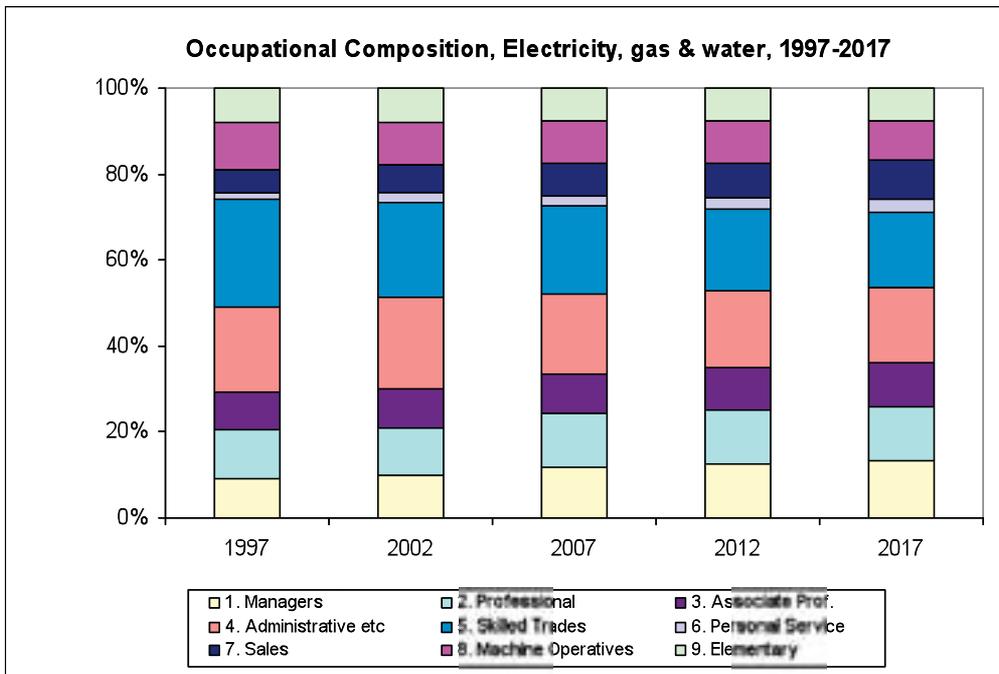
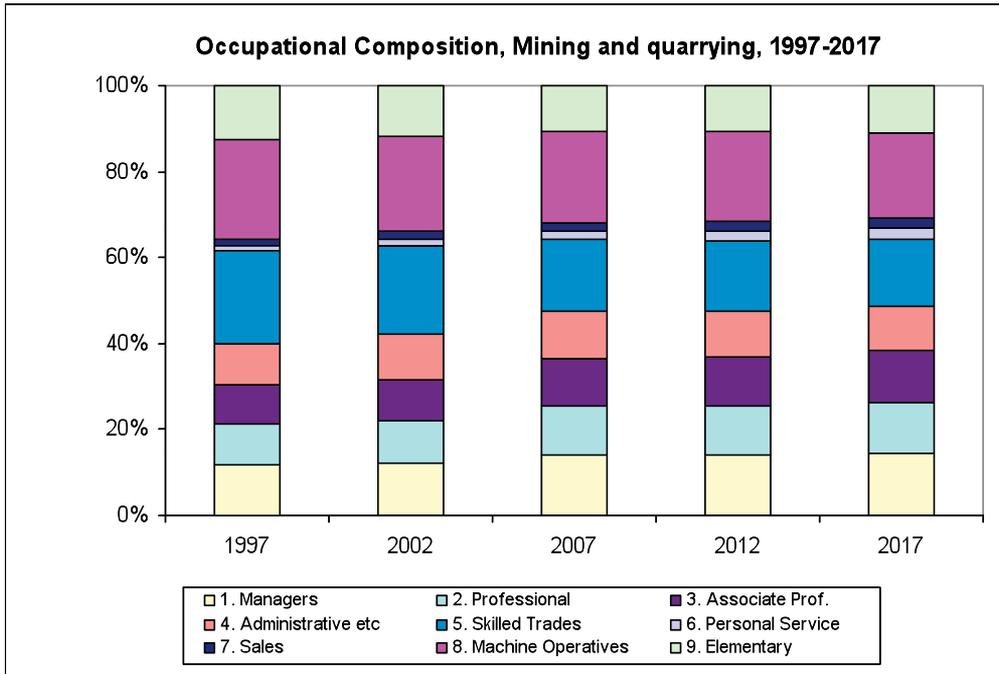


Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 27xUK.xls (Figure 6.X.4b).

Changes in Occupational structure within component industries

- The main differences in occupational employment structure and the changes observed over recent years and projected for the next decade are illustrated in Figures 4.2.4a and b.
- Figure 4.2.4a focuses on net changes and also compares the component industries directly with the industry group as a whole. Figure 4.2.4b compares the occupational structures of the two component industries, as well as showing how these have changed and are expected to change over the next decade.
- In the early 1990s both parts of the industry employed a significant proportion of skilled trades and plant and machine operatives. These shares have fallen, but especially so for utilities.
- Most white collar occupations are projected to make up an increasing share of employment, in both component industries.
- The job losses amongst manual workers, which were dramatic in the 1980s (and to a lesser extent in the 1990s), are expected to continue but at a much more modest pace.
- Perhaps the most striking feature is the continued decline in employment levels, but at a progressively slower rate over the three decades for all occupational groups and for all the component industries.

Figure 4.2.1b: Structure of Employment by Occupation in Component Industries



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 27xUK.xls (Figure 6.X.10).

4.3 FOOD, DRINK & TOBACCO

4.3.1 Description of the industry

INDUSTRY 3: FOOD, DRINK & TOBACCO		
SIC2003 headings: 15.1-15.8, 15.9, 16		
Production, processing and preserving of meat, fish, fruit and vegetables, vegetable and animal oils and fats, dairy products; grain milling, cereals and starches; animal feed; bread, pastry goods, biscuits; sugar, cocoa, confectionery etc., tea, coffee; seasonings and other food products not elsewhere specified. Distilling of spirits including ethyl alcohol; manufacturing of wine, cider and other fruit wines; manufacture of beer and malt; production of mineral waters and soft drinks. Manufacture of tobacco products: cigarettes, cigars, pipe tobacco, snuff.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	2.1	100
Exposure to International Trade:	high	average
Concentration (market share of largest employers):	medium	average
Total employment (2007):	429,000	31,234,000
Share of total employment (%2007):	1.4	100
Gender split (male:female) (% 2007):	67:33	53:47
Part-time share (% 2007):	9	28
Self-employment share (% 2007):	4	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.3.2 Industry Commentary

Before the 1980s, the UK food industry consisted of many low-volume producers, but during the 1980s and 1990s the industry was transformed by mergers and consolidation, which increased efficiency and realised economies of scale. One sign of increased efficiency was the fact that output growth averaged about 1 per cent per annum during the 1990s while employment declined by about ¼ per cent per annum. In the late 1990s, however, productivity deteriorated, and the industry then suffered from a number of food scares (BSE linked to new-variant CJD, foot-and-mouth, and e-coli). Despite the consolidation of the 1990s, there was still considerable over-capacity. These factors prompted further rounds of restructuring, as the major players bought firms that were struggling to survive in this highly competitive market.

Drink is also a global industry: the UK drinks market is dominated by multinational firms; nearly 75 per cent of demand is met by imports while more than 60 per cent of production is exported. By the mid-2000s consumer tastes in the UK were shifting away from carbonated drinks and towards non-carbonated waters and natural fruit drinks. Both Pepsico and Coca Cola are entering that drinks market, and Britvic, which gains about 25 per cent of its revenues from its ownership of the Robinsons fruit drinks company, is also focusing on that area. The cigarette and tobacco market in the UK is dominated also by two big companies.

The current strong rises in the prices of agricultural products are causing serious problems for the UK's food-producers, and these problems are compounded by the weakness of consumer spending

The prospects for consumer spending on food and drink are complex. Clearly, food is not a discretionary item, and so households will, on the whole, increase their spending on essential food when prices rise. On the other hand, choice of types of food is discretionary. During a slowdown in consumer spending, people turn away from premium foods towards less expensive brands. This move is, however, likely to be compensated by a move away from expensive restaurant meals towards premium foods to be cooked at home. The successful companies will be those that can take advantage of these consumer reactions to financial circumstances.

Acquisitions are driving profits growth and leading to re-organisation at some of the UK's larger food companies. For some of the UK's larger food businesses, profits in a fiercely-competitive market are being sustained by acquisitions. Health consciousness among consumers is a source of profit for some food & drink companies which aim is to grow through developing new products in the healthy or 'better for you' segment

The difficult conditions faced by the food & drink industry are not expected to abate in

the next few years. Most food and drinks companies expect conditions to remain difficult. The factors that are driving up the cost of their raw materials seem set to continue for several years, and may well intensify. As household finances become more straitened, people may well tend to move towards less expensive food and drink. The more agile companies may be able to take advantage of this by modifying their product range and pricing policies; but it is not easy to change a product range at short notice.

These conditions will make even more urgent the cost-cutting and rationalisation programmes that are in any case among the consequences of recent acquisitions and mergers (and, in the case of Cadbury Schweppes, the result of a demerger).

Over the longer term, growth is projected to average around 1¼ per cent per annum, much the same as in the late 1990s. The pressures on costs and margins and the consequences of mergers and the increasing dominance of large companies are expected to keep employment on a continual decline in this industry and productivity on an upward path.

4.3.3 Productivity and Output trends

Table 4.3.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	0.2	0.6	0.9	0.9
Employment (% pa)	-1.4	-2.1	-0.5	-0.8
(000s)	-34	-48	-11	-17
Productivity (% pa)	1.6	2.7	1.4	1.7

Source: 6725output.xls (Figure 6.x.1)

- Over the long term trends in output have been positive, but growth has stalled over the past decade or so. Some modest recovery is expected over the next decade.
- Following further rationalisation and implementation of technological improvements, productivity growth is expected to be maintained.
- The implication of the combination of these two trends is that employment levels are expected to continue their downward trend.

4.3.4 Employment by Status and Gender

A reasonably large number of females are employed by the food, drink and tobacco industry, who account for around a third of all jobs, although this share is falling.

Part-time employment currently accounts for just over 1 in 10 jobs, being more important for women. Self-employment is relatively insignificant.

Further declines in employment levels are projected after having stabilised in recent

years, with males increasing their share slightly.

The share of full-time employment is projected to rise significantly, reflecting structural change within the industry and, in particular the decline in importance of female jobs.

Again, this prediction is based on extrapolation of recent trends and it is possible that these patterns may be reversed over the next decade.

Table 4.3.2: Employment Levels by Gender and Status, Food, Drink & Tobacco
Changes in Employment Status (000s)

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	265	(61.8)	10	(2.3)	13	(3.1)	288	(67.2)	21	-6	-2	13
Female employment	108	(25.2)	28	(6.5)	5	(1.1)	141	(32.8)	-3	-20	-1	-24
Total employment	373	(87)	38	(8.8)	18	(4.2)	429	(100)	18	-26	-3	-11
2012									2012-2017			
Male employment	286	(68.4)	4	(1)	11	(2.6)	301	(72)	1	-1	-3	-3
Female employment	105	(25)	8	(2)	4	(1)	117	(28)	-9	-4	-1	-14
Total employment	391	(93.5)	12	(2.9)	15	(3.6)	418	(100)	-8	-5	-3	-17
2017									2007-2017			
Male employment	287	(71.5)	3	(0.7)	8	(2.1)	298	(74.3)	22	-7	-5	10
Female employment	95	(23.8)	5	(1.1)	3	(0.8)	103	(25.7)	-13	-23	-1	-37
Total employment	383	(95.2)	7	(1.8)	12	(2.9)	402	(100)	10	-31	-6	-27

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.3.5 Projections of Employment by Occupation

Key aspects of occupational structure

Table 4.3.3 illustrates that:

- Accounting for 1 in 4 of all jobs, the machine operatives category is the most important occupational group.
- Skilled trades and elementary occupations have also been important in the past but have seen their employment shares fall sharply.
- Groups such as managers, associate professionals and sales and customer service occupations have seen increases in their shares of total employment.

Future changes

- Projected job losses in the next decade are expected to be concentrated in manual occupations such as skilled trades, transport & machine operatives and elementary occupation groups. Job losses are also projected for administrative, clerical & secretarial sales & customer service occupations over the next decade.
- Increases are projected for managers and to a much smaller degree for professionals and associate professionals.

Shift share analysis

Table 4.3.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

For this group of industries the industry effect has played a major part in declining employment for many occupations. In the period 1987-97, the industry effect was a very significant negative impact at -16 per cent. Almost doubling in size to around -27 per cent, the industry effect increased intensely over the period 1997-2007. The industry effect is projected to fall back but will still result the loss of 13 per cent of jobs across all occupations over the projection period.

Managers and professionals are projected to benefit particularly from positive occupational effects over the projection period. Administrative & clerical and sales & customer service occupations are expected to experience especially rapid job losses. These patterns broadly follow those for the previous two decades.

Replacement demands

Table 4.3.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

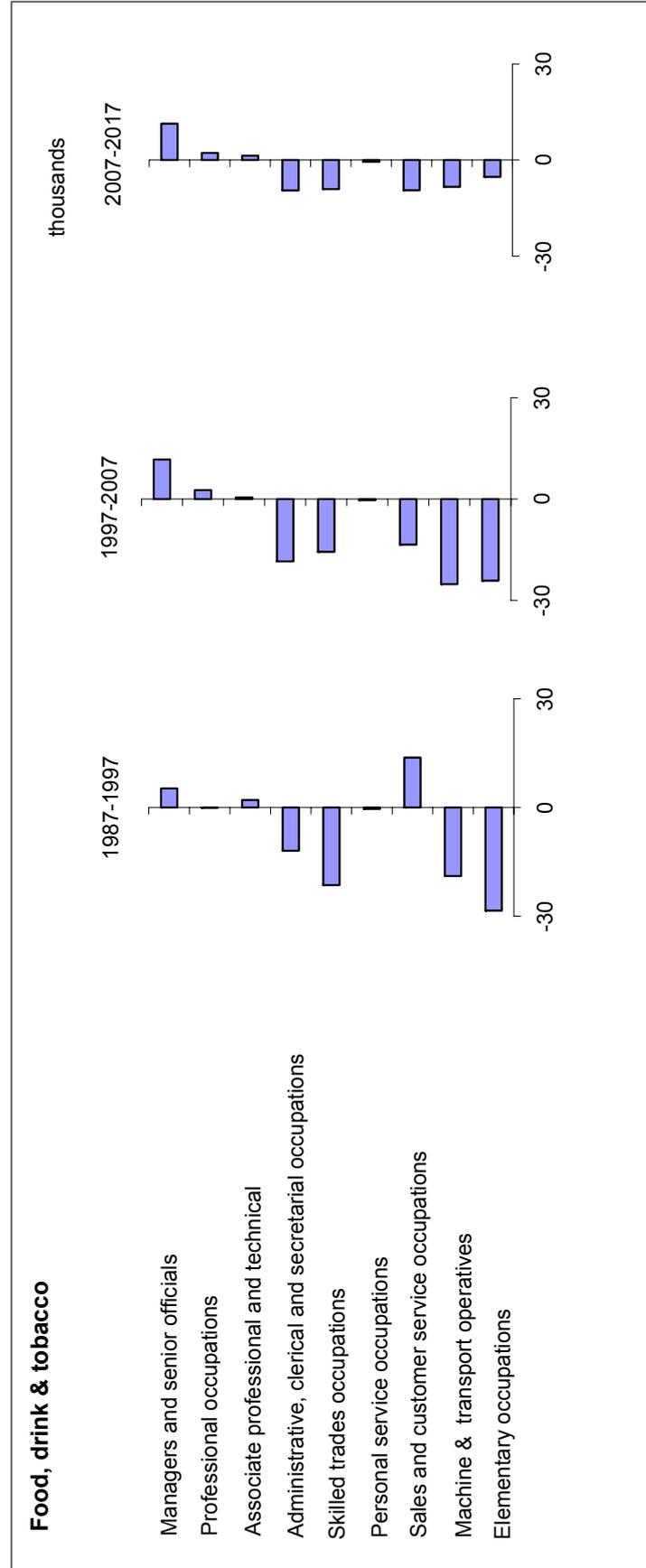
- The overall decline in employment levels projected for the industry over the next decade (of around -6 per cent) is more than offset by replacement demands.
- The total net requirement is around 125 thousand jobs, with replacement needs amounting to 150 thousand in total.
- Managers & senior officials, transport & machine operators, skilled trades and elementary occupations are the main areas where new recruits will be needed.

Table 4.3.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Food, drink & tobacco Employment Levels (000s)	2007-2017								
	1987	1992	2002	2007	2012	2017	Net Change	Replacement Demands	Total Requirement
1. Managers & Senior Officials	42	47	59	66	70	70	11	20	32
2. Professional Occupations	16	16	19	20	21	21	2	6	9
3. Associate Professional & Technical Occupation:	34	36	37	38	38	38	1	12	13
4. Administrative, Clerical & Secretarial Occupation:	66	54	36	30	26	26	-9	15	5
5. Skilled Trades Occupations	100	78	63	60	54	54	-9	21	11
6. Personal Service Occupations	4	4	4	3	3	3	-1	1	1
7. Sales & Customer Service Occupations	34	47	34	27	24	24	-9	11	1
8. Machine & Transport Operatives	154	135	110	108	101	101	-8	41	32
9. Elementary Occupations	122	93	69	66	64	64	-5	24	19
Total	571	511	429	418	402	402	-27	151	124
Percentage Shares	1987	1997	2007	2012	2017	2017	Percentage Changes		
1. Managers & Senior Officials	7.3	9.2	13.7	15.8	17.5	17.5	19.2	34.8	54.0
2. Professional Occupations	2.9	3.2	4.4	4.9	5.3	5.3	11.7	34.1	45.9
3. Associate Professional & Technical Occupation:	5.9	7.1	8.5	9.0	9.4	9.4	3.7	33.0	36.7
4. Administrative, Clerical & Secretarial Occupation:	11.6	10.6	8.4	7.1	6.6	6.6	-26.4	40.8	14.4
5. Skilled Trades Occupations	17.5	15.3	14.6	14.3	13.3	13.3	-14.5	32.8	18.3
6. Personal Service Occupations	0.8	0.8	0.9	0.8	0.8	0.8	-14.5	38.4	23.9
7. Sales & Customer Service Occupations	5.9	9.3	7.9	6.5	6.1	6.1	-27.9	31.8	3.9
8. Machine & Transport Operatives	26.9	26.3	25.5	25.9	25.2	25.2	-7.6	37.0	29.4
9. Elementary Occupations	21.3	18.2	16.1	15.8	15.9	15.9	-7.7	35.3	27.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	-6.4	35.3	28.9

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.3.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

4.4 TEXTILES & CLOTHING

4.4.1 Description of the industry

INDUSTRY 4: TEXTILES & CLOTHING		
SIC2003 headings: 17, 18, 19		
Preparation and spinning of textile fibres (cotton, wool, flax, silk, threads etc.); weaving and finishing of textiles; manufacture of made-up textile articles (soft furnishings, blankets, table linen etc.); manufacture of carpets and rugs; manufacture of other textiles not elsewhere specified; manufacture of knitted and crocheted fabrics including hosiery pullovers, cardigans and similar articles. Clothing including workwear, coats, suits, jackets, trousers, dresses, skirts etc, underwear, hats swimwear and fur articles. Tanning and dressing of leather; manufacture of luggage, handbags and the like; manufacture of footwear for all purposes.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	0.4	100
Exposure to International Trade:	high	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	137,000	31,234,000
Share of total employment (% 2007):	0.4	100
Gender split (male:female) (% 2007):	55:45	53:47
Part-time share (% 2007):	11	28
Self-employment share (% 2007):	19	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.4.2 Industry Commentary

In some high-value markets, UK producers still have a competitive advantage, but more generally, the Textiles, Clothing & Leather as a sector has been in decline in all advanced economies for several decades. Although sales have risen recently in the UK, import penetration has also risen markedly in response to the combined effect of trade liberalisation and a highly price-sensitive domestic market. At the same time export demand has tailed off dramatically. Large retail chains have continued to place more of their orders with overseas suppliers and to encourage their UK-based suppliers to shift production to lower-cost countries.

China and the EU have agreed to replace the current quota system with a monitoring system for textiles imports in 2008. In an

attempt to check the surge in imports of textiles and clothing from China, the EU and China agreed to a monitoring system, which will track imported goods and issue export licences in China during 2008 but free trade in textiles will be permitted from 2009.

Further trade liberalisation poses a further threat to the UK domestic economy. China's accession to membership of the World Trade Organisation and the gradual implementation of the relevant trade agreements have resulted in a very difficult climate for UK companies. Some firms are succeeding by exploiting low-volume, high-value niche markets. This allows them to gain a competitive advantage over companies that concentrate production on the high-volume, lower-margin end of the market.

According to data from the European Fashion and Textile Export Council exports from the UK to the United Arab Emirates in the first half of 2007 increased-year on-year by 30 per cent. This represented the fastest growth among the member states of the EU. The driving force behind the growth is demand from Dubai which has emerged as the fashion capital of the region thanks to its fashion-conscious consumers with increasing disposable income.

Price inflation in Asia and consumer decisions in Europe could lead UK clothing retailers to move back to more local sourcing. The rise in the value of the rupee and growing concerns about child labour in India's manufacturing industry have prompted some western retailers to boycott products from the sub-continent. Following a twelve-year period of deflation in the retail price of clothing in the UK, the advantages gained by sourcing ever-increasing amounts of stock from lower-cost overseas manufacturers may have now been fully exploited.

Furthermore, consumers are becoming increasingly aware of the environmental impact of shipping goods over long distances and of the poor pay and conditions in some countries whose exports have surged as western retailers have sought ever-cheaper textiles and garments.

These factors could combine to alter the balance of advantage between the UK

and Europe on the one hand and Asia on the other as a location for textiles production.

Innovation continues to drive the UK textiles industry forward. For example researchers at the William Lee Innovation Centre at the University of Manchester have developed high-tech textiles that can glow in the dark, which could have a number of commercial applications. Specialist clothing Manufacturer Gill has developed a new coast-sport jacket that it claims has a softer feel and better breathability and performs as well as a traditional waterproofed jacket

Textiles output is forecast to continue falling steeply. In the long term the industry will specialise in areas of strength such as technical textiles and the rate of decline in output may slow much less. Despite possible moves by retailers to source some garments more locally in response to ethical and environmental concerns and a growth in exports to the Middle East, the bulk of demand will still be satisfied by low-cost Far-East suppliers. With quotas ending on trade between China and the EU in 2009 it is likely that exports from China will surge once again and that any action taken in response to the latest trade monitoring system will suffer a time lag. Inevitably, as demand for UK-produced textiles remains under pressure, job losses will continue. Employment in the industry is forecast to fall.

4.4.3 Productivity and Output Trends

Table 4.4.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	-7.3	-3.1	-2.5	-0.4
Employment (% pa)	-10.4	-11.0	-4.2	-3.2
(000s)	-178	-108	-26	-17
Productivity (% pa)	3.4	8.9	1.8	2.9

Source: 6725output.xls (Figure 6.x.1)

- Levels of output have declined steadily in this industry in recent years, as a result of increasing import penetration and stiff foreign competition.
- Output is anticipated to decline further over the next decade, with relatively high rates of decline in the short term.
- Productivity levels have improved rapidly, especially over the past 5 years, following a pattern of steady improvement over much of the past 30 years. Whilst this long term trend is expected to slow in the short term, the reprieve is only likely to be short-lived.
- In combination, these trends result in a continued rapid decline in employment, averaging around 3-4 per cent per annum, and accounting for the loss of over 40 thousand jobs over the next decade.

4.4.4 Employment by Status and Gender

In this industry, women have traditionally held a large share of the jobs. This pattern however has been changing as the industry has restructured in the face of foreign competition. Females currently account for a 45 per cent share in employment and if recent trends continue this is projected to fall further.

Self-employment is accounting for an increasingly important share of total employment.

Part-time employment is relatively unimportant.

Sharply declining employment levels in this industry have hit females hardest as those parts of the industry employing

female machinists, etc have been hardest hit by competition from cheap foreign imports.

The projections assume a continuation of these recent trends, with a consequent further dramatic reduction in the share of females in employment. Very low levels of female employment are expected as a result. In practice, it is possible that the reductions in female jobs may not be quite as severe as projected here.

Both full-time and part-time workers are expected to lose job share in the overall declining employment market. Self-employment will increase its share, although the absolute level of such employment is not projected to change much.

Table 4.4.2: Employment Levels by Gender and Status, Textiles & Clothing
Changes in Employment Status (000s)

Employment by gender	Full time		Part time		Self employed		Total		FT	PT	SE	Total
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)				
2007									2007-2012			
Male employment	64	(46.6)	4	(3)	7	(5.5)	75	(55.1)	2	-1	0	2
Female employment	32	(23.4)	10	(7.6)	19	(13.9)	61	(44.9)	-23	-5	0	-28
Total employment	96	(70)	15	(10.6)	26	(19.4)	137	(100)	-21	-5	0	-26
2012									2012-2017			
Male employment	66	(59.9)	3	(3.1)	7	(6.7)	77	(69.7)	-4	-1	-1	-5
Female employment	9	(7.8)	6	(5.2)	19	(17.2)	33	(30.3)	-7	-3	-2	-12
Total employment	75	(67.7)	9	(8.3)	26	(23.9)	110	(100)	-11	-4	-2	-17
2017									2007-2017			
Male employment	62	(66.6)	3	(3)	7	(7.3)	72	(76.8)	-1	-1	-1	-3
Female employment	1	(1.5)	3	(3.1)	17	(18.6)	22	(23.2)	-30	-8	-2	-40
Total employment	64	(68.1)	6	(6)	24	(25.8)	94	(100)	-32	-9	-2	-43

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.4.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Semi-skilled operative jobs have traditionally dominated employment. These typically accounted for almost one in every two jobs, but their share had fallen to below 30 per cent by 2007.
- Skilled trades and elementary occupations are the other main types of jobs to have declined in number. The employment shares of such occupations have also been declining.
- The managers and senior officials group have seen the fastest increase in employment shares over the past decade. Professionals and associate professionals have also seen rising shares.

Future change

- All occupations are projected to experience job losses.
- The main employment decline occurs amongst the (transport and) machine operatives group, with the loss of 18 thousand jobs.

Shift share analysis

Table 4.4.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

For this group of industries the industry effect has played a key role in the observed patterns of declining employment for many occupations. In the period 1987-97, the industry effect

accounted for a reduction of over 40 per cent of employment. This negative industry effect almost doubled in the period 1997-2007. Over that decade almost 4 in every 5 jobs disappeared. This effect is only expected to moderate slightly over the next decade. The industry effect is projected to result in the loss of some 37 per cent of jobs across all occupations over the coming decade.

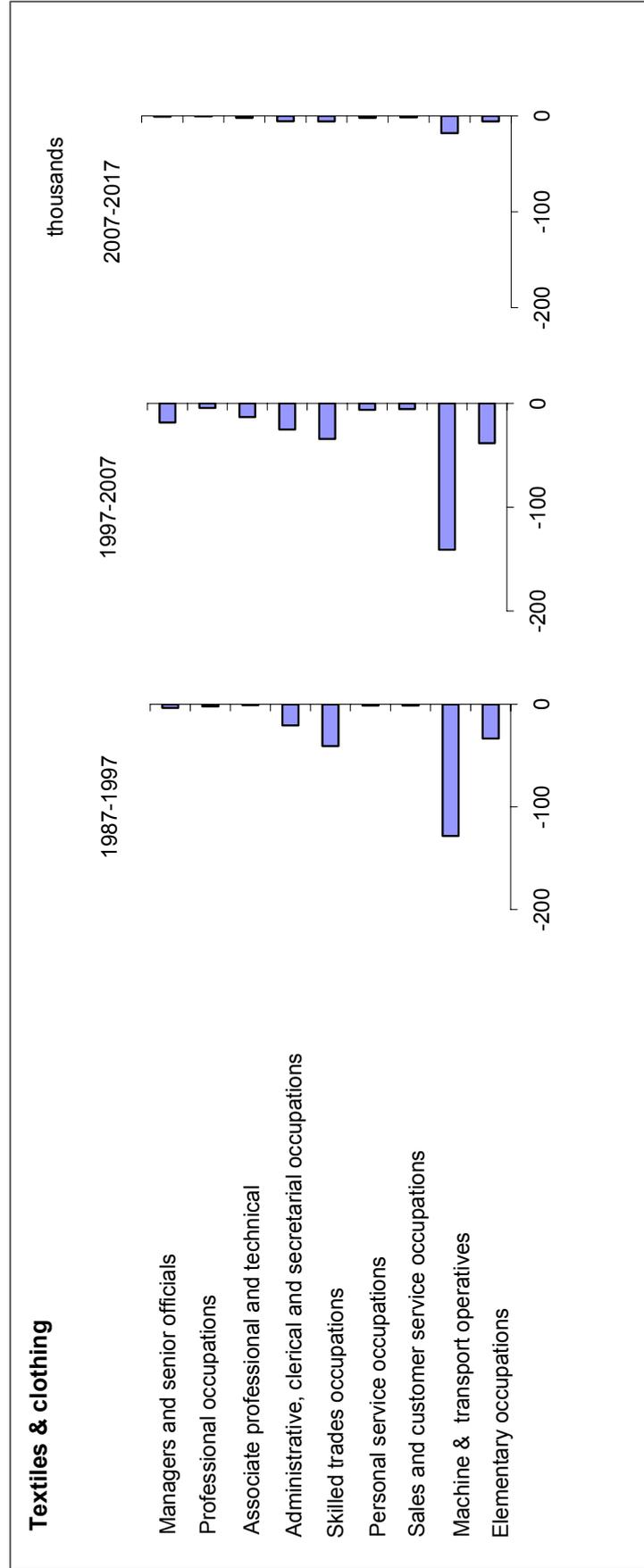
Managers and professionals have tended to benefit from positive occupational effects over all three decades but these have generally been insufficient to offset the huge industry effects. The occupational effect for skilled trades will also be positive over the projection period. However, this is more than offset by the large negative industry effect.

Replacement demands

Table 4.4.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

- Replacement demands will in large measure offset most of these projected declines, so that there will be a need for some recruitment even in this industry.
- Machine & transport operatives will have the largest level of replacement demand, but significant changes will occur in many other occupations.
- Over the next 10 years, over a third of the current workforce on average will need to be replaced.

Figure 4.4.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

Table 4.4.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	-3	3	-19	13	-18	4	-33	10	-1	1	-9	7						
2. Professional Occupations	-2	1	-5	2	-4	1	-7	2	-1	0	-2	1						
3. Associate Professional & Technical Occupations	-1	2	-11	9	-13	3	-20	4	-2	1	-5	2						
4. Administrative, Clerical & Secretarial Occupations	-21	3	-23	-1	-25	4	-27	-2	-6	1	-4	-3						
5. Skilled Trades Occupations	-41	6	-39	-8	-34	6	-42	2	-6	1	-7	0						
6. Personal Service Occupations	-1	1	-5	3	-6	1	-9	1	-2	0	-2	-1						
7. Sales & Customer Service Occupations	-1	1	-4	2	-6	1	-7	0	-2	0	-1	-1						
8. Machine & Transport Operatives	-128	18	-128	-19	-141	19	-142	-18	-18	3	-15	-5						
9. Elementary Occupations	-33	5	-37	-2	-38	6	-44	0	-6	1	-7	0						
Total	-232	39	-271	0	-286	45	-331	0	-43	9	-51	0						
	1987-1997			% change			1997-2007			% change			2007-2017			% change		
1. Managers & Senior Officials	-7.4	6.0	-41.4	28.0	-43.6	10.7	-78.3	24.1	-4.0	6.2	-37.7	27.5						
2. Professional Occupations	-17.5	6.0	-41.4	17.9	-46.1	10.7	-78.3	21.6	-14.5	6.2	-37.7	16.9						
3. Associate Professional & Technical Occupations	-3.2	6.0	-41.4	32.3	-50.4	10.7	-78.3	17.2	-16.6	6.2	-37.7	14.9						
4. Administrative, Clerical & Secretarial Occupations	-37.3	6.0	-41.4	-1.9	-72.7	10.7	-78.3	-5.0	-60.1	6.2	-37.7	-28.6						
5. Skilled Trades Occupations	-43.5	6.0	-41.4	-8.0	-64.4	10.7	-78.3	3.3	-30.6	6.2	-37.7	0.9						
6. Personal Service Occupations	-10.3	6.0	-41.4	25.1	-55.3	10.7	-78.3	12.4	-44.4	6.2	-37.7	-13.0						
7. Sales & Customer Service Occupations	-12.5	6.0	-41.4	22.9	-62.3	10.7	-78.3	5.4	-48.9	6.2	-37.7	-17.4						
8. Machine & Transport Operatives	-41.4	6.0	-41.4	-6.0	-77.6	10.7	-78.3	-10.0	-44.4	6.2	-37.7	-12.9						
9. Elementary Occupations	-37.3	6.0	-41.4	-1.9	-68.4	10.7	-78.3	-0.8	-33.3	6.2	-37.7	-1.8						
Total	-35.4	6.0	-41.4	0.0	-67.7	10.7	-78.3	0.0	-31.5	6.2	-37.7	0.0						

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.5 WOOD, PULP & PAPER; PRINTING & PUBLISHING

4.5.1 Description of the industry

INDUSTRY 5: WOOD, PULP & PAPER; PRINTING & PUBLISHING				
SIC2003 headings 20, 21, 22				
Sawmilling and planing of wood; manufacture of veneer sheets, plywood, laminated board, fibreboard etc; manufacture of builders' carpentry and joinery; manufacture of wooden containers, and other products of wood. Manufacture of pulp, paper and paperboard; articles of paper and paperboard including bags, containers, sanitary goods, stationery, wallpaper and other articles of paper nes.				
Printing & publishing of books, newspapers, periodicals and miscellaneous products; reproduction of recorded media including records, CDs, tapes, videos and computer media.				
INDUSTRY PROFILE				
	Total	Wood, pulp & paper	Printing & Publishing	All industries
Share of UK Output (% 2007):	1.9	0.6	1.4	100
Exposure to International Trade:	medium			average
Concentration (market share of largest employers):	low			average
Total employment (2007):	509,000	167,000	343,000	31,234,000
Share of total employment (% 2007)	1.6	0.5	1.1	100
Gender split (male:female) (% 2007):	67:33	77:23	61:39	53:47
Part-time share (% 2007):	12	8	13	28
Self-employment share (% 2007):	13	12	13	13

Source: 6725output.xls (industry profile). CE/IER estimates based on ONS data.

4.5.2 Industry Commentary

Demand remains reasonably firm for wood and wood products in the UK in line with the strong performance of the economy in 2007. Nevertheless, the weakening of the housing market and construction is feeding through and this will keep pressure on prices and margins, particularly in semi-finished and finished products.

Consolidation and focus remain important elements of corporate strategy in paper and board and sustainable forestry is becoming increasingly important for paper producers generally.

In Printing & Publishing significant challenges from new media contrast newspaper titles at national, regional and local levels. The long-established trend decline in newspaper circulation is continuing and intensifying under pressure particularly from the internet, but also from more traditional media, such as radio, which lend themselves well to digital distribution. A significant proportion of households with broadband internet read and download news via the web. The proportion still using dial-up is diminishing as broadband rapidly displaces narrowband. Almost 20 per cent of 12-15 year olds already use the internet as a source of sports news and the single biggest percentage of users in this age

group use the internet for doing school work. The new generation rely increasingly on the internet as a source of factual information.

The convergence of media is exemplified by increasingly sophisticated mobile phones, to which, news podcasts and text alerts can be transmitted, and also bundled media services combining internet, telephone and radio and television. New media do not simply provide general competition but also compete directly as a source of news.

Demand for magazines continues to be robust, and their publishers are making more use of online production. Customer magazines, published on behalf of companies selling to consumers and linked to their product or service, continue to be a strong area of growth in magazines.

As the importance of this marketing medium grows, so companies are demanding higher production quality and many are now of a standard which bears comparison with paid-for titles. Demand for books remains strong in the UK, but the challenge of new technology is mounting from a variety of sources, particularly the internet and supermarkets, posing serious strategic challenges to traditional booksellers. The prevailing view in the industry remains that this multiplicity of opportunities to buy books is having the effect of expanding the market, not least through stimulating impulse purchases.

The music industry also continues to grapple with weak sales and the rise of the internet. Around nine of every ten new singles are sold digitally, with iTunes and downloads to mobile phones being popular channels of distribution. Digital sales of albums and album tracks also continue to grow strongly. In addition to pressures from digital distribution, the profitability of CD sales has been adversely affected by strong competition to traditional specialist high-street music retailers from online CD sales and supermarkets. At the end of October 2007, the UK saw a record number of

downloaded singles, 1.7 million. This high volume of online sales also coincided with high sales of physical products on the high street. 90 per cent of recorded music sales are still in physical form. Industry opinion has it that the high volume of demand is being driven in part by the ability of consumers to sample a wider variety of music online. Digital distribution is also offering potential for established record companies to exploit their back catalogues far more fully and effectively than would be possible through physical distribution.

Competition remains strong in printing, but the outlook is improving in the UK. Both domestic and export demand has been reasonably strong. This is showing up in firm investment plans, both for new premises and equipment, including digital presses. Margins have remained under pressure as input costs have been rising and strong competition is keeping up the pressure to seek efficiency improvements. There is a high degree of international competition, which has intensified in the EU with the recent major expansion to include several eastern European countries, which offer low cost location. The competitive response from printers in countries such as the UK must be to upgrade and compete on higher value-added rather than trying to compete on cost and price alone. UK firms will therefore need to continue investing to keep at the forefront of developing technology, as well as offering bespoke services and nurturing client relationships. Networking and sharing resources with other firms are also becoming increasingly important.

Wood & Paper is expected to have only weak output growth and to continue to shed jobs. In the long run, output growth will maintain a weak but positive trajectory. This will mean that employment in the industry will continue to diminish and numbers employed will continue to fall as competitive pressure forces firms to seek productivity improvements. Exports will give a boost to demand due to rapidly growing demand in Asia, particularly for recycled paper. This will help to stabilise

the trade balance, which will nevertheless remain firmly negative.

Rising prices of energy and raw materials are expected to increase pressures on total costs. The trade balance will continue to deteriorate and is forecast to turn negative in the long term. Output growth is

forecast to stabilise in the long run, but the industry will grow more slowly than the economy as a whole. Employment levels will be fairly static due to stronger growth in productivity.

4.5.3 Productivity and Output Trends

Table 4.5.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	0.3	-1.5	0.8	1.2
Employment (% pa)	-1.1	-2.8	-1.2	-0.5
(000s)	-34	-77	-29	-13
Productivity (% pa)	1.4	1.3	2.0	1.7

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725output.xls (Figure 6.x.1).

- Output trends for this group of industries have been flat in recent years, declining slightly over the past 5 years. A modest recovery is projected over the next decade but growth rates are well below the average rates for manufacturing as a whole.
- Productivity growth has continued to rise slowly and this pattern is expected to be continued over the next decade, however, again the rates of change are modest compared with many other parts of the manufacturing sector.
- The consequence of the combination of these two trends is a projection of further modest job losses for the industry as a whole continuing the trends observed over recent years.
- The two main parts of this industry have both experienced slow but steady improvements in productivity over the past few decades, with the fastest gains in wood, pulp & paper.
- These patterns are expected to continue.
- Output has not grown very rapidly in either sector over the last decade.
- Output growth is expected to be stronger in the printing & publishing industries than in wood & paper over the next decade.
- Employment prospects, as a consequence, are projected to be more optimistic in the printing & publishing industries, although even here small declines are anticipated over the decade as a whole.

Table 4.5.1a: Productivity, Output & Employment in Component Industries**15 & 16 Wood, pulp & paper**

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	-0.7	-0.3	0.0	0.4
Employment (% pa)	-3.0	-3.1	-2.4	-2.4
(000s)	-33	-29	-19	-17
Productivity (% pa)	2.4	2.9	2.5	2.8

17 Printing & publishing

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	0.7	-2.0	1.1	1.5
Employment (% pa)	-0.1	-2.6	-0.6	0.2
(000s)	-2	-48	-10	4
Productivity (% pa)	0.8	0.6	1.7	1.3

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 6725Output.xls (Figures for 27 extras).

4.5.4 Employment by Status and Gender

In this industry group, women account for about a third of all employment.

Around 1 in 8 jobs are accounted for by part-time working.

Self-employment accounts for a similar proportion.

Over the period considered in the projections, the female share of jobs is projected to decline slightly. This reflects a continuation of recent trends over the past decade.

In future years, self-employment is projected to show a small increase in its share of total employment.

In contrast, part-time working is projected to decline, mainly as a result of the expected reduction in the number of female jobs. Again, this is the result of an assumption of a continuation of recent

trends which show a reasonably sharp change. Future shares may (in practice) change less rapidly, so this result should only be regarded as indicative.

While not detailed in Table 4.5.2, a number of observations about gender and status shares in component industries can be made:

- Historically, wood & paper has been rather more male dominated, although the female share of employment is increasing slightly.
- The share of female employment in printing & publishing has fallen rapidly in recent years and this is the pattern that is projected to continue into the future.
- Full-time employment is the predominant form of employment in both parts of the industry group.
- In printing & publishing, self employment is projected to become more important.

Table 4.5.2: Employment Levels by Gender and Status, Wood, Pulp & Paper; Printing & Publishing

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	275	(54)	22	(4.4)	42	(8.2)	339	(66.5)	-13	0	-1	-14
Female employment	111	(21.9)	37	(7.2)	22	(4.4)	171	(33.5)	-11	-7	2	-16
Total employment	386	(75.8)	59	(11.6)	64	(12.5)	509	(100)	-24	-7	2	-29
2012									2012-2017			
Male employment	261	(54.5)	23	(4.7)	41	(8.5)	325	(67.7)	-5	1	0	-4
Female employment	101	(21)	30	(6.2)	25	(5.1)	155	(32.3)	-7	-4	3	-9
Total employment	362	(75.5)	52	(10.9)	65	(13.6)	480	(100)	-13	-3	3	-13
2017									2007-2017			
Male employment	256	(54.9)	24	(5.1)	41	(8.8)	321	(68.7)	-19	1	-1	-18
Female employment	93	(20)	25	(5.4)	28	(5.9)	146	(31.3)	-18	-12	5	-24
Total employment	349	(74.8)	49	(10.5)	69	(14.7)	467	(100)	-37	-10	5	-42

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.5.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Managers, associate professionals and administrative and clerical workers each account for between 10 and 20 per cent of employment in the industry as a whole.
- Skilled trades and transport and machine operatives each account for 15-20 per cent of employment.

Future change

- Some employment growth is projected for managers and senior officials and associate professional and technical occupations.
- Significant job losses are projected for skilled trades and transport and machine operatives and elementary occupations.
- However it is administrative & clerical jobs that are expected to see the sharpest fall
- These patterns reflect the continuing impact of technological change and the restructuring of the industry group, especially printing & publishing.

Shift share analysis

Table 4.5.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

During the period 1987-97, the industry effect for this group of industries was modestly negative at -5 per cent. This changed significantly in the next decade, the industry effect resulting in the loss of

more than one in every four jobs. Over the coming decade this is expected to moderate, but the industry effect will still account for the loss of about 15 per cent of all jobs.

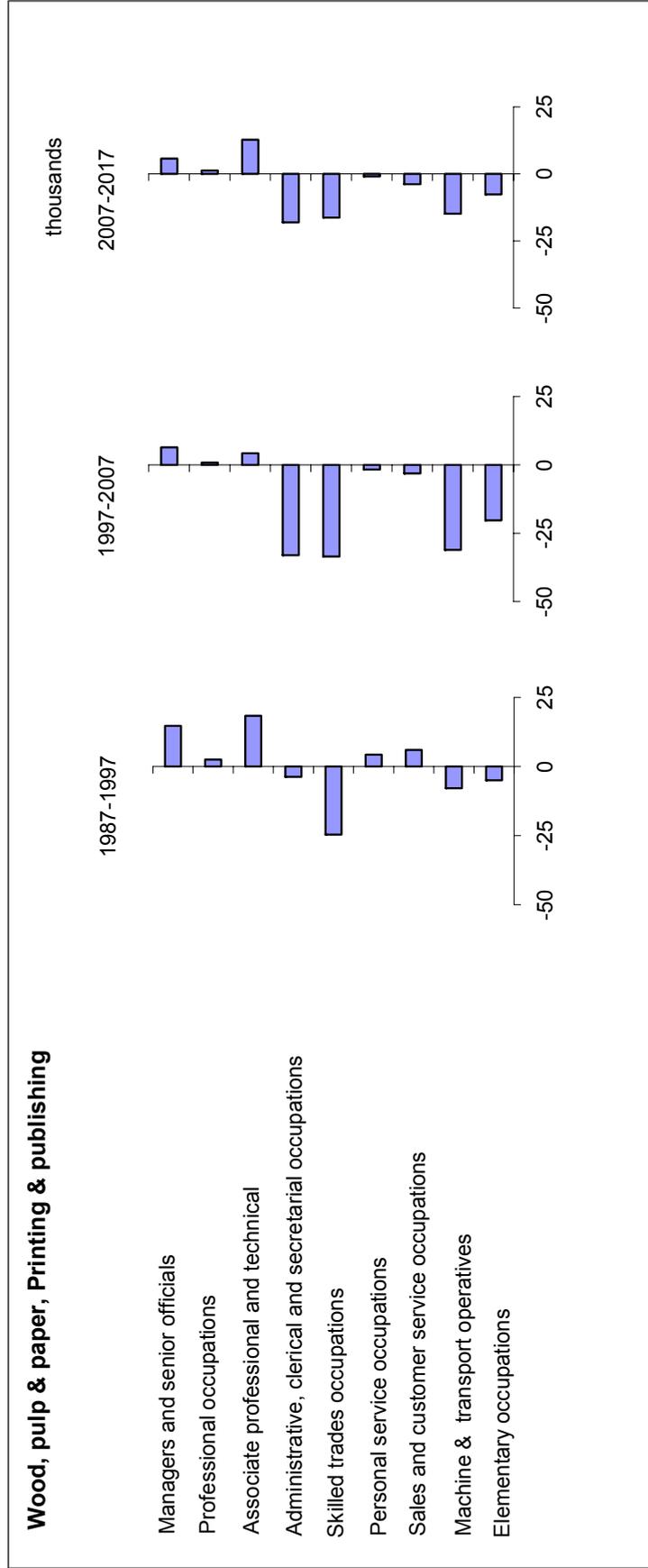
Managers and professionals are projected to continue to benefit from positive occupational effects over the next decade. In contrast administrative & clerical, personal service occupations, sales & customer service occupations skilled trades, machine & transport operatives, and elementary occupations are all expected to see significant negative occupational effects. These patterns broadly follow those for the previous decade.

Replacement demands

Table 6.5.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

- The net change projected for this industry as a whole is for a loss of some 40 thousand jobs. Total requirements amount to about 135 thousand net jobs, reflecting a string replacement demand of almost 180 thousand.
- The largest growth areas are for managers & senior officials and associate professionals, which each have total requirements of almost 30-40 thousand over the decade.
- Despite negative expansion demands, quite strong job requirements are also apparent for skilled trades and machine & transport operatives.

Figure 4.5.1: Changing Composition of Employment by Occupation



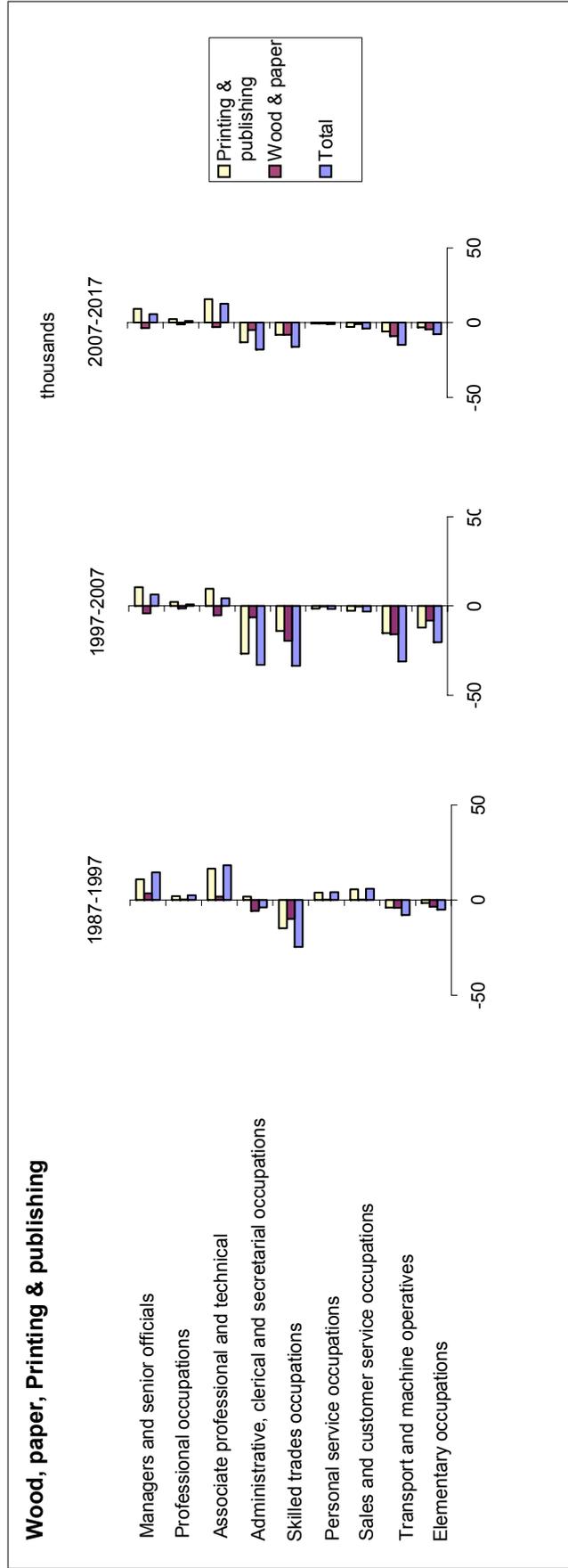
Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.5.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	15	4	4	-3	14	8	6	8	-22	20	6	5	-12	5	13			
2. Professional Occupations	3	1	1	-1	2	2	1	2	-7	5	1	2	-4	2	3			
3. Associate Professional & Technical Occupations	18	4	4	-4	18	9	4	9	-25	20	13	6	-13	6	20			
4. Administrative, Clerical & Secretarial Occupations	-4	5	5	-5	-4	9	-33	9	-24	-18	-18	3	-8	3	-14			
5. Skilled Trades Occupations	-25	9	9	-8	-26	14	-34	14	-38	-9	-16	6	-15	6	-8			
6. Personal Service Occupations	4	1	1	-1	4	2	-2	2	-4	1	-1	1	-2	1	0			
7. Sales & Customer Service Occupations	6	1	1	-1	6	2	-3	2	-6	1	-4	1	-3	1	-2			
8. Machine & Transport Operatives	-8	7	7	-6	-9	12	-31	12	-32	-11	-15	5	-12	5	-8			
9. Elementary Occupations	-5	4	4	-4	-6	7	-20	7	-19	-9	-8	3	-7	3	-4			
Total	5	37	37	-32	0	66	-111	66	-177	0	-42	32	-74	32	0			
	1987-1997			% change			1997-2007			% change			2007-2017			% change		
1. Managers & Senior Officials	23.2	6.0	6.0	-5.2	22.4	10.7	8.2	10.7	-28.6	26.2	6.7	6.2	-14.5	6.2	15.0			
2. Professional Occupations	12.1	6.0	6.0	-5.2	11.3	10.7	3.7	10.7	-28.6	21.6	5.0	6.2	-14.5	6.2	13.3			
3. Associate Professional & Technical Occupations	26.9	6.0	6.0	-5.2	26.1	10.7	4.9	10.7	-28.6	22.9	14.0	6.2	-14.5	6.2	22.3			
4. Administrative, Clerical & Secretarial Occupations	-4.2	6.0	6.0	-5.2	-5.0	10.7	-38.9	10.7	-28.6	-21.0	-34.7	6.2	-14.5	6.2	-26.4			
5. Skilled Trades Occupations	-15.5	6.0	6.0	-5.2	-16.2	10.7	-24.9	10.7	-28.6	-7.0	-16.1	6.2	-14.5	6.2	-7.9			
6. Personal Service Occupations	42.3	6.0	6.0	-5.2	41.5	10.7	-11.9	10.7	-28.6	6.1	-7.8	6.2	-14.5	6.2	0.4			
7. Sales & Customer Service Occupations	37.8	6.0	6.0	-5.2	37.1	10.7	-14.2	10.7	-28.6	3.8	-20.2	6.2	-14.5	6.2	-12.0			
8. Machine & Transport Operatives	-6.6	6.0	6.0	-5.2	-7.4	10.7	-28.1	10.7	-28.6	-10.2	-18.7	6.2	-14.5	6.2	-10.5			
9. Elementary Occupations	-7.0	6.0	6.0	-5.2	-7.8	10.7	-31.0	10.7	-28.6	-13.0	-17.0	6.2	-14.5	6.2	-8.7			
Total	0.8	6.0	6.0	-5.2	0.0	10.7	-17.9	10.7	-28.6	0.0	-8.3	6.2	-14.5	6.2	0.0			

Source: CE/IER estimates, MDM95 C51F8A Forecast, 25UK.xls (Table 6.x.3).

Figure 4.5.1a: Changing Composition of Employment by Occupation, in Component industries, 1987-2017



Source: CE/IER estimates, MDM95 C51F8A Forecast, 27xUK.xls (Figure 6.X.4b).

Changes in Occupational structure within component industries

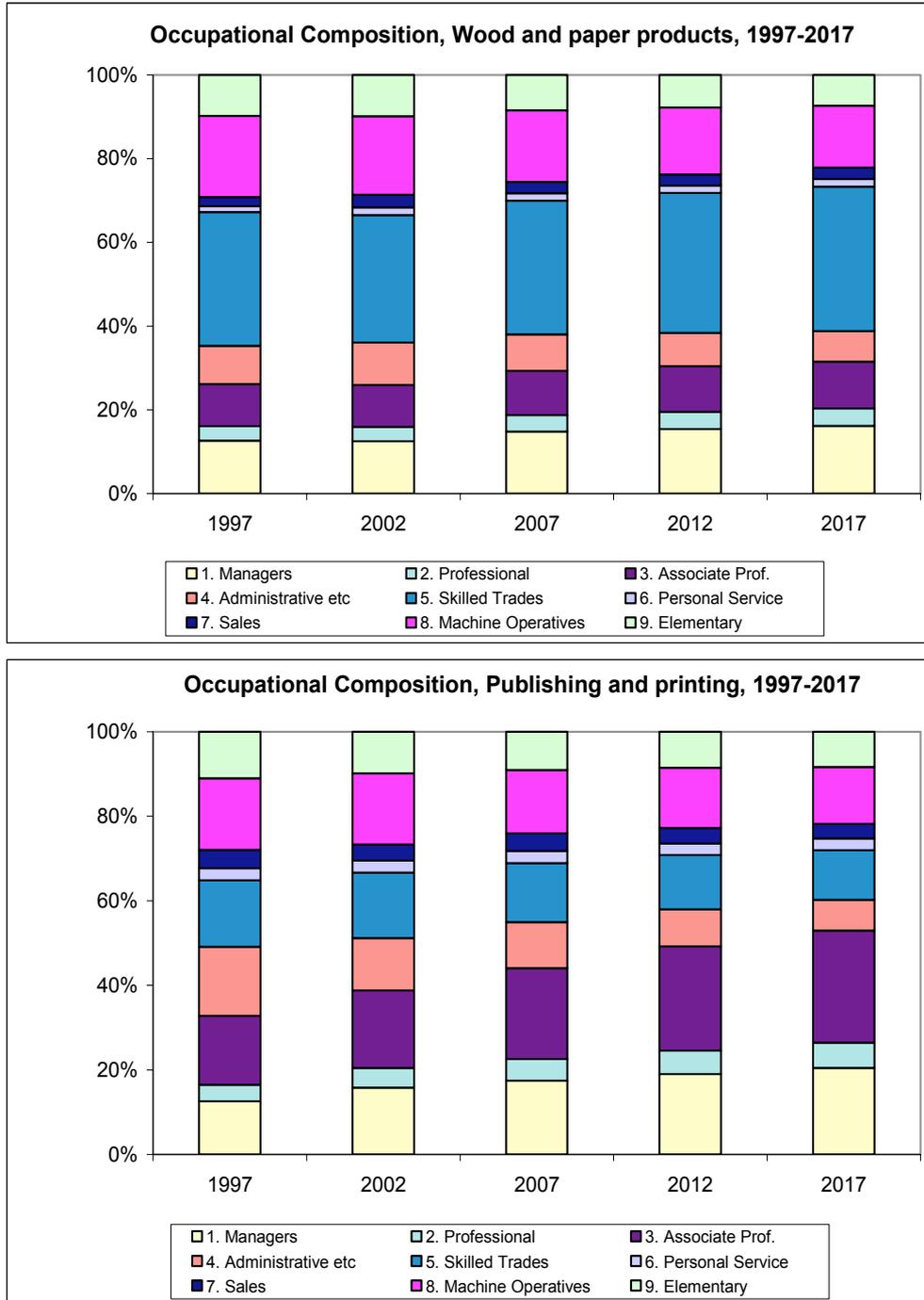
The main differences in occupational employment structure between the component industries and the changes observed over recent years and projected for the next decade are illustrated in Figures 4.5.1a and b.

Figure 4.5.1a focuses on net changes and also compares the components directly with the industry group as a whole (Total). Figure 4.5.1b compares the occupational structures of the two component industries, as well as showing how these have changed and are expected to change over the next decade.

Wood & paper employs a much higher proportion of blue collar manual occupations such as skilled trades, machine operatives and labourers (elementary occupations). In contrast, printing & publishing employment is much more heavily concentrated amongst white collar occupations such as managers, professionals and especially associate professionals. In both cases, technological and other changes are projected to favour the white collar occupations, but the occupational structures will remain very different.

Patterns of change over the next decade are expected to continue those evident over the 1990s, with further job increases for managerial and associate professional occupations in printing & publishing, and job losses amongst skilled trades, machine operatives and elementary occupations in wood & paper.

Figure 4.5.1b: Structure of Employment by Occupation in Component Industries



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 27xUK.xls (Figure 6.X.10).

4.6 CHEMICALS & OTHER NON-METALLIC MINERAL PRODUCTS

4.6.1 Description of the industry

INDUSTRY 6: CHEMICALS & OTHER NON-METALLIC MINERAL PRODUCTS		
SIC2003 headings: 23, 24, 25, 26		
<p>Manufacture of coke, refined petroleum products and processing and reprocessing of nuclear fuel. Investigation, perfecting and production of basic pharmaceutical products; manufacture of pharmaceuticals and medicaments. Manufacture of basic chemicals incl. industrial gases, dyes and pigments, inorganic and organic basic chemicals, fertilizers, plastics and synthetic rubber in primary forms; pesticides, paints, varnishes and inks; detergents, cleaning and toilet preparations; other chemical and unrecorded media (tapes, cassettes, discs); manufacture of man-made fibres. Manufacture of rubber products, such as rubber tyres and inner tubes, including products made from reclaimed rubber; retreating and rebuilding of rubber tyres (repair work by garages excluded); manufacture of other rubber products; production of finished and semi manufactured plastic goods, including plates, sheets, tubes and profiles, packing goods, builders' ware and other plastic products.</p> <p>Manufacture of various building materials, such as glass; ceramic products, bricks, tiles and clay products; cement, lime and plaster; articles of concrete, plaster and cement; cutting and finishing of stone; abrasive products; and other non-metallic products not elsewhere specified.</p>		
INDUSTRY PROFILE		All Industries
Share of UK Output (% 2007):	3.1	100
Exposure to International Trade:	high	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	540,000	31,234,000
Share of total employment: (% 2007)	1.7	100
Gender split (male:female) (% 2007):	76:24	53:47
Part-time share (% 2007):	5	28
Self-employment share (% 2007):	6	13

Source 6725output.xls, (industry profile). CE/IER estimates based on ONS data.

4.6.2 Industry Commentary

Manufactured Fuels

The UK petroleum products industry is dominated by the large international oil companies, its activities cover refining, storage, and distribution of petroleum products. There are nine major oil refineries in the UK situated around the coastline for ease of access by crude oil tankers. Onward distribution is achieved via a national pipeline system and road, rail and sea transport.

The oil refining industry employs around 15,000 people directly, with a further 105,000 employed in support roles ranging from contractors to tanker drivers. Refineries are significant sources of CO₂ emissions and were included in Phase 1 of the EU Emissions Trading Scheme when it began on 1 January 2005.

Since the late 1980s, the decline in demand for petrol has led to a rationalisation of refinery capacity but retail prices for petrol products have fluctuated. Petroleum products account for the bulk of the manufactured fuels

industry's gross output, with the remainder being produced by the manufacture and processing of coke and the processing of nuclear fuels, including the treatment of nuclear waste. Nuclear fuel processing is in fact responsible for around one-third of the industry's value-added, but its processing makes a relatively minor contribution to the industry's overall turnover.

British Nuclear Fuels dominates nuclear fuel processing in the UK, but is in the process of being privatised. Its activities span the entire nuclear cycle, from reactor design and fuel manufacture to nuclear site decommissioning and clean-up of waste. Its role is to work with the Nuclear Decommissioning Authority to achieve its clean-up programme.

Further investment in biofuel production capacity and growing demand for nuclear decommissioning are expected to cause output growth to rise by 2-2¼ per cent per annum over the longer term Policy initiatives by the government to promote the use of biofuels and the investment cycle in nuclear power generation sector are the largest drivers determining demand for this sector in the medium and long-term.

Pharmaceuticals

UK Pharmaceuticals companies are consolidating in response to changing market conditions, based on their strengths and capabilities. R&D strengths, marketing networks and capitalising on opportunities, such as the shift from chemical-based to biology-based medicines, are shaping drugs companies' portfolios. Smaller pharmaceuticals companies are doing this by consolidating into networks of companies which match complementing capabilities with each other. Large pharmaceuticals companies, on the other hand, are consolidating.

Merger and acquisition (M&A) activity among the main R&D-based pharmaceuticals companies to access more resources for drug development has resulted in four to five global key players. It can take up to twelve years for a drug to

reach the market, and the process can cost over \$500million, even before regulatory approval. In the EU, the fragmented structure of the pharmaceuticals market has resulted in the largest companies being based in the largest countries, with Germany, France and the UK dominating the top ten EU pharmaceuticals companies.

The Pharmaceuticals industry is sheltered from the economic cycle because governments are a major purchaser. Pharmaceuticals is better protected from the economic cycle than most industries. The main reason is that drugs are seen as a necessary good regardless of economic conditions. Furthermore, governments are typically the main purchasers of prescription ('ethical') drugs, and their stable spending helps to sustain demand in times of economic downturn.

In the longer term demand for pharmaceuticals is expected to continue to be strong as the proportion of national income spent on healthcare tends to increase with wealth and a rapidly aging population.

However, strain on healthcare budgets in recent years has seen many governments turning to generic drugs and encouraging self-medication. Generic drugs can sell for up to 90 per cent less than brand-name drugs, while over-the-counter (OTC) drugs are bought directly by the consumer. Because it is required less extensive investment to launch a product, generic drugs are typically produced by smaller firms, whereas the market for prescription and over-the-counter drugs is dominated by global pharmaceuticals firms.

The pharmaceuticals industry is now the top investor in research and development globally.

The annual international measure of corporate R&D spending, announced by the European Commission in October 2007, saw pharmaceuticals leapfrog technology hardware as the industry with the highest level of R&D. Spending in the sector increased 15.7 per cent on the

2005 level. The industry also has the highest percentage of turnover spent on R&D of any industry, at 15.9%.

Many UK-based pharmaceuticals firms are currently in the process of expanding their international businesses. While some are targeting the low-cost Asian markets, particularly when looking for R&D expansion, many are looking to move into the US.

In the longer term employment will continue to fall. This contrasts sharply with expected strong growth in output.

Chemicals nes

Although leading chemicals companies have merged and specialised, their profit margins are still being squeezed. Take-over and merger activity among the dominant European firms in Chemicals (which are located in Germany, France and the UK) continues. The prices of raw materials have also continued rising and the large, newly-merged companies are struggling to control costs. Many have chosen to specialise, in order to profit from niches where the cost of raw materials is more stable.

The prices of upstream products (ie products at the beginning of the value chain), such as ethylene, propylene and aromatics, are closely linked to oil and natural gas prices. Because they are highly-traded commodities, their prices tend to move with oil (see chart: Crude Oil Price (Brent)); and this preserves profit margins. Further downstream, fluctuations in oil and natural gas prices are harder to pass on to the customer. This can be due to supply contracts, which can last for any period between one month and two years. Although contracts sometimes have clauses that allow changes in raw material prices to be passed on, large customers often use their bargaining power to force the supplier to absorb most of the costs. Customers of specialist chemicals companies can also argue that, because they are buying expertise and technology, there is no good reason for them to accept

price rises resulting from increased costs of raw materials.

Rising productivity in Chemicals is starting to improve export performance. In the long term, chemicals output is expected to grow by between 1 per cent and 1½ per cent per year up to 2017. Lower levels of employment and higher productivity will help to boost the competitiveness of the sector in the longer term and raise export levels further. However, the outlook for the sector is mixed. Rising productivity and exports will allow continued growth, but greater dependence on foreign markets and exchange rates leaves chemicals more exposed to international events at a time when stricter environmental measures may be brought in to curb CO2 emissions at many chemicals plants.

Rubber & Plastics

The UK rubber industry is dominated by a small number of large firms, whereas plastics is characterised by SMEs operating in niche markets.

The Rubber & Plastics industry is very sensitive to commodity and energy prices, and waste policy. Commodity prices have a major influence on Rubber & Plastics. This was seen most recently in 2006 when high commodity and energy prices contributed to a highly volatile and competitive market, and led to the lowest profit margins the industry has seen in a decade. Higher rubber prices had a significant impact on tyre producers across the world, while excess capacity and the weakness of continental European economies added to the industry's problems.

Rubber & Plastics is also very sensitive to government waste policy, notably the disposal of the industry's products. There is as yet very little research and development of biodegradable products, because the higher costs of environmentally-friendly products are discouraging their diffusion. This situation is now beginning to change - with higher recycling rates and moves towards the

greener alternatives becoming more widespread.

Over the long term, firms are moving more domestic production abroad to lower-cost producers in Asia, the US and eastern Europe. Employment is forecast to continue to fall as the industry focuses on high value-added, specialist markets that require a highly-skilled work-force, while productivity is expected to grow. The outlook for rubber manufacturers remains uncertain, as recent turbulence on commodity markets may have significant effects in the medium to long term.

The fortunes of Non-Metallic Minerals Products are closely linked to general economic conditions. There are two reasons for this. First, the low value/weight ratio makes transport very expensive and thus makes it inefficient for companies to develop markets outside their local region. As a result the industry is very fragmented, and the preponderance of small and medium-sized enterprises means that the top ten companies in the industry control no more than one-third of the world market. Consequently, firms rely on domestic demand. There is no better example of this than the recent shortage of domestic cement, which left many firms searching for alternative supplies and coming up short. Second, many of the products are inputs into divisions of the building industry, which is itself highly sensitive to general economic conditions.

Despite the domestic focus of the industry, firms are increasingly seeking joint ventures in order to spread risk and avoid the danger of creating excess capacity. Joint ventures are, less effective in the manufacture of clay and concrete since economies of scale are absent.

Competition from low-cost Asian producers has damaged the UK's china and ceramics sector. Worldwide, the greatest growth opportunities are in Asia and South America, where many acquisitions have been taking place. The developing world is becoming an

increasingly attractive target for expansion because its lower capital costs and more relaxed environmental regulations mean that production costs are much lower. This expansion will, however, increase the sector's sensitivity to world prices and expose UK companies to conditions in other countries.

Technological progress is probably more important for the flat-glass sub-sector than for many others in this industry, because it is highly capital-intensive. However, technology will become increasingly important for all sectors, as companies seek to compete in the global market and look for mergers, not least to support R&D costs.

In the longer term, many analysts believe that the big aggregate companies in mature western markets will place greater emphasis on the large and growing markets of China and India, in which the demand for cement will be replaced by a demand for ready-mixed concrete.

The performance of the construction industry is a key factor in the health of the non-metallic mineral products industry simply because construction uses bricks, tiles, concrete, plaster and cement. Large construction projects (such as the 2012 Olympic Games) provide significant demand boosts to this will therefore industry, whereas periods of low growth for construction will have the reverse effect.

Productivity gains in the non-metallic mineral products industry will remain steady through the forecast period. Employment will continue to decline.

Output of the non-metallic mineral products industry is expected to continue to decline steadily in the long term, at a mild pace of around $\frac{1}{2}$ per cent per annum. Domestic demand is expected to fall through the forecast period by $\frac{1}{4}$ per cent per annum whereas export demand will grow strongly by $3\frac{1}{4}$ - $3\frac{1}{2}$ per cent per annum over the same period.

4.6.3 Productivity and Output trends

Table 4.6.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	0.8	1.4	1.9	2.3
Employment (% pa)	-2.4	-3.3	-1.5	-1.8
(000s)	-81	-97	-40	-44
Productivity (% pa)	3.3	4.8	3.5	4.2

Source: 6725output.xls (Figure 6.x.1)

- For much of the past 20 years, the chemicals industry has enjoyed above average output growth, but rates have slowed in recent years. With growth rates of around 2-2½ per cent per annum, some recovery is projected.
- Productivity growth also slowed in the early 1990s but has picked up again subsequently. Over the next decade, this is projected to continue at 3-4 per cent per annum.
- As a result employment is projected to fall, but at a slower rate than in previous years.

4.6.4 Employment by Status and Gender

Male employment very strongly dominates the chemicals industry. Currently men account for almost 3 in 4 of all jobs. Most jobs are full-time and self-employment is relatively small.

The gender share of employment is expected to remain unchanged with females accounting for just under 1 in 4 of all jobs in 2017.

Although the shares for part-time jobs are expected to increase marginally, self-employment and part-time working are expected to continue to account for only a small share of future jobs.

Table 4.6.2: Employment Levels by Gender and Status, Chemicals & Other Non-Metallic Mineral Products

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	383	(70.9)	7	(1.3)	23	(4.2)	413	(76.4)	-27	1	-4	-30
Female employment	98	(18.1)	22	(4)	8	(1.4)	127	(23.6)	-7	0	-2	-10
Total employment	481	(89)	29	(5.3)	30	(5.6)	540	(100)	-34	0	-6	-40
2012									2012-2017			
Male employment	356	(71.2)	7	(1.5)	19	(3.8)	383	(76.5)	-31	0	-4	-34
Female employment	91	(18.2)	21	(4.3)	5	(1.1)	118	(23.5)	-8	-1	-2	-10
Total employment	447	(89.4)	29	(5.7)	24	(4.9)	501	(100)	-39	0	-5	-44
2017									2007-2017			
Male employment	325	(71.3)	8	(1.7)	15	(3.4)	348	(76.4)	-58	1	-7	-64
Female employment	83	(18.3)	21	(4.6)	4	(0.8)	108	(23.6)	-15	-1	-4	-20
Total employment	408	(89.5)	29	(6.3)	19	(4.2)	456	(100)	-73	0	-11	-84

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.6.5 Projections of Employment by Occupation

Key aspects of occupational structure

- This group of industries employs significant numbers of plant & machine operatives, skilled trades and elementary occupations. In 2007, these three groups combined accounted for over 50 per cent of all jobs in the industry.
- Quite significant numbers of managerial, professional and associate professional occupations are also employed in the industry.

Future changes

- In recent years, significant job losses have occurred for administrative, clerical & secretarial occupations, skilled trades, transport & machine operatives and elementary occupations.
- Managerial and associate professional occupations are expected to increase their employment shares, but only very modest increase in absolute employment levels is expected.

Shift share analysis

Table 4.6.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and

organisational factors on the occupational structure *within* the industry.

Over the past two decades, the industry effect has played a major part in declining employment for many occupations within this group of industries. In the period 1987-1997 it accounted for the loss of just under 15 per cent of all jobs increasing to a loss of over 35 per cent in 1997-2007. Over the projection period, this is expected to fall slightly resulting in the loss of just over 20 per cent of all jobs.

Most occupations, over the projection period are expected to experience positive occupational effects, with the exception of administrative & clerical, skilled trades, machine & transport and elementary occupations.

Replacement demands

Table 4.6.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

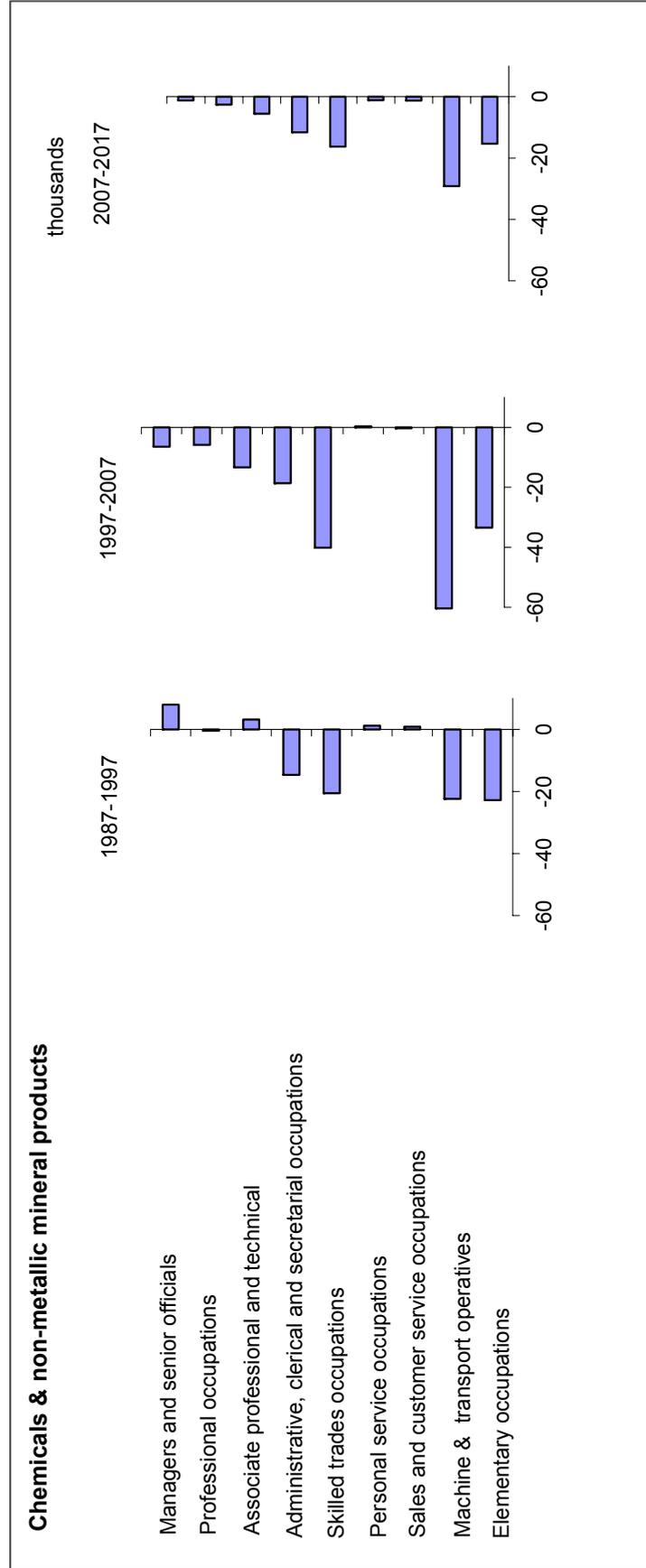
- An expected decline of employment of some 84 thousand for the industry is in marked contrast to the estimated replacement demands of just over 186 thousand.
- This translates into significant net requirements for a number of occupations including managers & senior officials, associate professionals & technicians and machine & transport operatives.
- Replacement demands, for most occupations, for the period 2007-17 are around a third or more of 2007 employment levels.

Table 4.6.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Chemicals & non-metal minerals Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	78	86	79	79	78	-1	27	26
2. Professional Occupations	52	52	46	45	43	-3	15	12
3. Associate Professional & Technical Occupations	69	72	59	56	53	-6	19	13
4. Administrative, Clerical & Secretarial Occupations	78	64	45	39	34	-12	18	7
5. Skilled Trades Occupations	140	120	79	72	63	-16	26	10
6. Personal Service Occupations	11	12	12	11	11	-1	5	3
7. Sales & Customer Service Occupations	13	14	14	13	13	-1	4	3
8. Machine & Transport Operatives	218	196	135	122	106	-29	48	19
9. Elementary Occupations	127	104	71	62	55	-15	24	8
Total	786	719	540	501	456	-84	186	102
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	9.9	11.9	14.6	15.9	17.1	-1.6	34.0	32.5
2. Professional Occupations	6.7	7.2	8.5	9.0	9.5	-5.6	32.6	27.0
3. Associate Professional & Technical Occupations	8.7	10.0	10.8	11.2	11.6	-9.4	31.9	22.5
4. Administrative, Clerical & Secretarial Occupations	10.0	8.9	8.4	7.9	7.3	-25.8	41.0	15.2
5. Skilled Trades Occupations	17.8	16.6	14.7	14.5	13.9	-20.4	33.0	12.5
6. Personal Service Occupations	1.4	1.6	2.3	2.3	2.4	-9.3	37.4	28.1
7. Sales & Customer Service Occupations	1.7	2.0	2.6	2.6	2.7	-9.1	32.4	23.3
8. Machine & Transport Operatives	27.8	27.3	25.1	24.5	23.3	-21.5	35.7	14.2
9. Elementary Occupations	16.1	14.5	13.1	12.3	12.1	-21.7	33.3	11.6
Total	100.0	100.0	100.0	100.0	100.0	-15.6	34.5	18.9

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.6.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

4.7 METALS & METAL GOODS

4.7.1 Description of the industry

INDUSTRY 7: METALS & METAL GOODS		
SIC2003 headings: 27, 28		
<p>Manufacture of basic iron and steel and ferro-alloys including pig iron and steel and hot-rolled or cold-rolled products such as sheets, bars, roads and rails; manufacture of tubes and other first processing of iron and steel; manufacture of basic precious and non-ferrous metals, including aluminium, lead, zinc, tin and copper; casting of metals (ferrous and non-ferrous). Manufacture of fabricated metal products, excluding machinery and equipment, but including: structural metal products, doors and windows; tanks, reservoirs, boilers and steam generators; forging, pressing and stamping; general hardware; light metal packaging; other fabricated metal products not elsewhere specified.</p>		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	1.4	100
Exposure to International Trade:	high	average
Concentration (market share of largest employers):	medium	average
Total employment (2007):	421,000	31,234,000
Share of total employment (% 2007):	1.3	100
Gender split (male:female) (% 2007):	84:16	53:47
Part-time share (% 2007):	6	28
Self-employment share (% 2007):	9	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.7.2 Industry Commentary

Basic Metals

The Basic Metals industry comprises the manufacture and processing of iron and steel, non-ferrous metals, and precious metals. Manufacturing activity in the UK is mainly in the production of iron, steel and aluminium. The industry contributed around ½ per cent of the UK's total GVA and accounted for just a ¼ per cent of total employment in 2007.

The global metals sector is enjoying a period of sustained output and demand expansion that is being driven principally by the growth of China and other emerging economies. Tata Steel, part of the Tata Group, the diversified engineering company whose headquarters are in India, is now the

principal enterprise in the UK iron and steel sector having acquired the assets of Corus plc. The acquisition of Corus is part of the general process of consolidation and globalisation that is taking place in the steel industry with the intention of increasing and sustaining profitability through cost reductions and improved efficiency.

Major UK and European steel makers have restructured in recent years, but the process of consolidation still has some way to go. Tata Steel is increasing its concentration on the supply of carbon steel to the European market. Tata Steel has two main large-scale centres for the manufacture of flat products, IJmuiden in the Netherlands, where annual capacity is being increased to more than 6 million tonnes, and Port Talbot in Wales. World

steel production is at a record high. By the standards of other international industries, the industry is still fragmented. Further consolidation is inevitable.

Since 2000 output of Basic Metals has started to grow again, following a long period of decline. Growth has been driven by the strength of the international metals market, rather than by the UK economy, where demand for metals has been weak. Production fell back in 2005, during the de-stocking phase of the current metals cycle, but began to recover the following year, generating strength that continued through 2007.

The steel market in Europe is relatively strong but UK steel demand is set to weaken. The sensitivity of production and employment in the UK steel industry to changes in exchange rates and in relative competitiveness that influence the balance of trade is clear. The prospect is for the overall demand for steel in the domestic market to weaken. The longer-term outlook for basic metals depends on export demand.

Against the background of weak output growth, increasing global competition and robust productivity growth, employment is expected to continue to fall. Restructuring in order to gain efficiency improvements will go on until over the whole of the forecast period.

Exports will give support to output, whereas domestic demand is expected to weaken as the overall economy slows and the importance of manufacturing continues to decline.

Over the longer term to 2017, output is forecast to continue to grow slowly driven by exports, as domestic demand will continue to be very weak. Both export and import volumes are forecast to be high in relation to the scale of output. The trade balance is expected to remain negative, and indeed deteriorate, in the long term.

Metal Goods

The metal goods industry in the UK produces a wide range of products but the

market share of UK-based producers has been declining. The metal goods industry comprises principally the production of castings and forgings, metal structures and sections, tanks and containers, steam generators, boilers and radiators; general mechanical engineering products; and the manufacture of a wide range of metal products, such as cutlery, tools and fasteners, wire products and packaging materials. The industry contributes slightly more than 1 per cent of the UK's total GVA and employs a similar proportion of the workforce. The main sectors that drive the demand for metal goods are aerospace and defence, automotive, construction, engineering, and the process and packaging industries.

Over the past twenty years the volume of annual metal goods output in the UK has neither risen nor fallen by much. While domestic demand has shown some increase, the market share of UK-based producers has been steadily eroded by imports, which have enjoyed both quality and price advantages. The price advantage of imported goods has arisen from the shift of manufacturing to low-cost centres of production and, from time to time, from the strength of sterling against other major currencies. Export sales are influenced primarily by exposure to the markets of the US and the euro-zone. Strong competition in the home market, coupled with increasing costs of energy, labour and materials, is putting severe pressure on profit margins. Enterprises in the metal goods industry range from small businesses to large diversified engineering groups.

The leading UK companies in Metal Goods have been engaged in profound restructuring to meet the challenge of intense global competition. The principal input costs associated with raw materials energy and labour are rising at the same time as strong competitive pressures in intermediate and final product markets are squeezing profit margins. UK engineering companies that are heavily exposed to the US market are at a particular disadvantage. Their key sectors of automotive supplies and construction are

in recession, and their revenues are dollar-determined but a significant proportion of their costs is in sterling.

Investors' preferences have moved from favouring managerial strategies that emphasise product and geographic diversification to rewarding policies that are focused on clearly specified target markets. Increases in the quality and the range of services provided to customers are now the main means by which the financial performance of engineering companies' is being improved, rather than relying as before on high-volume, low-margin commodity production. To an increasing extent, the manufacturing process is being transferred away from the UK to low-cost centres of production.

Against this background, a number of companies are adapting successfully to the opportunities and challenges of the global market. But The international competitiveness of the Metal Goods industries generally continue to decline.

Its characteristics over the longer term have been the slow growth of output, demand and supply, coupled with rising import penetration and an increasing trade deficit. The sector's growth is largely insensitive to variations in the overall rate of economic activity. Deteriorating trade performance signals a progressive loss of competitiveness.

The key end-use sectors influencing the demand for metal goods are: aerospace and defence; automotive components, and engineering and allied products. The market for commercial aircraft continues to grow strongly. As travel demand

increases, airlines replace their fleets with aircraft that are more fuel-efficient and less environmentally damaging, and new aircraft types come into service.

The output of the metal goods industries has shown low growth during the past two decades. Output grew in 2006, as the pace of overall economic activity in the UK continued to be strong, but both demand and output weakened in 2007. The outlook is for the market to remain weak, gaining little support from the growth of GDP. Against this background of poor growth, productivity gains will result in employment reductions. Imports will continue to increase their share of the market, demonstrating the UK industry's continuing loss of competitiveness. Export sales have increased since 2006 but not as fast as imports and so the trade balance has deteriorated; this trend is expected to continue. Prices will increase, but below the general rate of inflation.

The pattern of development over the period to 2017 is forecast to be similar. The level of output is forecast to remain flat with employment continuing to fall as the rationalisation of production supports robust productivity growth.

Globalisation and restructuring of UK engineering are impacting on demand for Metal Goods products, as UK engineering firms suffer profit reductions in their US markets. The long-term outlook for Metal Goods is for weak growth and employment reductions.

4.7.3 Productivity and Output trends

Table 4.7.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	-0.3	0.6	0.6	0.6
Employment (% pa)	-3.9	-3.5	-1.6	-1.5
(000s)	-110	-81	-32	-29
Productivity (% pa)	3.8	4.2	2.2	2.2

Source: 6725output.xls (Figure 6.x.1)

- The profile of output over time for this group of industries has been quite erratic. This reflects the particular problems faced by the steel industry.
- Over the next decade prospects are for only modest growth in output.
- Although it is not expected to grow quite as strongly as over recent years, productivity levels are also expected to continue rising steadily.
- The combination of these two results in employment being projected to continue its steady downward trend, with an expected loss of a further 60 thousand jobs in the next decade.

4.7.4 Employment by Status and Gender

In this group of industries, over 4 in 5 jobs are currently held by men.

Self employment accounts for fewer than 1 in 10 jobs.

Part-time jobs currently account for only 6 per cent of all jobs in this industry.

Males are expected to bear the brunt of the expected future job losses.

The share of females is projected to increase to over 20 per cent of total employment.

Full-time jobs are expected to bear the brunt of the projected employment decline.

Part-time working is expected to increase slightly in importance.

Table 4.7.2: Employment Levels by Gender and Status, Metals & Metal Goods

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	311	(73.7)	7	(1.6)	36	(8.5)	353	(83.8)	-38	-1	4	-36
Female employment	47	(11.1)	17	(4.1)	4	(0.9)	68	(16.2)	3	2	-1	4
Total employment	357	(84.8)	24	(5.8)	40	(9.5)	421	(100)	-36	0	3	-32
2012									2012-2017			
Male employment	272	(69.9)	6	(1.4)	39	(10.1)	317	(81.5)	-33	-1	3	-32
Female employment	50	(12.7)	19	(4.9)	3	(0.9)	72	(18.5)	3	1	0	3
Total employment	322	(82.6)	25	(6.3)	43	(11)	389	(100)	-31	0	2	-29
2017									2007-2017			
Male employment	239	(66.2)	5	(1.3)	42	(11.7)	285	(79.1)	-72	-2	6	-68
Female employment	52	(14.4)	20	(5.6)	3	(0.8)	75	(20.9)	5	3	-1	7
Total employment	291	(80.6)	25	(6.9)	45	(12.5)	361	(100)	-66	0	5	-61

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.7.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Skilled trades have historically accounted for well over a third of all jobs in this industry, but this has declined significantly over the past two decades
- Also significant in terms of shares and numbers, are machine operatives and elementary occupations.

Future change

- The projected losses in employment are expected to be concentrated in the skilled trades group and, to a lesser extent, amongst transport and machine operatives and elementary occupations.
- Shares of employment are projected to increase for managers and senior officials and, to a lesser extent, professional and associate professional occupations.

Shift share analysis

Table 4.7.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment in the UK economy. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

The industry effect for this group of industries has also played a major part in declining employment for all occupations. In the period 1987-97, the industry effect accounted for the loss of almost 1 in every 5 jobs. The industry effect was even higher over the period 1997-2007,

accounting for the loss of over 2 in every 5 jobs. The industry effect is projected to be less significant over the projection period, falling back to around -20 per cent.

Elementary occupations, skilled trades and machine & transport operatives are expected to suffer from significant negative occupational effects over the projection period.

Replacement demands

Table 4.7.3 presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

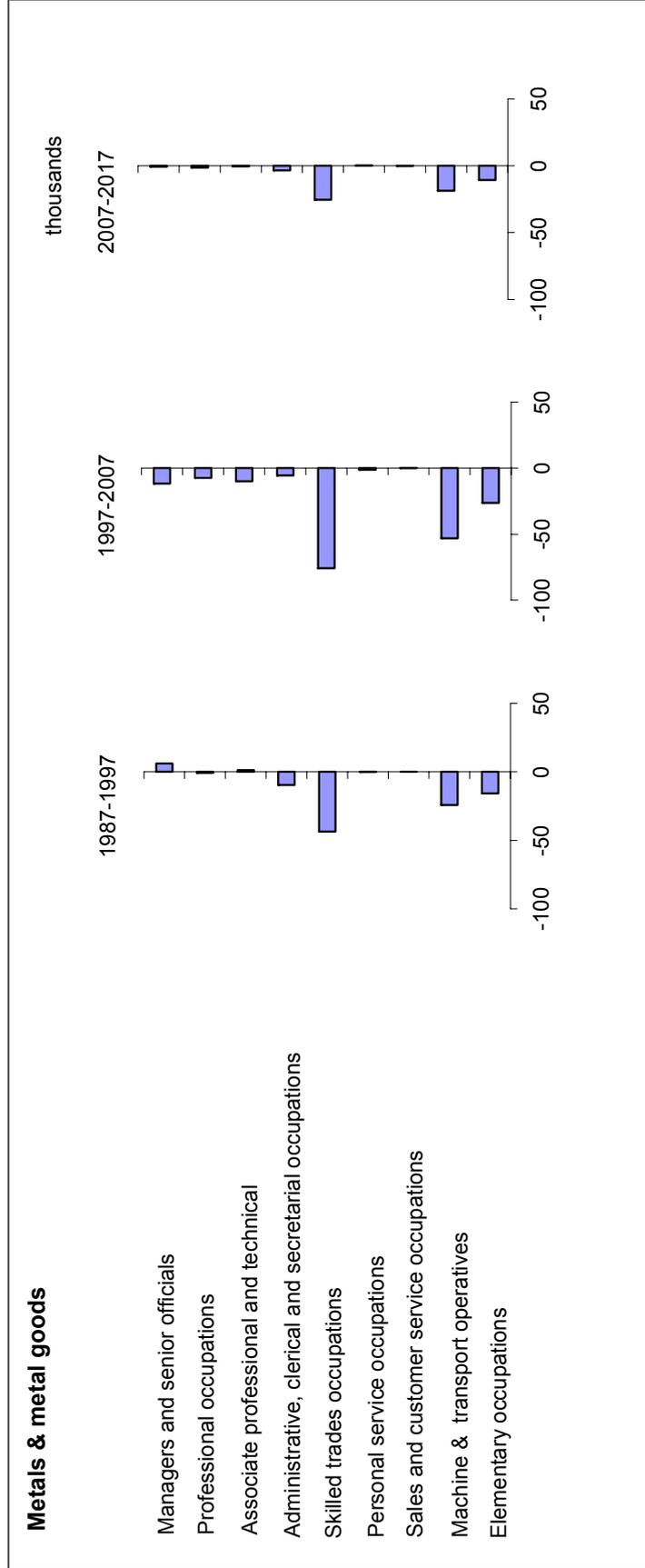
- Although the projections of so called “expansion demands” are for quite sharp job losses, as in most other manufacturing industries, there will be significant needs to replace members of the existing workforce. In this industry replacement demand is two to three times larger in magnitude than the job losses arising from new demand.
- These replacement needs are most significant for skilled trades and for machine & transport operatives. The large projected declines are likely to be offset by significant replacement needs.
- Replacement demands are around a third of current employment levels for all the managerial, professional, associate professional and administrative support occupations, as well as for personal service and sales occupations.

Table 4.7.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Metal & metal goods Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	65	71	59	59	58	-1	20	19
2. Professional Occupations	36	35	27	27	26	-1	9	7
3. Associate Professional & Technical Occupations	41	42	32	32	32	0	10	10
4. Administrative, Clerical & Secretarial Occupations	41	31	26	24	22	-4	11	7
5. Skilled Trades Occupations	245	201	126	112	100	-25	39	14
6. Personal Service Occupations	6	6	5	5	5	0	2	2
7. Sales & Customer Service Occupations	7	7	7	7	7	0	2	2
8. Machine & Transport Operatives	168	144	91	83	72	-19	32	14
9. Elementary Occupations	91	75	49	41	38	-11	16	5
Total	699	612	421	389	361	-61	141	80
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	9.2	11.5	14.0	15.1	16.2	-1.3	33.7	32.4
2. Professional Occupations	5.1	5.7	6.5	6.9	7.2	-5.0	31.9	26.8
3. Associate Professional & Technical Occupations	5.9	6.9	7.6	8.2	8.8	-1.3	31.3	30.0
4. Administrative, Clerical & Secretarial Occupations	5.9	5.1	6.1	6.2	6.2	-13.7	40.6	26.9
5. Skilled Trades Occupations	35.1	32.9	29.8	28.8	27.8	-20.2	31.3	11.1
6. Personal Service Occupations	0.9	1.0	1.1	1.3	1.3	3.8	35.0	38.8
7. Sales & Customer Service Occupations	1.0	1.1	1.7	1.8	1.9	-2.1	31.9	29.8
8. Machine & Transport Operatives	24.1	23.5	21.5	21.2	20.0	-20.5	35.8	15.3
9. Elementary Occupations	13.0	12.3	11.6	10.5	10.6	-22.0	31.9	10.0
Total	100.0	100.0	100.0	100.0	100.0	-14.4	33.3	18.9

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.7.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

4.8 MACHINERY, ELECTRICAL & OPTICAL EQUIPMENT

4.8.1 Description of the industry

INDUSTRY 8: MACHINERY, ELECTRICAL & OPTICAL EQUIPMENT

SIC2003 headings: 29, 30, 32, 31, 33

Manufacture of machinery and equipment including: engines for mechanical power; furnaces; general purpose machinery (including lifting and handling equipment, cooling and ventilation equipment; tractors and other agriculture. machinery); machine tools; special purpose machinery (e.g. for quarrying and construction; food, drink and tobacco processing; textiles and clothing production); weapons and ammunition; domestic appliances. Manufacture of office machinery (including calculators, franking machines and terminals for dispensing tickets, banknotes etc) and computers (including peripheral units such as printers or optical readers); manufacture of radio, television and communication equipment and apparatus (including valves tubes and other components). Manufacture of: electric motors, generators and transformers; electricity distribution and control apparatus; insulated wires and cables; batteries, lighting equipment and electric lamps; electrical equipment not elsewhere specified. Manufacture of electric domestic appliances (fridges, razors, ovens, toasters etc.). Manufacture of: medical and surgical equipment and orthopaedic devices; instruments for measuring, checking, testing, navigating and other purposes; industrial process control equipment; optical instruments and photographic equipment; watches and clocks.

INDUSTRY PROFILE

		All industries
Share of UK Output (% 2007):	2.8	100
Exposure to International Trade:	high	average
Concentration (market share of largest employers):	medium	average
Total employment (2007):	615,000	31,234,000
Share of total employment (% 2007):	2.0	100
Gender split (male:female) (% 2007):	78:22	53:47
Part-time share (% 2007):	5	28
Self-employment share (% 2007):	6	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.8.2 Industry Commentary

Mechanical Engineering accounts for about 1½ per cent of the UK's total GVA and just under 1 per cent of employment. It also accounts for a large part of this industry group. This sector encompasses a number of activities ranging from the manufacture of machinery, equipment, domestic appliances and machine tools to the production of armoured land vehicles, weapons and ammunition. About half of the industry's products are finished capital goods, while the remainder consist primarily of components for capital goods.

Mechanical Engineering is consequently very sensitive to the UK and European investment cycle, because of its dependence on capital goods spending by other parts of the manufacturing sector.

UK engineering is a relatively strong sector whose products are much in demand; but it suffers from a shortage of high-skilled personnel

A report from the Engineering Employers Federation published in September 2007 explains the healthy condition of the engineering sector in the UK, highlighting

its strengths but also drawing attention to some weaknesses. The findings of the report are relevant particularly to Mechanical Engineering and to Electrical Engineering, but also bear on Electronics.

The weaknesses in UK engineering that are constraining growth are low levels of R&D expenditure, compared to leading European countries (notably Germany) and an inadequate number of people with high-level skills and scientific training. In this respect too the UK compares unfavourably with Germany (as it has done for very many years). One feature of modern production methods is that labour is a diminishing proportion of total costs (one sign of this is the disparity between the 1½ per cent share of Mechanical Engineering in the UK's total GVA and its share of less than 1 per cent in total employment). This changes the balance of advantage between countries with lower labour costs and the UK. However, the UK's shortage of people with high-level skills limits its ability to benefit from this change. A substantial proportion of the high-skilled new staff that profitable companies are taking on is graduates from other countries.

The recent experience of some leading UK companies in Mechanical Engineering illustrates the benefits of focusing on core skills and products in markets with strong growth. They provide clear examples of success won through shedding the non-essential and concentrating on a few profitable areas.

The UK's largest military procurement programme for many years is generating work for mechanical engineering companies.

There is still some small-scale manufacturing of domestic appliances in the UK, but employment is increasingly in higher-skilled engineering and service support.

Forecast demand from the energy industries and for infrastructure equipment is expected to sustain the mechanical engineering industry through the sharp

slowdown in output growth in the immediate future.

The main drivers of the current strong output growth of Mechanical Engineering in the UK (domestic supply grew by an estimated 4½ per cent in 2007) are demand for equipment for infrastructure work, including the energy, oil and gas industries; military procurement; and demand for domestic appliances. Current data and estimates suggest that the peak of the present business cycle was in 2006.

The long-term prospects of mechanical engineering in the UK are for modest output growth and declines in employment rather less severe than those seen in the years to 2006.

The longer-term prospects depend to a marked extent on several imponderables. As global warming opens up the Arctic and Antarctic to exploration for oil and gas reserves, there will be considerable openings for UK companies, but also stiff challenges against foreign competition. Within the UK itself two of the larger potential sources of work in the long term are very controversial and subject to much uncertainty: the building of successors to Trident submarines and the construction of a new generation of nuclear power plants. At present the forecast is for fairly weak output growth (around 1 per cent per annum) and modest declines in employment, but the fate of large-scale infrastructure and military programmes could give this industry rather better prospects.

Electronics covers a wide range of manufacturing activities from computers and televisions to microprocessors.

The electronics industry covers the manufacturing of four broad types of product:

- office machinery (a heterogeneous group ranging from calculators to ATM dispensers)
- computer hardware and peripherals
- consumer electronics related to entertainment and communications

(from televisions to iPods and mobile phones)

- components (mainly semiconductors and micro-processors)

The first three groups are end-user products; the fourth consists of the key components of the end-user products. Electronic components, however, are essential to the end-user products of many other industries besides electronics. For example, they are used in almost all kinds of domestic electrical appliances and in the measuring and control equipment used in a wide variety of activities including surgery, armaments systems, transport equipment and industrial control processes. They are essential to the sensors and actuators used in automotive engineering and in all kinds of detection, surveillance and security systems.

The main sources of demand for electronics products at present are automotive applications, consumer electronics, defence, communications and security systems

These contrasts between the 1990s and the present can be summed up in the observation that in the 1990s the one type of equipment that was the main driver of growth in consumer electronics was the PC whereas today the main driver is the latest generation of mobile phone handsets and smart phones/PDAs (personal digital assistants).

The reasons why electronics manufacturing has left the UK are varied, and they explain why it is unlikely ever to return on a large scale. The downturn in electronics across the globe in the years 2001-02 hastened the process, but the root problem was that the UK never had the right combination of skills and costs to support components manufacture on a large scale; but this is the only competitive basis for the manufacture of standard components. There were not sufficient people with high enough skills to outweigh the disadvantages of high costs.

The UK electronics industry is expected to be relatively unaffected by the imminent

slowdown of household spending. Specialist electronics companies in the UK will continue to enjoy high demand for their products and technologies.

Over the long term the UK's specialist electronics companies are going to become increasingly involved in collaborative ventures in the more expensive and technologically-advanced areas of innovation. Competition and collaboration have already moved away from the older pattern of outsourcing manufacturing to lower-cost locations. The forecast growth in domestic supply is around 3¼ per cent per annum.

Export performance is expected to be strong but the value of exports is forecast to decrease because the UK industry is becoming even less oriented to large-scale manufacturing. Employment, however, in this world of high-level operations on a global scale, is expected to continue to decline within the UK, not just because little large-scale manufacturing takes place in this country but more because the successful UK firms will shift the bulk of their high-skilled employment to the growth markets.

Electrical Engineering & Instruments embraces a wide range of activities from traditional commodities to leading-edge technology.

No categorisation of this varied industry is fully adequate, but a division into five segments brings out some fundamental features of Electrical Engineering & Instruments:

- instruments & appliances (mainly for measuring and testing products, for controlling industrial processes and for navigation)
- medical and surgical equipment
- electric motors and apparatus to generate electricity
- apparatus to distribute electricity (including wires and cables)
- lighting and other electrical equipment

UK companies in Electrical Engineering & Instruments are performing very well in the niche markets of medical equipment and specialist equipment for the oil and gas and defence industries.

The UK's electrical engineering industry contains leading companies whose recent history exhibits, dramatically in some cases, the benefits of restructuring and refocusing on core competences and finding niches in growing markets.

Military spending and the civilian aerospace market are driving sales growth at a number of UK companies making specialist instruments and systems.

Several UK engineering companies have benefited from strong demand in the chemicals, oil and gas industries.

UK manufacturers of specialist medical equipment have achieved high sales growth in the US.

Demand for the specialist products of electrical engineering will probably not be much affected by uncertainty in the financial markets.

Exports will drive long-term output growth in Electrical Engineering & Instruments.

4.8.3 Productivity and Output trends

- Over the past few decades, machinery, electrical & optical equipment output levels have followed a cyclical but generally positive trend. However, around the millennium there was a significant decline.
- Following this recession a modest recovery occurred and this is projected to continue, with overall growth rates of between 1 and 1½ per cent per annum. This will mainly benefit the electronics industry.
- Productivity has risen rapidly over the past 5 years and is expected to continue to rise at slightly slower rates of 3-4 per cent per annum to 2017.
- The inevitable implications for employment are for further job losses, continuing the long-term trend decline. Overall, some 130 thousand jobs are expected to go over the next 10 years.

Table 4.8.1: Trends in Output, Productivity and Employment

Indicator	Average change in the period			
	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	-0.8	1.4	1.1	1.2
Employment (% pa)	-3.4	-5.0	-2.1	-2.5
(000s)	-151	-180	-63	-65
Productivity (% pa)	2.7	6.8	3.3	3.8

Source: CE/IER estimates, MDM95 C31F9S Forecast, 6725output.xls (Figure 6.x.1)

4.8.4 Employment by Status and Gender

Employment in machinery, electrical & optical equipment is predominantly male. Females account for fewer than 1 in 4 jobs. Most jobs are full-time, while self-employment accounts for only about 1 in 20 jobs.

At around 80 per cent of the total, males are expected to maintain their share of employment.

The industry will continue to be a source of mostly full-time jobs, but the share of both part-time and self-employed jobs are projected to increase by a fairly small amount.

Table 4.8.2: Employment Levels by Gender and Status, Machinery, electrical & optical equipment

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	439	(71.4)	8	(1.4)	34	(5.5)	481	(78.3)	-51	2	1	-47
Female employment	105	(17)	23	(3.8)	5	(0.9)	133	(21.7)	-17	0	0	-16
Total employment	543	(88.4)	32	(5.2)	39	(6.4)	615	(100)	-67	3	1	-63
2012									2012-2017			
Male employment	388	(70.4)	11	(2)	35	(6.4)	434	(78.8)	-52	2	0	-50
Female employment	88	(16)	24	(4.3)	5	(1)	117	(21.2)	-14	0	0	-14
Total employment	476	(86.3)	34	(6.2)	41	(7.4)	552	(100)	-66	2	0	-65
2017									2007-2017			
Male employment	336	(69.1)	13	(2.6)	35	(7.3)	384	(78.9)	-102	4	1	-97
Female employment	74	(15.2)	23	(4.8)	5	(1.1)	103	(21.1)	-31	0	0	-31
Total employment	410	(84.3)	36	(7.4)	41	(8.3)	487	(100)	-133	4	1	-128

Source: CE/IER estimates, MDM95 C31F9S Forecast, 25UK.xls (Table 6.X.2).

4.8.5 Projections of Employment by Occupation

Key aspects of occupational structure

- In 2007, skilled trades accounted for around 1 in 5 jobs; a much lower percentage when compared to earlier years.
- Accounting for a somewhat smaller share of the total are machine operatives.
- Managerial, professional and associate professional occupations together accounted for 40 per cent of employment in 2007. This share has increased steadily over the past two decades.

Future change

- Further job losses are expected to be concentrated amongst:
 - Skilled trades;
 - Machine operatives;
 - Elementary occupations; and
 - Administrative clerical & secretarial occupations.
- Most other occupations are expected to see fairly stable employment levels, with a small increase for sales and customer services.

Shift share analysis

Table 4.8.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

As for most other manufacturing industries, the industry effect has played a major part in declining employment for all occupations. The industry effect was

almost -20 per cent in the period 1987-97. The industry effect increased two-fold to account for the loss of 2 in every 5 jobs in 1997-2007. The industry effect is projected to moderate to just under -30 per cent, over the projection period (2007-2017).

There are negative occupational effects for skilled trades and, more especially, elementary occupations over the projection period, exacerbating the projected negative industry effects.

Replacement demands

Table 4.8.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

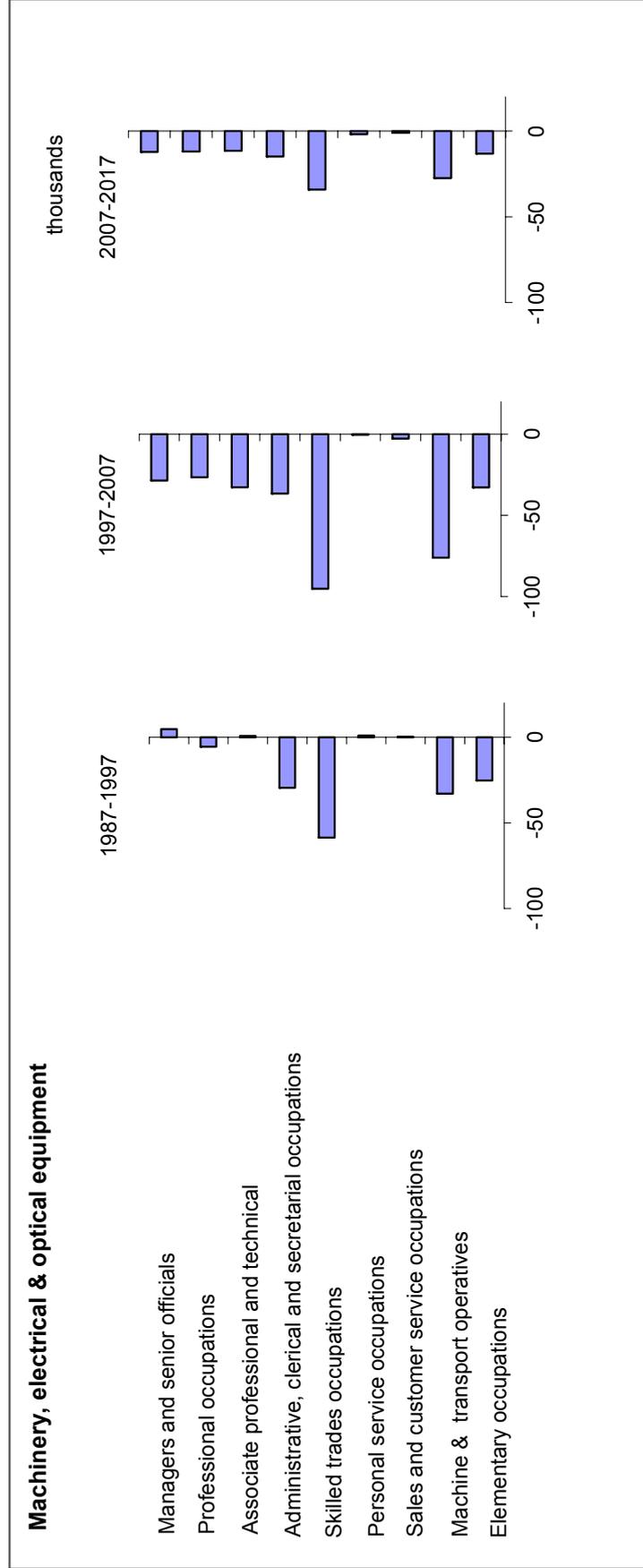
- Substantial replacement demands are estimated for all occupations in this industry. The replacement demand over the decade is for 200 thousand jobs overall, a requirement that far outweighs the projected declines for “expansion” demand.
- Skilled trades and machine & transport operatives are expected to see the largest increases.
- However there are also significant replacement needs for the managerial, professional and associate professional groups, as well as for administrative & clerical and elementary occupations.

Table 4.8.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Engineering Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	124	128	100	94	87	-12	34	21
2. Professional Occupations	104	98	72	66	60	-12	23	11
3. Associate Professional & Technical Occupations	108	109	76	71	64	-11	24	12
4. Administrative, Clerical & Secretarial Occupations	120	91	54	47	39	-15	22	7
5. Skilled Trades Occupations	288	229	134	118	100	-34	43	9
6. Personal Service Occupations	10	11	10	9	8	-2	4	2
7. Sales & Customer Service Occupations	17	17	14	14	13	-1	5	4
8. Machine & Transport Operatives	213	180	104	91	77	-27	38	11
9. Elementary Occupations	109	84	51	43	38	-13	17	4
Total	1,092	946	615	552	487	-128	208	81
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	11.3	13.6	16.2	17.1	18.0	-12.2	33.8	21.5
2. Professional Occupations	9.5	10.4	11.6	11.9	12.2	-16.6	31.6	15.0
3. Associate Professional & Technical Occupations	9.9	11.5	12.3	12.8	13.2	-15.1	31.3	16.2
4. Administrative, Clerical & Secretarial Occupations	11.0	9.6	8.8	8.4	8.1	-27.4	41.2	13.8
5. Skilled Trades Occupations	26.4	24.2	21.8	21.3	20.5	-25.5	31.9	6.4
6. Personal Service Occupations	0.9	1.1	1.7	1.6	1.7	-17.1	38.7	21.6
7. Sales & Customer Service Occupations	1.5	1.8	2.3	2.5	2.7	-6.6	32.2	25.6
8. Machine & Transport Operatives	19.5	19.1	17.0	16.5	15.8	-26.3	36.4	10.1
9. Elementary Occupations	10.0	8.8	8.3	7.7	7.7	-25.8	33.0	7.2
Total	100.0	100.0	100.0	100.0	100.0	-20.8	33.9	13.1

Source: CE/IER estimates, MDM95 C31F9S Forecast, 25UK.xls (Table 6.x.3).

Figure 4.8.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, MDM95 C31F95 Forecast, 25UK.xls (Figure 6.x.4).

Table 4.8.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			1997-2007			2007-2017			000s			
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	000s
1. Managers & Senior Officials	5	7	-24	21	14	-59	16	6	-27	-12	6	-27	9
2. Professional Occupations	-6	6	-20	8	10	-45	8	4	-19	-12	4	-19	3
3. Associate Professional & Technical Occupations	1	6	-21	15	12	-50	5	5	-20	-11	5	-20	4
4. Administrative, Clerical & Secretarial Occupations	-29	7	-23	-14	10	-41	-5	3	-15	-15	3	-15	-4
5. Skilled Trades Occupations	-59	17	-55	-20	24	-105	-15	8	-36	-34	8	-36	-6
6. Personal Service Occupations	1	1	-2	2	1	-5	3	1	-3	-2	1	-3	0
7. Sales & Customer Service Occupations	0	1	-3	3	2	-8	3	1	-4	-1	1	-4	2
8. Machine & Transport Operatives	-33	13	-41	-5	19	-82	-13	7	-28	-27	7	-28	-6
9. Elementary Occupations	-25	6	-21	-11	9	-38	-3	3	-14	-13	3	-14	-3
Total	-145	65	-210	0	101	-433	0	38	-166	-128	38	-166	0
	1987-1997			1997-2007			2007-2017			% change			
	3.8	6.0	-19.2	17.1	10.7	-45.7	12.8	6.2	-27.0	-12.2	6.2	-27.0	8.6
1. Managers & Senior Officials	-5.3	6.0	-19.2	8.0	10.7	-45.7	8.0	6.2	-27.0	-16.6	6.2	-27.0	4.1
2. Professional Occupations	0.7	6.0	-19.2	14.0	10.7	-45.7	4.9	6.2	-27.0	-15.1	6.2	-27.0	5.7
3. Associate Professional & Technical Occupations	-24.5	6.0	-19.2	-11.2	10.7	-45.7	-5.3	6.2	-27.0	-27.4	6.2	-27.0	-6.7
4. Administrative, Clerical & Secretarial Occupations	-20.4	6.0	-19.2	-7.1	10.7	-45.7	-6.5	6.2	-27.0	-25.5	6.2	-27.0	-4.7
5. Skilled Trades Occupations	10.1	6.0	-19.2	23.4	10.7	-45.7	31.2	6.2	-27.0	-17.1	6.2	-27.0	3.7
6. Personal Service Occupations	2.0	6.0	-19.2	15.3	10.7	-45.7	19.1	6.2	-27.0	-6.6	6.2	-27.0	14.2
7. Sales & Customer Service Occupations	-15.4	6.0	-19.2	-2.2	10.7	-45.7	-7.1	6.2	-27.0	-26.3	6.2	-27.0	-5.5
8. Machine & Transport Operatives	-23.2	6.0	-19.2	-9.9	10.7	-45.7	-4.2	6.2	-27.0	-25.8	6.2	-27.0	-5.0
9. Elementary Occupations	-13.3	6.0	-19.2	0.0	10.7	-45.7	0.0	6.2	-27.0	-20.8	6.2	-27.0	0.0
Total													

Source: CE/IER estimates, MDM95 C31F9S Forecast, 25UK.xls (Table 6.x.3).

4.9 TRANSPORT EQUIPMENT

4.9.1 Description of the industry

INDUSTRY 9: TRANSPORT EQUIPMENT		
SIC2003 headings: 34, 35		
<p>Manufacture of: cars, commercial vehicles, buses and coaches; motor vehicles engines and chassis; bodies (coachwork) for motor vehicles, trailers and semi-trailers; parts and accessories for motor vehicles and their engines. (Electrical parts (such as sparking plugs, lighting, windscreen wipers and defrosters) are classified to industry 8). Manufacture of: aeroplanes, helicopters, gliders, dirigibles and balloons, spacecraft, satellites and launch vehicles; major assemblies such as fuselages, wings, doors, landing gear, rotor blades and engines of a kind typically found on aircraft; ground flying trainers. (Manufacture of instruments and navigation systems is classified to industry 8). Building and repairing of ships (merchant, warships, fishing vessels and pleasure boats), hovercraft and drilling platforms; manufacture of railway and tramway locomotives and rolling stock, specialised parts (such as brakes, axles, coupling devices), signalling equipment; manufacture of motorcycles and bicycles, invalid carriages and other transport equipment not elsewhere specified.</p>		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	1.7	100
Exposure to International Trade:	high	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	326,000	31,234,000
Share of total employment (% 2007):	1.0	100
Gender split (male:female) (% 2007):	88:12	53:47
Part-time share (% 2007):	3	28
Self-employment share (% 2007):	6	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.9.2 Industry Commentary

This industry is dominated by the manufacture of motor vehicles, trailers and semi trailers (SIC 34) and the manufacture of other transport equipment. The Western European marketplace for motor vehicles is mature and continues to suffer from overcapacity in production. Competition in the global motor vehicles industry is intense despite the fact that six groups (Toyota, GM, Ford, Daimler-Chrysler, Renault/Nissan, Volkswagen and PSA Peugeot-Citroën) control 80 per cent of the output of final products. Overcapacity may stretch to as many as 20m units per year globally. This

overcapacity is a consequence of the maturity of the principal markets for the product – North America and Western Europe. In these markets, growth is slow or stagnant.

The UK motor vehicles industry is diverse, ranging from small specialist manufacturers to large-scale volume car production. With the 2005 insolvency of MG Rover, there are no longer any UK-owned volume car manufacturers. However, the UK is still a significant part of the European motor industry. In 2005, UK production represented 3 per cent of global car output making the country the

fourth most important in Europe and ninth in the World. Seven of the top ten vehicle producers have manufacturing operations in the UK, as do 19 of the 20 leading 'tier 1' component suppliers. In addition, the UK has plants for the production of commercial vehicles, vehicle and engine design facilities and a significant number of specialist vehicle manufacturers. Of the vehicles manufactured in the UK, a significant percentage is for export. In 2006, the UK manufactured 1.44m cars of which 1.11m (77 per cent) were for export. As for commercial vehicles, in 2006, just under 207,000 were manufactured of which 136,000 were exported (66 per cent). A similar story applies to vehicle components manufactured in the UK. For example, 25 per cent of all Ford Motor engines worldwide are manufactured in the UK at Dagenham or Bridgend. Of these, 80 per cent are exported.

The three most efficient car plants in Europe are located in the UK - Nissan at Sunderland, Toyota at Burnaston and Honda at Swindon.

Growing government and consumer concern over the environmental impact of motor vehicles poses a significant challenge for the motor vehicles industry. In July 2007 Ford Motors announced plans to sell its Jaguar and Land Rover marques, which are part of its Premier Automotive Group. Both marques are produced in the UK (in the case of Jaguar at Halewood, Coventry and Castle Bromwich and in that of Land Rover at Solihull). Land Rover employs 8,300 workers and Jaguar 7,300. Honda's Swindon facility has expanded production to full capacity but will not receive further investment unless the UK joins the Euro.

The UK government has reaffirmed its commitment to reduce the environmental impact of motoring with changes to fuel duty and Vehicle Excise duties planned to further influence consumer behaviour.

Output growth in the motor vehicles industry will be slow in the medium to long term, but increases in productivity will lead to falling employment.

The UK motor vehicles industry saw a decline in output in 2005 and 2006. This was owing to the loss of production at several facilities including the 2005 closure of MG Rover at Longbridge and the 2006 closure of Peugeot's Ryton plant.

Increased output is forecast to come about through increases in labour productivity and not from increases in employment. In fact, higher productivity will mean that the industry will shed on average 1-2 per cent of its employees each year in the period to 2017. These labour-shedding productivity increases will arise as a result of efficiencies and process improvements made by manufacturers in an effort to maintain margins at a time of excess capacity and competition from low-cost producers both on the periphery of Europe and in India and China. Furthermore, industry-average productivity will tend to rise as manufacturers close inefficient plants that cannot compete. In the present industry conditions of excess capacity, manufacturers are becoming increasingly ruthless about such production decisions. Recent history provides examples of both of these phenomena. The most efficient plant in Europe, Sunderland, has been able to increase production without increasing the size of the workforce and in the past has even been able to reduce the workforce. As an example of the other case, Peugeot closed Ryton, citing high production and logistical costs. GM's Ellesmere Port was only able to save itself from closure by increasing productivity by 17 per cent in one year. These are patterns that are likely to repeat themselves in the future.

In the long run, output growth is expected to be slower than for the economy as a whole. This is to be expected as the UK motor vehicles industry loses the less efficient sectors of its industry, and focuses on those parts which are higher value-added (such as design and niche markets) or which can, for the moment at least, still be performed competitively in Western Europe (for instance vehicle assembly). However, it is likely that in the

future a greater percentage of each vehicle assembled in the UK will have been sourced from abroad. This is because it is cheaper to manufacture smaller parts and electrical components in lower-cost environments even with the expense of shipping the vehicle to Western Europe. This is the impact that globalisation is having on the vehicle manufacture supply chain.

Other Transport Equipment is dominated by aerospace. The principal firms in the UK Aerospace industry are: BAE Systems which has significant interests in defence aerospace; EADS (European Aeronautic Defence and Space Company), which is the parent company of Airbus and Eurocopter and has significant interests in Ariane Espace and Eurofighter; and Rolls-Royce the world's second-largest manufacturer of jet engines. Both BAE Systems and Rolls-Royce, as well as Airbus UK, are descendants of companies nationalised in the 1970s but privatised in the 1980s.

The UK's Defence Industrial Strategy is placing an increased importance on domestic production. The weak dollar is leading to drastic restructuring at Airbus and Rolls-Royce. After exceptional growth in 2006, long-term trends in the Other Transport Equipment industry will be reasserted.

The Other Transport Equipment industry grew by over 16½ per cent in 2006. This can be accounted for by rapid growth in two sub-sectors, which collectively make up over 90 per cent of the industry - the manufacture of aircraft and the building and repair of pleasure sports boats; both grew by around 23 per cent in 2006. The strong growth can be accounted for by strong demand. In the aircraft sector, demand has again returned to levels achieved before 9/11, buoyed by airline recoveries and the rapid development of civil aviation in emerging markets such as India, China and the United Arab Emirates. In 2006, Airbus made record aircraft deliveries and saw a 14 per cent increase in revenues.

Productivity growth is projected to increase, reducing the rate of employment growth rises in productivity feeding through to declining employment. This is consistent with the plans of major firms in the industry. For instance, Airbus' Power8 program plans to increase output and productivity will reduce employment.

In the long term these trends are expected to continue in the decade to 2017. Strong demand growth is forecast to lead to rising output, but increases in productivity will mean that this higher level of output can be achieved with fewer employees.

4.9.3 Productivity and Output trends

Table 4.9.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	-0.1	3.6	1.5	1.5
Employment (% pa)	-1.0	-3.2	-1.4	-1.9
(000s)	-20	-58	-22	-28
Productivity (% pa)	0.9	7.0	2.9	3.5

Source: CE/IER estimates, MDM95 C31F9S Forecast, 6725output.xls (Figure 6.x.1)

- Output levels in this group of industries have shown only very modest growth over the past decade, reflecting uncertainties about rail and air transport as well as the continuing trials and tribulations of the UK motor industry. But things picked up over the last 5 years with growth rates of over 3 per cent per annum.
- More modest growth is expected over the next decade, with output expected to grow annually, on average about 1½ per cent.
- As producers innovate and respond to intense international competition, productivity growth accelerated in the last 5 years or so. This is projected to moderate over the coming decade.
- In combination, the slowdown in output growth coupled with continued productivity gains results in an expected 55 thousand jobs lost between 2007 and 2017.

4.9.4 Employment by Status and Gender

Males still dominate employment in the transport equipment industry although this is gradually changing.

Part-time employment and self-employment are relatively tiny but are increasing in importance.

By 2017, males are projected to see a slight loss of their share of total employment but they are still expected to account for over 80 per cent of all jobs.

Full-time jobs will remain the norm in this industry.

Part-time employment and self-employment are projected to grow slowly but will remain relatively insignificant in numerical terms.

Table 4.9.2: Employment Levels by Gender and Status, Transport equipment

Employment by gender	Changes in Employment Status (000s)											
	Full time		Part time		Self employed		Total		FT	PT	SE	Total
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)				
2007									2007-2012			
Male employment	268	(82.1)	2	(0.6)	17	(5.1)	287	(87.9)	-30	0	0	-30
Female employment	31	(9.6)	7	(2)	2	(0.5)	40	(12.1)	5	3	0	8
Total employment	299	(91.7)	9	(2.7)	18	(5.7)	326	(100)	-25	3	-1	-22
2012									2012-2017			
Male employment	238	(78.2)	2	(0.8)	16	(5.3)	257	(84.4)	-33	0	-1	-34
Female employment	37	(12)	9	(3.1)	2	(0.5)	47	(15.6)	3	2	0	5
Total employment	275	(90.3)	12	(3.9)	18	(5.9)	304	(100)	-29	2	-1	-28
2017									2007-2017			
Male employment	205	(74.4)	3	(1)	15	(5.5)	223	(80.9)	-63	1	-1	-64
Female employment	40	(14.5)	11	(4.1)	1	(0.5)	53	(19.1)	9	5	0	13
Total employment	245	(88.9)	14	(5.1)	17	(6.1)	276	(100)	-54	5	-2	-50

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.9.5 Projections of Employment by Occupation

Key aspects of occupational structure

- The most important occupations in this industry are skilled trades and machine operatives, although the former have seen a sharp decline in their employment share over the past two decades.
- Managers, professionals and associate professionals have all increased their employment shares in recent years, in combination reaching 30 per cent of the total in 2007.

Future change

- Future job losses are projected to be concentrated in manual occupations such as skilled trades, machine operatives and elementary occupations.
- Whilst their employment levels will fall slightly, the managerial, professional and associate professional groups are projected to increase their shares of employment.

Shift share analysis

Table 4.9.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In the period of 1987-97, the industry effect resulted in a loss of almost 30 per cent of all jobs. This played a major part in declining employment for all occupations in the industry. Over the next decade, 1997-2007, the industry effect continued

at around 30 per cent. Over the projection period, the industry effect is projected to fall back, resulting in the loss of just over 20 per cent of jobs across all occupations, all else equal.

Over the projection period skilled trades, machine & transport operatives and elementary occupations are expected to experience negative occupational effects which reinforce these changes.

Replacement demands

Table 4.9.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

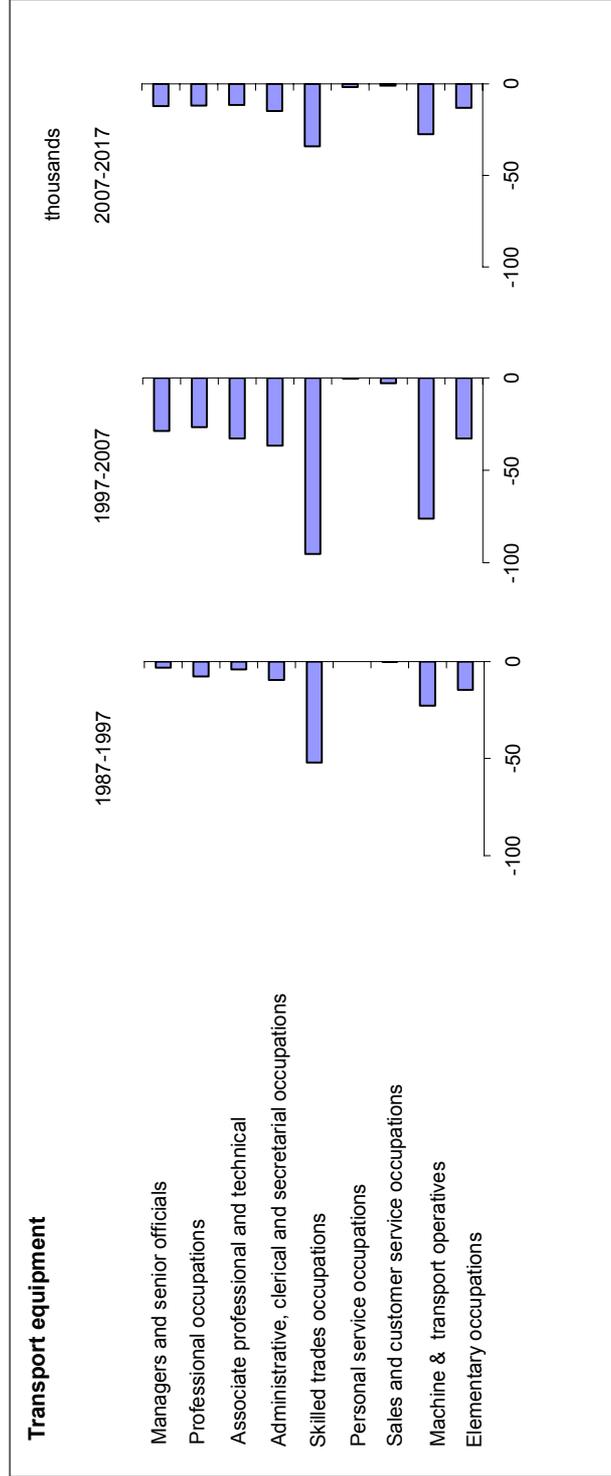
- Replacement demands are significant for many occupations in this industry. These are sufficient to generate a total industry requirement of almost 60 thousand new workers by 2017 offsetting the negative expansion demand of around 50 thousand.
- The largest elements of replacement demand in absolute terms are for skilled trades occupations (more than cancelling out the 26 thousand projected decline in expansion demand).
- There is also a projected replacement need for some 24 thousand transport and machine operatives, which again more than off-sets the projected decline due to structural changes.

Table 4.9.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Transport equipment Employment Levels (000s)	2007-2017									
	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Total Requirement		
1. Managers & Senior Officials	37	34	33	33	32	-1	11	10		
2. Professional Occupations	41	33	31	30	28	-3	10	7		
3. Associate Professional & Technical Occupation:	37	33	28	27	26	-3	9	6		
4. Administrative, Clerical & Secretarial Occupation:	30	21	23	24	24	1	9	10		
5. Skilled Trades Occupations	188	136	94	82	69	-26	29	4		
6. Personal Service Occupations	3	3	4	4	5	1	1	2		
7. Sales & Customer Service Occupations	4	4	5	6	6	1	2	2		
8. Machine & Transport Operatives	117	94	69	65	56	-13	24	11		
9. Elementary Occupations	62	47	38	33	30	-8	12	4		
Total	519	405	326	304	276	-50	107	57		
Percentage Shares	1987	1997	2007	2012	2017		Percentage Changes			
1. Managers & Senior Officials	7.2	8.4	10.0	10.7	11.6	-2.4	33.5	31.2		
2. Professional Occupations	7.9	8.2	9.5	9.8	10.3	-9.0	31.2	22.3		
3. Associate Professional & Technical Occupation:	7.1	8.1	8.7	8.9	9.3	-9.9	30.4	20.5		
4. Administrative, Clerical & Secretarial Occupation:	5.8	5.1	7.1	8.0	8.8	4.8	39.6	44.4		
5. Skilled Trades Occupations	36.3	33.6	28.9	27.0	24.8	-27.4	31.2	3.8		
6. Personal Service Occupations	0.7	0.9	1.2	1.5	1.7	16.5	35.8	52.3		
7. Sales & Customer Service Occupations	0.8	0.9	1.6	1.8	2.1	15.8	30.2	46.1		
8. Machine & Transport Operatives	22.6	23.3	21.3	21.2	20.4	-18.9	35.1	16.2		
9. Elementary Occupations	11.9	11.6	11.7	11.0	11.0	-20.3	31.1	10.8		
Total	100.0	100.0	100.0	100.0	100.0	-15.5	32.8	17.4		

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.9.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

Table 4.9.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s			
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	
1. Managers & Senior Officials	-3	2	-10	5	-1	4	-1	4	-10	5	-1	2	-1	2	-7	4	2	-7	4
2. Professional Occupations	-8	2	-11	1	-2	4	-2	4	-10	4	-3	2	-3	2	-7	2	2	-7	2
3. Associate Professional & Technical Occupations	-4	2	-10	4	-4	3	-4	3	-10	2	-3	2	-3	2	-6	2	2	-6	2
4. Administrative, Clerical & Secretarial Occupations	-9	2	-8	-3	3	2	3	2	-6	7	1	1	1	1	-5	5	1	-5	5
5. Skilled Trades Occupations	-52	11	-52	-11	-42	14	-42	14	-41	-15	-26	6	-26	6	-20	-11	6	-20	-11
6. Personal Service Occupations	0	0	-1	1	1	0	1	0	-1	1	1	0	1	0	-1	1	0	-1	1
7. Sales & Customer Service Occupations	0	0	-1	1	1	0	1	0	-1	2	1	0	1	0	-1	2	0	-1	2
8. Machine & Transport Operatives	-23	7	-33	3	-25	10	-25	10	-28	-7	-13	4	-13	4	-15	-2	4	-15	-2
9. Elementary Occupations	-15	4	-17	-1	-9	5	-9	5	-14	0	-8	2	-8	2	-8	-2	2	-8	-2
Total	-114	31	-145	0	-78	43	-78	43	-121	0	-50	20	-50	20	-71	0	20	-71	0
	1987-1997			% change			1997-2007			% change			2007-2017			% change			
1. Managers & Senior Officials	-8.6	6.0	-27.9	13.4	-3.7	10.7	-3.7	10.7	-30.0	15.6	-2.4	6.2	-2.4	6.2	-21.7	13.1	6.2	-21.7	13.1
2. Professional Occupations	-18.8	6.0	-27.9	3.1	-6.0	10.7	-6.0	10.7	-30.0	13.3	-9.0	6.2	-9.0	6.2	-21.7	6.5	6.2	-21.7	6.5
3. Associate Professional & Technical Occupations	-10.9	6.0	-27.9	11.1	-13.3	10.7	-13.3	10.7	-30.0	6.0	-9.9	6.2	-9.9	6.2	-21.7	5.6	6.2	-21.7	5.6
4. Administrative, Clerical & Secretarial Occupations	-31.5	6.0	-27.9	-9.6	12.9	10.7	12.9	10.7	-30.0	32.3	4.8	6.2	4.8	6.2	-21.7	20.2	6.2	-21.7	20.2
5. Skilled Trades Occupations	-27.7	6.0	-27.9	-5.7	-30.6	10.7	-30.6	10.7	-30.0	-11.2	-27.4	6.2	-27.4	6.2	-21.7	-11.9	6.2	-21.7	-11.9
6. Personal Service Occupations	1.6	6.0	-27.9	23.6	16.6	10.7	16.6	10.7	-30.0	36.0	16.5	6.2	16.5	6.2	-21.7	32.0	6.2	-21.7	32.0
7. Sales & Customer Service Occupations	-4.8	6.0	-27.9	17.1	38.1	10.7	38.1	10.7	-30.0	57.5	15.8	6.2	15.8	6.2	-21.7	31.3	6.2	-21.7	31.3
8. Machine & Transport Operatives	-19.5	6.0	-27.9	2.5	-26.3	10.7	-26.3	10.7	-30.0	-7.0	-18.9	6.2	-18.9	6.2	-21.7	-3.4	6.2	-21.7	-3.4
9. Elementary Occupations	-23.6	6.0	-27.9	-1.7	-19.1	10.7	-19.1	10.7	-30.0	0.3	-20.3	6.2	-20.3	6.2	-21.7	-4.9	6.2	-21.7	-4.9
Total	-22.0	6.0	-27.9	0.0	-19.3	10.7	-19.3	10.7	-30.0	0.0	-15.5	6.2	-15.5	6.2	-21.7	0.0	6.2	-21.7	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.10 OTHER MANUFACTURING & RECYCLING

4.10.1 Description of the industry

INDUSTRY 10: OTHER MANUFACTURING & RECYCLING		
SIC2003 headings: 36, 37		
<p>Manufacture and upholstery of furniture (incl. chairs and seats, office and shop furniture, fitted kitchens, other furniture and mattresses). Other manufacturing & recycling including: jewellery, musical instruments, sports goods, games and toys, and miscellaneous products. Recycling of metal and non-metal waste and scrap; (but excluding new products from secondary raw material, e.g. paper from pulp).</p>		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	0.6	100
Exposure to International Trade:	medium	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	204,000	31,234,000
Share of total employment (% 2007):	0.7	100
Gender split (male:female) (% 2007):	72:28	53:47
Part-time share (% 2007):	11	28
Self-employment share (% 2007):	14	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.10.2 Industry Commentary

Manufacturing nes encompasses a range of manufacturing industries, mainly furniture (which accounts for 56 per cent of output and dominates the sector), jewellery, games, toys, sports goods and recycling of metal and non-metal waste. Consequently, rates of growth in demand and output within manufacturing nes vary considerably but in general tend to be cyclical and dependant on overall economic performance, interest rates and disposable incomes.

Demand for furniture has been increased by the trend towards smaller household size and by the diffusion of ICT equipment, which enables people to work at home. During the 1990s the UK shifted from being a net exporter to a net importer of furniture, with an increase in imports from Indonesia, China and Malaysia, and

more trade with eastern European countries.

Technological innovation influences activity in the games and toys sub-sectors. Many of the sub-sectors show a trade deficit. The sports goods sub-sector imports heavily from the US and China; the traditional games and toys industry relies almost exclusively on imports from Japan and China; electronic games is the exception, it has a trade surplus; musical instruments sends most of its exports to the US, but has a trade deficit.

Recycling is closely linked to acquisition and disposal by households and industry and is increasing as a result of EU directives and government policy.

European and UK authorities are seeking ways of increasing the level of recycling despite the high cost to manufacturers.

The EU directives on recycling are based on the 'polluter pays' principle, and are directed particularly at motor vehicles and electronics. In motor vehicles, the aim is to ensure that recyclable components account for 85 per cent of the weight of new vehicles by 2015 (compared to the current level of 75 per cent) in order to facilitate the recycling of end-of-life vehicles. Car manufacturers will, therefore, need to create dis-assembly plants to dispose of cars and extract reusable components. The EC would prefer to have voluntary agreements rather than legislation, but it is unlikely that this hope will be realised, given the estimated cost to the European car industry of £20bn over the next ten years or so.

Furthermore, the Waste Electrical and Electronic Equipment (WEEE) Directive, in force in the UK from 2007, obliges electronics manufacturers to recover between 70 per cent and 80 per cent of electronic waste. Electronic waste accounts for only about 4 per cent of total waste, but is one of the most dangerous pollutants.

In 2001, WRAP (Waste and Resources Action Programme) was launched to

reduce the volume of UK waste. WRAP is designed to remove or reduce barriers that prevent recycling in order to achieve the target announced in the waste strategy of quadrupling the recycling of household waste by 2015. Figures published by DEFRA in October 2006 show that households in England recycled 27 per cent of their waste in 2005/06. DEFRA figures also show that between 2001/02 and 2005/06 the volume of household waste recycled in the UK more than doubled. This means that the government easily met its target of recycling or composting 25 per cent of waste by the end of 2006.

In the long term, output growth is forecast to remain stable at 1½ per cent per annum over 2007-2017, driven by consistent growth in domestic demand of 3 per cent per annum and further enhanced by strong export demand, growing at 2½ per cent per annum. Employment growth, however, is expected to be low at 1 per cent per annum or less, leading to an improvement in productivity of ¾ per cent per annum.

4.10.3 Productivity and Output trends

Table 4.10.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	0.7	0.8	1.6	1.6
Employment (% pa)	0.0	-3.0	-0.1	0.4
(000s)	0	-33	-1	4
Productivity (% pa)	0.6	3.9	1.7	1.1

Source: 6725output.xls (Figure 6.x.1)

- Long-term output trends in this group of industries have been fairly flat. Although with a strong cyclical pattern, things are expected to pick up, after the downturn, with recycling doing especially well.
- Continued productivity growth is also expected, at about the same rate as output growth.
- Only minimal changes in employment levels are projected. The net impact of the similar changes in output and productivity is to produce growth that is mainly jobless.

4.10.4 Employment by Status and Gender

Females account for just over a quarter of jobs in this industry. About 10 per cent of jobs are accounted for by part-time employment. Self-employment accounts for a slightly higher share.

Males are projected to gradually increase their share of a stable employment level. This result is based on an assumption of a continuation of recently observed trends.

Part-time employment is likely to fall slightly linked to the female job share which is projected to decline.

Self employment is expected to continue to increase its share of employment slightly. By 2017 almost 18 per cent of the workforce will be in this category.

Table 4.10.2: Employment Levels by Gender and Status, Other manufacturing & recycling

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	119	(58.5)	6	(3.1)	21	(10.1)	146	(71.7)	2	0	2	4
Female employment	35	(17.1)	16	(7.7)	7	(3.5)	58	(28.3)	-6	-1	2	-4
Total employment	154	(75.6)	22	(10.8)	28	(13.6)	204	(100)	-4	-1	4	-1
2012									2012-2017			
Male employment	122	(59.8)	6	(2.9)	22	(11)	150	(73.7)	5	0	2	7
Female employment	29	(14.3)	15	(7.4)	9	(4.6)	53	(26.3)	-5	0	2	-3
Total employment	151	(74.1)	21	(10.3)	32	(15.6)	203	(100)	0	0	5	4
2017									2007-2017			
Male employment	126	(60.9)	6	(2.9)	25	(11.9)	157	(75.6)	7	0	4	11
Female employment	24	(11.5)	15	(7.3)	12	(5.7)	51	(24.4)	-11	-1	5	-7
Total employment	150	(72.3)	21	(10.1)	36	(17.5)	208	(100)	-4	-1	9	4

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.10.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Skilled trades and machine operatives in combination still account for over half the jobs in this industry, with the former being the most important.
- Managers and associate professionals have seen some of the fastest growth and in 2007, together accounted for just under 1 in 55 jobs in 2007.

Future changes

- Projected declines in employment are expected for machine & transport operatives and elementary occupations, but skilled trades are projected to experience some significant growth.
- The white collar groups, apart from administration & clerical occupations, are projected to continue increase their employment shares.

Shift share analysis

Table 4.10.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

For this group of industries the industry effect played a less significant role in the period 1987-97. The industry effect accounted for the loss of around just 1 in 40 jobs over this period. But in 1997-2007 this increased to 1 in 4. The industry effect is projected to fall back to around -4 per cent over the projection period.

The occupational effects are similar to those for all industries and services, over the projection period. Strong positive effects are projected for managerial, professional and associate professional occupations, while there are significant negative effects for most manual occupations. In contrast to the results for all industries, however, there are quite strong positive effects for skilled trades. These patterns broadly follow those for the previous decade.

Replacement demands

Table 4.10.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

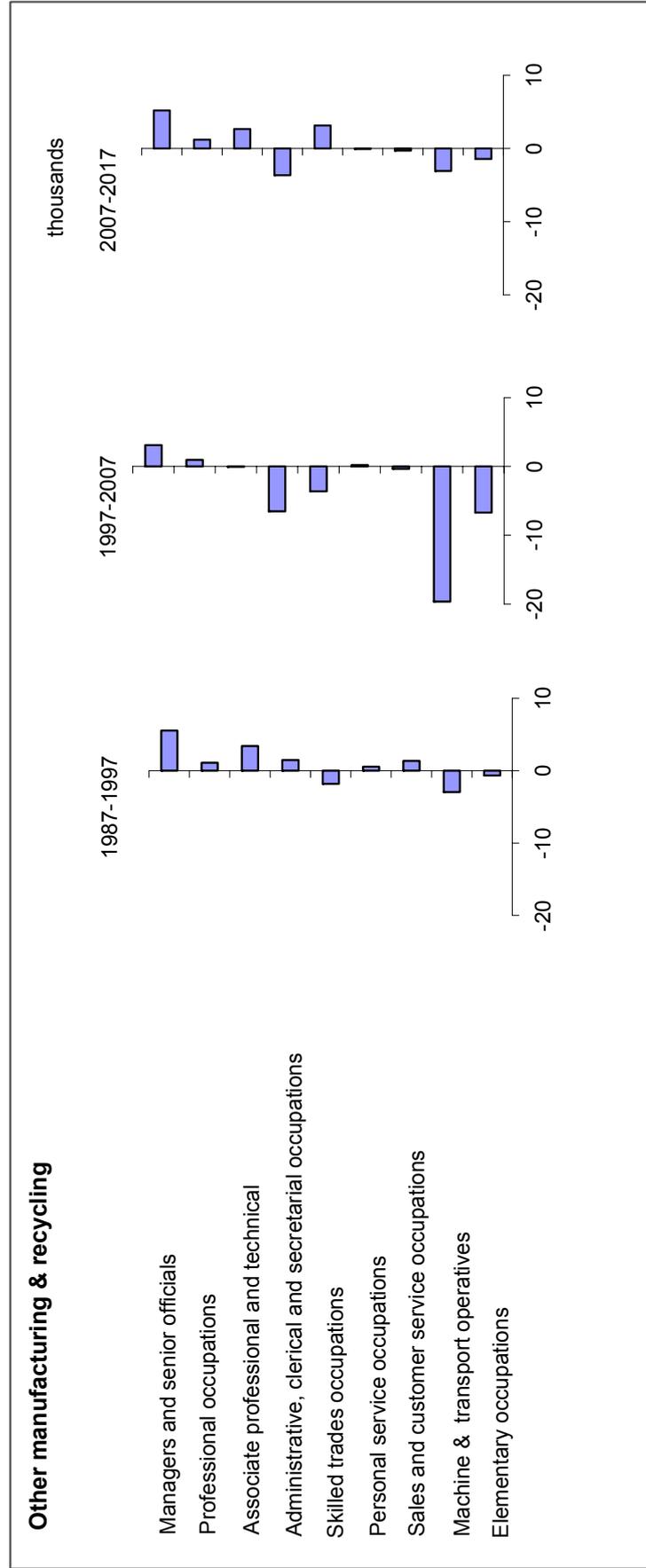
- With few dramatic shifts in occupational structure, overall employment levels in this industry are projected to remain fairly stable.
- Replacement demands are much more important than any expansion demand and they are expected to lead to around 70 thousand workers needing to be replaced over the decade.
- Patterns of replacement demand and total requirements therefore mirror the current patterns of employment, with the largest increase being for skilled trades and machine & transport operatives.

Table 4.10.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Manufacturing nes & recycling Employment Levels (000s)	1987					2007					2012					2017					2007-2017		
	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Total Requirement
1. Managers & Senior Officials	21	27	30	32	35	21	27	30	32	35	21	27	30	32	35	21	27	30	32	35	5	10	15
2. Professional Occupations	6	7	8	9	9	6	7	8	9	9	6	7	8	9	9	6	7	8	9	9	1	3	4
3. Associate Professional & Technical Occupations	12	15	15	16	18	12	15	15	16	18	12	15	15	16	18	12	15	15	16	18	3	5	8
4. Administrative, Clerical & Secretarial Occupations	21	23	16	14	13	21	23	16	14	13	21	23	16	14	13	21	23	16	14	13	-4	7	3
5. Skilled Trades Occupations	74	72	69	69	72	74	72	69	69	72	74	72	69	69	72	74	72	69	69	72	3	23	26
6. Personal Service Occupations	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	1	1
7. Sales & Customer Service Occupations	3	5	4	4	4	3	5	4	4	4	3	5	4	4	4	3	5	4	4	4	0	2	1
8. Machine & Transport Operatives	62	59	40	38	37	62	59	40	38	37	62	59	40	38	37	62	59	40	38	37	-3	15	11
9. Elementary Occupations	27	26	19	18	18	27	26	19	18	18	27	26	19	18	18	27	26	19	18	18	-1	7	5
Total	228	237	204	203	208	228	237	204	203	208	228	237	204	203	208	228	237	204	203	208	4	71	75
Percentage Shares	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	9.2	11.3	14.6	15.8	16.8	9.2	11.3	14.6	15.8	16.8	9.2	11.3	14.6	15.8	16.8	9.2	11.3	14.6	15.8	16.8	17.4	34.3	51.8
2. Professional Occupations	2.7	3.1	4.1	4.3	4.6	2.7	3.1	4.1	4.3	4.6	2.7	3.1	4.1	4.3	4.6	2.7	3.1	4.1	4.3	4.6	14.5	34.3	48.8
3. Associate Professional & Technical Occupations	5.1	6.3	7.3	8.0	8.5	5.1	6.3	7.3	8.0	8.5	5.1	6.3	7.3	8.0	8.5	5.1	6.3	7.3	8.0	8.5	17.7	33.2	50.9
4. Administrative, Clerical & Secretarial Occupations	9.4	9.7	8.0	7.0	6.1	9.4	9.7	8.0	7.0	6.1	9.4	9.7	8.0	7.0	6.1	9.4	9.7	8.0	7.0	6.1	-22.3	41.6	19.4
5. Skilled Trades Occupations	32.5	30.6	33.8	34.2	34.7	32.5	30.6	33.8	34.2	34.7	32.5	30.6	33.8	34.2	34.7	32.5	30.6	33.8	34.2	34.7	4.5	33.1	37.6
6. Personal Service Occupations	0.7	0.9	1.2	1.1	1.1	0.7	0.9	1.2	1.1	1.1	0.7	0.9	1.2	1.1	1.1	0.7	0.9	1.2	1.1	1.1	-2.1	36.9	34.8
7. Sales & Customer Service Occupations	1.5	2.0	2.2	2.1	2.0	1.5	2.0	2.2	2.1	2.0	1.5	2.0	2.2	2.1	2.0	1.5	2.0	2.2	2.1	2.0	-6.5	34.5	27.9
8. Machine & Transport Operatives	27.3	25.1	19.5	18.9	17.7	27.3	25.1	19.5	18.9	17.7	27.3	25.1	19.5	18.9	17.7	27.3	25.1	19.5	18.9	17.7	-7.7	36.5	28.8
9. Elementary Occupations	11.6	10.9	9.4	8.7	8.5	11.6	10.9	9.4	8.7	8.5	11.6	10.9	9.4	8.7	8.5	11.6	10.9	9.4	8.7	8.5	-7.5	35.0	27.5
Total	100.0	1.8	34.9	36.7																			

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.10.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

4.11 CONSTRUCTION

4.11.1 Description of the industry

INDUSTRY 11: CONSTRUCTION		
SIC2003 headings: 45		
General construction work including: site preparation and demolition; building of complete constructions or parts thereof and civil engineering (including all types of buildings, bridges, tunnels, pipelines, roads, airfields, sports facilities, water projects etc.); installation and completion (including wiring, insulation, plumbing, plastering, painting and glazing).		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	6.2	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	2,187,000	31,234,000
Share of total employment (% 2007):	7.0	100
Gender split (male:female) (% 2007):	90:10	53:47
Part-time share (% 2007):	4	28
Self-employment share (% 2007):	42	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.11.2 Industry Commentary

Construction is an industry dominated by small firms, In 2006 there were an estimated 186,000 firms (private contractors registered with the Department for Business, Enterprise & Regulatory Reform (BERR) (formerly the DTI)). These were distributed across a wide range of size classes and trade types. Although it is not highly concentrated, large firms carry out a disproportionate share of the work by value.

The construction industry enjoyed robust output growth in 2007 thanks to strong outturns for the UK economy as a whole and the private housing and commercial property sub-sectors. However, activity in the housing market started to slow in the second half of 2007 as the monetary tightening by the Bank of England took effect on borrowing. This was exacerbated by the impact of the credit crisis (including the run on Northern Rock).

In 2008, activity in the housing market slowed sharply. The housing market was affected by the widespread weakening of confidence following the credit crunch. With property transactions and mortgage demand falling, house price inflation is now clearly on a downward trajectory. This is likely to have a significant negative impact on the sector, especially firms dependent on the housing market.

A steady stream of infrastructure and public works should support construction activity over the medium to long term. Public sector (housing and non-housing) and infrastructure work made up around 26 per cent of output in 2006. Several announcements in 2007 indicate a steady stream of infrastructure work over the medium and long terms, which should continue to support activity in Construction.

The government published its Housing and Regeneration Bill in November (after a Green Paper in July) aimed at increasing the supply of affordable homes.

The government also announced funding for several rail network projects in July 2007, which are intended to improve capacity of the network. They are expected to run between 2008 and 2014. The major Crossrail project also got the go-ahead in October 2007. Other projects in the pipeline under the Highways Agency's £12bn Targeted Programme of Improvements include the widening of the M1 between Derby and Mansfield (due to start in 2008) and the widening of most of the M25 (contracts are to be awarded in 2008-09).

After the severe flooding in some parts of England in 2007, there are calls for the government to invest more in flood

defences. Any plans to upgrade flood defences would be a major project and be another boost to infrastructure and public works specialists.

The medium and longer term prospects are more optimistic. Output growth should recover for the sector as growth in the wider economy picks up. Over the longer term, the drivers of housing demand should ensure growth in the housing sector and this will be complemented by a lot of infrastructure and public works projects. There will also be a substantial amount of repair and maintenance work to bring the existing housing stock into line with environmental and energy standards that currently only apply to new homes.

4.11.3 Productivity and Output trends

Table 4.11.1: Trends in Output, Productivity and Employment

Indicator	Average change in the period			
	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	1.5	3.1	1.8	2.0
Employment (% pa)	1.8	2.9	0.9	0.7
(000s)	165	292	98	76
Productivity (% pa)	-0.3	0.2	0.9	1.3

Source: 6725output.xls (Figure 6.x.1)

- The construction industry is notoriously cyclical. Recent history has been of fairly steady output and employment growth. However it is likely that the sector will be hard hit by the effects of the credit crunch. Over the medium to longer term (5-10 years ahead) things are projected to be more optimistic. Output growth is projected to continue, albeit at somewhat more modest rates of around 2 per cent per annum over the decade to 2017.
- Over the longer term, productivity has improved steadily but most recently has stagnated. This has reflected the use of large numbers of relatively low skilled migrant workers in some parts of the sector. This is not expected to be sustainable over the medium term. A steady increase of just over 1 per cent per annum is projected.
- As a consequence of these two trends, employment levels are projected to grow only modestly to 2017, growing by about 175 thousand.

4.11.4 Employment by Status and Gender

The construction industry is one of the most male dominated industries in employment terms featured here. Females account for barely 1 in 10 of all jobs.

Despite efforts by the Inland Revenue to tighten up rules and regulations, self-employment is still very important in the sector, accounting for over 40 per cent of total employment in 2007. This follows a sharp downturn after the tightening up of regulations on self-employment status.

Part-time employment is relatively unimportant in the industry. Patterns of full-time working remain dominant in the industry.

Despite attempts by the construction industry to encourage more female entrants, males are expected to maintain their predominant share of employment in this industry.

While the Inland Revenue has endeavoured to tighten up on the rules and regulations governing self-employment, it is likely to remain a very important feature of future employment in the industry.

Self-employment is expected to stabilise its share of total employment and projected to remain at roughly its current level, as the effects of recent restructuring peter out. It will continue to account for more than 2 in 5 jobs.

Part-time employment will remain relatively insignificant.

Table 4.11.2: Employment Levels by Gender and Status, Construction

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	1,040	(47.6)	29	(1.3)	901	(41.2)	1,970	(90.1)	64	6	17	87
Female employment	131	(6)	63	(2.9)	22	(1)	217	(9.9)	9	2	0	11
Total employment	1,172	(53.6)	92	(4.2)	923	(42.2)	2,187	(100)	73	8	18	98
2012									2012-2017			
Male employment	1,104	(48.3)	35	(1.5)	918	(40.2)	2,057	(90)	53	6	9	68
Female employment	140	(6.1)	65	(2.9)	23	(1)	228	(10)	7	1	0	9
Total employment	1,244	(54.5)	100	(4.4)	941	(41.2)	2,285	(100)	60	7	9	76
2017									2007-2017			
Male employment	1,157	(49)	41	(1.7)	927	(39.3)	2,124	(90)	117	12	27	155
Female employment	148	(6.3)	66	(2.8)	23	(1)	237	(10)	16	3	0	20
Total employment	1,304	(55.2)	107	(4.5)	950	(40.2)	2,361	(100)	133	15	27	175

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.11.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Skilled trades continued to account for just under half of all jobs in 2007.
- The only other occupational groups with job shares of more than 10 per cent are managers & senior officials and machine & transport operatives. As demand for unskilled labour has fallen elementary occupations have experienced significant job losses over the 1980s and 1990s. This was potentially reversed in the last decades as greater use has been made of unskilled immigrant labour..

Future changes

- Through to 2017, skilled trades are expected to see a slow decline in their share of total jobs.
- Job losses are projected for administrative, clerical & secretarial occupations
- Job shares for elementary occupations, machine & transport operatives are also expected to fall slightly.
- These are offset by small employment increases in shares for managerial, professional and also the associate professional & technical group.

Shift share analysis

Table 4.11.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

During the period 1987-97 the industry effect was negative, accounting for the loss of around 1 in 5 jobs. Over the next decade this had turned into a positive

effect as the industry boomed as a result of a combination of demands from both the private and public sectors. For the next decade, a rather less optimistic picture is expected, as the combination of slower output growth and significantly faster productivity improvements, is projected to result in only a slight positive impact.

Occupational effects are projected to be positive for most occupations over the projection period. However there are negative effects for administrative & clerical occupations, machine & transport operatives and elementary occupations.

Replacement demands

Table 4.11.3 presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

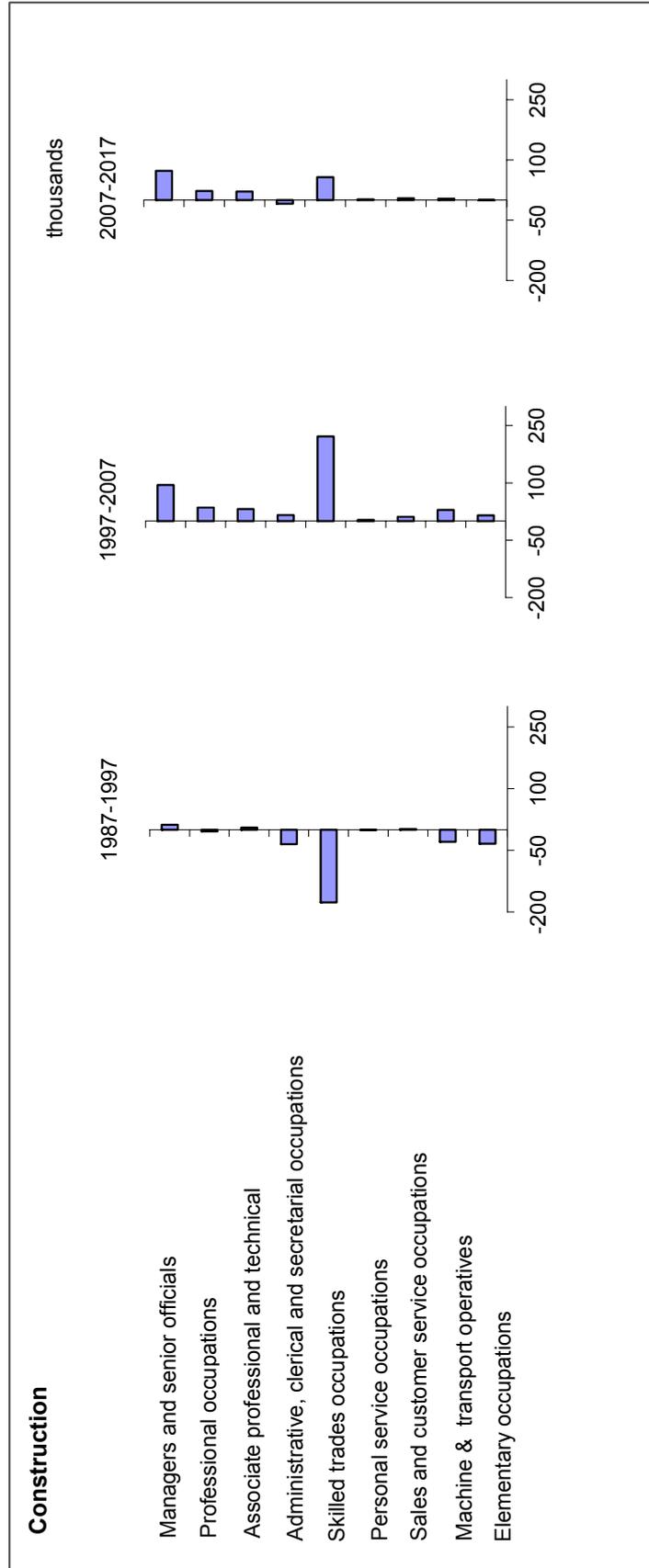
- These projections indicate a modest expansion of employment for the industry over the decade as a whole. This does not take into account the very substantial need to replace members of the existing workforce who will retire or leave for other reasons over the next decade. This will have significant implications for training of new entrants.
- The occupation requiring the largest number of replacements is skilled trades, where a high percentage of craftsmen are nearing retirement age. The estimated replacement demands for this group are nearly one third of a million.
- Significant replacement demands are projected for many other groups. These include managers, administrative, clerical & secretarial occupations, professionals and associate professional & technical occupations, as well as machine & transport operatives and elementary occupations.

Table 4.11.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Construction Employment Levels (000s)	2007-2017								
	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Total Requirement	
1. Managers & Senior Officials	179	191	286	323	358	73	96	169	
2. Professional Occupations	93	89	124	136	147	23	39	62	
3. Associate Professional & Technical Occupations	78	83	115	127	136	21	36	58	
4. Administrative, Clerical & Secretarial Occupations	153	118	134	131	125	-9	55	46	
5. Skilled Trades Occupations	1,025	849	1,070	1,101	1,127	57	332	389	
6. Personal Service Occupations	8	7	10	11	12	2	4	6	
7. Sales & Customer Service Occupations	15	17	28	30	32	4	9	13	
8. Machine & Transport Operatives	234	205	234	238	237	3	78	82	
9. Elementary Occupations	205	171	186	186	186	0	57	56	
Total	1,990	1,730	2,187	2,285	2,361	175	707	882	
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes			
1. Managers & Senior Officials	9.0	11.0	13.1	14.2	15.2	25.5	33.8	59.3	
2. Professional Occupations	4.7	5.1	5.7	6.0	6.2	18.2	31.7	49.9	
3. Associate Professional & Technical Occupations	3.9	4.8	5.2	5.6	5.8	18.7	31.7	50.3	
4. Administrative, Clerical & Secretarial Occupations	7.7	6.8	6.1	5.7	5.3	-6.7	40.9	34.2	
5. Skilled Trades Occupations	51.5	49.0	48.9	48.2	47.7	5.3	31.1	36.4	
6. Personal Service Occupations	0.4	0.4	0.5	0.5	0.5	21.6	36.5	58.1	
7. Sales & Customer Service Occupations	0.8	1.0	1.3	1.3	1.4	15.5	32.4	47.8	
8. Machine & Transport Operatives	11.8	11.9	10.7	10.4	10.1	1.5	33.5	35.0	
9. Elementary Occupations	10.3	9.9	8.5	8.1	7.9	-0.2	30.4	30.3	
Total	100.0	100.0	100.0	100.0	100.0	8.0	32.3	40.3	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.11.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

4.12 SALE & MAINTENANCE OF MOTOR VEHICLES

4.12.1 Description of the industry

INDUSTRY 12: SALE & MAINTENANCE OF MOTOR VEHICLES		
SIC2003 headings: 50		
Sale, maintenance and repair of motor vehicles and motorcycles (but excluding renting, classified to Industry 21, Other Business Services); retail sale of automotive fuel.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	2.1	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	644,000	31,234,000
Share of total employment (% 2007):	2.1	100
Gender split (male:female) (% 2007):	77:23	53:47
Part-time share (% 2007):	17	28
Self-employment share (% 2007):	12	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.12.2 Industry Commentary

Distribution is divided into two main sub-sectors: wholesale distribution (dealing with the general sale of products to retailers or professional users) and the motor trade (the sale of motor vehicles and related products). The motor trade has always been a special case, with specific distribution problems partly created by exceptional distribution regulations. This is now changing to some extent, as a consequence of the modest changes to the block exemption from EU competition laws.

UK Car sales picked up towards the end of 2007. Car registrations in the UK improved towards the end of 2007, and overall grew by 2½ per cent. The data, from the Society of Motor Manufacturers and Traders also show that rising awareness of climate change issues is affecting the market, with sales of alternatively fuelled vehicles more than 80 per cent higher than a year earlier. Sales of diesel vehicles also reached a

record high, accounting for more than 40 per cent of all registrations.

Four motor vehicle manufacturers are now legally obliged by the European Commission to provide technical information to independent car repairers. In September 2007 the European Commission adopted four decisions to legally bind DaimlerChrysler, Toyota, General Motors and Fiat to commitments to provide technical information about car repairs to all independent garages in the EU. The commitments were given after a Commission investigation found that inadequate access to the full range of technical information could drive independent repairers from the market, and that the agreements between the carmakers and their authorised repairers would therefore infringe EC Treaty rules on restrictive business practices. The resulting reduction in competition between car repairers could lead to less choice and higher prices for consumers: independent repairers are often cheaper than authorised outlets, sometimes by over 50

per cent. In addition, if repairs were carried out without the right technical information, this could lead to vehicles being driven in an unsafe condition, and add to air pollution and wasted fuel. The commitments will be binding until the motor vehicle block exemption expires in May 2010. By that time, the vehicle emissions regulation will have entered into force. This places an obligation upon vehicle manufacturers to provide

independent repairers with standardised access to all technical repair information.

Employment in this sector is expected to pick up in the medium and long term following the negative effects of the credit crunch, cooling of the housing market and deterioration in consumer confidence. Output growth is expected to average around 2 per cent over the decade to 2017, but employment is expected to grow by only a ¼ per cent.

4.12.3 Productivity and Output trends

Table 4.12.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	1.4	2.1	1.9	1.9
Employment (% pa)	-0.6	-0.5	0.3	0.3
(000s)	-20	-15	11	9
Productivity (% pa)	2.1	2.6	1.6	1.6

Source: 6725output.xls (Figure 6.x.1)

- The rate of growth in output levels was around 2 per cent per annum over the past 5 years.
- This is projected to continue over the next decade, growth rates are projected to remain modest at just under 2 per cent per annum.
- In recent years, productivity growth has been even faster. Some further growth is projected to 2017, as competitive pressures to reduce cost take effect, but it is projected to remain well below 2 per cent per annum.
- Consequently, employment levels are expected to remain fairly static, as productivity gains offset most of the projected growth in output levels.

4.12.4 Employment by Status and Gender

Women currently account for just under a quarter of the jobs in this industry. The historical picture is somewhat hazy, the official statistics presenting a somewhat erratic pattern.

Self-employment is quite important, accounting for around 1 in 8 jobs.

Part-time working currently accounts for a somewhat higher share of total employment.

During the late 1990s females increased their employment share substantially. This trend appears to have now petered out. The projections indicate maintenance of the current balance between male and female jobs.

Full-time employment is projected to increase its employment share at the expense of self employment over the next decade.

Self-employment shares are expected to continue the recent downward trend.

Part-time working is projected to increase its share of total employment, continuing the pattern evident from the late 1990s.

Table 4.12.2: Employment Levels by Gender and Status, Sale & maintenance of Motor Vehicles

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	378	(58.7)	48	(7.5)	69	(10.7)	495	(76.9)	0	9	-7	2
Female employment	81	(12.6)	58	(9)	9	(1.4)	149	(23.1)	6	3	0	9
Total employment	459	(71.3)	106	(16.5)	78	(12.1)	644	(100)	6	12	-7	11
2012									2012-2017			
Male employment	378	(57.7)	57	(8.8)	61	(9.4)	497	(75.9)	-1	13	-7	5
Female employment	87	(13.3)	61	(9.3)	10	(1.5)	158	(24.1)	2	2	0	4
Total employment	465	(71.1)	118	(18.1)	71	(10.8)	654	(100)	1	15	-7	9
2017									2007-2017			
Male employment	377	(56.9)	70	(10.6)	54	(8.2)	502	(75.6)	-1	22	-15	7
Female employment	89	(13.4)	63	(9.4)	10	(1.5)	161	(24.4)	8	4	1	13
Total employment	466	(70.3)	133	(20.1)	64	(9.7)	663	(100)	7	27	-14	19

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.12.5 Projections of Employment by Occupation

Key aspects of occupational structure

- With almost 28 per cent of all jobs, sales and customer service occupations is the main occupation in this industry. This is closely followed by managers & senior officials with over 20 per cent.
- Skilled trades accounted for almost a fifth of all jobs in this industry 20 years ago. However, this has declined sharply over the past two decades.

Future change

- Further job increases over the next decade are expected in sales & customer service occupations. Small job gains are also projected for many other white collar occupations, but these are all of a modest magnitude.
- Skilled trades are projected to experience more job losses. Also at a much slower rate job losses are expected for administrative, clerical & secretarial occupations. This reflects the continuing impact of productivity change, especially related to ICT, on such work.

Shift share analysis

Table 4.12.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered.

Finally, the occupational effect illustrates the impact of changes in technology and

organisational factors on the occupational structure *within* the industry.

The industry effect represented a modest negative factor of 7 per cent in the 1987-97 period, but this more than doubled over the period 1997-2007. Over the projection period, it is expected to be a rather less significant factor, falling again to under 5 per cent.

Skilled trades, administrative & clerical occupations and machine & transport occupations are projected to experience significant negative occupational effects over the projection period.

Replacement demands

Table 4.12.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

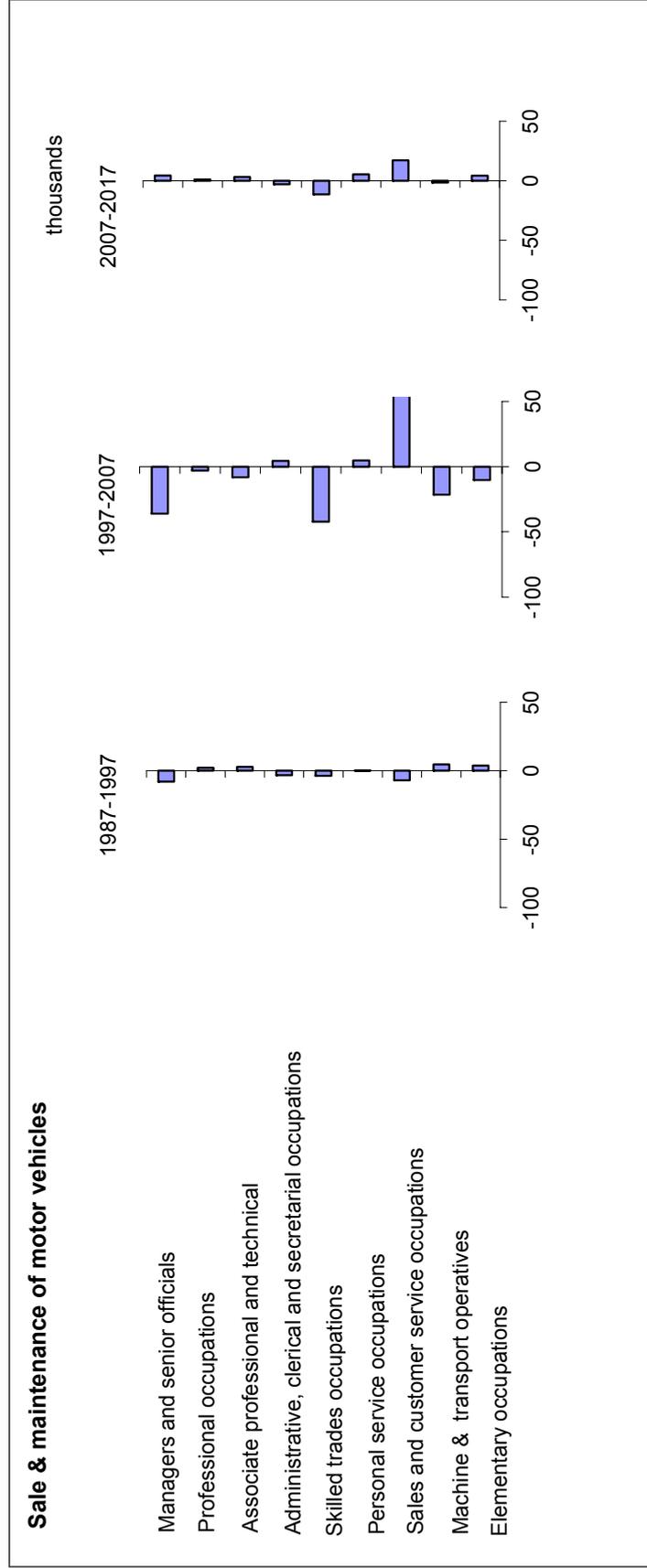
- Although, very little change in total employment is projected, there will inevitably be substantial replacement demands to be met in this industry and this amounts to over 200 thousand replacement jobs.
- Sales & customer service occupations make up the largest element, closely followed by managers & senior officials.
- Even those occupations projected to decline in importance (as measured by declining job shares) will have significant needs to replace existing workers. Over the next 10 years, it is expected, on average, that just over one third of the current workforce will need to be replaced.

Table 4.12.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Distribution relating to motors Employment Levels (000s)	2007-2017								
	1987	1997	2007	2012	2017	Change	Net Replacement Demands	Requirement	Total
1. Managers & Senior Officials	176	168	132	133	136	4	46	50	50
2. Professional Occupations	21	23	21	21	22	1	7	8	8
3. Associate Professional & Technical Occupations	56	59	51	52	54	3	16	19	19
4. Administrative, Clerical & Secretarial Occupations	32	29	34	33	31	-3	13	10	10
5. Skilled Trades Occupations	132	128	86	80	74	-11	27	16	16
6. Personal Service Occupations	19	19	24	26	29	5	9	15	15
7. Sales & Customer Service Occupations	107	100	177	186	194	17	55	73	73
8. Machine & Transport Operatives	72	77	55	55	53	-2	19	18	18
9. Elementary Occupations	71	75	65	68	69	4	21	25	25
Total	687	679	644	654	663	19	214	233	233
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes			
1. Managers & Senior Officials	25.6	24.7	20.5	20.3	20.5	3.3	34.7	38.0	38.0
2. Professional Occupations	3.1	3.5	3.2	3.2	3.3	5.3	33.5	38.7	38.7
3. Associate Professional & Technical Occupations	8.2	8.7	7.9	8.0	8.1	6.2	32.1	38.3	38.3
4. Administrative, Clerical & Secretarial Occupations	4.7	4.3	5.2	5.0	4.6	-8.6	39.3	30.7	30.7
5. Skilled Trades Occupations	19.2	18.9	13.3	12.3	11.2	-13.3	31.7	18.3	18.3
6. Personal Service Occupations	2.8	2.8	3.7	4.0	4.4	22.4	39.5	61.9	61.9
7. Sales & Customer Service Occupations	15.6	14.8	27.5	28.5	29.3	9.7	31.3	41.0	41.0
8. Machine & Transport Operatives	10.5	11.3	8.6	8.4	8.1	-2.8	34.7	31.9	31.9
9. Elementary Occupations	10.4	11.1	10.1	10.3	10.4	6.4	31.6	38.0	38.0
Total	100.0	100.0	100.0	100.0	100.0	3.0	33.2	36.2	36.2

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.12.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

4.13 WHOLESALE DISTRIBUTION

4.13.1 Description of the industry

INDUSTRY 13: WHOLESALE DISTRIBUTION		
SIC2003 heading: 51		
Wholesale and commission trade of new and used goods to retailers, industrial, commercial, institutional or profession users; acting as agents; usual manipulations such as assembling, sorting and grading of goods.		
INDUSTRY PROFILE		
		All Industries
Share of UK Output (% 2007):	4.5	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	1,275,000	31,234,000
Share of total employment: (% 2007)	4.1	100
Gender split (male:female) (% 2007):	69:31	53:47
Part-time share (% 2007):	12	28
Self-employment share (% 2007):	11	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.13.2 Industry commentary

The structure of the traditional Distribution sub-sectors has changed in recent years. Distribution is traditionally divided into two subsectors: wholesale distribution or merchant wholesaling, consisting of the sale of products to retailers or to professional users; and retailing, or the sale to final consumers. Production techniques and the logistical capacities and scale of distribution networks had, until the second half of the 20th century, made the division of distribution into wholesaling and retailing on the whole the most efficient means of taking goods from producer to consumer. Beginning in the 1960s, in the UK at least, improved production methods reducing the lead-time between orders and production and the general convergence of consumer tastes both within countries and across borders have made it possible for companies to manage ever larger distribution networks. In many areas of distribution this is leading to consolidation as there are large economies of scale to

be won. Major retailers have taken the initiative to bring wholesale under their control and also to exercise more influence over producers. The motor trade, however, has always been a special case, with specific distribution problems partly created by exceptional distribution regulations.

Since the mid-1990s this process has sped up and the lines between wholesaling and retailing have become more blurred. Vertical integration is increasing, and many companies such as grocery supermarkets, department stores and fashion houses now control both their own distribution networks and their retail outlets. They also control the manufacture of their own-label brands. However, modern technology also allows consumers to bypass retailers and to buy directly from wholesalers or producers.

Output growth in distribution is projected to average just under 3 per cent per annum, and employment is expected to grow by around ¼ per cent per annum over the decade to 2017.

4.13.3 Productivity and Output Trends

Table 4.13.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	3.4	2.7	2.8	2.8
Employment (% pa)	-0.4	-0.3	0.4	0.3
(000s)	-27	-19	26	22
Productivity (% pa)	3.9	3.0	2.4	2.4

Source: 6725output.xls (Figure 6.x.1)

- Output has grown steadily in this industry in recent years. This pattern is expected to continue.
- Over the period to 2017, growth rates are projected to remain at just under 3 per cent per annum.
- Productivity has also improved steadily in recent years. As the opportunities for further gains become harder to find, the pace of change is expected to slow.
- Contrasting with the job losses incurred in recent years, employment is projected to increase slightly as a result.

4.13.4 Employment by Status and Gender

This is an industry in which men predominate. Men account for around 7 out of every 10 jobs. Around ¾ of employment is full-time. Part-time employment and self employment each currently account for around 1 in 8 jobs.

Based on a continuation of recent trends, the female share of total employment is projected to decline slightly. The share of part-timers is projected to remain fairly constant.

A slight reduction in self employment shares is projected to 2017.

Table 4.13.2: Employment Levels by Gender and Status, Wholesale distribution

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	708	(55.5)	51	(4)	121	(9.5)	881	(69)	29	8	-9	28
Female employment	267	(20.9)	105	(8.2)	24	(1.8)	395	(31)	-1	-1	0	-1
Total employment	975	(76.4)	156	(12.2)	145	(11.4)	1,275	(100)	28	7	-9	26
2012									2012-2017			
Male employment	737	(56.6)	59	(4.5)	112	(8.6)	908	(69.8)	26	4	-11	19
Female employment	266	(20.4)	104	(8)	24	(1.8)	394	(30.2)	3	0	0	3
Total employment	1,003	(77.1)	163	(12.5)	136	(10.4)	1,302	(100)	29	4	-10	22
2017									2007-2017			
Male employment	764	(57.7)	63	(4.8)	101	(7.6)	927	(70.1)	55	12	-20	47
Female employment	268	(20.3)	104	(7.8)	25	(1.9)	396	(29.9)	2	-1	1	2
Total employment	1,032	(78)	166	(12.6)	125	(9.5)	1,324	(100)	57	11	-19	48

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.13.5 Projections of Employment by Occupation

Key Aspects of Occupational Structure

- Accounting for slightly more than a quarter of all jobs in the sector, sales & customer service occupations are the most important group of workers in this industry.
- Next come managers & senior officials with just over 20 per cent in 2007.
- Skilled trades occupations was in 2007 the next largest group accounting for more than 1 in 8 of all jobs.
- Elementary occupations account for about 1 in ten of all jobs

Future Changes

- Managers & senior officials, professional occupations, associate professional & technical occupations, personal service occupations and elementary occupations are expected to increase their share of all jobs over the period 2007-2017.
- Sales occupations are projected to become less important in the future.
- Skilled trades and administrative, clerical & secretarial occupations are projected to see job losses.
- Occupational structure is expected to remain relatively stable over the next decade in most other respects

Shift share analysis

Table 4.13.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment within the UK economy. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In Wholesale distribution, the industry effect has represented a significant negative impact on occupational employment levels over the past decade. In the period 1997-2007 it was around -14 per cent although it was much smaller in the period 1987-1997. The industry effect is projected to once again become much more modest (a negative effect of just under 2½ per cent) over the projection period (2007-2017).

Over the projection period negative occupational effects are also significant for administrative & clerical occupations and skilled trades occupations.

Replacement demands

Table 4.13.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

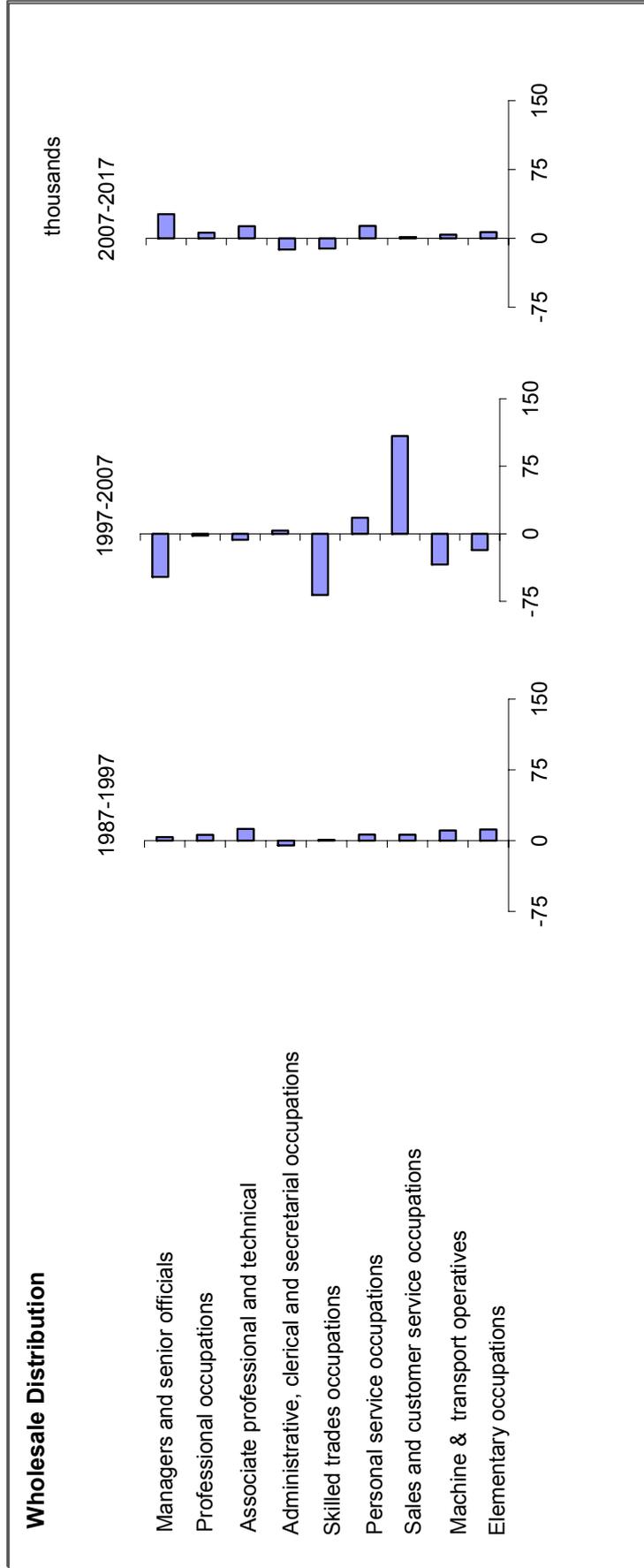
- Over the next 10 years, replacement demands for this industry are relatively high at well over 400 thousand.
- The sales & customer service occupations generate the highest replacement demand with more than 110 thousand workers, but managers & senior officials are close behind with over 90 thousand replacements needed.
- There are also substantial replacement needs across all other occupational groups.

Table 4.13.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Wholesale distribution nes Employment Levels (000s)	2007-2017								
	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Total Requirement	Total
1. Managers & Senior Officials	306	309	262	273	288	26	92	118	
2. Professional Occupations	38	44	42	45	48	6	14	21	
3. Associate Professional & Technical Occupations	102	114	108	114	121	13	36	49	
4. Administrative, Clerical & Secretarial Occupations	83	78	82	75	70	-12	33	21	
5. Skilled Trades Occupations	227	228	160	155	149	-11	51	40	
6. Personal Service Occupations	36	43	61	67	74	14	24	38	
7. Sales & Customer Service Occupations	219	225	333	338	335	1	110	111	
8. Machine & Transport Operatives	126	136	102	105	106	4	36	40	
9. Elementary Occupations	132	144	126	130	133	7	41	48	
Total	1,269	1,322	1,275	1,302	1,324	48	438	486	
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes			
1. Managers & Senior Officials	24.1	23.4	20.5	20.9	21.7	10.0	35.2	45.2	
2. Professional Occupations	3.0	3.3	3.3	3.5	3.7	14.4	34.2	48.5	
3. Associate Professional & Technical Occupations	8.0	8.7	8.5	8.8	9.1	12.3	33.0	45.3	
4. Administrative, Clerical & Secretarial Occupations	6.6	5.9	6.4	5.8	5.3	-14.7	40.6	25.9	
5. Skilled Trades Occupations	17.9	17.2	12.5	11.9	11.2	-6.9	31.9	25.1	
6. Personal Service Occupations	2.9	3.2	4.8	5.1	5.6	22.3	40.3	62.6	
7. Sales & Customer Service Occupations	17.2	17.0	26.1	25.9	25.3	0.4	33.0	33.4	
8. Machine & Transport Operatives	9.9	10.3	8.0	8.1	8.0	3.9	35.0	38.9	
9. Elementary Occupations	10.4	10.9	9.9	10.0	10.0	5.4	32.7	38.1	
Total	100.0	100.0	100.0	100.0	100.0	3.8	34.3	38.1	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.13.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.13.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total	scale	industry occupation	total	scale	industry occupation	total	scale	industry occupation	total	scale	industry occupation	total	scale	industry occupation	total	scale	industry occupation
1. Managers & Senior Officials	4	18	-5	-9	33	-44	-48	33	-44	-37	26	16	-6	16	16	16	16	16
2. Professional Occupations	6	2	-1	5	5	-6	-2	5	-6	0	6	3	-1	4	4	4	4	4
3. Associate Professional & Technical Occupations	12	6	-2	8	12	-16	-7	12	-16	-3	13	7	-3	9	9	9	9	9
4. Administrative, Clerical & Secretarial Occupations	-5	5	-1	-9	8	-11	3	8	-11	6	-12	5	-2	-15	-15	-15	-15	-15
5. Skilled Trades Occupations	1	14	-4	-9	24	-32	-68	24	-32	-60	-11	10	-4	-17	-17	-17	-17	-17
6. Personal Service Occupations	7	2	-1	5	5	-6	18	5	-6	19	14	4	-1	11	11	11	11	11
7. Sales & Customer Service Occupations	6	13	-4	-3	24	-32	108	24	-32	116	1	21	-8	-11	-11	-11	-11	-11
8. Machine & Transport Operatives	11	7	-2	6	15	-19	-34	15	-19	-29	4	6	-3	0	0	0	0	0
9. Elementary Occupations	12	8	-2	6	15	-20	-18	15	-20	-13	7	8	-3	2	2	2	2	2
Total	54	75	-22	0	141	-188	-47	141	-188	0	48	80	-31	0	0	0	0	0
			% change			% change			% change				% change			% change		% change
1. Managers & Senior Officials	1.3	6.0	-1.7	-3.0	10.7	-14.2	-15.5	10.7	-14.2	-11.9	10.0	6.2	-2.4	6.2	6.2	6.2	6.2	6.2
2. Professional Occupations	16.4	6.0	-1.7	12.2	10.7	-14.2	-4.3	10.7	-14.2	-0.8	14.4	6.2	-2.4	10.6	10.6	10.6	10.6	10.6
3. Associate Professional & Technical Occupations	12.2	6.0	-1.7	8.0	10.7	-14.2	-5.8	10.7	-14.2	-2.3	12.3	6.2	-2.4	8.5	8.5	8.5	8.5	8.5
4. Administrative, Clerical & Secretarial Occupations	-6.2	6.0	-1.7	-10.4	10.7	-14.2	4.5	10.7	-14.2	8.0	-14.7	6.2	-2.4	-18.5	-18.5	-18.5	-18.5	-18.5
5. Skilled Trades Occupations	0.3	6.0	-1.7	-3.9	10.7	-14.2	-29.8	10.7	-14.2	-26.3	-6.9	6.2	-2.4	-10.7	-10.7	-10.7	-10.7	-10.7
6. Personal Service Occupations	17.9	6.0	-1.7	13.6	10.7	-14.2	41.3	10.7	-14.2	44.9	22.3	6.2	-2.4	18.5	18.5	18.5	18.5	18.5
7. Sales & Customer Service Occupations	2.9	6.0	-1.7	-1.3	10.7	-14.2	48.2	10.7	-14.2	51.8	0.4	6.2	-2.4	-3.3	-3.3	-3.3	-3.3	-3.3
8. Machine & Transport Operatives	8.6	6.0	-1.7	4.4	10.7	-14.2	-24.9	10.7	-14.2	-21.4	3.9	6.2	-2.4	0.1	0.1	0.1	0.1	0.1
9. Elementary Occupations	9.0	6.0	-1.7	4.7	10.7	-14.2	-12.6	10.7	-14.2	-9.0	5.4	6.2	-2.4	1.7	1.7	1.7	1.7	1.7
Total	4.2	6.0	-1.7	0.0	10.7	-14.2	-3.5	10.7	-14.2	0.0	3.8	6.2	-2.4	0.0	0.0	0.0	0.0	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.14 RETAILING

4.14.1 Description of the industry

INDUSTRY 14: RETAILING		
SIC2003 heading: 52		
Retail of new and used goods to the general public for personal or household consumption or utilisation, by shops, department stores, stalls, mail-order houses, consumer co-operatives etc.; retail sale by commission agents; repair and installation of personal or household goods.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	6.2	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	medium	average
Total employment (2007):	3,142,000	31,234,000
Share of total employment (% 2007):	10.1	100
Gender split (male:female) (% 2007):	39:61	53:47
Part-time share (% 2007):	53	28
Self-employment share (% 2007):	8	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.14.2 Industry Commentary

Retailing takes many forms, from market stalls to independent high street shops, to department stores and high street chains, to mail order catalogues and internet retailers. The standard definition used here includes most forms of selling goods to households, apart from the retail sale of motor vehicles and the retail sale of fuels for vehicles. The large food retailers have extended their reach into non-food products and convenience stores.

The division between wholesale distribution and retailing has become more blurred in recent decades, especially with the rise of internet retailing, as it has become much easier for producers to sell directly to households, or retailers to control their own distribution networks.

Given the economies of scale in purchasing, branding and selling of commoditised products, some of the

largest retailers are naturally those that sell groceries. The top four supermarket chains in the UK are Tesco, Asda, J Sainsbury and Wm Morrison. Tesco has far and away the largest market share of grocery retailing (around 32 per cent in 2007) compared with the others (Asda and J Sainsbury, the next-largest, have around 17 per cent), and in 2005 became the first British retailer to make more than £2bn of annual profit. Price competition in the sector is fierce. Tesco and the other supermarket chains have for many years extended their brands to expand rapidly in non-food sales.

Another retail sector suffering from strong price competition is electrical goods. The growth of sales in the large supermarkets and via the internet, and the increasing use of price-comparison websites, has put severe pressure on high street stores, who have higher overheads. In a sign of the impact this is having, DSG International, the owner of Dixons and Currys, made the

decision in 2006 to shut down the high street operations of Dixons and turn it into an internet-only retailer. In the preceding four years Dixons had seen 50 per cent per annum growth in sales via the internet.

The use of the internet by households to make purchases has grown rapidly in recent years, but has only now reached a size where it is starting to have an impact on the fortunes of a significant number of retailers. The range of goods that consumers are now happy to purchase over the internet is expanding from the relatively small original selection of electrical goods, air tickets, books and CDs, to include items such as clothing, home furnishings and furniture. It is now essential for many high street retailers to also have an internet operation, and many of those that do not are looking to create one.

High-street retailing is in the grip of a price war due to three main causes. A major factor has been greater awareness of price differences among consumers, leading to (and reinforced by) the greater importance of price in marketing campaigns. Consumers are becoming more knowledgeable about the range of goods that are on offer, which is driving fierce rivalry among retailers for their custom. Two good examples of this are food retailing and clothes retailing. Supermarkets compete daily on the price of basic household goods and clothes shops compete fiercely in the sales periods, while consumers, aware of this competition through the advertising that surrounds it, have become increasingly discerning with respect to price. The internet provides a further boost to price competition; it is now easier than ever before to compare shop prices. E-tailers have noted, with anxiety, that the habit of comparing prices on competing websites and then buying the cheapest is now well established among internet shoppers.

Secondly, retail capacity continues to increase. Mobile phone retailing provides a good example of the problems of over-capacity. During the early period of explosive growth in mobile phone use, the

market was characterised by inexperienced users in need of substantial service support. In such a climate there was a need for a high physical presence, and so retail outlets proliferated. Revenues then flattened as sales of mobile phones dropped off and customers became more experienced in using the phones. The result of over-capacity in this particular case was not falling prices, (handsets were heavily subsidised to begin with, but are less so now), but widespread bankruptcy.

Thirdly, consumers are spending a smaller proportion of their income on retail goods, as increasing wealth allows them to spend a greater proportion on other services. In 1970 in the UK, retail sales accounted for a half of household expenditure, yet in recent years, retail sales have accounted for little more than a third.

Retailers can protect themselves from this competition by specialising in certain brands. Sports clothing retailing, for example, is centred around a few well-known brands which do not compete heavily on price. This is, however, an exception to the general trend for high-street retailers, and so price-cutting and special offers are commonplace.

The most important single factor for change in Retailing is the rise of e-commerce. In 2004, only about 6 per cent of all retail sales were carried out online. However, there has been rapid growth in internet selling since then, and Interactive Media in Retailing Group (IMRG), the e-tailing industry body, estimates that online shopping accounted for 10 per cent of all retail sales in 2006 and will account for 20 per cent by 2010. Internet retailing has already revolutionised some industries such as Air Transport, and e-commerce has the potential both to claim a high market share of all commerce and to alter radically the retailing and distribution sector. As with Air Transport, e-commerce could allow producers to communicate directly with consumers or, as in the case of well known internet brands such as Amazon.com, distribution could be enacted purely through the wholesaler's

network, bypassing completely the retailer's outlet. However, e-commerce is perhaps being used most effectively at present by so-called 'clicks-and-mortar' retailers: retailers who use the internet as an alternative medium for sales, and thus improve overall efficiency of their business. Retailers are now able, for example, not to stock less popular but important products on the shop floor, but instead make them available to consumers through their websites. Their success may also reflect the importance of a trusted brand to consumers who order over the internet.

The rise of internet spending by consumers reflects the spread of high-speed broadband. About half of UK adults are now estimated to have a broadband connection in their homes, many with speeds of more than 1 megabit per second. This compares with speeds of only 14.4 kilobits per second in 1995. The IMRG estimated that internet sales in the UK would rise to £42bn in 2007, a 39 per cent increase over 2006. It predicts sales will reach £78bn by 2010. A sizeable minority of retailers are yet to make use of

the internet at all, and so there appears to be great potential for further growth. According to a survey early in 2007 by Microsoft, only 56 of the UK's 100 largest retailers had a website which allowed consumers to shop online.

Retailing employment growth could be subdued in the long term due to growth in online spending.

In the long term, spending via the internet is expected to make up an increasing proportion of retail spending, and this is expected to affect the distribution channel rather than the level of total spending. As the more labour-intensive high street operations of retailers account for a smaller share of retail sales over time, employment growth in the industry could be more subdued. Continued price competition is expected to lead to further consolidation in the industry. By and large, the increasing share of sales via the internet is expected to support this pressure towards further concentration.

4.14.3 Productivity and Output Trends

Table 4.14.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	4.9	4.3	2.4	2.5
Employment (% pa)	1.8	0.2	0.6	0.7
(000s)	272	36	97	117
Productivity (% pa)	3.0	4.1	1.8	1.8

Source: 6725output.xls (Figure 6.x.1)

- For the last two decades, output has been on a rapidly rising trend.
 - Very recently growth has slowed and the prospects for the next decade are for a more moderate rate of around 2¼ per cent per annum.
 - The time profile for productivity is similar, with a marked slow down in growth expected over the next decade,
- as opportunities for continuing efficiency gains become harder to find.
- Employment levels have risen steadily for many years, in response to the rapid increases in output. This trend is expected to continue, albeit at a much less rapid rate, with some 200 thousand extra jobs projected over the next decade.

4.14.4 Employment by Status and Gender

In this industry, females account for around 3 out of every 5 jobs.

Part-time employment accounts for over half of all the jobs.

Self employment accounts for a moderately small and declining share of the total.

The already relatively large share of employment held by females is expected to be broadly maintained. However, some slight decline is projected.

Part-time employment is projected to maintain its share of the total, at just under 55 per cent of all employment.

Self employment is projected to continue the long-term decline with the share falling to just 7 percent.

Table 4.14.2: Employment Levels by Gender and Status, Retailing

Employment by gender	Changes in Employment Status (000s)								Changes in Employment Status (000s)			
	Full time		Part time		Self employed		Total		FT	PT	SE	Total
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)				
2007									2007-2012			
Male employment	645	(20.5)	447	(14.2)	139	(4.4)	1,230	(39.2)	41	65	-11	95
Female employment	563	(17.9)	1,231	(39.2)	117	(3.7)	1,912	(60.8)	-1	2	2	3
Total employment	1,208	(38.5)	1,678	(53.4)	256	(8.1)	3,142	(100)	40	66	-9	97
2012									2012-2017			
Male employment	686	(21.2)	512	(15.8)	127	(3.9)	1,325	(40.9)	46	71	-11	106
Female employment	562	(17.4)	1,233	(38.1)	119	(3.7)	1,914	(59.1)	0	8	3	11
Total employment	1,248	(38.5)	1,744	(53.9)	247	(7.6)	3,239	(100)	47	79	-9	117
2017									2007-2017			
Male employment	732	(21.8)	582	(17.4)	116	(3.5)	1,431	(42.6)	88	135	-22	200
Female employment	562	(16.8)	1,241	(37)	122	(3.6)	1,925	(57.4)	-1	10	4	14
Total employment	1,295	(38.6)	1,823	(54.3)	238	(7.1)	3,356	(100)	87	145	-18	214

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.14.5 Projections of Employment by Occupation

Key Aspects of Occupational Structure

- In 2007, sales & customer service occupations accounted for more than 1 in every 3 jobs and are easily the most important group.
- Managers & senior officials, are also a key occupational group, with a 17 per cent job share.
- Of the remainder, administrative, clerical & secretarial occupations and the elementary occupations are the only two other groups that have a 10 per cent or more share.

Future changes

- Sales & customer service occupations, are expected to be the main beneficiaries of projected employment growth, although their job share declines.
- Managers & senior officials and to a lesser extent associate professionals are expected to significantly increase their employment shares and benefit from above average growth. Most other occupations will have constant or falling job shares.
- Modest job losses are projected to be experienced in administrative, clerical & secretarial occupations.

Shift share analysis

Table 4.14.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In retailing, the industry effect has played a major part in increasing employment for

many occupations. The industry effect was a very significant positive factor accounting for a 10 per cent increase in employment across the board in the period 1987-97. The industry effect moderated in 1997-2007, and it is not expected to be very significant in the projection period (2007-2017).

Professional occupations, associate professional occupations and most especially personal service occupations are projected to benefit from strong occupational effects over the period to 2017. In contrast, these result in significant job losses for administrative & clerical, skilled trades and elementary occupations.

Replacement demands

Table 4.14.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

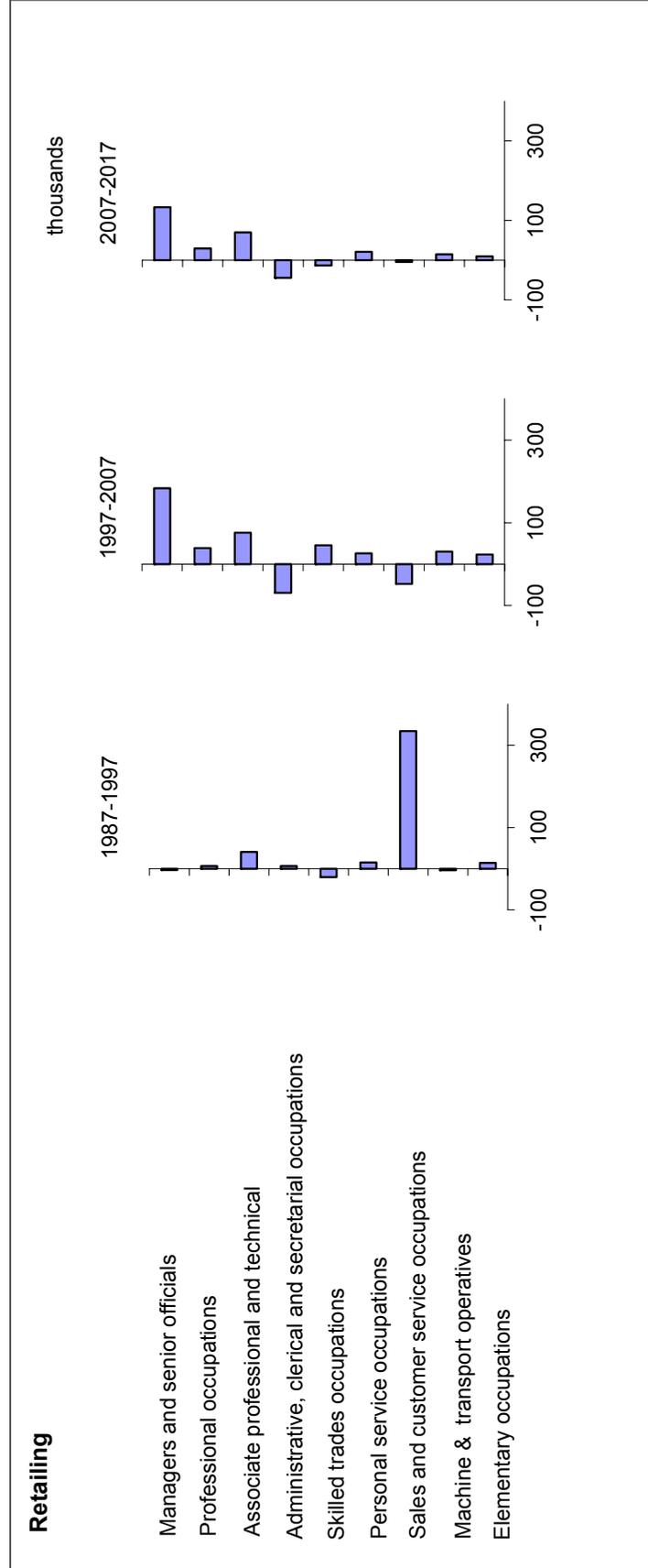
- The 200 thousand expansion demand projected between 2007 and 2017 is rendered comparatively small by replacement demands which are almost 6 times as large.
- Sales & customer service occupations alone will need well over 400 thousand people to replace those leaving the workforce. Managers & senior officials have replacement needs of 200 thousand, while administrative, clerical & secretarial occupations and elementary occupations each have replacement demands of well over 100 thousand.
- Substantial total requirements are also projected for most other occupations.

Table 4.14.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Retailing distribution nes Employment Levels (000s)	2007-2017						Total Requirement
	1987	1997	2007	2012	2017	Net Change	
1. Managers & Senior Officials	358	354	538	606	671	133	202
2. Professional Occupations	54	60	99	113	129	29	36
3. Associate Professional & Technical Occupation	150	191	267	301	337	70	94
4. Administrative, Clerical & Secretarial Occupation	368	374	305	281	261	-44	131
5. Skilled Trades Occupations	222	202	247	238	234	-13	83
6. Personal Service Occupations	56	71	97	112	118	21	39
7. Sales & Customer Service Occupations	806	1,141	1,093	1,085	1,089	-5	415
8. Machine & Transport Operatives	143	139	170	174	184	14	62
9. Elementary Occupations	288	302	325	328	335	9	125
Total	2,444	2,834	3,142	3,239	3,356	214	1,187
Percentage Shares	1987	1997	2007	2012	2017		Percentage Changes
1. Managers & Senior Officials	14.6	12.5	17.1	18.7	20.0	24.8	37.6
2. Professional Occupations	2.2	2.1	3.2	3.5	3.8	29.2	36.2
3. Associate Professional & Technical Occupation	6.2	6.7	8.5	9.3	10.0	26.1	35.3
4. Administrative, Clerical & Secretarial Occupation	15.0	13.2	9.7	8.7	7.8	-14.6	43.0
5. Skilled Trades Occupations	9.1	7.1	7.9	7.4	7.0	-5.4	33.7
6. Personal Service Occupations	2.3	2.5	3.1	3.4	3.5	21.5	40.5
7. Sales & Customer Service Occupations	33.0	40.3	34.8	33.5	32.4	-0.4	37.9
8. Machine & Transport Operatives	5.9	4.9	5.4	5.4	5.5	8.5	36.2
9. Elementary Occupations	11.8	10.6	10.4	10.1	10.0	2.9	38.4
Total	100.0	100.0	100.0	100.0	100.0	6.8	37.8

Source: CE/IER estimates, MDM95 C51F8A Forecast, 25UK.xls (Table 6.x.3).

Figure 4.14.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25JK.xls (figure 6.x.4).

4.15 HOTELS & RESTAURANTS

4.15.1 Description of the industry

INDUSTRY 15: HOTELS & RESTAURANTS		
SIC2003 headings: 55		
Hotels: licensed/unlicensed hotels, motels and guest houses, other tourist or short-stay accommodation (incl. camping and caravan sites, holiday camps and conference centres). Catering: licensed and unlicensed eating places, including take-aways; public houses and bars; night clubs, including residential clubs; canteens; contract catering for airlines, corporate hospitality, weddings etc.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	3.4	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	1,989,000	31,234,000
Share of total employment (% 2007):	6.4	100
Gender split (male:female) (% 2007):	44:56	53:47
Part-time share (% 2007):	52	28
Self-employment share (% 2007):	7	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.15.2 Industry Commentary

Hotels & restaurants, because of its great dependence on tourism, is particularly vulnerable to seasonal trends, fashion and currency movements. Furthermore, unexpected crises in other sectors of the economy can affect activity in Hotels & Restaurants, as seen in 2001 during the foot-and-mouth epidemic in the UK, the aftermath of 9/11, and after the terrorist attacks in July 2005. The closing of parts of the countryside during the foot-and-mouth epidemic led to severe reductions in tourist numbers throughout the country and did great harm to the business of hotels and restaurants. However, visitor numbers recovered quickly after 9/11 and the July 2005 bombings. The industry is also influenced by the growing use of on-line booking of hotels.

The huge US hotel chains still dominate the market and continue to grow through

merger and acquisition (M&A) activity. Few UK and European groups are truly pan-European, although some UK-owned hotel chains are expanding, mostly through acquisitions beyond the national border. Hoteliers are increasingly conscious of the need to pool resources, by such means as centralised reservation systems, grouped marketing and quality-enhancement initiatives, in order to compete effectively with the large US companies. They are choosing to expand by means of integrated chains and franchising rather than by direct ownership, in part because of the reduction in banks' involvement in property markets, and the scarcity of land in many of Europe's key cities.

A complete smoking ban in public places is now in force in all countries of the UK. In July 2007 a complete ban on smoking in enclosed public spaces came into effect in England, three months after a similar

ban was introduced in Wales and Northern Ireland and 16 months later than the ban in Scotland. This means it is no longer permitted to smoke in the country's bars, pubs, restaurants and hotels (except for designated smoking guestrooms and similar areas).

As a result of the increases in food prices, many UK restaurants and pubs have been raising their menu prices, while some restaurants are considering switching to cheaper ingredients to avoid 'menu inflation'.

After a slowdown due to the financial crisis, Hotels & Catering can expect a boost in the long term from the London Olympic Games. Employment growth is forecast to substantially lag behind the

output growth. Pubs and bars in England are expected to slowly recover from the recently introduced smoking ban, as they have in Scotland.

In the long term, output growth is expected to pick up on average to around 2 per cent per annum. This is partly due to the 2012 London Olympic and Paralympic Games, which are expected to be attended by 9.5m spectators, boosting the hotels, restaurants, bars and pubs sub-sectors. Productivity growth is forecast to decrease to a low 1 per cent per annum over the medium term, while employment growth is also forecast to remain relatively low over the same period.

4.15.3 Productivity and Output Trends

Table 4.15.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	2.9	4.8	2.1	1.8
Employment (% pa)	1.5	1.2	1.1	0.9
(000s)	134	112	111	100
Productivity (% pa)	1.4	3.6	1.0	0.9

Source: 6725output.xls (Figure 6.x.1)

- Output trends have continued to be quite positive, despite some adverse effects on tourist visits to the UK in recent years.
- Over the medium term, this trend is projected to be maintained, albeit at rather more modest rates of growth.
- Over much of the 1980s and 1990s, productivity levels were flat but some improvements were observed in recent years as attempts to cut costs and look for savings in personnel, in what is a quite labour intensive activity, bore fruit.
- A more modest rate of 1 per cent per annum is expected in productivity growth for the decade to 2017.
- The net impact on the growth in employment levels is that they are expected to slow somewhat although significant increases are still expected, amounting to over 200 thousand extra jobs by 2017.

4.15.4 Employment by Status and Gender

In this industry females currently account for the majority of employment.

Well over half the jobs in the industry are also part-time.

Self employment accounts for only a relatively small and declining share of employment (around 7 per cent).

A slight reduction in the female share of employment is projected. However, gender shares are expected to remain broadly stable.

Continuing a period of long-term decline, self employment shares are projected to weaken slightly.

Full-time employees are expected to increase their employment shares.

Table 4.15.2: Employment Levels by Gender and Status, Hotels & restaurants

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	430	(21.6)	374	(18.8)	80	(4)	884	(44.5)	44	56	-5	95
Female employment	378	(19)	661	(33.2)	66	(3.3)	1,105	(55.5)	28	-7	-5	16
Total employment	808	(40.6)	1,035	(52)	146	(7.3)	1,989	(100)	72	49	-10	111
2012									2012-2017			
Male employment	474	(22.6)	430	(20.5)	75	(3.6)	979	(46.6)	43	57	-7	93
Female employment	406	(19.3)	654	(31.1)	61	(2.9)	1,121	(53.4)	27	-15	-4	7
Total employment	880	(41.9)	1,084	(51.6)	136	(6.5)	2,100	(100)	69	42	-11	100
2017									2007-2017			
Male employment	517	(23.5)	487	(22.1)	68	(3.1)	1,072	(48.7)	87	113	-12	188
Female employment	433	(19.7)	639	(29)	57	(2.6)	1,128	(51.3)	54	-22	-9	23
Total employment	950	(43.2)	1,126	(51.2)	125	(5.7)	2,200	(100)	141	91	-21	211

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.15.5 Projections of Employment by Occupation

Key Aspects of Occupational Structure

- Two groups dominate employment in this sector, managers & senior officials at one end of the job spectrum and, at the other, elementary occupations. Each account for around 30 per cent or more of employment.
- Skilled trades are the next most important occupational category. They account for just over 10 per cent of all jobs.

Future changes

- These patterns are not likely to change much over the next decade. All groups are expected to have employment increases, except administrative, clerical & secretarial occupations, and skilled trades.
- Previous upward trends in the share of the managers group are projected to cease and level out.
- Elementary occupations are also expected to flatten out, following a historical pattern of declining shares.
- One of the beneficiaries of restructuring in this industry is personal service occupations, where strong future growth is projected.

Shift share analysis

Table 4.15.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

The industry effect has played a major part in expanding employment for many occupations in this industry as with many other service industries. In the period 1987-97, the industry effect was around 14 per cent, falling to just under 4 per cent in 1997-2007. The industry effect is projected to continue at a similar rate over the projection period.

The most significant occupational effect over 2007-17, is an almost 30 per cent increase for personal service occupations.

Replacement demands

Table 4.15.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

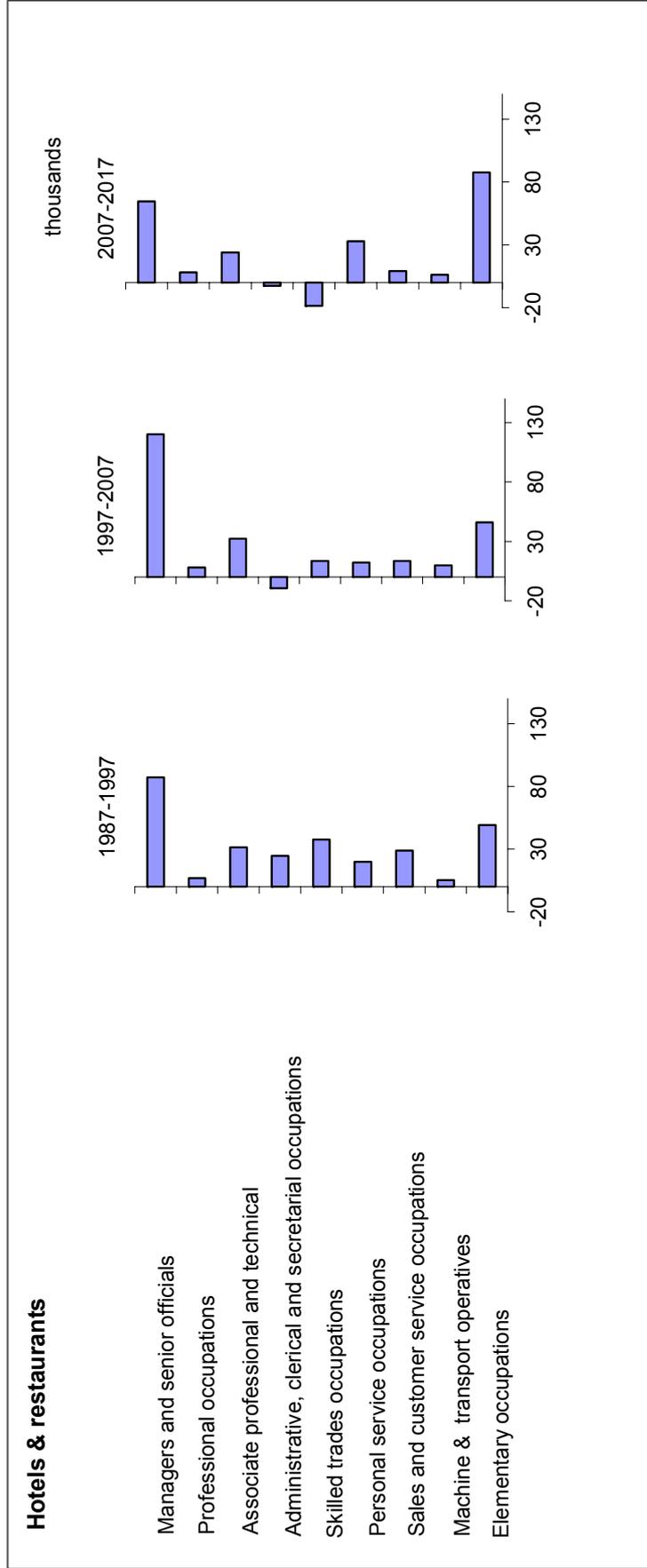
- There will be significant, replacement demand needs for all occupations, in addition to new demand-driven employment growth.
- It is estimated that around 770 new workers will be needed to replace existing personnel over the next 10 years.
- By far the largest increases are in the elementary occupations and the managers & senior officials groups. In terms of education and training needs, these present some markedly different challenges.
- Over the next 10 years, all other occupations will also require significant proportions of the current workforce to be replaced.

Table 4.15.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Hotels and catering Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	359	446	566	591	630	65	212	277
2. Professional Occupations	14	21	29	33	38	8	11	19
3. Associate Professional & Technical Occupation:	44	76	108	119	132	24	37	60
4. Administrative, Clerical & Secretarial Occupation:	100	124	115	111	112	-3	48	45
5. Skilled Trades Occupations	155	192	206	202	187	-19	78	60
6. Personal Service Occupations	54	74	86	105	119	33	35	68
7. Sales & Customer Service Occupations	55	84	98	101	107	9	35	44
8. Machine & Transport Operatives	23	29	38	42	45	6	14	20
9. Elementary Occupations	648	697	743	798	831	88	304	392
Total	1,452	1,743	1,989	2,100	2,200	211	774	985
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	24.7	25.6	28.4	28.1	28.6	11.4	37.5	48.9
2. Professional Occupations	1.0	1.2	1.5	1.6	1.7	27.6	37.6	65.2
3. Associate Professional & Technical Occupation:	3.0	4.3	5.4	5.6	6.0	22.1	33.9	56.0
4. Administrative, Clerical & Secretarial Occupation:	6.9	7.1	5.8	5.3	5.1	-2.4	41.7	39.3
5. Skilled Trades Occupations	10.6	11.0	10.3	9.6	8.5	-9.0	38.0	28.9
6. Personal Service Occupations	3.7	4.2	4.3	5.0	5.4	38.2	40.9	79.1
7. Sales & Customer Service Occupations	3.8	4.8	4.9	4.8	4.9	9.4	36.1	45.5
8. Machine & Transport Operatives	1.6	1.6	1.9	2.0	2.0	16.1	36.3	52.4
9. Elementary Occupations	44.6	40.0	37.4	38.0	37.8	11.8	40.9	52.7
Total	100.0	100.0	100.0	100.0	100.0	10.6	38.9	49.5

Source: CE/IER estimates, CE projections MIDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.15.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.15.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	87	21	50	15	47	16	120	47	57	65	35	25	4	4	25	65	35	4
2. Professional Occupations	7	1	2	4	2	1	8	2	5	8	2	1	5	1	1	8	2	5
3. Associate Professional & Technical Occupations	32	3	6	23	8	3	32	8	22	24	7	5	12	5	12	24	7	12
4. Administrative, Clerical & Secretarial Occupations	25	6	14	5	13	4	-9	13	-27	-3	7	5	-15	5	-15	-3	7	5
5. Skilled Trades Occupations	38	9	22	7	20	7	14	20	-14	-19	13	9	-40	9	-40	-19	13	9
6. Personal Service Occupations	20	3	8	9	8	3	12	8	2	33	5	4	24	4	24	33	5	4
7. Sales & Customer Service Occupations	29	3	8	18	9	3	14	9	2	9	6	4	-1	4	-1	9	6	4
8. Machine & Transport Operatives	5	1	3	1	3	1	10	3	6	6	2	2	2	2	2	6	2	2
9. Elementary Occupations	49	39	91	-81	74	24	46	74	-53	88	46	32	9	9	32	88	46	9
Total	291	86	204	0	186	61	246	186	0	211	124	87	0	87	211	124	87	0
				% change	% change	% change	% change	% change	% change	% change	% change	% change	% change	% change	% change	% change	% change	% change
1. Managers & Senior Officials	24.3	6.0	14.1	4.3	10.7	3.5	26.9	10.7	12.8	11.4	6.2	4.4	0.8	4.4	11.4	6.2	4.4	0.8
2. Professional Occupations	47.6	6.0	14.1	27.6	10.7	3.5	38.2	10.7	24.0	27.6	6.2	4.4	17.0	4.4	27.6	6.2	4.4	17.0
3. Associate Professional & Technical Occupations	71.4	6.0	14.1	51.4	10.7	3.5	42.8	10.7	28.6	22.1	6.2	4.4	11.5	4.4	22.1	6.2	4.4	11.5
4. Administrative, Clerical & Secretarial Occupations	24.6	6.0	14.1	4.6	10.7	3.5	-7.6	10.7	-21.7	-2.4	6.2	4.4	-13.0	4.4	-2.4	6.2	4.4	-13.0
5. Skilled Trades Occupations	24.3	6.0	14.1	4.3	10.7	3.5	7.0	10.7	-7.1	-9.0	6.2	4.4	-19.6	4.4	-9.0	6.2	4.4	-19.6
6. Personal Service Occupations	36.9	6.0	14.1	16.9	10.7	3.5	16.8	10.7	2.6	38.2	6.2	4.4	27.6	4.4	38.2	6.2	4.4	27.6
7. Sales & Customer Service Occupations	51.6	6.0	14.1	31.6	10.7	3.5	16.1	10.7	1.9	9.4	6.2	4.4	-1.2	4.4	9.4	6.2	4.4	-1.2
8. Machine & Transport Operatives	22.8	6.0	14.1	2.8	10.7	3.5	34.7	10.7	20.6	16.1	6.2	4.4	5.5	4.4	16.1	6.2	4.4	5.5
9. Elementary Occupations	7.6	6.0	14.1	-12.4	10.7	3.5	6.6	10.7	-7.5	11.8	6.2	4.4	1.2	4.4	11.8	6.2	4.4	1.2
Total	20.0	6.0	14.1	0.0	10.7	3.5	14.1	10.7	0.0	10.6	6.2	4.4	0.0	4.4	10.6	6.2	4.4	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.16 TRANSPORT

4.16.1 Description of the industry

INDUSTRY 16: TRANSPORT		
SIC2003 headings: 60.1, 60.2, 60.3, 61, 62, 63		
<p>This sector includes: Passenger and freight transport by inter-city and inter-urban railways; Operation of tramways and underground or elevated railways; Sea and coastal water transport of passengers and freight; Inland water transport of passengers and freight; Cargo handling, harbour operation and other auxiliary activities; Transport of passengers or freight by air or via space, including scheduled and non-scheduled (e.g. charter) services; The operation of terminal facilities, cargo handling, etc; Supporting and auxiliary transport activities, including cargo handling, storage and warehousing; Operation of terminal facilities such as railway stations, bus stations, parking lots or garages, harbours and piers, navigations, pilotage and berthing, airports and air traffic control; Activities of travel agencies and tour operators, and other transport agencies such as freight forwarding, customs agents.</p>		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	5.2	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	1,346,000	31,234,000
Share of total employment (% 2007):	4.3	100
Gender split (male:female) (% 2007):	76:24	53:47
Part-time share (% 2007):	12	28
Self-employment share (% 2007):	19	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.16.2 Industry Commentary

Land Transport & Auxiliary Services comprises all types of commercial land transport and supporting facilities. It is divided into Rail Transport and Other Land Transport, but it does not include the most used mode of passenger transport and the main competitor to rail and bus/coach transport, the private car. Transport by private car is not, normally, a commercial and revenue-earning industry.

It is no less important on account of the contribution it makes to other industries through freight, commuter, business and leisure transport. Because of its role in commuter and freight transport, rail

transport, although it contributes only 6% of the total output of Land Transport & Auxiliary Services, is a crucial industry to the wider economy.

Since the mid-1990s the strongest growth in demand for land transport in the UK has been for rail transport, and for bus transport in London.

In the UK freight market, road transport dominates, but rail's share has increased a little over the past ten years. The UK has a large number of long-distance coach operators, but most local bus services are in the control of five companies. Almost all

of the UK's major airports are now owned by infrastructure and property groups. Most of the UK's larger seaports are owned by property groups and financial consortia.

Land Transport and Auxiliary Services output growth is expected to grow at the same rate as the wider economy. There are three key reasons for this: first, the industry definition covers a broad range of economic activity; second, Land Transport is a facilitating industry and as such is both dependent on and crucial for economic growth; third, Auxiliary Services such as tour operators and travel agents provide income-elastic services and will grow when the economy is prosperous and decline when the economy is contracting.

In the long term, buoyant levels of sustained structural investment (growth of over 4 per cent per annum) are projected from both central government and the private sector. This should underpin moderate to strong output growth: output growth of between 2 per annum and 2½ per cent per annum over the decade. Long term employment growth is forecast to be modest. Both aspects of the industry (Land Transport and Auxiliary Services) are expected to restructure towards automated systems where possible (for example automated check-ins in airports and the London Underground's Oyster card) and this, coupled with consolidating merger and acquisition activity in the sector, will restrict employment growth and increase labour productivity in the long term.

UK Water Transport is dominated by the carriage of bulk goods through the northern ports and containerised traffic through the southern ports. More people still travel between the UK and France by sea than by air. Water transport is a small industry of great economic and social importance in the UK. While the tonnage of UK-owned and UK-registered ships has increased sharply in recent years, the ultimate ownership of UK container shipping companies is in foreign hands

The shipping industry is projected to experience a long-term decline in the number of UK seafarers, particularly officers. In the long run, industry output is set to grow by around 1½ per cent per annum.

The UK air transport industry is dominated by a small number of airlines. During the past decade, the UK air transport industry has changed tremendously in terms of its structure. The biggest change was the introduction of the low-cost airline sector in the mid-1990s which now dominates the short-haul airline market. However, there has also been considerable consolidation in the air transport industry. Various issues such as increasing security concerns, environmental pressures, rising oil prices, limited airport infrastructure, and increasing openness in the airline market have encouraged mergers and acquisitions and other forms of consolidation between airlines. The charter airlines have also been restructuring and consolidating, and some have entered the low-cost sector. In recent years, long-haul all-business class services have been introduced in the UK, while low-cost airlines are expanding their route networks beyond Europe. Since the mid-1990s budget airlines have become the fastest-growing segment of the air passenger industry in Europe.

Air transport output is forecast to grow substantially as result of strong demand from the Asian market and liberalisation. In the long run, output in the UK air transport industry is expected to continue to grow at a fast pace. However, the positive impact of liberalisation policies is likely to be offset by the fierce competition that it will bring. Growth in the low-cost airline market is expected to slow down as the market is moving toward maturity. Many airports are expected to reach their full capacity and consequently there will be less room for expansion. Strong investment growth in the UK air transport industry is expected as airlines try to find alternative routes for expansion, for example, by purchasing bigger and more efficient aircraft.

4.16.3 Productivity and Output Trends

Table 4.16.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	3.7	3.8	1.8	1.9
Employment (% pa)	1.6	1.3	0.3	0.5
(000s)	94	84	23	37
Productivity (% pa)	2.1	2.4	1.4	1.4

Source: 6725output.xls (Figure 6.x.1)

- For many years, output trends have been positive in this industry. More recently, this has slowed somewhat as a consequence of the kinds of problems outlined above. With projected output growth of 1½-2 per cent per annum. This more modest rate of increase is expected to continue over the next decade.
- Productivity growth was also very strong when output was rising rapidly, but recent events have resulted in a much slower rate of increase. Growth is expected to pick up to around 1-1½ per cent per annum over the next decade.
- As a consequence, only very modest increases in employment are projected, with overall levels growing by about 60 thousand jobs over the decade to 2017.

4.16.4 Employment by Status and Gender

Women currently account for about a quarter of all jobs in this industry.

Part-time employment remains quite low compared to many other service industries.

Self employment is very significant, particularly in the road transport sector. This accounts for almost 1 in 5 of all jobs for the industry as a whole.

Women are expected to increase their share of employment substantially. This is

on the basis of a continuation of recent trends.

Females will approach a third of the total number of jobs by 2017.

Self employment will continue to be important in some parts of the industry, however, the projections suggest that its overall share is expected to decline slightly.

Recent positive trends in the share of part-time employment are projected to continue. The presence of more women in the industry will help to encourage such a trend.

Table 4.16.2: Employment Levels by Gender and Status, Transport

Employment by gender	Changes in Employment Status (000s)											
	Full time		Part time		Self employed		Total		FT	PT	SE	Total
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)				
2007									2007-2012			
Male employment	717	(53.3)	73	(5.5)	228	(16.9)	1,019	(75.7)	-44	23	-3	-24
Female employment	210	(15.6)	90	(6.7)	27	(2)	327	(24.3)	20	29	-1	47
Total employment	927	(68.9)	163	(12.1)	255	(19)	1,346	(100)	-24	52	-4	23
2012									2012-2017			
Male employment	673	(49.2)	97	(7)	225	(16.4)	995	(72.6)	-40	25	-1	-15
Female employment	230	(16.8)	119	(8.7)	26	(1.9)	375	(27.4)	22	31	-1	52
Total employment	903	(65.9)	215	(15.7)	251	(18.4)	1,370	(100)	-18	56	-2	37
2017									2007-2017			
Male employment	634	(45.1)	121	(8.6)	225	(16)	979	(69.6)	-84	48	-3	-39
Female employment	252	(17.9)	150	(10.6)	25	(1.8)	427	(30.4)	42	60	-2	99
Total employment	885	(63)	271	(19.3)	250	(17.8)	1,406	(100)	-42	108	-5	60

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.16.5 Projections of Employment by Occupation

Key Aspects of Occupational Structure

- Machine & transport operatives (especially drivers) remain the largest occupational group in this industry, despite declines in their employment share over recent decades. In 2007, this group still accounted for over a quarter of all jobs.
- Other occupations such as administrative, clerical & secretarial, skilled trades and elementary occupations are also important, although the latter two groups have been declining in importance.
- Managers & senior officials today occupy more than 1 in 10 of the industry jobs.

Future Changes

- Changes in occupational structure inevitably will favour white collar groups such as managers, professionals and associate professionals. In contrast to the trends in most other sectors, administrative, clerical & secretarial occupations are also projected to have an increasing job share. However this increase is expected to moderate as the impact of technological change begins to offset compositional effects of changing industry mix within the industry group.
- Personal service occupations and sales & customer service occupations are projected to show small but significant increases. Against such growth, small but significant job losses are projected for skilled trades and transport drivers & machine operatives.

Shift share analysis

Table 4.16.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of

total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In Transport the industry effect was insignificant but negative over the period 1987-97. This turned into a slightly positive effect over the last decade but this is projected to turn slightly negative again over the next decade, accounting for a loss of just under 2 per hundred jobs across all occupations.

Occupational effects are generally positive but notable negative effects are projected for skilled trades, transport & machine operatives and elementary occupations over the projection period.

Replacement demands

Table 4.16.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

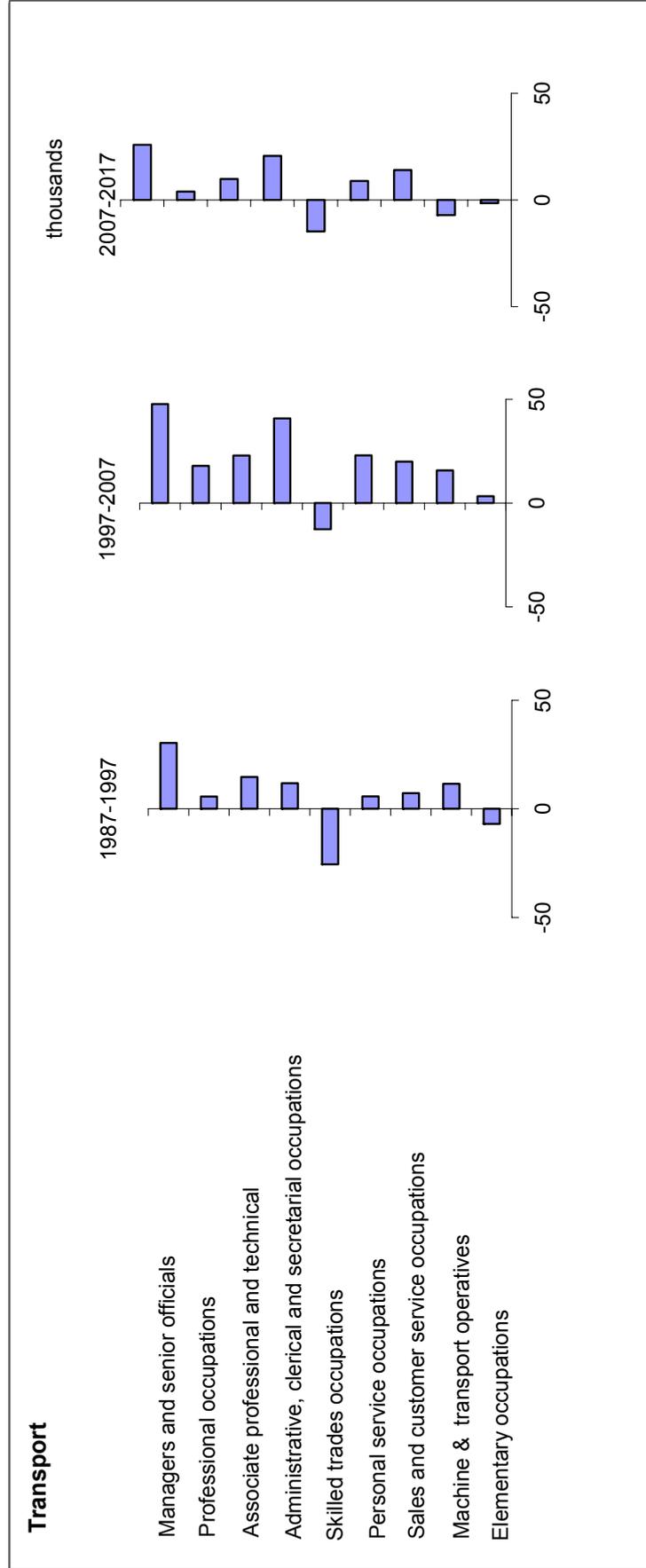
- Although only a modest increase in total employment is projected, once again, the need to replace those who will be leaving the current workforce will be very substantial. Replacement demands are projected to be almost 8 times as big as increases arising from expansion demands.
- Replacement demands over the next 10 years are estimated at well over 465 thousand in total. By far the largest figures are for transport & machine operatives, followed by administrative, clerical & secretarial occupations, elementary occupations and managers & senior officials.
- A substantial proportion of the current workforce will need to be replaced over the next decade in all other occupations. Typically these average around a third of current employment levels.

Table 4.16.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Transport and storage Employment Levels (000s)	1987					2007					2007-2017			Total Requirement
	1987	1997	2007	2012	2017	2007	2012	2017	2017	Net Change	Replacement Demands			
1. Managers & Senior Officials	86	116	164	176	190	164	176	190	190	26	57	83		
2. Professional Occupations	45	51	69	70	73	69	70	73	73	4	22	26		
3. Associate Professional & Technical Occupation	77	91	114	118	124	114	118	124	124	10	36	46		
4. Administrative, Clerical & Secretarial Occupation	142	154	195	209	215	195	209	215	215	21	78	98		
5. Skilled Trades Occupations	183	157	144	135	130	144	135	130	130	-15	45	30		
6. Personal Service Occupations	31	36	59	60	68	59	60	68	68	9	23	32		
7. Sales & Customer Service Occupations	17	24	44	51	58	44	51	58	58	14	14	28		
8. Machine & Transport Operatives	344	356	371	366	364	371	366	364	364	-7	131	124		
9. Elementary Occupations	190	183	186	184	185	186	184	185	185	-1	59	57		
Total	1,113	1,168	1,346	1,370	1,406	1,346	1,370	1,406	1,406	60	465	525		
Percentage Shares	1987	1997	2007	2012	2017	2007	2012	2017	2017	Percentage Changes				
1. Managers & Senior Officials	7.7	10.0	12.2	12.9	13.5	12.2	12.9	13.5	13.5	15.8	34.8	50.7		
2. Professional Occupations	4.1	4.3	5.1	5.1	5.2	5.1	5.1	5.2	5.2	5.7	31.9	37.6		
3. Associate Professional & Technical Occupation	6.9	7.8	8.5	8.6	8.8	8.5	8.6	8.8	8.8	8.6	31.8	40.4		
4. Administrative, Clerical & Secretarial Occupation	12.8	13.2	14.5	15.2	15.3	14.5	15.2	15.3	15.3	10.6	39.9	50.5		
5. Skilled Trades Occupations	16.4	13.4	10.7	9.9	9.2	10.7	9.9	9.2	9.2	-10.2	31.1	21.0		
6. Personal Service Occupations	2.8	3.1	4.4	4.4	4.9	4.4	4.4	4.9	4.9	15.1	38.0	53.1		
7. Sales & Customer Service Occupations	1.5	2.0	3.3	3.7	4.1	3.3	3.7	4.1	4.1	32.2	32.5	64.7		
8. Machine & Transport Operatives	30.9	30.4	27.6	26.7	25.9	27.6	26.7	25.9	25.9	-1.9	35.4	33.4		
9. Elementary Occupations	17.0	15.7	13.8	13.4	13.1	13.8	13.4	13.1	13.1	-0.8	31.6	30.8		
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	4.5	34.5	39.0		

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.16.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.16.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	30	5	-1	26	48	12	5	30	26	10	-3	19						
2. Professional Occupations	6	3	0	3	18	5	2	10	4	4	-1	1						
3. Associate Professional & Technical Occupations	15	5	-1	11	23	10	4	9	10	7	-2	5						
4. Administrative, Clerical & Secretarial Occupations	12	8	-2	5	41	16	7	17	21	12	-3	12						
5. Skilled Trades Occupations	-26	11	-2	-34	-13	17	7	-37	-15	9	-3	-21						
6. Personal Service Occupations	6	2	0	4	23	4	2	17	9	4	-1	6						
7. Sales & Customer Service Occupations	7	1	0	6	20	3	1	16	14	3	-1	12						
8. Machine & Transport Operatives	12	20	-4	-5	16	38	16	-39	-7	23	-7	-24						
9. Elementary Occupations	-7	11	-2	-16	3	19	8	-25	-1	12	-3	-10						
Total	54	66	-12	0	178	124	54	0	60	84	-24	0						

	1987-1997		1997-2007		2007-2017	
	total:	% change	total:	% change	total:	% change
1. Managers & Senior Officials	35.3	6.0	41.0	10.7	15.8	11.3
2. Professional Occupations	12.5	6.0	35.3	10.7	5.7	1.2
3. Associate Professional & Technical Occupations	19.1	6.0	25.0	10.7	8.6	4.1
4. Administrative, Clerical & Secretarial Occupations	8.3	6.0	26.5	10.7	10.6	6.1
5. Skilled Trades Occupations	-14.0	6.0	-8.1	10.7	-10.2	-14.7
6. Personal Service Occupations	18.7	6.0	63.1	10.7	15.1	10.6
7. Sales & Customer Service Occupations	43.4	6.0	83.6	10.7	32.2	27.7
8. Machine & Transport Operatives	3.4	6.0	4.4	10.7	-1.9	-6.4
9. Elementary Occupations	-3.7	6.0	1.8	10.7	-0.8	-5.2
Total	4.9	6.0	15.3	10.7	4.5	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3)

4.17 COMMUNICATIONS

4.17.1 Description of the Industry

INDUSTRY 17: COMMUNICATIONS		
SIC2003 headings: 64		
National post and courier activities, including collection, distribution and delivery of national and international mail and parcels. Telecommunications, including the transmission of sound, images, data or other information via cables, broadcasting, relay or satellite; this includes maintenance of the network and transmission of radio and television programmes.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	3.2	100
Exposure to International Trade:	medium	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	484,000	31,234,000
Share of total employment (% 2007):	1.6	100
Gender split (male:female) (% 2007):	75:25	53:47
Part-time share (% 2007):	15	28
Self-employment share (% 2007):	3	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.17.2 Industry Commentary

Communications is divided into the market for postal and courier services, and the market for telecommunications. In the UK the postal market is dominated by Royal Mail, which held its monopoly until 2006.

Royal Mail succeeded in returning to profit in advance of the opening-up of the postal market but must now do the same with its Post Office network.

Competitors such as UK Mail, DHL and TNT Post have begun to take work away from Royal Mail, but it will be several years before Royal Mail's share of the market falls to the level expected in a competitive market. In the UK, the Royal Mail employs around 185,000 and in 2006/07 it had a turnover of £9.2bn. In 2002/03 it initiated a three-year renewal plan to turn it into a profitable venture in its own right, in advance of the opening-up of the postal market. This appears to have succeeded

(it turned an operating loss of £318m in 2001-02 into an operating profit of £233m in 2006-07), and resulted in the loss of some 45,000 jobs across the Royal Mail group. More jobs will go between now and 2010, during the programme of branch closures across its Post Office network. The Post Office has struggled to keep up with changes in the marketplace and continues to make losses despite an annual subsidy of £150m. Around 2,500 branches are expected to close before 2010 in an attempt to return the network to profitability. Given that Royal Mail suggested that it could operate a viable network with 10,000 fewer branches than the 14,000 it had in 2006, further closures cannot be ruled out in the future, especially as competition intensifies.

The key sub-sectors in the telecoms market are fixed-line telephony, mobile telephony and the provision of internet access. Technological and regulatory developments are the main drivers of

growth in Communications Wireless computing has many different standards, but only a few can truly support genuinely mobile computing. More than half of all UK households now have internet connection, and broadband is already becoming commonplace. The switchover to digital TV has begun, and 85 per cent of UK homes now receive digital services.

BT continues to dominate fixed-line services in the UK, although the company's undertakings have seen the firm's share of the market fall. Vodafone remains the leading mobile network operator in the world, although in the UK other firms are providing strong competition. Although the UK postal market was opened up to free competition in 2006, Royal Mail still dominates. Strong output growth in the communications sector is expected combined with strong productivity growth fuelled by competition, regulation and convergence of technologies.

As firms in the postal market adapt to free competition, employment is expected to remain largely unchanged in the short term. This outcome will stem predominantly from efficiency and productivity drives, in particular in the postal sector as Royal Mail continues to try to cut costs in response to increased competition.

Firms in the telecommunications industry will face fierce competition in the largely saturated UK market, and so will need investment and innovation to gain market

share. The industry has already experienced a trend towards convergence of technologies, and it is these 'new wave' technologies that are likely to stimulate most growth. In addition, the new mobile roaming legislation passed by the EU Parliament in 2007 encouraging cross-border telecommunications is likely to play a positive role in the medium-term.

Over the long term, the projection is for strong annual growth in output for the 2007-2017 period of between 5¾ per cent per annum and 6 per cent per annum. Employment in the sector is expected to decline further, albeit at a modest rate, before stabilising. The long-term future for the industry is likely to be shaped by the responses to changing regulations, particularly in the postal market. In addition, firms in the telecommunications sub-sector will strive to find new ways of generating market share and will inject many resources into creating new ways of presenting existing technologies. The convergence of wireless computing and broadband, together with video services will become a key part of the industry and the area of greatest development. However, whether consumers accept these new packages remains to be seen; as the industry runs the risk of over-saturation. Productivity is expected to be the driving force behind growth, doubling between 2007 and 2017.

4.17.3 Productivity and Output Trends

Table 4.17.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	13.3	3.9	5.4	5.8
Employment (% pa)	4.4	-3.1	-0.5	-0.2
(000s)	109	-82	-12	-4
Productivity (% pa)	8.6	7.2	6.0	6.0

Source: 6725output.xls (Figure 6.x.1)

- In recent years, output in this industry has followed an almost exponential growth path. It has been one of the UK's fastest growing sectors. Output trends in this industry have slowed in the last 5 years or so, but are expected to pick up as the economy recovers. With projected average rates of increase of almost 6 per cent per annum it remains a high growth area.
- Although slowing in the last few years, productivity has also continued to grow rapidly. A fast rate of productivity increase is anticipated as further technological change takes place, and pressures to save cost grow. Productivity is projected to rise at a similar pace to the growth in output.
- Consequently the industry is not expected to see significant increases in employment. Rather a pattern of "jobless" growth, with very slight reductions in employment levels is expected.

4.17.4 Employment by Status and Gender

Females currently account for about a quarter of all jobs but this has been rising.

Representing about 15 per cent of all jobs, part-time employment is also important.

Comparatively speaking self employment remains trivial in numerical terms.

By 2017, females are expected to increase their share of employment, reaching about 31 per cent of the total.

Part-time employment is expected to increase in importance, by 2017, accounting for almost 1 in 5 jobs, by then.

The share of self employment is projected to remain unchanged and insignificant in numerical terms.

Table 4.17.2: Employment Levels by Gender and Status, Communications

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	320	(66)	35	(7.2)	6	(1.3)	361	(74.5)	-21	-1	0	-22
Female employment	78	(16.2)	39	(8.1)	6	(1.2)	123	(25.5)	4	6	0	10
Total employment	398	(82.1)	74	(15.3)	12	(2.5)	484	(100)	-17	5	0	-12
2012									2012-2017			
Male employment	299	(63.2)	34	(7.2)	6	(1.4)	339	(71.8)	-16	0	0	-16
Female employment	82	(17.4)	45	(9.6)	6	(1.2)	133	(28.2)	5	7	0	12
Total employment	381	(80.6)	80	(16.8)	12	(2.6)	473	(100)	-11	7	0	-4
2017									2007-2017			
Male employment	282	(60.3)	34	(7.3)	7	(1.4)	323	(69)	-37	-1	0	-38
Female employment	87	(18.7)	52	(11.1)	6	(1.2)	145	(31)	9	13	0	22
Total employment	370	(79)	86	(18.4)	12	(2.6)	468	(100)	-28	12	0	-16

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.17.5 Projections of Employment by Occupation

Key Aspects of Occupational Structure

- Currently employment in this industry is concentrated in four main occupations:
 - administrative, clerical & secretarial;
 - skilled trades;
 - machine & transport operatives;
 - elementary occupations.
- These patterns largely reflect the dominance of the postal and deliveries side of the industry, as opposed to tele-communications.
- All but the first of these occupations have seen their employment shares decline in recent years, as those of the white collar occupations have risen.

Future Changes

- As the industry continues to restructure, reductions in employment in skilled trades and elementary occupations are projected, especially in postal services.
- These are expected to be offset by small job gains in the administrative, clerical & secretarial category, as well as for managerial, and especially sales & customer service occupations. Elsewhere employment changes are likely to be quite tiny.

Shift share analysis

Table 4.17.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In communications there was a negative industry effect of around -5 per cent in the

period 1987-97. This negative effect continued over the past decade. This negative effect is expected to double to -10 per cent over the next decade, as technological change and restructuring continue to bear down on employment levels.

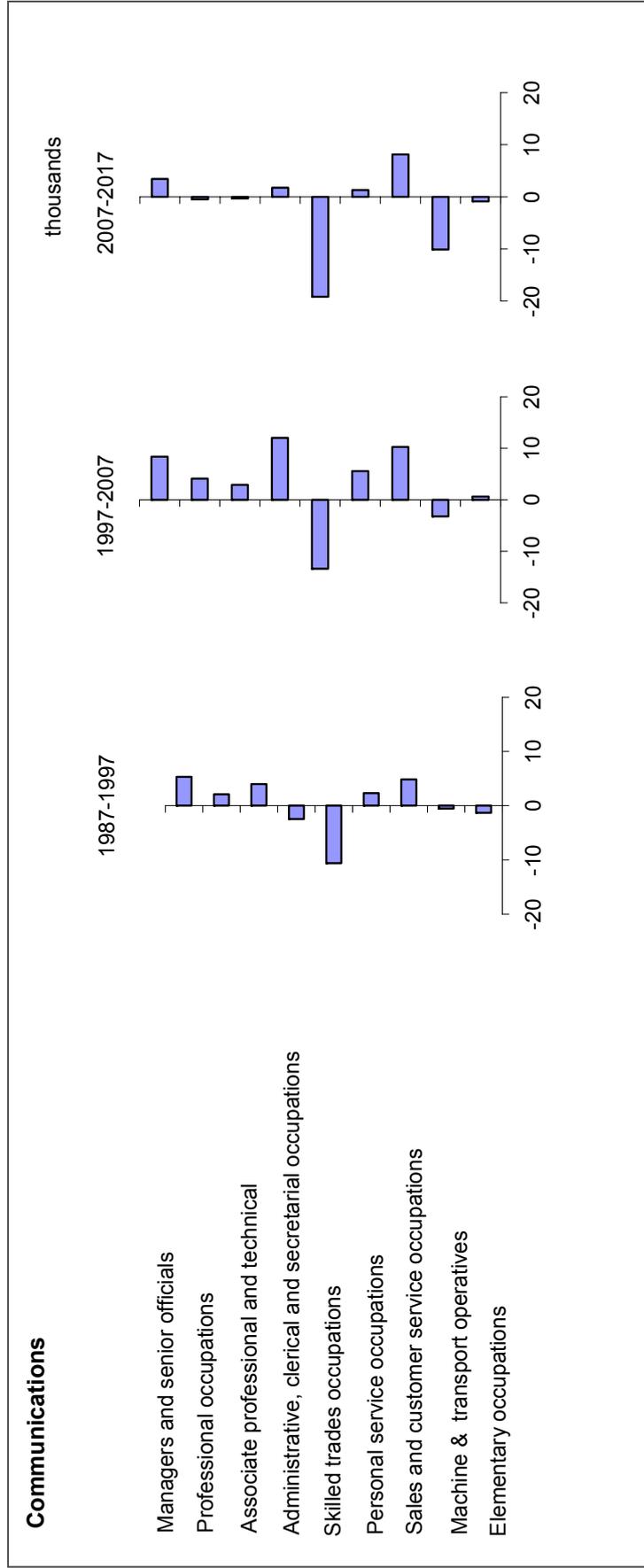
Over the projection period occupational effects are generally positive, the main exception being skilled trades and, to a lesser extent, machine & transport operatives.

Replacement demands

Table 4.17.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

- Despite the expectation of slight reductions in total employment there will be significant replacement needs to be met, especially in the postal delivery service, with its ageing workforce.
- These replacement needs are predominantly concentrated in the four occupations highlighted above. A total replacement demand of some 165 thousand workers is projected across the industry as whole.
- Total requirements in some of the newly emerging occupations such as the sales & customer service group show some of the highest rates of increase.

Figure 4.17.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.17.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s			
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	
1. Managers & Senior Officials	5	2	-1	5	3	-1	8	3	-1	7	3	2	3	2	-4	5	2	-4	5
2. Professional Occupations	2	1	-1	2	2	-1	4	2	-1	3	0	2	0	2	-2	0	2	-2	0
3. Associate Professional & Technical Occupations	4	1	-1	4	3	-1	3	3	-1	1	0	2	0	2	-3	1	2	-3	1
4. Administrative, Clerical & Secretarial Occupations	-2	5	-4	-3	12	9	12	9	-4	7	2	6	2	6	-9	5	6	-9	5
5. Skilled Trades Occupations	-11	7	-6	-12	11	-5	-13	11	-5	-19	-19	5	-19	5	-8	-16	5	-8	-16
6. Personal Service Occupations	2	0	0	2	1	0	6	1	0	5	1	1	1	1	-2	2	1	-2	2
7. Sales & Customer Service Occupations	5	1	-1	5	10	2	10	2	-1	9	8	2	8	2	-3	9	2	-3	9
8. Machine & Transport Operatives	-1	6	-5	-1	-3	10	-3	10	-5	-9	-10	6	-10	6	-9	-7	6	-9	-7
9. Elementary Occupations	-1	4	-4	-2	1	8	1	8	-3	-4	-1	4	-1	4	-7	2	4	-7	2
Total	4	27	-23	0	27	49	27	49	-21	0	-16	30	-16	30	-47	0	30	-47	0

	1987-1997			% change			1997-2007			% change			2007-2017			% change			
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	
1. Managers & Senior Officials	20.9	6.0	-5.1	20.1	10.7	-4.7	27.3	10.7	-4.7	21.3	8.8	6.2	8.8	6.2	-9.6	12.1	6.2	-9.6	12.1
2. Professional Occupations	11.1	6.0	-5.1	10.3	10.7	-4.7	19.5	10.7	-4.7	13.5	-1.9	6.2	-1.9	6.2	-9.6	1.5	6.2	-9.6	1.5
3. Associate Professional & Technical Occupations	16.8	6.0	-5.1	16.0	10.7	-4.7	10.4	10.7	-4.7	4.5	-1.1	6.2	-1.1	6.2	-9.6	2.3	6.2	-9.6	2.3
4. Administrative, Clerical & Secretarial Occupations	-2.9	6.0	-5.1	-3.7	14.5	-4.7	14.5	10.7	-4.7	8.5	1.8	6.2	1.8	6.2	-9.6	5.2	6.2	-9.6	5.2
5. Skilled Trades Occupations	-9.6	6.0	-5.1	-10.5	-13.5	-4.7	-13.5	10.7	-4.7	-19.4	-22.3	6.2	-22.3	6.2	-9.6	-18.9	6.2	-9.6	-18.9
6. Personal Service Occupations	29.2	6.0	-5.1	28.3	54.3	-4.7	54.3	10.7	-4.7	48.3	8.2	6.2	8.2	6.2	-9.6	11.6	6.2	-9.6	11.6
7. Sales & Customer Service Occupations	37.8	6.0	-5.1	37.0	58.0	-4.7	58.0	10.7	-4.7	52.0	29.1	6.2	29.1	6.2	-9.6	32.5	6.2	-9.6	32.5
8. Machine & Transport Operatives	-0.6	6.0	-5.1	-1.4	-3.3	-4.7	-3.3	10.7	-4.7	-9.3	-10.8	6.2	-10.8	6.2	-9.6	-7.5	6.2	-9.6	-7.5
9. Elementary Occupations	-1.8	6.0	-5.1	-2.6	0.9	-4.7	0.9	10.7	-4.7	-5.1	-1.3	6.2	-1.3	6.2	-9.6	2.1	6.2	-9.6	2.1
Total	0.8	6.0	-5.1	0.0	6.0	10.7	6.0	10.7	-4.7	0.0	-3.4	6.2	-3.4	6.2	-9.6	0.0	6.2	-9.6	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3)

4.18 FINANCIAL SERVICES

4.18.1 Description of the Industry

INDUSTRY 18: FINANCIAL SERVICES		
SIC2003 headings: 65, 66, 67		
Financial intermediation, other than for insurance and pension funding, including: central banking, banks, building societies, financial leasing, factoring, mortgage finance, investment and unit trusts, venture capital and financial intermediation not elsewhere specified. Insurance, including friendly societies, benevolent funds and Lloyd's underwriters, covering life insurance, pensions and non-life insurance. Activities auxiliary to financial intermediation, including administration of financial markets, broking of securities, insurance agents and brokers.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	9.8	100
Exposure to International Trade:	medium	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	1,107,000	31,234,000
Share of total employment (% 2007):	3.5	100
Gender split (male:female) (% 2007):	48:52	53:47
Part-time share (% 2007):	15	28
Self-employment share (% 2007):	6	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.18.2 Industry Commentary

This is the sector most directly affected by the fallout from the credit crunch. It includes banking and insurance and related activities. The Northern Rock crisis showed up several weaknesses in the UK banking system. These culminated in the massive interventions by the government to support the financial sector in the Autumn of 2008 following the global financial crisis that emerged as it became clear that the Northern Rock crash was just the tip of the iceberg.

A slowdown in output growth of the Banking & Finance sector was already built into the *Working Futures* projections, but the restructuring of the system is likely to lead to a much sharper downturn than originally anticipated, as the impact of the credit crunch continues to unwind.

Although a modest recovery can be anticipated over the medium term, the outlook is for only modest growth, at rates much lower than have been seen in recent years.

Employment growth is also expected to be altered as institutions adjust to the new reality after the sub-prime crisis. Productivity growth should hold up over the long term. This trend in productivity, along with more sober output growth, means employment growth is expected to be modest over the long term compared with historical trends.

The UK insurance industry is the largest in Europe and the third-largest in the world. The UK insurance industry comprises two main categories: general insurance such as motor, household and commercial insurance and long-term business such as

life insurance and pensions. This will also be affected by events in the financial market.

The UK insurance industry is now subject to greater regulatory scrutiny. The Pensions Act 2007 puts into law the reforms to the state pension system set out in the White Paper. The State Second Pension, also known as additional State Pension, was introduced to replace the old State Earnings Related Pension Scheme (SERPS). The State Second Pension is paid in addition to the Basic State Pension. People are allowed to combine contributions from earnings with national insurance credits in order to gain qualifying years of State Second Pension. The method of accrual has been changed so that by 2030 a simple, flat-rate, weekly top-up to the Basic State Pension will replace the current earning-related method.

Other factors that will affect the sector include the change in the state pension age for women which will increase gradually from after 2010 to 65 so that the state pension age for men and women will be the same by 2020. The state pension age will also rise for both men and women from 65 to 68 in stages between 2024 and 2046.

Pension and life insurance providers are using market segmentation to attract new customers. Sales of Self-Invested Personal Pensions have increased substantially in the UK. Severe flooding in

the UK in Summer 2007 highlighted the exposure of the insurance industry to natural disasters. The flooding in the UK in summer 2007 has pushed up premiums in several types of insurance. The number of 'green' insurance policies is likely to rise. The Association of British Insurers has launched a financial inclusion action plan directed at the 35 per cent of people in low-income households.

The major source of growth in the insurance industry comes from long-term business (pensions and life insurance), which accounts for around three-quarters of total net premiums written. This business was boosted by the introduction of the new pensions rules in April 2006.

In the long run, output in the insurance industry is expected to grow in line with the UK average at around 2¼-2½ per cent per annum. Continuing increases in internet sales, product diversification and higher premiums are among the reasons for the steady output growth forecast.

Since 2000 the insurance industry has experienced several years of declining employment, as several firms shed labour to cut costs. The employment level in 2007 was lower than the levels during the 1990s. In the long run, employment in the insurance industry is expected to grow a little, by around ½ per cent per annum.

4.18.3 Productivity and Output Trends

Table 4.18.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	3.7	7.8	3.0	2.7
Employment (% pa)	1.5	-1.0	0.9	0.6
(000s)	81	-57	53	36
Productivity (% pa)	2.2	8.8	2.0	2.1

Source: 6725output.xls (Figure 6.x.1)

- For many years, output in this industry has been growing strongly. Growth has continued at around 7-8 per cent per annum, over the period 2002-2007.
- This pace is projected to slow over the next decade but increases of around 2½-3 per cent per annum are still expected.
- Productivity growth has followed a similar path to output. It is projected to slow significantly over the next 10 years but to remain above 2 per cent per annum.
- As productivity improvements offset the expected output growth, future trends in employment are expected to remain fairly flat, with only modest increases to 2017 (a total of just under additional 100 thousand jobs over the decade to 2017).

4.18.4 Employment by Status and Gender

Employment in this industry is fairly even split between males and females, although many of the latter work only part-time.

More of the men are self employed but in total this only accounts for 1 in 20 of all jobs.

Part time working currently accounts for around 16 per cent of all jobs in total.

The gender mix of employment is not projected to change radically. The sector remains an attractive area of employment for females. They are expected to maintain their current share of just over half of all the jobs in the industry.

Self employment will remain a small part of total employment, but is projected to maintain its current share.

Part-time working is projected to increase its share of total employment continuing recent trends.

Table 4.18.2: Employment Levels by Gender and Status, Financial services

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	469	(42.3)	17	(1.6)	47	(4.2)	533	(48.1)	20	12	1	33
Female employment	404	(36.5)	154	(13.9)	16	(1.5)	574	(51.9)	-13	30	2	20
Total employment	873	(78.8)	171	(15.5)	63	(5.7)	1,107	(100)	8	42	3	53
2012									2012-2017			
Male employment	489	(42.2)	29	(2.5)	48	(4.1)	566	(48.8)	14	12	0	26
Female employment	391	(33.7)	185	(15.9)	18	(1.6)	594	(51.2)	-21	29	2	10
Total employment	880	(75.9)	214	(18.4)	66	(5.7)	1,160	(100)	-7	42	2	36
2017									2007-2017			
Male employment	503	(42)	41	(3.5)	48	(4)	592	(49.5)	34	24	1	59
Female employment	370	(31)	214	(17.9)	20	(1.7)	604	(50.5)	-34	60	4	30
Total employment	873	(73)	255	(21.3)	68	(5.7)	1,196	(100)	0	84	5	89

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.18.5 Projections of Employment by Occupation

Key Aspects of Occupational Structure

- Administrative, clerical & secretarial workers still accounted for some 40 per cent of all jobs in this industry in 2007, despite significant job losses over recent decades.
- Accounting for at least 1 in 8 jobs each, managerial and associate professional & technical occupations are also significant.

Future Changes

- As on-line banking services reduce the demand for front line staff, continued declines in the employment share of administrative, clerical & secretarial occupations are projected.
- These job losses are likely to be offset by small increases elsewhere for managers & senior officials and the associate professional occupations, and also sales & customer service occupations. Marketing activities have become increasingly important in this sector.

Shift share analysis

Table 4.18.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In Financial services, the industry effect played an insignificant role for the 1987-97 period. During the past decade, this changed dramatically into a negative effect as a result of continuing pressures

to rationalise and improve, cut costs, and improve productivity. The industry effect is projected to be slightly positive over the projection period.

Managers and professionals, as well as personal service occupations and sales and customer service occupations, are expected to benefit particularly from positive occupational effects. Administrative & clerical, skilled trades and machine & transport operatives and elementary occupations are projected to experience negative occupational effects.

Replacement demands

Table 4.18.3 presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

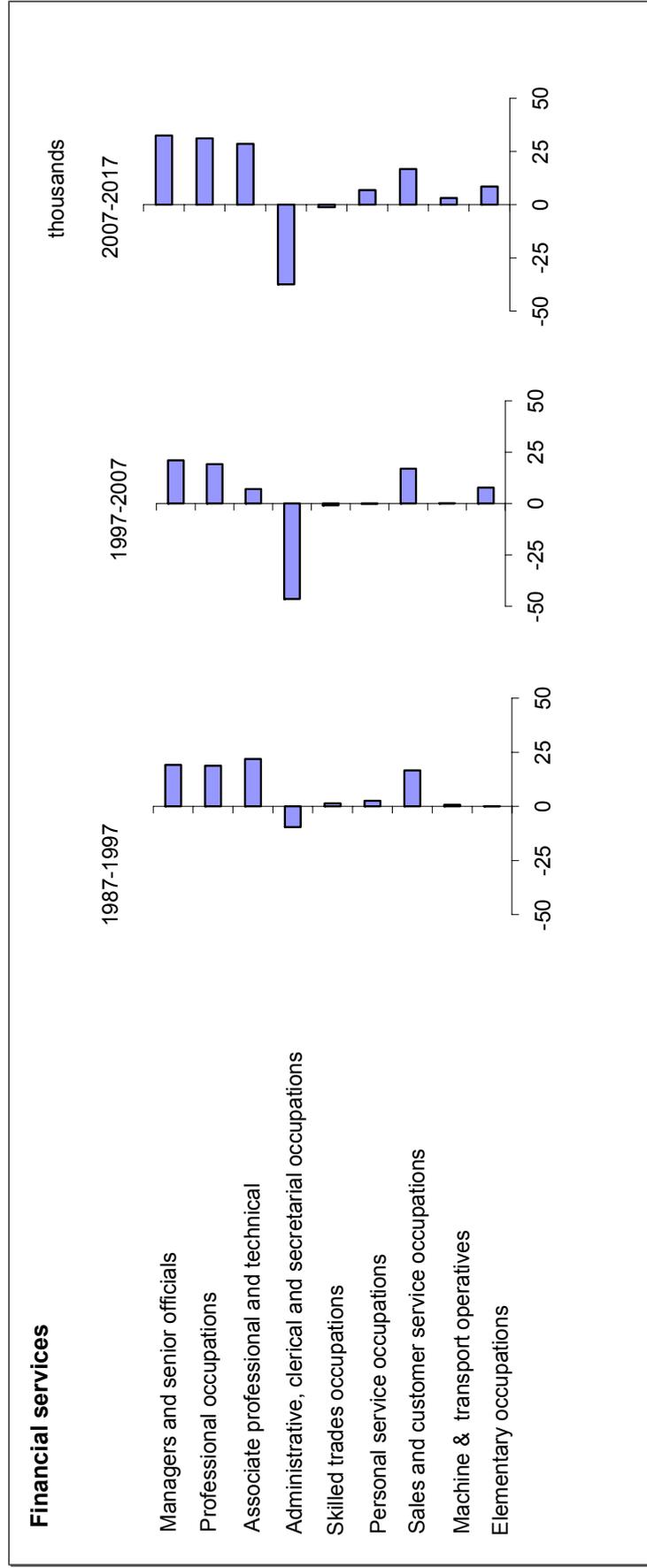
- Total replacement demands for the industry are well over 4 times the very modest scale of expansion demand.
- Replacement demands are dominated by the administrative, clerical & secretarial group which, although in decline, will account for almost half of all replacement needs.
- Between 2007 and 2017, the other occupational groups already highlighted make up most of the balance of more than 400 thousand job opening that will be needed to replace those retiring, etc.

Table 4.18.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Banking & insurance Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	125	144	165	180	198	33	59	91
2. Professional Occupations	69	88	107	122	138	31	37	68
3. Associate Professional & Technical Occupations	109	130	138	151	166	29	45	74
4. Administrative, Clerical & Secretarial Occupations	525	515	469	455	431	-37	191	153
5. Skilled Trades Occupations	32	33	32	32	31	-1	11	10
6. Personal Service Occupations	12	15	15	19	22	7	6	12
7. Sales & Customer Service Occupations	61	77	94	104	111	17	32	49
8. Machine & Transport Operatives	21	21	22	23	25	3	8	11
9. Elementary Occupations	59	59	66	73	75	9	25	33
Total	1,011	1,082	1,107	1,160	1,196	89	413	502
Percentage Shares	1987	1997	2007	2012	2017		Percentage Changes	
1. Managers & Senior Officials	12.4	13.3	14.9	15.5	16.5	19.7	35.6	55.3
2. Professional Occupations	6.8	8.1	9.6	10.5	11.5	29.3	34.3	63.6
3. Associate Professional & Technical Occupations	10.7	12.0	12.4	13.0	13.9	20.8	32.8	53.7
4. Administrative, Clerical & Secretarial Occupations	51.9	47.6	42.3	39.3	36.1	-8.0	40.7	32.7
5. Skilled Trades Occupations	3.1	3.1	2.9	2.8	2.6	-3.7	34.6	30.9
6. Personal Service Occupations	1.2	1.4	1.3	1.6	1.8	46.2	37.8	84.0
7. Sales & Customer Service Occupations	6.0	7.1	8.5	9.0	9.3	17.8	33.9	51.7
8. Machine & Transport Operatives	2.0	2.0	2.0	2.0	2.1	14.4	35.8	50.3
9. Elementary Occupations	5.8	5.4	6.0	6.3	6.3	12.8	37.5	50.4
Total	100.0	100.0	100.0	100.0	100.0	8.0	37.3	45.3

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.18.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.18.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	19	7	10	21	15	18	33	10	3	19	10	3	33	10	3	19	10	3
2. Professional Occupations	19	4	14	19	9	17	31	7	2	23	7	2	31	7	2	23	7	2
3. Associate Professional & Technical Occupations	22	6	14	7	14	4	29	9	2	18	9	2	29	9	2	18	9	2
4. Administrative, Clerical & Secretarial Occupations	-10	31	-47	-46	55	-58	-37	29	8	-75	29	8	-37	29	8	-75	29	8
5. Skilled Trades Occupations	1	2	-1	-1	4	-2	-1	2	1	-4	2	1	-1	2	1	-4	2	1
6. Personal Service Occupations	3	1	0	0	2	-1	7	1	0	6	1	0	7	1	0	6	1	0
7. Sales & Customer Service Occupations	17	4	12	17	8	15	17	6	2	9	6	2	17	6	2	9	6	2
8. Machine & Transport Operatives	1	1	-1	0	2	-2	3	1	0	1	1	0	3	1	0	1	1	0
9. Elementary Occupations	0	3	-4	8	6	-5	9	4	1	3	4	1	9	4	1	3	4	1
Total	72	60	12	25	115	-91	89	69	20	0	69	20	89	69	20	0	69	20
			% change			% change			% change			% change			% change			% change
1. Managers & Senior Officials	15.4	6.0	1.1	8.3	10.7	-8.4	19.7	6.2	1.8	11.7	6.2	1.8	19.7	6.2	1.8	11.7	6.2	1.8
2. Professional Occupations	27.3	6.0	1.1	20.2	10.7	-8.4	29.3	6.2	1.8	21.2	6.2	1.8	29.3	6.2	1.8	21.2	6.2	1.8
3. Associate Professional & Technical Occupations	20.2	6.0	1.1	13.1	10.7	-8.4	20.8	6.2	1.8	12.8	6.2	1.8	20.8	6.2	1.8	12.8	6.2	1.8
4. Administrative, Clerical & Secretarial Occupations	-1.8	6.0	1.1	-8.9	10.7	-8.4	-8.0	6.2	1.8	-16.0	6.2	1.8	-8.0	6.2	1.8	-16.0	6.2	1.8
5. Skilled Trades Occupations	4.4	6.0	1.1	-2.7	10.7	-8.4	-3.7	6.2	1.8	-11.8	6.2	1.8	-3.7	6.2	1.8	-11.8	6.2	1.8
6. Personal Service Occupations	21.2	6.0	1.1	14.1	10.7	-8.4	46.2	6.2	1.8	38.2	6.2	1.8	46.2	6.2	1.8	38.2	6.2	1.8
7. Sales & Customer Service Occupations	27.4	6.0	1.1	20.3	10.7	-8.4	17.8	6.2	1.8	9.8	6.2	1.8	17.8	6.2	1.8	9.8	6.2	1.8
8. Machine & Transport Operatives	3.5	6.0	1.1	-3.6	10.7	-8.4	14.4	6.2	1.8	6.4	6.2	1.8	14.4	6.2	1.8	6.4	6.2	1.8
9. Elementary Occupations	0.1	6.0	1.1	-7.0	10.7	-8.4	12.8	6.2	1.8	4.8	6.2	1.8	12.8	6.2	1.8	4.8	6.2	1.8
Total	7.1	6.0	1.1	0.0	10.7	-8.4	8.0	6.2	1.8	0.0	6.2	1.8	8.0	6.2	1.8	0.0	6.2	1.8

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.19 PROFESSIONAL SERVICES

4.19.1 Description of the industry

INDUSTRY 19: PROFESSIONAL SERVICES		
SIC2003 headings: 70, 71, 73		
Real estate activity, including development, buying and selling, letting and management of real estate. Renting of machinery, equipment, personal and household goods, incl. motor vehicles and other transport equipment. R&D on natural sciences, engineering, social sciences etc.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	7.8	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	863,000	31,234,000
Share of total employment (% 2007):	2.8	100
Gender split (male:female) (% 2007):	57:43	53:47
Part-time share (% 2007):	20	28
Self-employment share (% 2007):	15	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.19.2 Industry Commentary

This sector contains a very varied group of professional activities, one sub-group of which are focused on real estate, including development, buying and selling, letting and management of property. The residential housing market weakened significantly in 2008, following a period of strong performance in recent years. House prices increased very rapidly in the late 1990s and early 2000s and this resulted in many potential first time buyers being pushed out of the market. But this has now been replaced by a period of declining prices and very uncertain demand for related services.

Another area of activity in this industry is concerned with the renting of machinery, equipment, and personal and household goods, to include motor vehicles and other transport equipment. This sector has seen strong growth in the last few years, as small contractors make widespread use of

plant hire, as they can rarely afford to buy new plant or equipment. However, plant and machinery rental has been affected by the general slowdown in economic activity.. The buoyant construction sector in the early years of the millennium buoyed up demand in this sector, but more recently this area of activity has been affected by the fall out from the credit crunch.

The final area of activity in this industry is based around research and development in natural sciences, engineering and social sciences. The services sector has seen increases spending on research and development, as firms have sought to raise productivity levels. Much of this increase is attributable to high-tech industries, but some traditional industries, such as retailing, have also been investing more in R&D.

4.19.3 Productivity and Output trends

Table 4.19.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	4.0	6.2	3.0	3.3
Employment (% pa)	3.7	2.9	0.1	0.3
(000s)	124	115	4	11
Productivity (% pa)	0.3	3.2	2.9	3.0

Source: 6725output.xls (Figure 6.x.1)

- As the UK property market flourished over the last decade output in this sector grew strongly. Following recent events in financial and housing markets, growth prospects are now rather less certain.
- Nevertheless, over the next 5-10 years positive output growth is projected, albeit at a significantly lower rate than previously. Increases at or just above 3 per cent per annum on average are now projected.
- Productivity slowed significantly in the period between 1997 and 2002 but has subsequently picked up rapidly. This is projected to continue.
- Employment has risen steadily since the early 1990s. Much slower growth is expected in the period 2007-17.
- As illustrated in the supplementary figure (Figure 4.19.1a), this disguises significant compositional effects within the industry.
- Growth in real estate is projected to slow sharply after being by far the fastest growing component.
- The prospects for the other two elements are also less optimistic, especially for the renting of goods.

4.19.4 Employment by Status and Gender

Accounting for well over half the jobs, males dominate employment in this industry.

Part-time workers account for 1 in every 5 jobs, but these are predominantly held by females.

Self employment accounts for around 15 per cent of all jobs, but in this case males predominate.

Females are projected to maintain their share of the total number of jobs in this industry at just over 40 per cent.

The importance of part-time employment over the projection period is expected to rise slightly.

Table 4.19.2: Employment Levels by Gender and Status, Prof. Services

Changes in Employment Status (000s)

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)				
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	2007-2012	FT	PT	SE	Total
2007													
Male employment	358	(41.5)	50	(5.8)	85	(9.9)	493	(57.1)	-2	11	-7	2	
Female employment	203	(23.5)	121	(14)	46	(5.4)	370	(42.9)	-12	10	5	2	
Total employment	561	(65)	171	(19.8)	131	(15.2)	863	(100)	-14	21	-2	4	
2012													
Male employment	356	(41)	61	(7)	78	(9)	495	(57.1)	-4	16	-6	6	
Female employment	191	(22)	131	(15.1)	51	(5.9)	372	(42.9)	-11	10	6	5	
Total employment	547	(63)	191	(22.1)	130	(14.9)	868	(100)	-15	26	0	11	
2017													
Male employment	352	(40.1)	77	(8.8)	72	(8.2)	501	(57)	-6	27	-13	8	
Female employment	180	(20.4)	141	(16)	57	(6.5)	378	(43)	-23	20	11	8	
Total employment	532	(60.5)	218	(24.8)	129	(14.7)	879	(100)	-29	47	-2	16	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.19.5 Projections of Employment by Occupation

Key aspects of occupational employment structure

- Again four groups dominate employment:
 - managers & senior officials;
 - professional occupations;
 - association professional and technical occupations;
 - administrative, clerical & secretarial occupations.
- The first three each account for around 1 in every 5 jobs.
- As in other industries, the first three occupations have seen a rising share of employment, while the last one has experienced a declining share in recent years, as the effects of information and communication technologies on routine clerical work have hit home.

Future changes

Generally occupational structure is not expected to change radically.

- The same three occupations are all projected to see employment growth..
- Quite sharp job losses will be seen in administrative, clerical & secretarial occupations.
- A significant further increase in employment for personal service occupations and to a much lesser extent sales & customer service occupations are projected (both in terms of shares of total employment and the absolute number of jobs).

Shift share analysis

Table 4.19.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. Had the industry maintained its share of total employment, the scale effect shows what would have happened had the industry maintained its overall share of total employment. The

industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

For the Professional services industry, the industry effect has played a major part in expanding employment in the past twenty years, accounting for an increase of around 20 per cent in the period 1987-97 rising to 28 per cent in the 1997-2007. However, over the projection period, the industry effect is projected to turn negative as compositional effects, and generally poorer output prospects, coupled with projected productivity gains, take effect.

Personal service occupations and sales and customer service occupations over the projection period are the main exceptions to the rule of negative occupational effects.

Replacement demands

Table 4.19.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

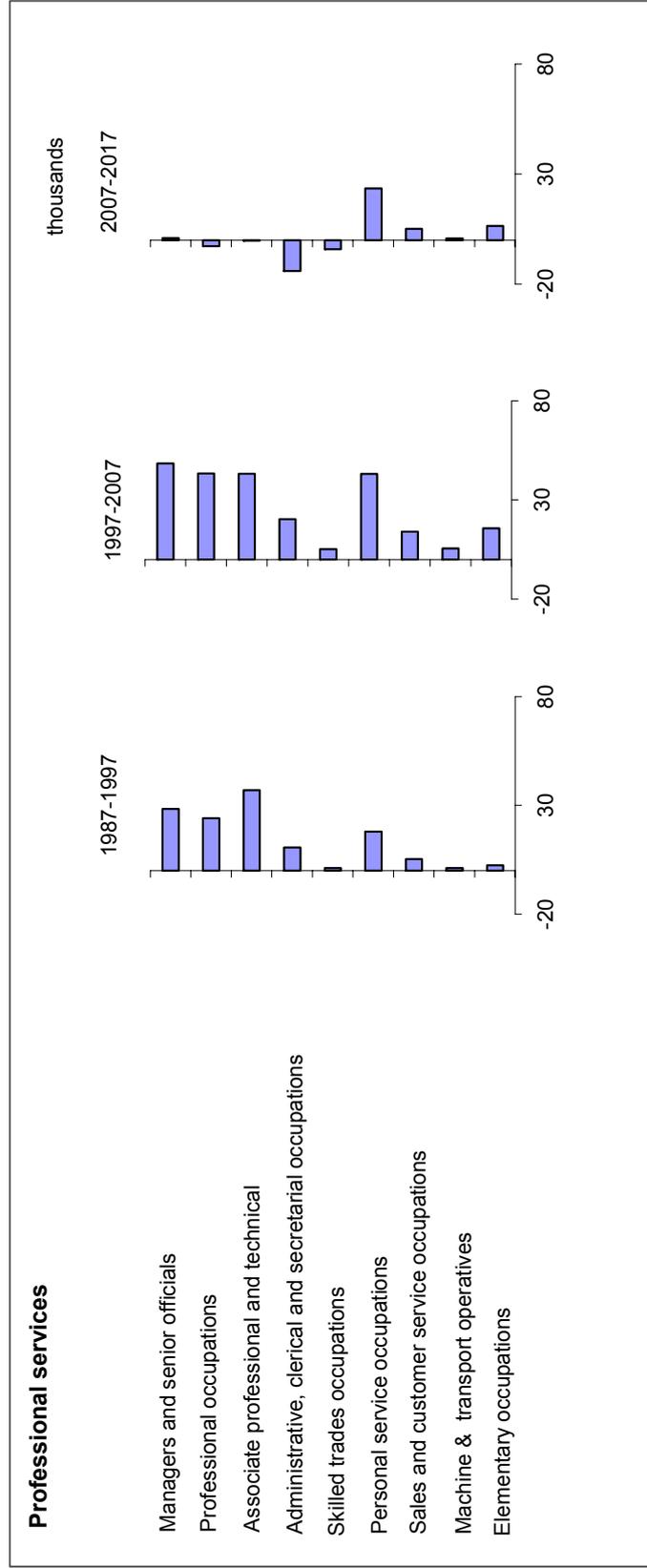
- By 2017 expansion demands in this industry are expected to be trivial but replacement needs will add more than 300 thousand to total requirements.
- Replacement needs affect all occupations, but are especially important for the 4 occupations highlighted above and also for the personal service occupations group.

Table 4.19.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Professional services Employment Levels (000s)	2007-2017					Total Requirement
	1987	1997	2007	2012	2017	
1. Managers & Senior Officials	90	119	167	167	168	62
2. Professional Occupations	87	111	154	152	152	48
3. Associate Professional & Technical Occupations	87	124	167	165	167	55
4. Administrative, Clerical & Secretarial Occupations	102	113	133	126	119	42
5. Skilled Trades Occupations	33	34	39	37	35	9
6. Personal Service Occupations	21	39	82	93	105	57
7. Sales & Customer Service Occupations	12	18	32	34	37	16
8. Machine & Transport Operatives	24	25	30	30	31	12
9. Elementary Occupations	40	43	58	63	65	28
Total	496	624	863	868	879	327
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes
1. Managers & Senior Officials	18.2	19.0	19.4	19.2	19.1	0.6
2. Professional Occupations	17.5	17.8	17.9	17.5	17.2	-1.8
3. Associate Professional & Technical Occupations	17.5	19.8	19.3	19.1	19.0	-0.1
4. Administrative, Clerical & Secretarial Occupations	20.6	18.1	15.4	14.5	13.6	-10.5
5. Skilled Trades Occupations	6.7	5.5	4.6	4.3	4.0	-10.4
6. Personal Service Occupations	4.2	6.2	9.5	10.7	12.0	28.8
7. Sales & Customer Service Occupations	2.5	2.8	3.7	4.0	4.2	16.2
8. Machine & Transport Operatives	4.8	4.0	3.5	3.5	3.5	2.6
9. Elementary Occupations	8.1	6.8	6.8	7.3	7.4	11.0
Total	100.0	100.0	100.0	100.0	100.0	1.8

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.19.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.19.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	28	5	18	5	48	13	33	3	10	1	10	7	-2					
2. Professional Occupations	24	5	17	2	43	12	31	1	10	-3	10	-7	-6					
3. Associate Professional & Technical Occupations	37	5	17	15	43	13	34	-4	0	0	10	-7	-3					
4. Administrative, Clerical & Secretarial Occupations	11	6	20	-16	20	12	31	-23	-14	8	8	-6	-16					
5. Skilled Trades Occupations	1	2	7	-7	5	4	9	-8	2	-4	2	-2	-5					
6. Personal Service Occupations	18	1	4	13	43	4	11	28	23	5	4	-4	22					
7. Sales & Customer Service Occupations	5	1	2	2	14	2	5	7	5	2	2	-1	5					
8. Machine & Transport Operatives	1	1	5	-5	6	3	7	-4	1	2	2	-1	0					
9. Elementary Occupations	2	2	8	-8	16	5	12	-1	6	4	4	-3	5					
Total	128	30	99	0	239	67	173	0	16	54	16	-38	0					
				% change				% change				% change						% change
1. Managers & Senior Officials	31.4	6.0	19.9	5.6	40.8	10.7	27.6	2.5	0.6	6.2	6.2	-4.4	-1.2					
2. Professional Occupations	27.7	6.0	19.9	1.9	39.1	10.7	27.6	0.8	-1.8	6.2	6.2	-4.4	-3.6					
3. Associate Professional & Technical Occupations	42.6	6.0	19.9	16.8	34.9	10.7	27.6	-3.4	-0.1	6.2	6.2	-4.4	-2.0					
4. Administrative, Clerical & Secretarial Occupations	10.5	6.0	19.9	-15.4	18.0	10.7	27.6	-20.3	-10.5	6.2	6.2	-4.4	-12.3					
5. Skilled Trades Occupations	3.6	6.0	19.9	-22.3	15.1	10.7	27.6	-23.2	-10.4	6.2	6.2	-4.4	-12.2					
6. Personal Service Occupations	87.0	6.0	19.9	61.1	111.9	10.7	27.6	73.6	28.8	6.2	6.2	-4.4	26.9					
7. Sales & Customer Service Occupations	43.6	6.0	19.9	17.8	79.9	10.7	27.6	41.6	16.2	6.2	6.2	-4.4	14.4					
8. Machine & Transport Operatives	4.9	6.0	19.9	-20.9	22.2	10.7	27.6	-16.1	2.6	6.2	6.2	-4.4	0.8					
9. Elementary Occupations	6.1	6.0	19.9	-19.7	37.0	10.7	27.6	-1.3	11.0	6.2	6.2	-4.4	9.2					
Total	25.8	6.0	19.9	0.0	38.3	10.7	27.6	0.0	1.8	6.2	6.2	-4.4	0.0					

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.20 COMPUTING SERVICES

4.20.1 Description of the Industry

INDUSTRY 20: COMPUTING SERVICES		
SIC2003 headings: 72		
Hardware consultancy; software consultancy and supply including development, production, supply and documentation of customised and on-customised software; data processing including facilities management; database activities including on-line data retrieval; maintenance and repair of computer equipment; and other computer related activities.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	3.4	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	581,000	31,234,000
Share of total employment (% 2007):	1.9	100
Gender split (male:female) (% 2007):	67:33	53:47
Part-time share (% 2007):	14	28
Self-employment share (% 2007):	11	13

Source: 6725output.xls (industry profile) CE/IER estimates based on ONS data.

4.20.2 Industry Commentary

Computing Services continues to grow rapidly in terms of both output and employment. The Computing Services industry covers such activities as the writing of general and bespoke software, outsourced IT services and, more recently, specialist activities related to the internet such as webpage hosting.

Driven by technological change, output growth has tended to outpace that for the UK economy as a whole. The contribution of the industry to total GVA increased from just over 1 per cent in 1995 to 2½ per cent in 2006.

The industry is also important as a generator of jobs. While many industries have seen their workforces shrink since the 1980s or the 1990s, especially those in manufacturing, the Computing Services industry has seen its workforce continue to expand such that by 2007 it employed roughly 580,000 workers, just under 2 per

cent of total employment. Employment within the industry remains heavily skewed towards men and this is expected to remain the case for some time to come.

Meanwhile, globalisation is changing the skills composition of the workforce. This is leading to some basic IT jobs such as programming and support roles being offshored to lower-cost countries. At the same time this process, along with the more sophisticated use of computers by companies, is generating demand for a new type of IT worker. Demand for traditional technical, development and platform support skills is falling away while demand for workers with the combination of up-to-date IT skills and business skills is increasing.

As with other services, the nature of the industry means it is not heavily traded and so the export share and import penetration are comparatively low, at around 12 per cent and 6 per cent respectively. The combination of improvements in

communications technology and the virtual nature of some services may help to lift this over time.

Offshoring and the changing use of IT are expected to generate high value-added IT jobs over the medium to long term. Demand for security, storage and search facilities is continuing to present the Computer Services industry with a range of opportunities.

UK Computing Services firms are giving a mixed performance, but have good prospects of strong overall growth. The UK has succeeded in building one of the strongest ICT infrastructures in the world. The Global Information Technology Report, 2007 published by the World Economic Forum has placed the UK ninth in the world for network readiness, which is a benchmark of key ICT infrastructure indices. At the same time, London has been rated the best place in Europe for telecommunications according to the European Cities Monitor by Cushman & Wakefield/Healy & Baker. In addition, a report published by the Economist Intelligence Unit in 2007 rates the UK as the seventh most e-ready country in the world. This ranking incorporates several infrastructural factors including economic, political and technological infrastructure. In The measure also takes account of social factors that relate to the development of e-business. The UK obtains a score of 8.59 out of 10 for e-readiness, only 0.29 behind

the top country, Denmark, and third-highest in the EU.

The UK is an important IT hub in Europe, having the second-highest number of Wi-Fi hotspots in the world after the US, and the highest number of secure servers in Europe. In addition, the UK has one of the highest broadband penetration rates in Europe, with a 20.2 per cent penetration rate and behind only Denmark.

The UK remains a decisive net exporter of computing services, and the gap between exports and imports is expected to expand rapidly. The UK has one of the most developed and skills-driven computing services sectors in Europe, helping to generate a forecast 6-7 per cent growth in exports compared to only a 2¼-2¾ per cent growth in imports.

Growth in computing services is forecast to pick up after faltering in the short term and has good prospects for the long term. Growth in computing services is expected to pick up from 2007 after below-trend growth of under 4 per cent in the previous two years.

The long-term projection for output growth in the sector is for 6 per cent per annum over 2007-2017. In spite of expected skills **shortages**, employment will grow at a moderate 1-2 per cent per annum. Strong long-term investment in the sector will ensure that productivity will increase solidly.

4.20.3 Productivity and Output Trends

Table 4.20.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	13.3	7.2	5.8	6.0
Employment (% pa)	9.2	1.2	1.6	2.3
(000s)	194	34	48	77
Productivity (% pa)	3.8	5.9	4.2	3.6

Source: Forecast, 6725output.xls (Figure 6.x.1)

- With growth in the past 10 years averaging 10 per cent per annum, this industry, has shown one of the most rapidly rising trends in output. The driving force behind this has been the phenomenal growth of information and communications technologies.
- This growth is expected to slow somewhat over the next decade, but, in comparative terms, projected growth, at just below 6 per cent per annum, remains very strong.
- Productivity (as measured by output per person employed) has also increased rapidly and further increases are projected.
- Employment growth is projected to slow before picking up again, reaching around 2½ per cent per annum. This results in an additional 125 thousand extra jobs by 2017.

4.20.4 Employment by Status and Gender

Females account for just over a third of all jobs in this industry.

Part-time employment is on a rising trend and currently accounts for around 15 per cent of all jobs.

In 2007, self employment accounted for around 1 in 10 jobs, but this has been on a declining trend.

Following rapid growth during the late 1990s, the share of females in total

employment has stabilised in recent years. Base on a continuation of the more recent trends in this industry, females are projected to see a slight decline in their share of a rapidly growing total.

Part-time employment is projected to see a maintenance of its share, again based on a continuation of the most recent trends.

Self-employment shares are projected to be maintained at more or less the current levels.

Table 4.21.2 Employment Levels by Gender and Status, Computing services

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	308	(53)	28	(4.8)	54	(9.2)	389	(67)	40	8	2	49
Female employment	128	(22)	56	(9.7)	8	(1.4)	192	(33)	-2	-1	2	-1
Total employment	435	(75)	84	(14.5)	61	(10.6)	581	(100)	38	7	3	48
2012									2012-2017			
Male employment	347	(55.3)	36	(5.7)	55	(8.8)	438	(69.7)	59	11	3	73
Female employment	126	(20)	55	(8.8)	9	(1.5)	190	(30.3)	1	1	2	4
Total employment	473	(75.3)	91	(14.5)	65	(10.3)	629	(100)	60	12	6	77
2017									2007-2017			
Male employment	406	(57.6)	47	(6.6)	59	(8.3)	511	(72.5)	98	19	5	122
Female employment	127	(18)	56	(7.9)	12	(1.6)	194	(27.5)	-1	0	4	3
Total employment	533	(75.5)	103	(14.5)	70	(9.9)	706	(100)	98	18	9	125

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.20.5 Projections of Employment by Occupation

Key aspects of Occupational Structure

- Four occupational groups dominate employment in this industry, each accounting for around 1 in 5 jobs.
- These occupations are:
 - managers and senior officials;
 - professionals occupations;
 - associate professional & technical occupations; and
 - administrative, clerical & secretarial occupations.

All other occupations have very low employment job shares.

Future changes

- With employment for all four of the key occupational groups identified above growing substantially, these patterns are expected to remain essentially unchanged over the next 10 years.
- Some job losses are projected in administration and clerical occupations.

Shift share analysis

Table 4.20.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In Computing & related services there has been a huge positive industry effect. This was 94 per cent in the period 1987-97, but fell to 54 per cent in 1997-2007. This represented a period of unprecedented growth. The industry effect is expected to

moderate to around 15 per cent over the next decade.

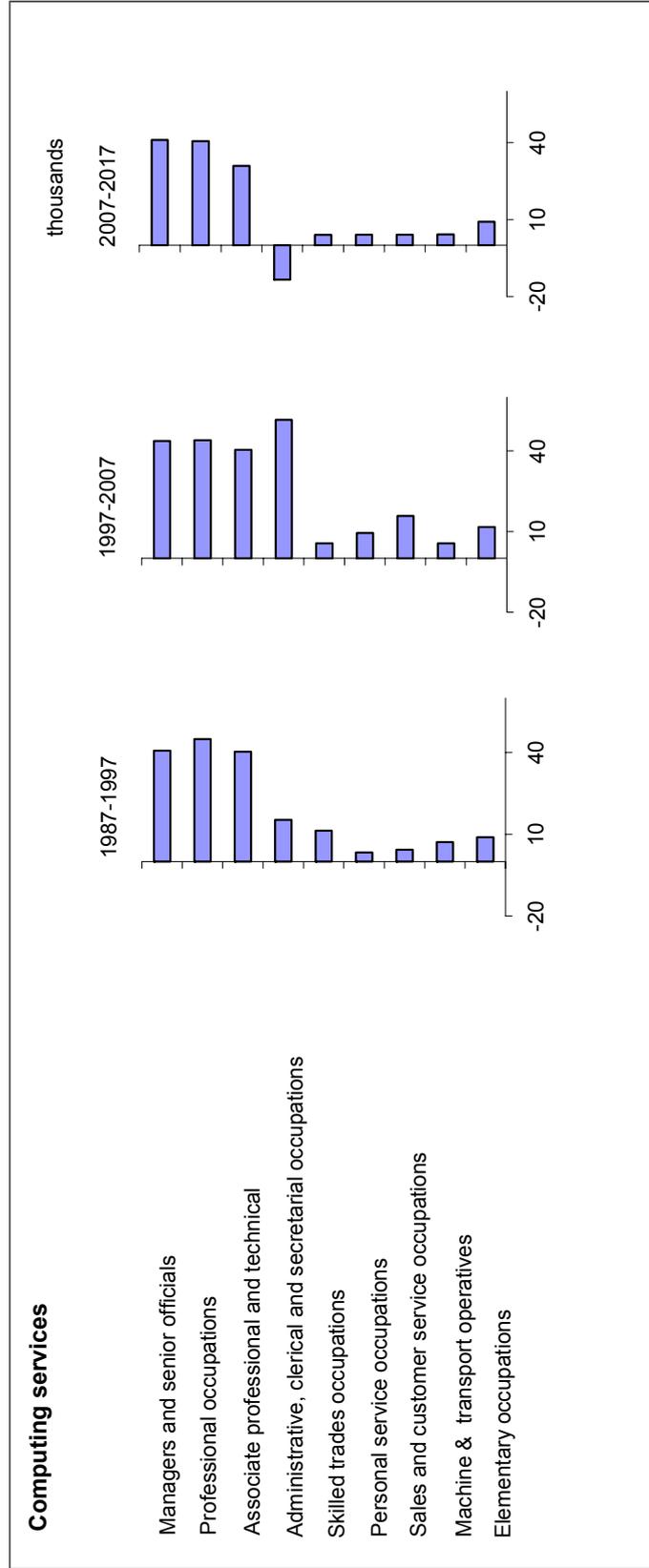
Over the projection period some sharp negative occupational effects for skilled trades, transport & machine operatives and especially administrative, clerical & secretarial occupations serve to offset some of these positive effects.

Replacement demands

Table 4.20.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

- Total requirements are almost twice as large as the already significant expansion demand projected.
- These replacement demands are also concentrated in the four main occupations already highlighted.

Figure 4.20.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.20.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997		000s		1997-2007		000s		2007-2017		000s	
	total:	scale	industry	occupation	total:	scale	industry	occupation	total:	scale	industry	occupation
1. Managers & Senior Officials	41	2	29	10	44	8	39	-3	41	7	18	16
2. Professional Occupations	45	2	34	8	44	9	44	-9	41	8	19	14
3. Associate Professional & Technical Occupations	40	2	29	9	40	8	39	-6	31	7	17	7
4. Administrative, Clerical & Secretarial Occupations	15	2	35	-22	52	6	29	17	-13	7	16	-36
5. Skilled Trades Occupations	11	1	12	-1	6	3	13	-10	4	2	4	-2
6. Personal Service Occupations	3	0	3	0	10	1	3	5	4	1	2	1
7. Sales & Customer Service Occupations	4	0	4	0	16	1	5	10	4	2	4	-1
8. Machine & Transport Operatives	7	1	8	-2	6	2	9	-5	4	1	3	0
9. Elementary Occupations	9	1	11	-3	12	2	11	-1	9	2	5	2
Total	176	11	166	0	228	38	191	0	125	36	88	0
				% change				% change				% change
1. Managers & Senior Officials	131.7	6.0	93.7	32.1	61.2	10.7	54.0	-3.5	35.6	6.2	15.2	14.2
2. Professional Occupations	122.1	6.0	93.7	22.4	53.8	10.7	54.0	-10.9	32.3	6.2	15.2	10.8
3. Associate Professional & Technical Occupations	129.1	6.0	93.7	29.4	56.4	10.7	54.0	-8.2	27.6	6.2	15.2	6.2
4. Administrative, Clerical & Secretarial Occupations	40.7	6.0	93.7	-59.0	97.8	10.7	54.0	33.1	-12.9	6.2	15.2	-34.3
5. Skilled Trades Occupations	91.8	6.0	93.7	-7.8	24.0	10.7	54.0	-40.7	13.6	6.2	15.2	-7.9
6. Personal Service Occupations	104.9	6.0	93.7	5.3	149.5	10.7	54.0	84.9	25.9	6.2	15.2	4.4
7. Sales & Customer Service Occupations	94.2	6.0	93.7	-5.5	178.2	10.7	54.0	113.5	16.5	6.2	15.2	-4.9
8. Machine & Transport Operatives	82.1	6.0	93.7	-17.5	35.4	10.7	54.0	-29.3	19.5	6.2	15.2	-2.0
9. Elementary Occupations	76.7	6.0	93.7	-22.9	57.4	10.7	54.0	-7.3	28.4	6.2	15.2	6.9
Total	99.6	6.0	93.7	0.0	64.7	10.7	54.0	0.0	21.5	6.2	15.2	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.21 OTHER BUSINESS SERVICES

4.21.1 Description of the industry

INDUSTRY 21: OTHER BUSINESS SERVICES		
SIC2004 headings: 74		
Other business services incl.: recruitment agencies; security services; industrial cleaning; photographic, packaging and secretarial services; and other business services nes. Other professional services incl.: legal, accountancy, tax, market research, other consultancy, architects, engineering services, weather forecasting, surveying; technical testing; advertising.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	8.5	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	4,020,000	31,234,000
Share of total employment (% 2007):	12.9	100
Gender split (male:female) (% 2007):	55:45	53:47
Part-time share (% 2007):	23	28
Self-employment share (% 2007):	15	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.21.2 Industry Commentary

Other Business Services has grown by servicing the specialist organisational needs of business and government. It covers the high-value services provided by professionals such as accountants, lawyers, management and engineering consultants and marketing and advertising consultants. These are provided both to corporate clients and government and have grown rapidly over the last decade as markets have liberalised, and the twin forces of globalisation and outsourcing have seen such professionals become ever more closely involved in the everyday business activities of their clients. Each of the specialist professional areas has seen the largest professional partnerships consolidating to achieve global reach and to allow them to service global clients more effectively. Higher earnings from larger practices are evident in the enhanced fees earned by partners in the largest practices, especially in accountancy, law and advertising.

Other Business Services is a large and growing part of urban economies in the south of England.

By far the largest concentration of other business services firms is in London and, in particular, around the City. Although the activities of banks fall under Banking & Finance, many of the high value-added support services are part of Other Business Services. These include legal and accountancy services as well as business consultancy, recruitment, security and office cleaning. Once the activities of advertising agencies, architects and real estate companies (which often have a head or regional office in London) are included, professional services account for around 12 per cent of employment in London and make up 18 per cent of value added.

Government targets and outsourcing are driving growth in the UK's R&D sector, although short-term prospects for

Professional Services are likely to be affected by the credit crisis, industry output is expected to grow by just over 3 per cent per annum in 2007-17.

Until the effects of the credit crisis become clear, the extent to which Other business services will suffer knock-on consequences is uncertain. Many of the largest firms in the industry are dependent on activities in the City so a sharp reduction in profitability at banks and financial services companies is expected to have an impact on commercial property, consultancy, legal services and accountancy. The impact on advertising revenues is more likely to come through

secondary effects on consumer spending and the housing market.

Output growth in Other business services is projected to slow to 3.1 per cent per annum over the decade to 2017.

Other business services is expected to remain a key industry for UK increasing employment around 2 per cent per annum over this period. International demand is expected to become increasingly important for the industry as moves are made to harmonise regulatory frameworks (for example accountancy and legal systems and intellectual property rights), allowing greater cross-border competition.

4.21.3 Productivity and Output trends

Table 4.21.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	5.9	6.9	3.1	3.3
Employment (% pa)	2.5	4.0	2.2	1.9
(000s)	383	716	452	431
Productivity (% pa)	3.3	2.7	1.0	1.4

Source: 6725output.xls (Figure 6.x.1)

- In this diverse industrial group, output growth rates have been maintained at relatively high levels compared to other industries in recent years. This pattern is expected to continue over the next decade, albeit at a reduced pace.
- Since the early 1990's, productivity growth has also been quite strong. There is expected to be a slowdown here also but further improvements are projected.
- The relatively optimistic outlook for output more than offsets the impact of the projected modest productivity gains, resulting in significant projected increases in employment. Over the next 10 years these are expected to amount to almost a million jobs.

4.21.4 Employment by Status and Gender

Females currently account for just over 45 per cent of the jobs in this industry, many of which are part-time.

In total, part-time jobs account for just under a quarter of all employment.

Accounting for around 15 per cent of the total, self employment is rather less significant, although this still amounted to nearly 600,000 jobs in 2007, and this is a much higher share than in most other industries.

In this industry, the female share of employment is projected to remain significant at over 40 per cent of the total (albeit falling slightly over the next decade).

The most common pattern of employment in this industry will continue to be full-time working.

Over the next decade, part-time and self employment shares are not expected to change dramatically (the former falling slightly).

Table 4.21.2: Employment Levels by Gender and Status, Other bus. Services

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)				
	000s	(% share)	000s	(% share)	SE	(% share)	000s	(% share)	2007-2012	FT	PT	SE	Total
2007													
Male employment	1,533	(38.1)	282	(7)	398	(9.9)	2,212	(55)	224	48	25	297	
Female employment	961	(23.9)	653	(16.2)	194	(4.8)	1,809	(45)	83	32	40	155	
Total employment	2,494	(62)	935	(23.2)	592	(14.7)	4,020	(100)	307	80	64	452	
2012													
Male employment	1,757	(39.3)	329	(7.4)	422	(9.4)	2,508	(56.1)	229	44	18	292	
Female employment	1,044	(23.4)	685	(15.3)	234	(5.2)	1,964	(43.9)	77	23	40	140	
Total employment	2,801	(62.6)	1,015	(22.7)	656	(14.7)	4,472	(100)	306	67	58	431	
2017													
Male employment	1,986	(40.5)	374	(7.6)	440	(9)	2,800	(57.1)	453	92	43	588	
Female employment	1,121	(22.9)	708	(14.4)	274	(5.6)	2,103	(42.9)	160	55	80	295	
Total employment	3,107	(63.4)	1,082	(22.1)	714	(14.6)	4,903	(100)	613	147	123	883	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.21.5 Projections of Employment by Occupation

Key aspects of occupational employment structure

- Four white-collar occupations dominate employment in this industry:
 - managers & senior officials;
 - professional occupations;
 - associate professional & technical occupations; and
 - administrative, clerical & secretarial occupations.

Manual trades do not account for many jobs in this industry.

- In 2007 each of the four key occupations accounted for between 17 and 19 per cent of all employment.
- Whilst the administrative & clerical group has seen a steady decline, the first three had been increasing their employment shares.

Future changes

- In the managerial, professional and associate professional groups employment gains are expected to continue and, to a lesser extent, in personal service occupations.
- Job losses are projected to be seen in the administrative, clerical & secretarial group, as technological change makes inroads into jobs in these occupations.

Shift share analysis

Table 4.21.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry

over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

There was a very strong positive industry effect for Other business services. In the period 1987-97, this was a very significant 36 per cent. It declined slightly to 27 per cent in 1997-2007. The industry effect is projected to decline further but the end result is still a projected 16 per cent increase in employment across all occupations over the projection period, all else equal.

This will be partially offset by negative occupational effects for administrative & clerical occupations and elementary occupations in particular, over the projection period. These patterns broadly follow those for the previous decade.

Replacement demands

Table 4.21.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

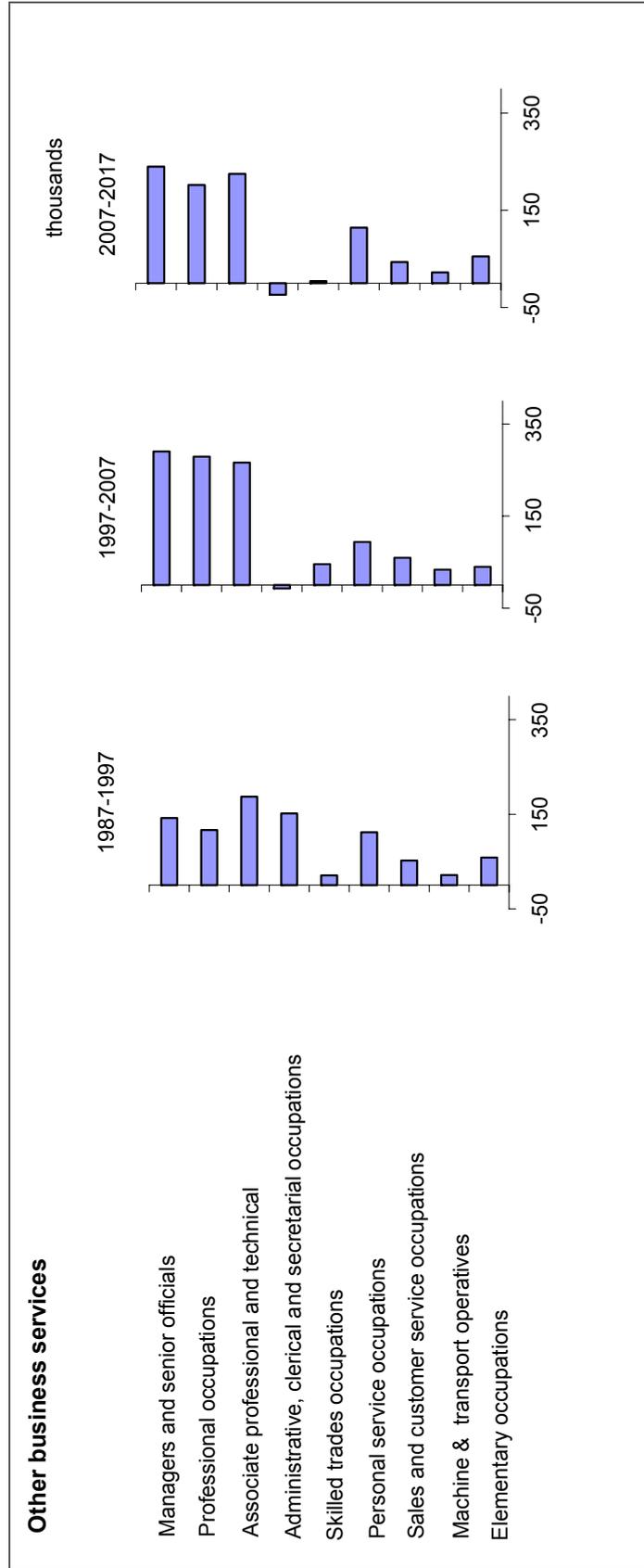
- Replacement demands are much larger than the already exceptionally large expansion demands highlighted. By themselves they would result in almost 900 thousand more jobs by 2017.
- Replacement demands reinforce this. They are concentrated in the four white-collar occupations highlighted earlier.
- Over the next 10 years total requirements are projected to amount to over 2.3 million jobs. This industry is therefore projected to be one of the most important sources of jobs in the future.

Table 4.21.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Other business services Employment Levels (000s)	2007-2017					Total Requirement		
	1987	1997	2007	2012	2017		Net Change	Replacement Demands
1. Managers & Senior Officials	309	451	741	856	981	240	270	510
2. Professional Occupations	294	411	690	785	892	202	231	433
3. Associate Professional & Technical Occupations	315	502	768	877	993	225	254	479
4. Administrative, Clerical & Secretarial Occupations	595	746	739	733	715	-24	312	288
5. Skilled Trades Occupations	117	138	183	185	188	4	61	65
6. Personal Service Occupations	86	198	291	357	406	114	118	232
7. Sales & Customer Service Occupations	61	113	172	196	216	44	58	102
8. Machine & Transport Operatives	88	110	143	157	165	22	51	74
9. Elementary Occupations	195	253	293	326	348	55	110	165
Total	2,058	2,921	4,020	4,472	4,903	883	1,464	2,347
Percentage Shares	1987	1997	2007	2012	2017	Percentage Changes		
1. Managers & Senior Officials	15.0	15.4	18.4	19.1	20.0	32.4	36.4	68.8
2. Professional Occupations	14.3	14.1	17.2	17.6	18.2	29.3	33.5	62.8
3. Associate Professional & Technical Occupations	15.3	17.2	19.1	19.6	20.2	29.3	33.0	62.3
4. Administrative, Clerical & Secretarial Occupations	28.9	25.6	18.4	16.4	14.6	-3.2	42.2	39.0
5. Skilled Trades Occupations	5.7	4.7	4.6	4.1	3.8	2.4	33.2	35.6
6. Personal Service Occupations	4.2	6.8	7.2	8.0	8.3	39.3	40.4	79.6
7. Sales & Customer Service Occupations	3.0	3.9	4.3	4.4	4.4	25.4	34.0	59.4
8. Machine & Transport Operatives	4.3	3.7	3.6	3.5	3.4	15.5	35.9	51.4
9. Elementary Occupations	9.5	8.7	7.3	7.3	7.1	18.8	37.4	56.3
Total	100.0	100.0	100.0	100.0	100.0	22.0	36.4	58.4

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.21.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.21.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s			
	total:	scale	industry	total:	scale	industry	total:	scale	industry	total:	scale	industry	total:	scale	industry	total:	scale	industry	
1. Managers & Senior Officials	142	18	111	13	290	48	122	121	240	46	117	77	240	46	117	77	240	46	117
2. Professional Occupations	117	17	106	-7	279	44	111	124	202	43	108	51	202	43	108	51	202	43	108
3. Associate Professional & Technical Occupations	187	19	113	55	266	53	135	77	225	48	121	56	225	48	121	56	225	48	121
4. Administrative, Clerical & Secretarial Occupations	152	35	214	-97	-7	80	201	-288	-24	46	116	-186	-24	46	116	-186	-24	46	116
5. Skilled Trades Occupations	21	7	42	-28	45	15	37	-7	4	11	29	-36	4	11	29	-36	4	11	29
6. Personal Service Occupations	112	5	31	76	94	21	53	19	114	18	46	50	114	18	46	50	114	18	46
7. Sales & Customer Service Occupations	52	4	22	27	59	12	31	17	44	11	27	6	44	11	27	6	44	11	27
8. Machine & Transport Operatives	21	5	32	-16	34	12	30	-8	22	9	23	-9	22	9	23	-9	22	9	23
9. Elementary Occupations	58	12	70	-23	40	27	68	-55	55	18	46	-9	55	18	46	-9	55	18	46
Total	862	122	740	0	1,100	311	788	0	883	251	632	0	883	251	632	0	883	251	632
	1987-1997			% change			1997-2007			% change			2007-2017			% change			
1. Managers & Senior Officials	46.0	6.0	36.0	4.1	64.4	10.7	27.0	26.8	32.4	6.2	15.7	10.4	32.4	6.2	15.7	10.4	32.4	6.2	15.7
2. Professional Occupations	39.7	6.0	36.0	-2.2	67.9	10.7	27.0	30.3	29.3	6.2	15.7	7.3	29.3	6.2	15.7	7.3	29.3	6.2	15.7
3. Associate Professional & Technical Occupations	59.5	6.0	36.0	17.6	53.0	10.7	27.0	15.4	29.3	6.2	15.7	7.3	29.3	6.2	15.7	7.3	29.3	6.2	15.7
4. Administrative, Clerical & Secretarial Occupations	25.5	6.0	36.0	-16.4	-1.0	10.7	27.0	-38.6	-3.2	6.2	15.7	-25.2	-3.2	6.2	15.7	-25.2	-3.2	6.2	15.7
5. Skilled Trades Occupations	17.8	6.0	36.0	-24.1	32.9	10.7	27.0	-4.7	2.4	6.2	15.7	-19.5	2.4	6.2	15.7	-19.5	2.4	6.2	15.7
6. Personal Service Occupations	130.9	6.0	36.0	89.0	47.4	10.7	27.0	9.7	39.3	6.2	15.7	17.3	39.3	6.2	15.7	17.3	39.3	6.2	15.7
7. Sales & Customer Service Occupations	85.6	6.0	36.0	43.7	52.3	10.7	27.0	14.6	25.4	6.2	15.7	3.4	25.4	6.2	15.7	3.4	25.4	6.2	15.7
8. Machine & Transport Operatives	24.1	6.0	36.0	-17.8	30.7	10.7	27.0	-7.0	15.5	6.2	15.7	-6.4	15.5	6.2	15.7	-6.4	15.5	6.2	15.7
9. Elementary Occupations	30.0	6.0	36.0	-11.9	15.7	10.7	27.0	-21.9	18.8	6.2	15.7	-3.1	18.8	6.2	15.7	-3.1	18.8	6.2	15.7
Total	41.9	6.0	36.0	0.0	37.6	10.7	27.0	0.0	22.0	6.2	15.7	0.0	22.0	6.2	15.7	0.0	22.0	6.2	15.7

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.22 PUBLIC ADMINISTRATION & DEFENCE

4.22.1 Description of the Industry

INDUSTRY 22: PUBLIC ADMINISTRATION & DEFENCE		
SIC2003 headings: 75		
General public service activities, including administration of central, regional and local bodies; business and government regulation agencies; foreign affairs, defence activities and judicial activities; police and fire services and compulsory social security.		
HM forces are not included in the main tables in this section		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	4.9	100
Exposure to International Trade:	zero	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	1,543,000	31,234,000
Share of total employment (% 2007):	4.9	100
Gender split (male:female) (% 2007):	48:52	53:47
Part-time share (% 2007):	22	28
Self-employment share (% 2007):	2	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.22.2 Industry Commentary

The UK government is trying to reverse the recent rise in employment in Public Administration & Defence. Employment has been on a downward trend for most of the last 30 years. Until the late 1980s productivity was increasing, albeit slowly; but thereafter there has been little change in the level of productivity. Indeed, during the late 1990s and early 2000s productivity in the sector actually fell, as government spending on Public Administration & Defence rose, albeit slowly, during this period, and employment increased as a result. The government is now making a considerable effort to reverse this increase and to ensure that public services are delivered efficiently. Its target is to reduce the number of civil service administrative jobs by 80,000 by April 2008.

In response to the weak productivity growth in public administration, the government is now putting considerable effort into improving delivery of services. Since the late 1990s government spending priorities have been set through a series of Comprehensive Spending Reviews. Each of these reviews has established core departmental budgets, typically for a three-year period. This gives departments a more predictable context for long-term planning. The reviews also required departments to establish public-service agreements, essentially departmental performance targets. In the 1998 Comprehensive Spending Review around 500 performance targets were agreed, but the number was reduced substantially in subsequent reviews.

The government commissioned a series of studies into different aspects of public-service delivery. The Gershon Review into

public-sector efficiency reported in 2004. It identified annual efficiency gains of over £20bn that could be achieved by 2007/08 together with an overall reduction of over 84,000 posts in the Civil Service and military personnel in administrative and support roles. In the same year, a review of potential relocation of public-sector activities by Sir Michael Lyons concluded that some 20,000 jobs could be relocated out of London and the South East, and so bring about cost savings.

A key element of the government's strategy to increase efficiency and to direct more staff to front-line delivery of services is the efficient and effective use of technology. A number of substantial IT projects have been commissioned. However, the public sector has had only limited success with the delivery of complex IT systems.

The aim of the Private Finance Initiative (PFI) is to deliver major public-sector projects efficiently and to reduce public borrowing. Since the early 1990s, the government has increasingly funded investment in, and delivery of, public services through the PFI.

Local government has become subject to increasing control from central government, though there is the prospect that central control will be reduced in the future. UK government spending will increase in real terms in the next three years, and additional resources are to be released through further efficiency savings. Efficiencies have been achieved in UK public services, but further savings are planned. Local government in the UK is to be allowed to impose a

supplementary business rate. The PFI will continue to have an important role in financing investment in public services. Spending on national security will increase to 2010/11.

The government announced a significant increase in its spending on security in the 2007 Pre-Budget Report, with increases for the Ministry of Defence (MoD) and also for measures to address the threat of terrorism.

The tight spending awards set out in the 2007 Comprehensive Spending Review are likely to keep output growth at or around 1 per cent per annum for the rest of the decade. Although there is little evidence yet that the sector has achieved significant and sustained improvements some improvement is expected in underlying productivity growth in future years. As a result, the level of employment in 2017 is expected to be slightly lower than in 2007.

In the long term government spending on Public Administration & Defence is expected to increase at a lower rate than the economy as a whole, at 1½-1¾ per cent per annum. Productivity growth in the sector should improve from its historical trend to grow at around 1¾ per cent per annum, a rate broadly similar to that expected in business services and this will result in little change in levels of employment in the long term.

4.22.3 Productivity and Output trends

Table 4.22.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	0.6	1.9	1.8	1.9
Employment (% pa)	0.8	1.4	-0.2	0.0
(000s)	58	105	-13	2
Productivity (% pa)	-0.2	0.5	2.0	1.8

Source: 6725output.xls (Figure 6.x.1)

- Output in this industry is measured by public expenditure on such services. This has seen modest growth in real terms, in recent years. The government commitment to increase spending on public services has boosted output growth over the last 5 years.
- In line with government announcements, modest further increases are projected over the next decade, as plans to improve services such as the police and fire services take effect.
- Productivity is difficult to measure in this sector. Trends in productivity have been flat, or even declining, over much of the last decade. As policies to modernise and restructure a number of public services take effect, some improvement in productivity is expected over the coming decade.
- Employment levels are expected to change very little as a result of the combination of these two trends. A very small decline is projected over the period to 2017.

4.22.4 Employment by Status and Gender

Employment in this industry is divided fairly equally between men and women.

However, a greater proportion of female workers are part-time. Part-timers account for about 1 in 5 jobs in total.

Self employment is insignificant.

Women are expected to continue to slowly increase their share of total employment in this industry.

This sector is a popular source of jobs for women, particularly those looking for part-time employment as conditions are favourable to such working arrangements.

Part-time working is projected to continue to increase its share of total employment slowly.

Self-employment is projected to remain insignificant in numerical terms, although increasing its share slightly.

Table 4.22.2: Employment Levels by Gender and Status, Public admin. & defence

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	646	(41.8)	70	(4.5)	18	(1.2)	733	(47.5)	-36	7	5	-24
Female employment	524	(33.9)	274	(17.8)	12	(0.8)	810	(52.5)	-15	22	4	11
Total employment	1,169	(75.8)	344	(22.3)	30	(1.9)	1,543	(100)	-51	29	8	-13
									2012-2017			
2012												
Male employment	610	(39.8)	77	(5)	23	(1.5)	709	(46.3)	-30	8	5	-17
Female employment	509	(33.3)	297	(19.4)	16	(1)	821	(53.7)	-9	25	4	20
Total employment	1,119	(73.1)	373	(24.4)	38	(2.5)	1,530	(100)	-39	33	9	2
									2007-2017			
2017												
Male employment	580	(37.8)	84	(5.5)	27	(1.8)	692	(45.1)	-66	14	10	-42
Female employment	500	(32.6)	322	(21)	19	(1.3)	841	(54.9)	-24	47	7	31
Total employment	1,080	(70.4)	406	(26.5)	47	(3.1)	1,532	(100)	-90	62	17	-11

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.22.5 Projections of Employment by Occupation

Key Aspects of Occupational Employment Structure

- In 2007, administrative, clerical & secretarial occupations were still the largest occupational group, although its employment share had fallen sharply in recent years to below 30 per cent.
- Accounting for over 20 per cent of all jobs in 2007, the associate professional and technical group is the next most significant category numerically.
- Managerial, professional and elementary occupations are also significant sources of employment, each accounting for around 1 in 10 of all jobs.

Future Changes

Occupational structures are generally only projected to evolve slowly.

- Further significant declines in the employment share for the administrative, clerical & secretarial group are projected.
- These losses are projected to be offset by small increases for managers & senior officials and professional occupations as well as personal service occupations.

Shift share analysis

Table 4.22.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

The industry effect was negative for public administration & defence over the 1987-1997 period (during the period of the conservative administration). This accounted for a loss of around 16 per cent of all jobs over this period. This moderated over the 1997-2007 period, the industry effect turning marginally positive. The industry effect is projected to return to a negative value over the projection period, resulting in the loss of just under 7 per cent of jobs across all occupations as pressures to restrain government expenditure and cut costs continue.

Over the projection period, this is reinforced by negative occupational effects for administrative & clerical, skilled trades and elementary occupations. For the majority of other occupations, positive occupational effects offset the negative industry effect. These patterns by occupation broadly follow those for the previous two decades.

Replacement demands

Table 4.22.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

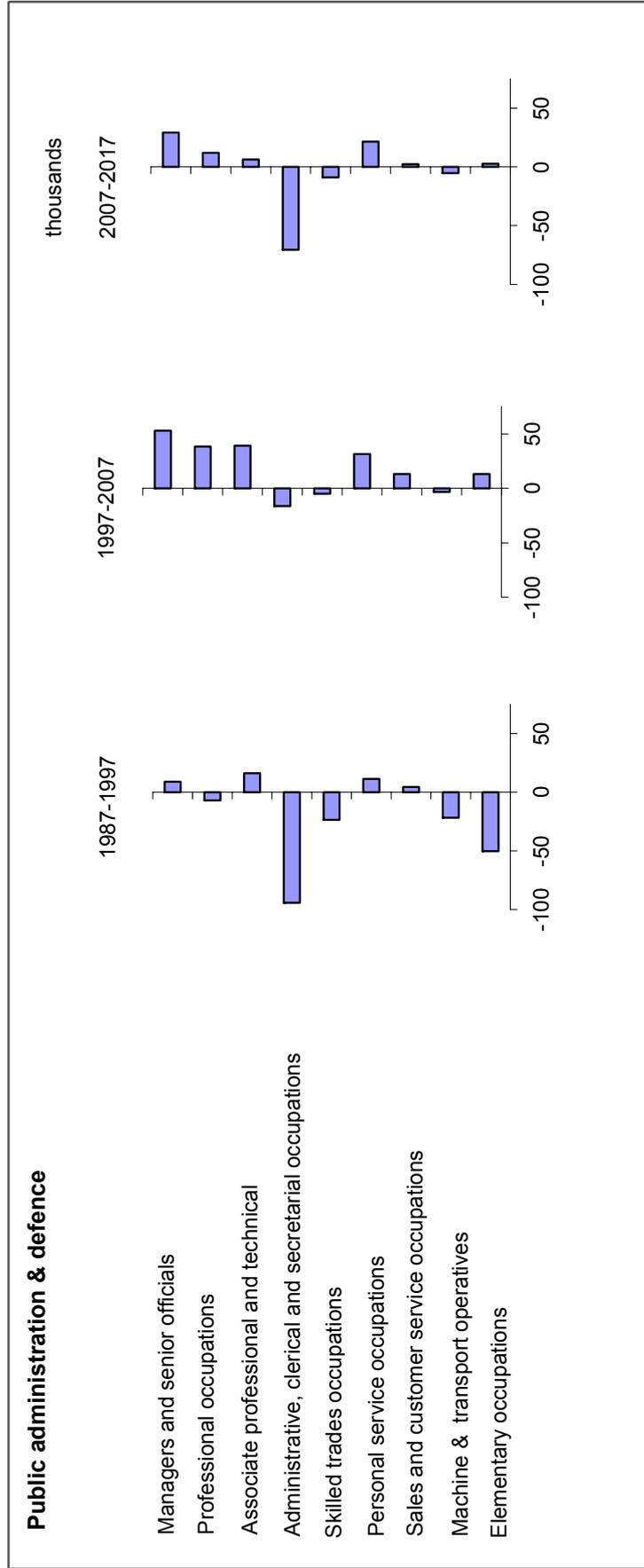
- Replacement demand for this industry will be substantial, much more than offsetting the small decline in expansion demand. Well over half a million members of the current workforce will need to be replaced by 2017.
- The bulk of these replacement demands fall in the administrative, clerical & secretarial occupations category, and to a lesser extent amongst associate professional & technical occupations.
- However, there will also be significant replacement needs for people in most other non manual occupations, and also those in elementary occupations.

Table 4.22.3 Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Public admin and defence Employment Levels (000s)	2007-2017								
	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Total Requirement	
1. Managers & Senior Officials	144	153	206	223	235	29	75	104	
2. Professional Occupations	153	146	185	188	197	12	66	78	
3. Associate Professional & Technical Occupation:	254	270	309	310	316	6	96	103	
4. Administrative, Clerical & Secretarial Occupation:	524	429	413	372	343	-71	172	101	
5. Skilled Trades Occupations	79	55	50	45	41	-9	16	7	
6. Personal Service Occupations	43	54	86	95	107	22	34	56	
7. Sales & Customer Service Occupations	22	27	40	41	42	2	13	16	
8. Machine & Transport Operatives	78	56	53	50	48	-5	19	14	
9. Elementary Occupations	239	189	202	206	205	3	71	74	
Total	1,535	1,380	1,543	1,530	1,532	-11	564	553	
Percentage Shares	1987	1997	2007	2012	2017		Percentage Changes		
1. Managers & Senior Officials	9.4	11.1	13.3	14.5	15.3	14.2	36.5	50.8	
2. Professional Occupations	10.0	10.6	12.0	12.3	12.8	6.5	36.0	42.5	
3. Associate Professional & Technical Occupation:	16.5	19.6	20.0	20.3	20.6	2.0	31.1	33.1	
4. Administrative, Clerical & Secretarial Occupation:	34.1	31.1	26.8	24.3	22.4	-17.1	41.6	24.5	
5. Skilled Trades Occupations	5.1	4.0	3.2	3.0	2.7	-17.7	32.6	14.9	
6. Personal Service Occupations	2.8	3.9	5.6	6.2	7.0	25.1	40.0	65.1	
7. Sales & Customer Service Occupations	1.4	1.9	2.6	2.7	2.7	5.8	34.0	39.7	
8. Machine & Transport Operatives	5.1	4.1	3.4	3.3	3.1	-10.0	36.0	26.0	
9. Elementary Occupations	15.6	13.7	13.1	13.5	13.3	1.3	35.3	36.6	
Total	100.0	100.0	100.0	100.0	100.0	-0.7	36.5	35.8	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.22.1 Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.22.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	9	9	-23	24	2	35	53	16	16	29	13	13	29	13	-14	31	13	13
2. Professional Occupations	-7	9	-25	8	2	21	38	16	16	12	12	12	12	12	-13	13	12	12
3. Associate Professional & Technical Occupations	16	15	-41	42	3	7	39	29	29	6	6	6	6	6	-21	8	6	6
4. Administrative, Clerical & Secretarial Occupations	-94	31	-84	-41	5	-67	-16	46	46	-71	26	26	-71	26	-29	-68	26	26
5. Skilled Trades Occupations	-24	5	-13	-16	1	-11	-5	6	6	-9	3	3	-9	3	-3	-9	3	3
6. Personal Service Occupations	11	3	-7	16	1	25	31	6	6	22	5	5	22	5	-6	22	5	5
7. Sales & Customer Service Occupations	5	1	-4	7	0	10	13	3	3	2	2	2	2	2	-3	3	2	2
8. Machine & Transport Operatives	-22	5	-13	-14	1	-10	-3	6	6	-5	3	3	-5	3	-4	-5	3	3
9. Elementary Occupations	-50	14	-38	-26	2	-9	13	20	20	3	13	13	3	13	-14	4	13	13
Total	-156	91	-247	0	17	0	164	147	147	-11	96	96	-11	96	-107	0	96	96
			% change			% change												
1. Managers & Senior Officials	6.3	6.0	-16.1	16.4	1.2	22.8	34.7	10.7	10.7	14.2	6.2	6.2	14.2	6.2	-6.9	14.9	6.2	6.2
2. Professional Occupations	-4.6	6.0	-16.1	5.5	1.2	14.4	26.3	10.7	10.7	6.5	6.2	6.2	6.5	6.2	-6.9	7.2	6.2	6.2
3. Associate Professional & Technical Occupations	6.4	6.0	-16.1	16.6	1.2	2.6	14.5	10.7	10.7	2.0	6.2	6.2	2.0	6.2	-6.9	2.7	6.2	6.2
4. Administrative, Clerical & Secretarial Occupations	-18.0	6.0	-16.1	-7.9	1.2	-15.7	-3.8	10.7	10.7	-17.1	6.2	6.2	-17.1	6.2	-6.9	-16.4	6.2	6.2
5. Skilled Trades Occupations	-30.1	6.0	-16.1	-19.9	1.2	-20.9	-9.0	10.7	10.7	-17.7	6.2	6.2	-17.7	6.2	-6.9	-17.0	6.2	6.2
6. Personal Service Occupations	26.7	6.0	-16.1	36.8	1.2	46.1	57.9	10.7	10.7	25.1	6.2	6.2	25.1	6.2	-6.9	25.8	6.2	6.2
7. Sales & Customer Service Occupations	20.8	6.0	-16.1	30.9	1.2	37.5	49.4	10.7	10.7	5.8	6.2	6.2	5.8	6.2	-6.9	6.5	6.2	6.2
8. Machine & Transport Operatives	-27.8	6.0	-16.1	-17.6	1.2	-17.7	-5.8	10.7	10.7	-10.0	6.2	6.2	-10.0	6.2	-6.9	-9.3	6.2	6.2
9. Elementary Occupations	-21.0	6.0	-16.1	-10.9	1.2	-4.9	7.0	10.7	10.7	1.3	6.2	6.2	1.3	6.2	-6.9	2.0	6.2	6.2
Total	-10.1	6.0	-16.1	0.0	1.2	0.0	11.9	10.7	10.7	-0.7	6.2	6.2	-0.7	6.2	-6.9	0.0	6.2	6.2

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.23 EDUCATION

4.23.1 Description of the industry

INDUSTRY 23: EDUCATION		
SIC2003 headings: 80		
Public and private education at any level or for any profession, oral or written as well as by radio or television, including: primary, secondary, technical, vocational and higher education; adult education including driving schools, other private training providers, TECs, LECs and LLSCs.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	5.5	100
Exposure to International Trade:	zero	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	2,553,000	31,234,000
Share of total employment (% 2007):	8.2	100
Gender split (male:female) (% 2007):	28:72	53:47
Part-time share (% 2007):	46	28
Self-employment share (% 2007):	6	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.23.2 Industry Commentary

The number of people employed in the education sector has been rising since the 1970s. However, despite the steadily increased activity it has been recognised for some time that the UK lags behind its economic competitors in terms of its educational attainment; and this lag is often believed to be a key factor behind the relatively poor productivity in the UK's economy.

Since 1997 education has been at the forefront of government policy and government funding has increased sharply as a result. There has also been increased focus on the productivity performance of the UK economy.

The structure of the state-maintained education sector has changed markedly since the early 1990s.

There have been several changes to the structure of the state schooling sector. Successive governments have introduced a number of formal tests at different stages in schooling. Performance on these tests has in turn been linked to the compilation of school league tables. These have been seen as providing important information about the performance of schools, and thereby as contributing to informed decisions by parents in choosing schools.

Schools that are seen to be performing well have been given greater autonomy, including the right to specialise in particular subjects while still teaching the whole of the National Curriculum.

Recently, the government has focused on improving the performance of schools that, for one reason or another, are seen to face challenging circumstances. One element of this is the development of City Academies, institutions which are

developed in partnership with sponsors from business, faith or voluntary groups and will generally replace existing schools. There is a target to open 100 such academies by 2010.

UK universities face increasing competition for students and are developing alternative sources of income. The number of UK universities increased markedly in the early 1990s when the higher education sector was reorganised with former polytechnics and various colleges of higher education given the status of university. Since then a number of other colleges have also gained university status.

Universities have received increased funding in recent years but are increasingly looking elsewhere for income. From September 2006 universities have been able to charge UK students top-up fees, which are intended to contribute towards the cost of teaching. A ceiling of £3,000 per annum was set, a rate that all universities introduced. UK universities have seen overseas students as an important source of income, as they are charged higher fees than domestic students or those from the EU. However, there is increasing competition internationally for overseas students and so the UK's share of the overseas student market can be expected to fall. There is a long history of companies being spun out from university research activities. Recently universities have become more proactive in using the intellectual property that is developed by their staff as a source of future income. A number of institutions have entered into long-term partnerships with intellectual property commercialisation companies which would make available initial funding for companies that are spun out of university research in return for an equity stake. Work-related training is focusing more on sector-based initiatives.

The emphasis on work-based training has increased: starting with the (now defunct) Manpower Services Commission 1976-1988, and continuing with Training and Enterprise Councils in the early 1990s and

their successor, the Learning and Skills Council (LSC) in 2001. The LSC is now responsible for all post-16 education and training other than in universities.

Skills training is increasingly sectorally focused, with the emphasis placed on employer leadership. This is illustrated by the prominent role now given to the Sector Skills Councils. More recently the government decided to establish a network of twelve National Skills Academies to improve the quality and status of vocational education available to students and to help train the existing workforce in new skills.

UK government funding for education will rise in real terms to 2010/11. The UK government has created a new departmental structure to oversee education policy.

The structure of government education departments changed in June 2007, when the Department for Children, Schools and Families (DCSF) and Department for Innovation, Universities and Skills (DIUS) were created to take over the work previously undertaken by DfES together with some policy areas previously handled by other departments. The DCSF's remit is much wider than education, and includes child health and poverty. The role of DIUS relates to developing and exploiting the UK's science research base, and to raising participation and attainment in all forms of post-16 education.

Recent analysis shows productivity in publicly-funded education has been falling. Policies to raise educational attainment in the UK involve an increase in personalised learning. The UK government also intends to raise the education participation age to 18.

In recent years, output growth in education has been weak, despite the considerable increase in government spending. Over 2000-05 output grew by just over 1 per cent per annum. In 2006 growth slowed to ½ per cent and output is estimated to have fallen in 2007. At the same time employment has seen strong growth.

In the long term Education output is forecast to rise slightly below the rate of growth of the economy as a whole. The growth of government spending on education is expected to slow to around the same rate as a result of competing demands of relatively slow growth in the population of school age and the continuing need to improve the skills base of the workforce. Demand for education and training from other parts of the economy is likely to grow more strongly in the long term.

Output growth is expected to strengthen to around 2 per cent per annum over the next decade, in line with the increases in government spending. Employment is expected to increase modestly reflecting in part the continued focus on individual learning, although the rate of increase is forecast to be much weaker than in recent years. Productivity in education is expected to rise further in the long term, by around 1 ½ per cent.

4.23.3 Productivity and Output Trends

Table 6.23.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	1.3	0.7	2.0	1.9
Employment (% pa)	2.0	2.5	0.5	0.3
(000s)	209	297	64	45
Productivity (% pa)	-0.7	-1.7	1.5	1.6

Source: 6725output.xls (Figure 6.x.1)

- Output in this industry is dominated by the public sector and is mainly measured by public expenditure. Further substantial growth is expected over the next decade, as the government continues to invest in education. This will be reinforced by private sector demand from employers and individuals for vocational training, etc.
- In the period 1997 to 2007 average productivity as measured by output per head has fallen. More teachers have been employed and class sizes have declined, as well as more class room assistants, etc being deployed. There is therefore an issue about how best to measure productivity in this sector in a meaningful way. Over the next decade the projections assume that there will be some positive productivity improvements using the crude measure adopted here, averaging around 1½ per cent per annum.
- Employment has grown rapidly in recent years, although much of this increase has been for part-time workers. By 2017, the combination of strong output growth and only modest productivity gains will result in over 100 thousand extra jobs.

4.23.4 Employment by Status and Gender

In this industry, females dominate employment, especially in the primary and secondary educational sectors. They currently account for around 70 per cent of all jobs.

Accounting for about 46 per cent of all jobs, part-time employment is also very important.

Although self employment accounted for around 160 thousand jobs in 2007, it remains a minor share of the total.

Female jobs are expected to maintain more or less a constant share, of total employment, rising only marginally.

Part-time employment will account for most of the net increase in the number of jobs in this industry.

Self-employment in this industry is comparatively small (at just over 6 per cent of the total). This is not projected to change much over the next ten years.

Table 4.23.2: Employment by Gender and Status, Education

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	450	(17.6)	186	(7.3)	82	(3.2)	719	(28.2)	-18	19	10	11
Female employment	770	(30.2)	988	(38.7)	76	(3)	1,834	(71.8)	11	42	1	54
Total employment	1,220	(47.8)	1,174	(46)	158	(6.2)	2,553	(100)	-8	61	12	64
2012									2012-2017			
Male employment	432	(16.5)	205	(7.8)	92	(3.5)	729	(27.9)	-23	17	10	5
Female employment	781	(29.8)	1,030	(39.3)	77	(3)	1,888	(72.1)	5	35	1	40
Total employment	1,212	(46.3)	1,235	(47.2)	170	(6.5)	2,617	(100)	-18	52	11	45
2017									2007-2017			
Male employment	409	(15.4)	223	(8.4)	102	(3.8)	734	(27.6)	-41	36	21	16
Female employment	785	(29.5)	1,064	(40)	78	(2.9)	1,928	(72.4)	15	77	2	94
Total employment	1,194	(44.9)	1,287	(48.3)	180	(6.8)	2,662	(100)	-26	113	22	109

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.23.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Teachers and lecturers are the major occupations within the professional occupational group. They account for over 1 in every 2 jobs in the industry. This share is on a rising trend.
- These occupations are increasingly being supported by associate professionals, personal service and managerial occupations.
- In contrast, there has been a decline in the importance in this industry of administrative, clerical and secretarial and elementary occupations.

Future changes

- Recent historical trends are projected to continue. With 150 thousand additional jobs, the professional group will be the main beneficiary of job growth.
- To a much lesser extent, personal service, associate professional and managerial occupations are also expected to benefit.
- Administrative, clerical & secretarial and elementary occupations are projected to see further job losses. The practice of sub-contracting out of many tasks, such as cleaning and catering, has impacted adversely on elementary occupations as private sector companies strive to cut costs. The use of Private Financial Initiatives, in school construction and maintenance will also transfer jobs out of this industry and into construction
-

Shift share analysis

Table 4.23.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered.

Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

The industry effect, in Education, was positive (albeit modest) in the period 1987-97, accounting for an increase in all occupations of around 4 per cent. In the last decade, this increased to around 14 per cent as education became a priority for public expenditure. This is expected to fall back to 6 per cent over the projection period 2007-2017.

This positive effect is offset by significant negative occupational effects for administrative & clerical, skilled trades, machine & transport operatives and elementary occupations over the projection period. For most other occupations, positive occupational effects reinforce the positive industry effect. These patterns by occupation broadly follow those for the previous two decades.

Replacement demands

Table 4.23.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

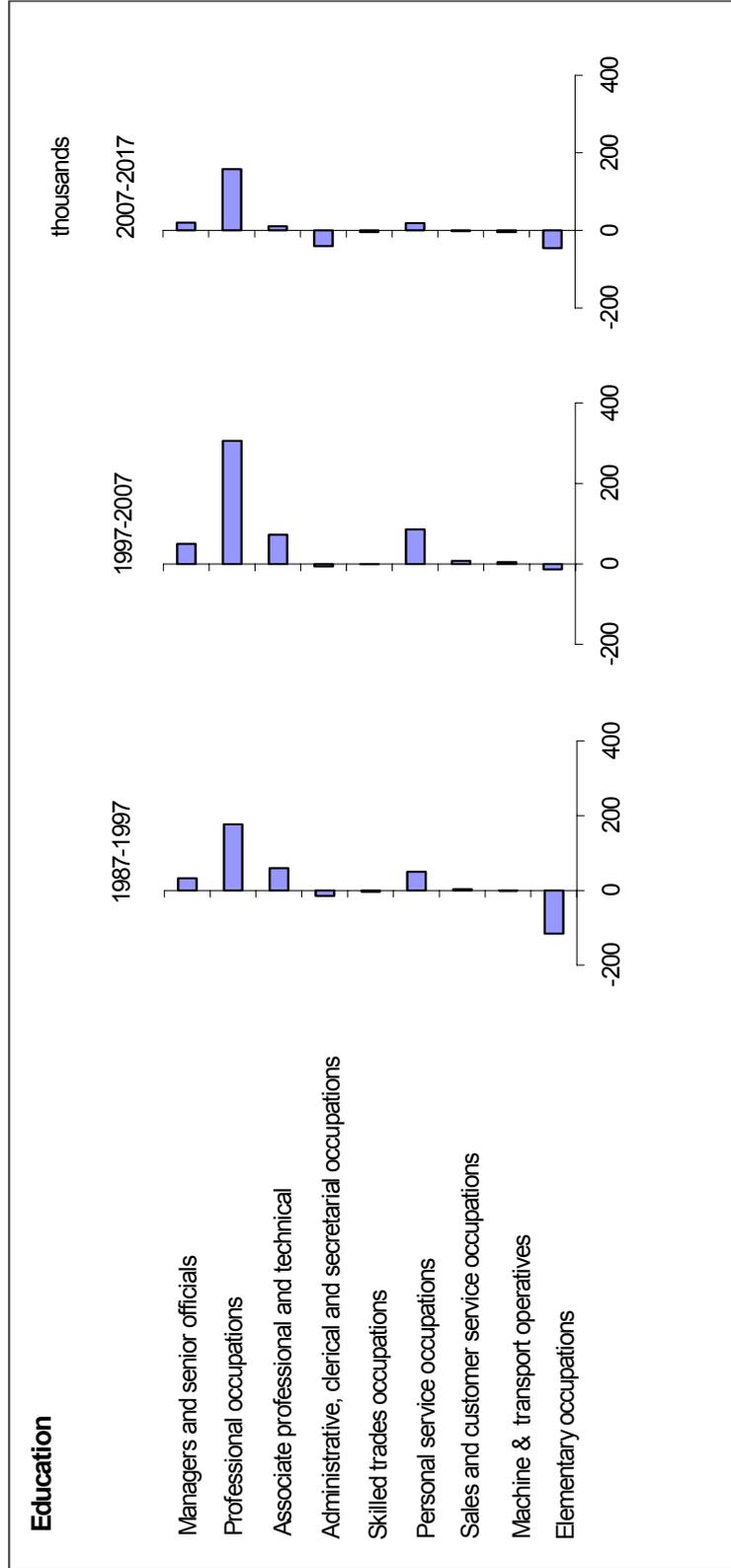
- As in most other industries, replacement demands far outweigh the projected expansion demands. Replacement demand is some 10 times larger than expansion demand.
- The total employment requirement over the decade is over a million. Well over half this figure relates to professional occupations.
- Associate professional & technical occupations and personal service occupations will also require substantial replacements.

Table 6.23.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Education Employment Levels (000s)	2007-2017									
	1987	1997	2007	2012	2017	2017	Net Change	Replacement Demands	Total Requirement	
1. Managers & Senior Officials	60	92	142	156	163	163	20	56	76	
2. Professional Occupations	857	1,034	1,340	1,422	1,498	1,498	158	573	731	
3. Associate Professional & Technical Occupation:	192	251	324	334	335	335	11	116	126	
4. Administrative, Clerical & Secretarial Occupation:	168	153	147	127	106	106	-41	64	23	
5. Skilled Trades Occupations	33	29	29	27	24	24	-5	10	5	
6. Personal Service Occupations	137	187	273	283	292	292	19	112	131	
7. Sales & Customer Service Occupations	16	20	27	26	25	25	-2	10	8	
8. Machine & Transport Operatives	47	46	51	49	46	46	-5	19	14	
9. Elementary Occupations	349	234	220	193	174	174	-46	94	48	
Total	1,860	2,046	2,553	2,617	2,662	2,662	109	1,054	1,163	
Percentage Shares	Percentage Changes									
1. Managers & Senior Officials	3.2	4.5	5.6	6.0	6.1	6.1	14.3	39.4	53.7	
2. Professional Occupations	46.1	50.5	52.5	54.3	56.3	56.3	11.8	42.8	54.5	
3. Associate Professional & Technical Occupation:	10.3	12.3	12.7	12.7	12.6	12.6	3.4	35.7	39.1	
4. Administrative, Clerical & Secretarial Occupation:	9.0	7.5	5.8	4.9	4.0	4.0	-27.9	43.7	15.8	
5. Skilled Trades Occupations	1.8	1.4	1.1	1.0	0.9	0.9	-16.3	33.9	17.6	
6. Personal Service Occupations	7.4	9.1	10.7	10.8	11.0	11.0	6.9	41.2	48.1	
7. Sales & Customer Service Occupations	0.9	1.0	1.1	1.0	0.9	0.9	-8.2	36.5	28.3	
8. Machine & Transport Operatives	2.6	2.3	2.0	1.9	1.7	1.7	-9.3	37.7	28.3	
9. Elementary Occupations	18.8	11.4	8.6	7.4	6.5	6.5	-21.0	42.8	21.8	
Total	100.0	100.0	100.0	100.0	100.0	100.0	4.3	41.3	45.6	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.23.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.23.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s		
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation
1. Managers & Senior Officials	33	4	2	27	10	13	50	10	27	20	9	27	20	9	-3	14	9	-3
2. Professional Occupations	177	51	35	91	110	145	306	110	145	158	84	50	158	84	-26	101	84	-26
3. Associate Professional & Technical Occupations	59	11	8	40	27	35	73	27	35	11	20	11	11	20	-6	-3	20	-6
4. Administrative, Clerical & Secretarial Occupations	-15	10	7	-32	16	22	-6	16	22	-41	9	-44	-41	9	-3	-47	9	-3
5. Skilled Trades Occupations	-4	2	1	-7	3	4	-1	3	4	-5	2	-8	-5	2	-1	-6	2	-1
6. Personal Service Occupations	49	8	6	36	20	26	86	20	26	19	17	40	19	17	-5	7	17	-5
7. Sales & Customer Service Occupations	3	1	1	1	2	3	7	2	3	-2	2	3	-2	2	-1	-3	2	-1
8. Machine & Transport Operatives	-1	3	2	-6	5	7	4	5	7	-5	3	-7	-5	3	-1	-7	3	-1
9. Elementary Occupations	-116	21	14	-151	25	33	-14	25	33	-46	14	-71	-46	14	-4	-56	14	-4
Total	186	111	76	0	218	288	506	218	288	109	159	0	109	159	-50	0	159	-50
	1987-1997			% change			1997-2007			% change			2007-2017			% change		
1. Managers & Senior Officials	54.7	6.0	4.1	44.7	10.7	14.1	53.8	10.7	14.1	14.3	6.2	29.1	14.3	6.2	-2.0	10.0	6.2	-2.0
2. Professional Occupations	20.6	6.0	4.1	10.6	10.7	14.1	29.6	10.7	14.1	11.8	6.2	4.9	11.8	6.2	-2.0	7.5	6.2	-2.0
3. Associate Professional & Technical Occupations	31.0	6.0	4.1	21.0	10.7	14.1	29.0	10.7	14.1	3.4	6.2	4.2	3.4	6.2	-2.0	-0.9	6.2	-2.0
4. Administrative, Clerical & Secretarial Occupations	-9.0	6.0	4.1	-19.0	10.7	14.1	-3.9	10.7	14.1	-27.9	6.2	-28.6	-27.9	6.2	-2.0	-32.2	6.2	-2.0
5. Skilled Trades Occupations	-10.9	6.0	4.1	-20.9	10.7	14.1	-2.5	10.7	14.1	-16.3	6.2	-27.2	-16.3	6.2	-2.0	-20.5	6.2	-2.0
6. Personal Service Occupations	36.0	6.0	4.1	26.0	10.7	14.1	46.0	10.7	14.1	6.9	6.2	21.3	6.9	6.2	-2.0	2.7	6.2	-2.0
7. Sales & Customer Service Occupations	19.1	6.0	4.1	9.1	10.7	14.1	38.2	10.7	14.1	-8.2	6.2	13.4	-8.2	6.2	-2.0	-12.4	6.2	-2.0
8. Machine & Transport Operatives	-2.2	6.0	4.1	-12.2	10.7	14.1	9.6	10.7	14.1	-9.3	6.2	-15.1	-9.3	6.2	-2.0	-13.6	6.2	-2.0
9. Elementary Occupations	-33.1	6.0	4.1	-43.1	10.7	14.1	-5.8	10.7	14.1	-21.0	6.2	-30.6	-21.0	6.2	-2.0	-25.3	6.2	-2.0
Total	10.0	6.0	4.1	0.0	10.7	14.1	24.7	10.7	14.1	4.3	6.2	0.0	4.3	6.2	-2.0	0.0	6.2	-2.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.24 HEALTH & SOCIAL WORK

4.24.1 Description of the Industry

INDUSTRY 24: HEALTH & SOCIAL WORK		
SIC2003 headings: 85		
Human health activities including: hospital, medical and dental practices; nurses, midwives, speech therapists, etc. working other than in hospitals; medical laboratories, blood banks and ambulance transport. Veterinary activities. Social work activities incl.: hostels/homes for children, the aged, the handicapped, homeless etc.; day care activities; and social, counselling, refugee, and similar activities.		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	7.5	100
Exposure to International Trade:	zero	average
Concentration (market share of largest employers):	high	average
Total employment (2007):	3,684,000	31,234,000
Share of total employment (% 2007):	11.8	100
Gender split (male:female) (% 2007):	21:79	53:47
Part-time share (% 2007):	42	28
Self-employment share (% 2007):	8	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.24.2 Industry Commentary

The health sector is dominated by the NHS, which is one of Europe's largest employers. At the end of 2005 the NHS hit two of its most difficult targets so far. It eliminated waiting times of more than six months for an in-patient operation and reduced the maximum waiting time for an out-patient appointment to 13 weeks. The next and more difficult target is to get the total waiting time from GP referral to start of treatment down to a maximum of 18 weeks by December 2008.

The role of the private sector in the NHS has grown in the last decade. Precise data are difficult to compile, but since 1997 the market share of the independent sector in the provision of healthcare in the UK is estimated to have grown significantly. The majority of family doctors remain independent contractors, earning their income from profits they make from their business. In other areas, however, the role of the private sector as a whole has

been expanded recently because of contracts negotiated centrally by the Department of Health's commercial directorate. Much of the growth has come from two waves of independent treatment centres, which, when fully up and running, will provide more than 400,000 operations a year at a cost of £1bn. Furthermore, contracts to provide diagnostics (e.g. scans, X-rays and similar investigations) have been signed to a value of £200m a year. The NHS also buys about £17bn-worth of supplies each year from the private sector as well as more than £10bn-worth of pharmaceuticals. In addition, the health service in England also buys about £4bn of clinical services from the private and the voluntary sectors each year. In this field, two significant contracts are under negotiation: one to allow the commercial sector to provide GP services in areas that are short of doctors and one to support, or even supply, the commissioning of patient care. How much these contracts will be worth will depend

on the extent of the use that primary care trusts make of them.

The government plans to increase spending on health by 4 per cent per annum over the next few years. This rate of increase will bring the amount the UK spends on health close to the European average as a proportion of GDP. However, despite the increase in spending, large investments in new hospitals, better heart and cancer care, and huge reductions in waiting times, the NHS remains a patchy performer at levels below the European average. Most of the recent increases in spending have been absorbed by growing staff levels and salaries.

Recent reviews have suggested that the service has made significant productivity gains due to increases in the quality of care. However, further significant improvements in productivity, through better use of resources, and progress in tackling unhealthy lifestyles are required in order to control the upward pressures on spending.

Acquisitions of hospitals and nursing homes continue at a fast pace in the private sector. The future of the NHS in many areas appears to encompass a move from the district general hospital to the creation of super-surgeries and polyclinics.

Complex care and emergency services will be concentrated in fewer centres and some of them will be linked with world-class academic medical centres, which will treat cancer and other diseases. The main drivers for the changes are safety and quality.

Increasing demands associated with an ageing population and ever more sophisticated (and expensive) treatments have led to greater pressures still on the health sector. There have been numerous initiatives to improve the operation of the state sector, with targets, and attempts to improve efficiency by introducing competition, and greater autonomy in provision for both hospitals and GP

services. Unfortunately, new indicators appear to show that health sector productivity over recent years has actually been falling, but this may be the result of measuring productivity without regard to the number of hours actually worked, as opposed to using only the number of workers employed.

The sector is projected to expand significantly over the next decade, in part driven by the implementation and upgrade of the NHS information network, including major electronic record and booking systems. Although the number of people working in the NHS has risen steadily over recent years, the organisation continues to suffer staff shortages, of both doctors and nurses. Many such shortages are currently being met by overseas recruitment.

The demand for health and social care will be driven by a number of long-term factors, such as the increase in the size of the elderly population, rising expectations about what health care should be available and increasing disposable incomes. The demographic trends will stimulate demand from both government and individuals and this is expected to lead to significant long-term output and employment growth in the industry.

The government is now allowing certain hospital trusts, those which have demonstrated clinical and financial excellence, to apply for Foundation Trust status which will give them greater financial and operational freedom from government control. They are run by local managers and staff and members of the public and are able to tailor their activities to the needs of the local population. It is hoped that this will bring a measure of greater efficiency to the NHS.

The government has also moved to increase the NHS use of private health care suppliers and has recently increased the presence of overseas providers in the UK. It is likely that the overseas operators, having established a presence in the NHS market, will look to increase their share of the private market, placing increasing

pressure on the existing hospital groups. In addition, operators are coming under increasing pressure from patients and medical insurers to reduce costs.

Long-term prospects for the Health & social care sector are good, with output rising by 3 per cent per annum and employment by almost 1 per cent per annum. A number of long-term factors, such as the aging and increasingly affluent population, and rising expectations, are expected to lead to

strong demand from consumers and the government. Merger and acquisition activity in the Health & Social Work industry is expected to continue as different segments of the health and care markets are consolidated. Efforts to improve productivity and contain costs are expected to result in employment growth of less than 1 per cent per annum over the second half of the decade, much slower than the 2½ per cent per annum seen over 1997-2007.

4.24.3 Productivity and Output Trends

Table 4.24.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	3.1	3.6	2.9	2.6
Employment (% pa)	1.8	2.5	1.2	0.9
(000s)	272	433	218	177
Productivity (% pa)	1.3	1.0	1.7	1.7

Source: 6725output.xls (Figure 6.x.1)

- In this industry output is dominated by the public sector's expenditure on health care. In recent years this has risen rapidly, as the government has committed an increasing proportion of public expenditure into the NHS. As a consequence there has been a pattern of strong growth at or around 2½ -3 per cent per annum. This is projected to continue over the next decade.
- Over the last 10 years or so productivity has also increased quite rapidly as advances in medical and surgical techniques have enabled more patients to be treated in a shorter time span. Further substantial productivity improvements are expected for the future.
- Employment has also grown rapidly. Although this is projected to continue, the rate of increase is expected to slow somewhat. Despite this, in the period to 2017 almost 400 thousand additional jobs are projected.

4.24.4 Employment by Status and Gender

Females account for 4 in every 5 jobs in the industry. The health and social work industry employs more women than any other industry.

Part-time employment is especially important for nursing and some assistant health care and support roles. Over 40 per cent of all jobs are part time. This is workforce is predominantly female.

Although a number of key personnel, such as GPs fall into the category of self employment, it accounts for only around 1 in 12 of all jobs in this industry. In total, there were just under 300 thousand self employed in 2007.

Over the next 10 years, the share of males in total employment is expected to rise. Whilst females will take the majority of the additional jobs, their job share will fall marginally.

The share of part-time working is expected to remain about the same, providing flexibility for both employers and employees. Job sharing schemes are likely to remain important. Such jobs are vitally important for filling skill shortages in the sector.

The total share of self-employment is projected to decline slightly over the decade.

Table 4.24.2: Employment Levels by Gender and Status, Health & Social Work

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	497	(13.5)	177	(4.8)	98	(2.7)	771	(20.9)	69	40	0	109
Female employment	1,349	(36.6)	1,367	(37.1)	196	(5.3)	2,913	(79.1)	90	11	9	110
Total employment	1,846	(50.1)	1,544	(41.9)	294	(8)	3,684	(100)	159	51	9	218
2012									2012-2017			
Male employment	565	(14.5)	216	(5.5)	98	(2.5)	880	(22.5)	67	40	-1	106
Female employment	1,439	(36.9)	1,378	(35.3)	205	(5.2)	3,022	(77.5)	76	-11	7	72
Total employment	2,005	(51.4)	1,595	(40.9)	303	(7.8)	3,902	(100)	142	30	5	177
2017									2007-2017			
Male employment	632	(15.5)	257	(6.3)	96	(2.4)	985	(24.2)	135	80	-1	214
Female employment	1,515	(37.1)	1,368	(33.5)	211	(5.2)	3,094	(75.8)	166	0	15	181
Total employment	2,147	(52.6)	1,624	(39.8)	308	(7.5)	4,079	(100)	301	81	14	395

Source: CE/IER estimates, MDM95 C51F8A Forecast, 25UK.xls (Table 6.X.2).

4.24.5 Projections of Employment by Occupation

Key aspects of occupational structure

- In recent years, nurses and other associate professional and technical occupations have enjoyed substantial shares of total employment have changed very little.
- Doctors, who are classified in the professional group, have seen both their absolute numbers and their shares of employment rise.
- Managers and senior officials have also become more important in the NHS and their share of all jobs is still on a rising trend. This has been partially offset by declines for administrative, clerical and secretarial occupations.
- The personal service occupations group has grown most rapidly. This growth is partially offset by declines amongst the elementary occupations.

Future changes

- The administrative, clerical and secretarial group and elementary occupations are projected to have further job losses.
- This is more than offset by increases elsewhere. The managerial, professional and associate professional groups are all projected to see strong job gains.
- However, the main beneficiaries in terms of additional jobs are expected to be amongst some of the less skilled, personal service occupations. Alone, these are projected to gain some 164 thousand extra jobs by 2017.

Shift share analysis

Table 4.24.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall

decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

In the period 1997-2007, there was a very strong positive industry effect in Health & social work of almost 15 per cent. This fell to 13 per cent in 1997-2007. An even smaller impact is projected for 2007-17.

This is offset by negative occupational effects for administrative & clerical, skilled trades, transport & machine operatives and elementary occupations over the projection period. For most other occupations, positive occupational effects reinforce the positive industry effect. .

Replacement demands

Table 4.24.3 also presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

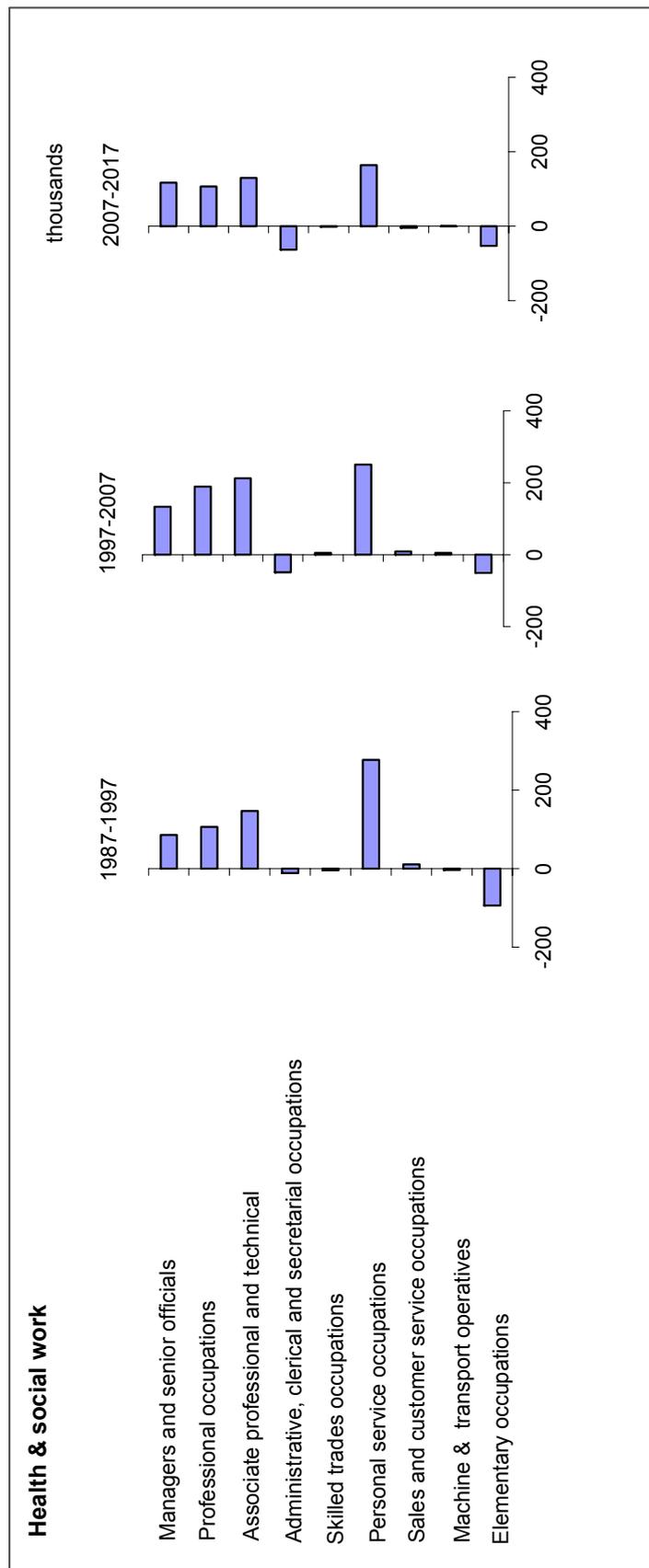
- Total employment is projected to increase substantially. This is expected to be reinforced many times over by replacement demands. The expansion demand of just over 400 thousand translates into a total requirement of almost 1.9 million.
- Filling these job openings is likely to be a difficult issue for the service over the next decade.
- Much of this growth is concentrated in just two main groups: associate professional and technical occupations (which incorporates all qualified nurses); and personal service occupations (including many less skilled occupations such as home helps for the elderly).
- Managers & senior officials and professional occupations will also see very large replacement demands.

Table 4.24.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Health & social work Employment Levels (000s)	2007-2017								
	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Requirement	Total
1. Managers & Senior Officials	219	305	438	505	555	117	173		289
2. Professional Occupations	279	385	575	633	681	107	220		327
3. Associate Professional & Technical Occupation:	695	842	1,054	1,117	1,184	130	424		554
4. Administrative, Clerical & Secretarial Occupation:	341	330	281	252	218	-63	122		60
5. Skilled Trades Occupations	60	56	61	61	59	-2	22		20
6. Personal Service Occupations	438	715	965	1,053	1,129	164	394		558
7. Sales & Customer Service Occupations	34	45	54	53	50	-4	20		16
8. Machine & Transport Operatives	58	55	60	60	60	0	23		22
9. Elementary Occupations	340	246	196	167	143	-53	81		28
Total	2,464	2,978	3,684	3,902	4,079	395	1,478		1,874
Percentage Shares								Percentage Changes	
1. Managers & Senior Officials	8.9	10.2	11.9	13.0	13.6	26.6	39.4		66.1
2. Professional Occupations	11.3	12.9	15.6	16.2	16.7	18.6	38.3		56.9
3. Associate Professional & Technical Occupation:	28.2	28.3	28.6	28.6	29.0	12.3	40.2		52.5
4. Administrative, Clerical & Secretarial Occupation:	13.8	11.1	7.6	6.5	5.3	-22.4	43.6		21.2
5. Skilled Trades Occupations	2.4	1.9	1.7	1.6	1.5	-2.8	35.5		32.7
6. Personal Service Occupations	17.8	24.0	26.2	27.0	27.7	17.0	40.9		57.8
7. Sales & Customer Service Occupations	1.4	1.5	1.5	1.4	1.2	-7.5	36.7		29.2
8. Machine & Transport Operatives	2.4	1.9	1.6	1.5	1.5	-0.7	37.8		37.1
9. Elementary Occupations	13.8	8.3	5.3	4.3	3.5	-26.9	41.3		14.3
Total	100.0	100.0	100.0	100.0	100.0	10.7	40.1		50.9

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.24.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Figure 6.x.4).

Table 4.24.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s			
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	
1. Managers & Senior Officials	86	13	33	40	133	32	40	61	117	27	20	70	117	27	20	70	27	20	70
2. Professional Occupations	106	17	42	48	189	41	50	98	107	36	26	45	107	36	26	45	36	26	45
3. Associate Professional & Technical Occupations	147	41	104	2	212	90	110	13	130	66	47	17	130	66	47	17	66	47	17
4. Administrative, Clerical & Secretarial Occupations	-11	20	51	-83	-49	35	43	-127	-63	18	13	-93	-63	18	13	-93	18	13	-93
5. Skilled Trades Occupations	-4	4	9	-17	5	6	7	-8	-2	4	3	-8	-2	4	3	-8	4	3	-8
6. Personal Service Occupations	277	26	65	186	251	76	93	81	164	60	43	60	164	60	43	60	60	43	60
7. Sales & Customer Service Occupations	11	2	5	4	9	5	6	-1	-4	3	2	-10	-4	3	2	-10	3	2	-10
8. Machine & Transport Operatives	-3	3	9	-15	5	6	7	-8	0	4	3	-7	0	4	3	-7	4	3	-7
9. Elementary Occupations	-94	20	51	-165	-51	26	32	-109	-53	12	9	-74	-53	12	9	-74	12	9	-74
Total	514	147	368	0	705	317	388	0	395	230	165	0	395	230	165	0	230	165	0
	1987-1997			% change			1997-2007			% change			2007-2017			% change			
1. Managers & Senior Officials	39.3	6.0	14.9	18.4	43.7	10.7	13.0	20.1	26.6	6.2	4.5	15.9	26.6	6.2	4.5	15.9	6.2	4.5	15.9
2. Professional Occupations	38.1	6.0	14.9	17.2	49.2	10.7	13.0	25.5	18.6	6.2	4.5	7.9	18.6	6.2	4.5	7.9	6.2	4.5	7.9
3. Associate Professional & Technical Occupations	21.1	6.0	14.9	0.2	25.2	10.7	13.0	1.5	12.3	6.2	4.5	1.6	12.3	6.2	4.5	1.6	6.2	4.5	1.6
4. Administrative, Clerical & Secretarial Occupations	-3.3	6.0	14.9	-24.2	-14.8	10.7	13.0	-38.5	-22.4	6.2	4.5	-33.1	-22.4	6.2	4.5	-33.1	6.2	4.5	-33.1
5. Skilled Trades Occupations	-6.7	6.0	14.9	-27.6	9.1	10.7	13.0	-14.6	-2.8	6.2	4.5	-13.6	-2.8	6.2	4.5	-13.6	6.2	4.5	-13.6
6. Personal Service Occupations	63.3	6.0	14.9	42.5	35.1	10.7	13.0	11.4	17.0	6.2	4.5	6.2	17.0	6.2	4.5	6.2	6.2	4.5	6.2
7. Sales & Customer Service Occupations	31.7	6.0	14.9	10.9	20.5	10.7	13.0	-3.2	-7.5	6.2	4.5	-18.2	-7.5	6.2	4.5	-18.2	6.2	4.5	-18.2
8. Machine & Transport Operatives	-5.4	6.0	14.9	-26.3	8.9	10.7	13.0	-14.8	-0.7	6.2	4.5	-11.5	-0.7	6.2	4.5	-11.5	6.2	4.5	-11.5
9. Elementary Occupations	-27.6	6.0	14.9	-48.5	-20.5	10.7	13.0	-44.2	-26.9	6.2	4.5	-37.7	-26.9	6.2	4.5	-37.7	6.2	4.5	-37.7
Total	20.9	6.0	14.9	0.0	23.7	10.7	13.0	0.0	10.7	6.2	4.5	0.0	10.7	6.2	4.5	0.0	6.2	4.5	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

4.25 OTHER SERVICES

4.25.1 Description of the industry

INDUSTRY 25: OTHER SERVICES		
SIC2003 headings: 99, 90		
<p>Business, professional, religious and political organisations; trade unions; recreational, cultural and sporting facilities including: film, radio and television, theatre, arts facilities, museums, sports arenas and organisations, betting; other service activities including dry cleaning, hairdressing, funerals. Sewage and refuse disposal, sanitation etc., including collection of solid wastes, transportation and treatment by incineration or other means, sewage removal and disposal, and maintenance of sewers and drains. Recycling of waste with an industrial process is classified to Industry 10, Manufacturing & Recycling. Collection and purification of water is classified to part of Industry 2, Water Supply.</p>		
INDUSTRY PROFILE		
		All industries
Share of UK Output (% 2007):	5.3	100
Exposure to International Trade:	low	average
Concentration (market share of largest employers):	low	average
Total employment (2007):	2,001,000	31,234,000
Share of total employment (% 2007)	6.4	100
Gender split (male:female) (% 2007):	49:51	53:47
Part-time share (% 2007):	30	28
Self-employment share (% 2007):	28	13

Source: 6725Output.xls (industry profile). CE/IER estimates based on ONS data.

4.25.2 Industry Commentary

Other Services is a diverse sector that covers household waste treatment, the broadcast media and sports and entertainment activities. Many of these are in the early stages of development and may one day establish themselves as separate industries. As such there are many small firms in the industry and some small, but rapidly expanding, sectors.

Waste management is becoming a higher value-added sector and of growing importance given the focus on green issues. In 2007, DEFRA published an updated version of its Waste Strategy for England

The UK has one of the most liberal TV and radio markets in the world. UK Television

services continue to develop at a rapid rate.

Other Services also includes organisations such as trade unions and political groups, film and theatre producers, libraries, museums, sports facilities, dry-cleaners, hairdressers and undertakers.

Many Other Services companies are increasingly competing with firms traditionally associated with communications and other industries.

The gaming industry has also recently been the subject of new regulations. Online gaming has grown rapidly in the UK since 2000, but British companies have suffered since online gaming became illegal in the US and in mid-2007 the government reversed its decision to set up the UK's first super-casino in Manchester.

In recent years, the main developments in the industry have included: environmental regulation of waste collection and treatment; the deregulation of the UK broadcast media; the strong growth in the betting industry following its deregulation and; in 2005 and 2007, the passing of the Gambling Acts.

As growth in consumer spending slows in response to the credit crisis, personal debt and a weaker housing market, output growth in Other Services is expected to slow. Parts of the industry that rely on household expenditure for demand will be directly affected by lower spending levels but other areas, including the broadcast media, will be affected indirectly, for example through lower advertising spending. There will also be positive effects of the Olympic Games and the European football championships on key parts of the industry.

In the long term, Other Services will be shaped by the forces of rapidly developing technologies, particularly in communications and the media. Innovation is likely to be further driven by cross-border competition resulting from European harmonisation under the Services Directive, currently under public consultation in the UK.

Overall industry output is forecast to grow by 2 per cent per annum over the period 2007-2017, but it is possible that the parts of the industry that embrace technological change and international markets will grow faster than this while other sectors stagnate. Employment in the industry is expected to increase by 1 per cent per annum, meaning that 2.2m people will be employed in Other Services in 2017, compared with 1.6m in 1997.

4.25.3 Productivity and Output Trends

Table 4.25.1: Trends in Output, Productivity and Employment
Average change in the period

Indicator	1997-2002	2002-2007	2007-2012	2012-2017
Output (% pa)	3.1	1.8	1.9	2.0
Employment (% pa)	3.0	1.2	0.8	1.1
(000s)	261	117	78	115
Productivity (% pa)	0.1	0.6	1.1	0.9

Source: 6725output.xls (Figure 6.x.1)

- In this industry, output trends have been strongly positive for many years. Average annual growth rates have been just under 2 per cent per annum over the past 5 years or so. This is expected to continue.
- Productivity growth has noticeably slowed over the past decade, and has also been somewhat erratic over recent years. A pattern of slow productivity growth is expected to continue over the next decade. As well as increasing use of part-time employment (which reduces output per head which is the measure of productivity used here), this partly reflects changes in the industry mix.
- As a result of output growth well ahead of productivity growth, employment is projected to grow significantly, with over 200 thousand extra jobs being created over the decade to 2017.

4.25.4 Employment by Status and Gender

Employment in this industry is evenly divided between men and women.

Accounting for 3 in every 10 jobs in 2007, part-time working is quite important in this industry group.

Accounting for a similar portion of the total employment, self employment is also very significant in certain parts of this industry group.

The projected rise in employment in this industry over the coming decade is expected to benefit both men and women.

Gender shares are expected to shift slightly in favour of male jobs.

A slight increase in part-time working is projected.

A small rise in employment share is also projected for self-employment.

The result of this is that the share of full-time jobs will decrease slightly

Table 4.25.2: Employment Levels by Gender and Status, Misc. Services

Employment by gender	Full time		Part time		Self employed		Total		Changes in Employment Status (000s)			
	000s	(% share)	000s	(% share)	000s	(% share)	000s	(% share)	FT	PT	SE	Total
2007									2007-2012			
Male employment	503	(25.1)	200	(10)	281	(14)	983	(49.1)	9	23	21	53
Female employment	324	(16.2)	406	(20.3)	288	(14.4)	1,018	(50.9)	-4	10	19	25
Total employment	827	(41.3)	606	(30.3)	569	(28.4)	2,001	(100)	5	33	40	78
2012									2012-2017			
Male employment	512	(24.6)	223	(10.7)	302	(14.5)	1,037	(49.8)	16	29	28	72
Female employment	320	(15.4)	416	(20)	307	(14.8)	1,043	(50.2)	0	17	26	43
Total employment	832	(40)	639	(30.7)	609	(29.3)	2,080	(100)	16	46	53	115
2017									2007-2017			
Male employment	528	(24)	252	(11.5)	329	(15)	1,109	(50.5)	25	52	49	125
Female employment	320	(14.6)	433	(19.7)	333	(15.2)	1,086	(49.5)	-4	27	45	68
Total employment	848	(38.6)	684	(31.2)	663	(30.2)	2,194	(100)	21	79	94	193

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.X.2).

4.25.5 Projections of Employment by Occupation

Key aspects of occupational structure

- Associate professional and technical occupations is the largest occupational group, accounting for around 1 in 5 of all jobs in this industry group in 2007.
- Other significant occupational groups but with smaller job shares, are managers & senior officials, professionals, administrative, clerical & secretarial occupations, personal service occupations and elementary occupations.

Future changes

- With an extra 90 thousand jobs being created, the associate professional and technical group is expected to benefit most from the projected employment increase.
- Most of the other groups mentioned above are also expected to see job growth.
- Administrative, clerical & secretarial occupations and elementary occupations are the main exception of this observation. These are each projected to see the loss of around 10 thousand jobs. This continues a long-term trend for the less skilled occupations to lose job share compared to the more highly skilled.
- Although little change is expected, the only other group to experience slight job losses are skilled trades occupations.

Shift share analysis

Table 4.25.4 presents an analysis of the relative importance of scale, industry and occupational effects in the observed and projected changes. The scale effect shows what would have happened had the industry maintained its overall share of total employment. The industry effect demonstrates the impact of the overall decline or growth of this particular industry over the various sub-periods covered. Finally, the occupational effect illustrates

the impact of changes in technology and organisational factors on the occupational structure *within* the industry.

This group of industries has also benefited from strong positive industry effects (just over 13 per cent in the period 1987-97, and a similar impact over 1997-2007). The industry effect is projected to be a much more modest 3 per cent over the coming decade.

This positive effect is offset by negative occupational effects for administrative & clerical, skilled trades, transport & machine operatives and elementary occupations. For most other occupations positive occupational effects reinforce the positive industry effect. These occupational patterns broadly follow those for the previous two decades.

Replacement demands

Table 4.25.3 presents estimates of replacement demands. These take into account the need to replace those leaving because of retirement or other factors.

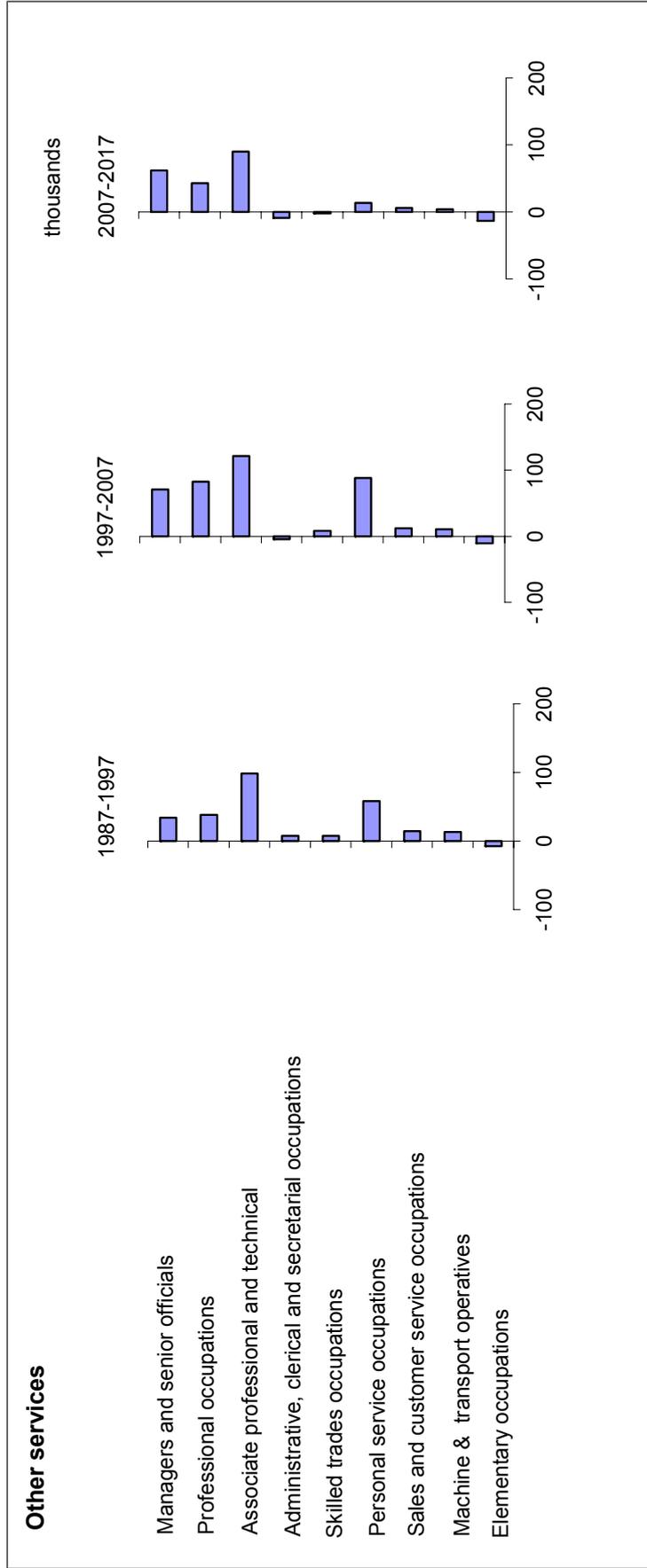
- Replacement demands are once again expected to add considerably to the required employment levels in this industry over the next decade. Replacement demands are expected to be 3-4 times as big as the projected expansion demand of around 190 thousand jobs.
- Managers, & senior officials, associate professionals, personal service occupations and elementary occupations are projected to have the largest replacement demands. Each of these groups is projected to require replacements of around 100 thousand staff or more.
- The largest requirement is projected for associate professional & technical occupations, which alone accounts for almost a ¼ of a million job openings. Total requirements across all occupations are projected to be almost a million jobs.

Table 4.25.3: Changing Composition of Employment by Occupation and Replacement Demands

United Kingdom: Miscellaneous services Employment Levels (000s)	1987					2007					2012					2017					2007-2017		
	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	Net Change	Replacement Demands	Total Requirement
1. Managers & Senior Officials	224	258	329	353	391	224	258	329	353	391	224	258	329	353	391	62	128	128	128	128	62	128	190
2. Professional Occupations	125	163	246	267	288	125	163	246	267	288	125	163	246	267	288	43	85	85	85	85	43	85	128
3. Associate Professional & Technical Occupation:	209	308	429	476	519	209	308	429	476	519	209	308	429	476	519	90	144	144	144	144	90	144	234
4. Administrative, Clerical & Secretarial Occupatioi	164	172	167	166	159	164	172	167	166	159	164	172	167	166	159	-9	69	69	69	69	-9	69	60
5. Skilled Trades Occupations	76	84	92	91	89	76	84	92	91	89	76	84	92	91	89	-2	32	32	32	32	-2	32	30
6. Personal Service Occupations	158	216	304	295	318	158	216	304	295	318	158	216	304	295	318	13	122	122	122	122	13	122	135
7. Sales & Customer Service Occupations	33	47	59	63	65	33	47	59	63	65	33	47	59	63	65	6	20	20	20	20	6	20	26
8. Machine & Transport Operatives	94	107	118	119	121	94	107	118	119	121	94	107	118	119	121	4	43	43	43	43	4	43	47
9. Elementary Occupations	277	269	258	249	245	277	269	258	249	245	277	269	258	249	245	-13	98	98	98	98	-13	98	85
Total	1,360	1,623	2,001	2,080	2,194	1,360	1,623	2,001	2,080	2,194	1,360	1,623	2,001	2,080	2,194	193	742	742	742	742	193	742	935
Percentage Shares	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	1987	1997	2007	2012	2017	18.8	38.9	38.9	38.9	38.9	18.8	38.9	57.8
1. Managers & Senior Officials	16.5	15.9	16.4	17.0	17.8	16.5	15.9	16.4	17.0	17.8	16.5	15.9	16.4	17.0	17.8	18.8	38.9	38.9	38.9	38.9	18.8	38.9	57.8
2. Professional Occupations	9.2	10.0	12.3	12.8	13.1	9.2	10.0	12.3	12.8	13.1	9.2	10.0	12.3	12.8	13.1	17.5	34.8	34.8	34.8	34.8	17.5	34.8	52.3
3. Associate Professional & Technical Occupation:	15.4	18.9	21.4	22.9	23.6	15.4	18.9	21.4	22.9	23.6	15.4	18.9	21.4	22.9	23.6	21.0	33.6	33.6	33.6	33.6	21.0	33.6	54.6
4. Administrative, Clerical & Secretarial Occupatioi	12.1	10.6	8.4	8.0	7.2	12.1	10.6	8.4	8.0	7.2	12.1	10.6	8.4	8.0	7.2	-5.3	41.2	41.2	41.2	41.2	-5.3	41.2	35.9
5. Skilled Trades Occupations	5.6	5.1	4.6	4.4	4.1	5.6	5.1	4.6	4.4	4.1	5.6	5.1	4.6	4.4	4.1	-2.6	34.7	34.7	34.7	34.7	-2.6	34.7	32.1
6. Personal Service Occupations	11.6	13.3	15.2	14.2	14.5	11.6	13.3	15.2	14.2	14.5	11.6	13.3	15.2	14.2	14.5	4.4	40.0	40.0	40.0	40.0	4.4	40.0	44.5
7. Sales & Customer Service Occupations	2.4	2.9	2.9	3.0	2.9	2.4	2.9	2.9	3.0	2.9	2.4	2.9	2.9	3.0	2.9	10.1	34.7	34.7	34.7	34.7	10.1	34.7	44.9
8. Machine & Transport Operatives	6.9	6.6	5.9	5.7	5.5	6.9	6.6	5.9	5.7	5.5	6.9	6.6	5.9	5.7	5.5	3.2	36.5	36.5	36.5	36.5	3.2	36.5	39.8
9. Elementary Occupations	20.3	16.6	12.9	12.0	11.2	20.3	16.6	12.9	12.0	11.2	20.3	16.6	12.9	12.0	11.2	-5.2	38.0	38.0	38.0	38.0	-5.2	38.0	32.8
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	100.0	100.0	9.7	37.1	37.1	37.1	37.1	9.7	37.1	46.7

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

Figure 4.25.1: Changing Composition of Employment by Occupation



Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (figure 6.x.4).

Table 4.25.4: Shift-share Analysis of Changes in Occupational Employment

	1987-1997			000s			1997-2007			000s			2007-2017			000s				
	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation	total:	scale	industry occupation		
1. Managers & Senior Officials	34	13	30	-10	71	28	33	11	62	21	11	30	62	21	11	30	62	21	11	30
2. Professional Occupations	38	7	17	14	83	17	21	45	43	15	8	19	43	15	8	19	43	15	8	19
3. Associate Professional & Technical Occupations	98	12	28	58	121	33	39	50	90	27	15	49	90	27	15	49	90	27	15	49
4. Administrative, Clerical & Secretarial Occupations	8	10	22	-24	-5	18	22	-45	-9	10	6	-25	-9	10	6	-25	-9	10	6	-25
5. Skilled Trades Occupations	7	5	10	-7	8	9	11	-11	-2	6	3	-11	-2	6	3	-11	-2	6	3	-11
6. Personal Service Occupations	58	9	21	27	88	23	27	38	13	19	10	-16	13	19	10	-16	13	19	10	-16
7. Sales & Customer Service Occupations	14	2	4	8	12	5	6	1	6	4	2	0	6	4	2	0	6	4	2	0
8. Machine & Transport Operatives	13	6	13	-5	11	11	13	-14	4	7	4	-8	4	7	4	-8	4	7	4	-8
9. Elementary Occupations	-7	16	37	-61	-11	29	34	-73	-13	16	9	-38	-13	16	9	-38	-13	16	9	-38
Total	263	81	182	0	378	173	205	0	193	125	68	0	193	125	68	0	193	125	68	0
				% change	1997-2007	% change	2007-2017	% change												
1. Managers & Senior Officials	15.1	6.0	13.4	-4.3	27.4	10.7	12.6	4.1	18.8	6.2	3.4	9.2	18.8	6.2	3.4	9.2	18.8	6.2	3.4	9.2
2. Professional Occupations	30.6	6.0	13.4	11.2	50.7	10.7	12.6	27.4	17.5	6.2	3.4	7.8	17.5	6.2	3.4	7.8	17.5	6.2	3.4	7.8
3. Associate Professional & Technical Occupations	47.0	6.0	13.4	27.7	39.4	10.7	12.6	16.1	21.0	6.2	3.4	11.3	21.0	6.2	3.4	11.3	21.0	6.2	3.4	11.3
4. Administrative, Clerical & Secretarial Occupations	4.6	6.0	13.4	-14.7	-2.6	10.7	12.6	-25.9	-5.3	6.2	3.4	-15.0	-5.3	6.2	3.4	-15.0	-5.3	6.2	3.4	-15.0
5. Skilled Trades Occupations	9.7	6.0	13.4	-9.7	9.8	10.7	12.6	-13.4	-2.6	6.2	3.4	-12.2	-2.6	6.2	3.4	-12.2	-2.6	6.2	3.4	-12.2
6. Personal Service Occupations	36.7	6.0	13.4	17.3	40.8	10.7	12.6	17.5	4.4	6.2	3.4	-5.2	4.4	6.2	3.4	-5.2	4.4	6.2	3.4	-5.2
7. Sales & Customer Service Occupations	43.3	6.0	13.4	23.9	25.3	10.7	12.6	2.1	10.1	6.2	3.4	0.5	10.1	6.2	3.4	0.5	10.1	6.2	3.4	0.5
8. Machine & Transport Operatives	14.1	6.0	13.4	-5.3	9.8	10.7	12.6	-13.4	3.2	6.2	3.4	-6.4	3.2	6.2	3.4	-6.4	3.2	6.2	3.4	-6.4
9. Elementary Occupations	-2.7	6.0	13.4	-22.0	-4.0	10.7	12.6	-27.3	-5.2	6.2	3.4	-14.9	-5.2	6.2	3.4	-14.9	-5.2	6.2	3.4	-14.9
Total	19.4	6.0	13.4	0.0	23.3	10.7	12.6	0.0	9.7	6.2	3.4	0.0	9.7	6.2	3.4	0.0	9.7	6.2	3.4	0.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), 25UK.xls (Table 6.x.3).

5. Spatial Perspectives

5.1 Introduction

A spatial focus is important given policy concerns about significant and persistent spatial variations in productivity and employment. Moreover, skills have been identified as a key driver underlying such regional differentials, and are a key focus of the work of Regional Skills Partnerships in England and of economic development agencies and governments elsewhere in the UK.

Along with a greater emphasis on territoriality and greater regional and local devolution in policy making, it is recognised that regional averages can mask significant intra-regional variations in experience. The detailed results from *Working Futures 2007-2017* enable analysis of such local variations, especially at the local area level within England.

This chapter provides an overview of overall prospects for the devolved nations and English regions of the UK, focussing on long-term changes in output (GVA) and employment. It also covers:

- (a) labour supply and demand – projected changes in the population, labour force, economic activity rates, unemployment and employment;
- (b) prospects for employment change by sector;
- (c) the changing composition of employment by gender and employment status;
- (d) trends in occupational employment for nine SOC Major Groups²⁷;
- (e) projections of replacement demand.

The emphasis in this overview is on the range and patterns of spatial differentiation across the UK over the period to 2017. It focuses on the areas covered by Regional Development Agencies (RDAs) in England, and the devolved administrations of Wales, Scotland and Northern Ireland.

²⁷ More detailed information at the 25 SOC Sub-Major Group level is also available.

Information is also presented for the UK as a whole.

The results incorporate the latest sectoral employment data from ONS, including the 2006 Annual Business Inquiry. They also take account of information from the latest Labour Force Survey (LFS) (2007). These new data provide insights into recent trends in sectoral employment, as well as other aspects of employment structure such as the gender status mix of employment and changing occupational shares, within regions.

Section 5.2 provides a summary of overall prospects in the nations and regions within the UK. Section 5.3 summarises aggregate labour supply and demand trends, including prospects for unemployment. Sectoral prospects at a regional level are described in more detail in Section 5.4. Developments by gender and employment status (full-time, part-time and self-employment) are covered in Section 5.5. Occupational employment prospects are described in Section 5.6, while Section 5.7 concludes by outlining implications for replacement demands.

The results include very detailed projections of **industrial and occupational employment levels**. At the most detailed level, the occupational model is built around a series of employment matrices distinguishing 67 industries (SIC92/2003) and 25 sub-major occupational groups taken from the SOC 2000 occupational classification. These are defined for each nation and region of the UK. Consistent results are also generated for each local area. Some details of the methods used to generate these projections are given below. Further technical information on sources and methods can be found in the supporting Annex and in the separate *Technical Report*.²⁸

The present chapter sets the context for the overall results, which present analyses of changing patterns of employment structure and likely future developments

²⁸ Wilson *et al.* (2006b).

for various sectoral and industrial breakdowns and for local areas within the English regions.²⁹ However, these are not discussed in detail here.

Changes in occupational employment levels between years are also analysed to show changes due to **replacement demand**. This takes into account the need to replace those who leave their jobs because of retirement or other reasons. These replacement demands need to be added to any **structural change** (or so called **expansion demand**) that is projected, in order to obtain an estimate of the overall recruitment requirement. These estimates are based on quite limited data on age structures and flow rates from the LFS. Note that they do not take account of geographical mobility. Hence, they should again be regarded as indicative rather than precise estimates of the likely scale of replacement demands. The key message here is that replacement demands are likely to be much more significant in terms of education and training requirements than expansion demand, even where the latter is quite large.

These projections were finalised before the financial crisis of Autumn 2008. It is unclear what the implications of this will be for the “real” economy. However, regions that are heavily reliant on banking and financial services, such as London (and perhaps to a lesser extent Scotland), could be especially hard hit in the short term. The present results do not take account of such effects. They focus on medium to long-term trends. They assume that the economy will recover from any short term difficulties quite quickly and, revert to its long term patterns of employment change over a 5-10 year horizon.

5.2 Overall Spatial Prospects

Aggregate trends

Table 5.1 shows recent and projected trends in output (GVA) and employment across the UK.

At the England and UK levels, the projections are for a reduction in the average rate of output growth over the period from 2007 to 2017 compared to that recorded over the previous decade. A more marked slowdown in the rate of employment growth is apparent from 1 per cent per annum in the UK and England between 1997 and 2007 to 0.6 per cent per annum, between 2007 and 2017.

Growth will remain generally higher in southern regions (the South East -2.8 per cent per annum, London - 2.9 per cent per annum, the East of England -2.8 per cent per annum and the South West - 2.6 per cent per annum) than in other parts of the UK. Scotland and the North East of England are expected to record the slowest rate of GVA growth. However, compared to the previous decade, projected rates of output growth are expected to hold up more strongly outside London over the next decade.

The southern part of England, including London, experienced rapid growth in employment over the past decade. Over the period to 2017, the South of England is again expected to head the employment growth rate table, but rates of increase are projected to be much more modest than in the past decade. This tendency will probably be reinforced by the after effects of the financial crisis in the Autumn of 2008 which is likely to impinge on London, in particular. Most areas outside London are projected to see annual rates of growth of around ½ per cent per annum.

²⁹ The detailed spatial analysis also includes estimates for more detailed industries. The full definitions used are given in Annex A.

Between 1997 and 2007, Northern Ireland saw the greatest relative employment increases of any part of the UK, as the benefits of the peace dividend were

reaped. The effect of this has now dissipated and Northern Ireland is now projected to see a similar rate of growth to the UK average over the coming decade.

Table 5.1: Long-term Changes in Macroeconomic Indicators

	GVA		Employment		% p.a.
	1997-2007	2007-2017	1997-2007	2007-2017	
London	4.6	2.9	1.4	0.9	
South East	3.4	2.8	1.1	0.7	
East of England	3.3	2.8	1.3	0.7	
South West	3.6	2.6	1.1	0.7	
West Midlands	2.6	2.3	0.5	0.5	
East Midlands	3.2	2.4	0.6	0.6	
Yorks & the Humber	2.9	2.2	1.0	0.6	
North West	2.7	2.2	0.7	0.5	
North East	2.8	2.0	0.9	0.3	
<i>England</i>	3.4	2.6	1.0	0.6	
Wales	2.7	2.3	1.4	0.5	
Scotland	2.8	2.1	0.9	0.4	
Northern Ireland	3.3	2.4	1.8	0.6	
United Kingdom	3.3	2.5	1.0	0.6	

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.1).

Notes: GVA (output) is measured on a residence basis, employment is on an establishment (workplace /jobs) basis. Under the European System of Accounts 1995 (ESA95), the term GVA is used to denote estimates that were previously known as gross domestic product (GDP) at basic prices. Under ESA95 the term GDP denotes GVA plus taxes (less subsidies) on products, i.e. at market prices. The Regional Accounts are currently only published at basic prices, so the figures are referred to as GVA rather than GDP.

Output by broad sector

Table 5.2 shows recent and projected trends in output (GVA) by broad sector.

The overall picture is one of increases in output in all regions and countries, for all the broad sectors, over the period from 2007 to 2017.

Relative to the previous decade, marked increases in output growth rates are confined to manufacturing and non-marketed services. A slowdown in growth rates compared to the previous decade is most apparent for *distribution, transport, etc.*, and in *business & other services*. However, the projected increases in output in the latter sector still remain higher than in any of the other sectors.

Northern Ireland, the North East and the South West are expected to see the fastest projected growth in output in the *primary sector & utilities* over the period to 2017, while Scotland is projected to record no change, reflecting the negative trends in North Sea oil and gas.

In *manufacturing*, projected output growth is highest in the South East and Wales (1.6 per cent per annum), with a number of

other regions close behind, but there is little variation around the average UK rate of 1.3 per cent per annum.

Projected rates of output growth over the period to 2017 in *construction* are highest in southern regions, especially in London, which benefits from the impact of the Olympics. In Northern Ireland, a very slow rate of increase is projected.

For *distribution, transport, etc.*, the southern regions are expected to experience the fastest rates of growth in output, but there is little variation around the UK average rate of increase of 2.7 per cent per annum

In *business & other services* southern regions again tend to be projected to experience output growth in excess of the UK average. In this broad sector, the slowest rates of output growth are in the North East and Scotland.

Finally, the West Midlands and Northern Ireland are expected to record the fastest gains in output for *non-marketed services*, but variations around the UK average rate of 2.3 percent per annum are generally very small. The slowest rates of output growth are projected for the North East.

Table 5.2: Long-term Changes in GVA by Broad Sector

	<i>% p.a.</i>					
	Primary & utilities		Manufacturing		Construction	
	1997-2007	2007-2017	1997-2007	2007-2017	1997-2007	2007-2017
London	0.0	0.8	-0.4	1.3	2.5	2.3
South East	1.5	0.9	0.7	1.6	2.6	2.1
East of England	0.5	0.7	0.3	1.4	1.7	2.0
South West	1.6	1.0	1.5	1.3	3.0	1.9
West Midlands	2.2	0.6	-1.0	0.8	2.0	2.0
East Midlands	0.8	0.7	0.8	1.1	2.6	2.0
Yorks & the Humber	0.1	0.5	0.4	1.2	2.5	1.7
North West	-0.6	0.6	0.3	1.3	2.2	1.3
North East	4.8	1.0	0.7	1.2	2.9	1.6
<i>England</i>	1.1	0.8	0.3	1.3	2.4	1.9
Wales	1.3	0.7	-0.6	1.6	1.7	1.7
Scotland	-0.9	0.0	0.0	1.0	1.4	1.8
Northern Ireland	0.9	1.2	2.3	1.3	-1.2	0.2
United Kingdom	0.8	0.7	0.3	1.3	2.3	1.9
	Distribution, transport etc		Business & other services		Non-marketed services	
	1997-2007	2007-2017	1997-2007	2007-2017	1997-2007	2007-2017
	1997-2007	2007-2017	1997-2007	2007-2017	1997-2007	2007-2017
London	4.1	2.9	6.4	3.2	2.6	2.2
South East	4.3	3.0	4.9	3.5	1.6	2.4
East of England	4.4	3.1	5.1	3.5	1.8	2.3
South West	4.8	3.0	5.6	3.4	1.9	2.3
West Midlands	4.0	2.6	4.8	3.1	2.3	2.5
East Midlands	4.5	2.7	5.6	3.3	2.4	2.4
Yorks & the Humber	3.7	2.5	5.1	2.9	2.3	2.2
North West	3.9	2.4	4.9	2.9	1.3	2.2
North East	3.5	2.5	4.9	2.5	2.0	1.9
<i>England</i>	4.2	2.8	5.5	3.3	2.0	2.3
Wales	4.7	2.4	4.7	2.9	2.5	2.3
Scotland	3.7	2.3	5.4	2.7	2.1	2.2
Northern Ireland	4.1	2.4	5.8	2.9	1.9	2.7
United Kingdom	4.2	2.7	5.5	3.2	2.0	2.3

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.2)

Employment by broad sector

Table 5.3 shows recent historical and projected future trends in employment by broad sector. The overall picture is one of a continuing transformation in the structure of employment, with increases in employment in broad service sectors in all regions, and of declines in the primary sector & utilities, and in manufacturing. A modest growth in construction employment is projected.

Projected rates of employment decline in the *primary sector & utilities*, reflect the combination of continued rapid increases in productivity projected for these sectors (as employers strive to cut labour input to reduce costs), with relatively modest output growth prospects. The net outcome of these conflicting forces is a quite broad range of employment changes across regions, but all are projected to decline. The West Midlands, with a loss rate of 3.7 per cent per annum, is at one extreme whereas the South East has a rate of loss of 0.7 per cent per annum.

It is a similar story in *manufacturing*, where international competition is continuing to drive pressures to reduce costs and improve productivity (with a negative impact on employment, all else being equal). Job losses are projected in this sector in all regions; Yorkshire and the Humber seeing the least damage in terms of job opportunities.

Construction employment is projected to rise modestly over the medium to long-term. Despite the current uncertainties in the housing market, other factors are expected to drive continued growth in demand for other types of buildings and infrastructure. This is projected to benefit all regions. The fastest projected rates of increase for the next decade are in London, and the East Midlands, but variations around the UK average rate of growth of 0.8 per cent per annum are modest.

In *distribution, transport, etc* it is a similar story. All regions are projected to benefit from growth in employment in this broad

sector (although there is considerable variation within the more detailed Sectoral categories which make up the broad sector, which include hotels and restaurants as well as retailing and transport). The South West has the highest projected growth at just under 1 per cent per annum. The North East and Scotland are projected to do least well, with an annual average rate of growth of just 0.4 per cent per annum.

Business & other services have been the source of many new jobs across all regions over the past decade, averaging 2½ per cent per annum. This is expected to slow over the coming decade as competition and pressures to reduce costs offset further opportunities for expansion of such businesses. This is expected to affect all regions. There is little variation from the average rate of employment growth of around 1.4 per cent per annum expected. Regional differentials in projected employment growth in business & other services are much narrower over the period to 2017 than over the past decade.

Finally, in *non-marketed services* all regions are projected to see modest employment gains (around 0.6 per cent per annum). With the exception of the North East and Scotland, there is little variation around this average figure.

Overview of prospects by region

In *London*, GVA is projected to growth by 2.9 per cent per annum over the period 2007-17, representing the highest growth amongst the regions and countries. Employment too is expected to grow faster in London than elsewhere. Within London, GVA is projected to grow fastest in Business & other services (3.2 per cent per annum) and slowest in Primary & utilities (0.8 per cent per annum). This is not surprising given the sectoral balance of activity in the capital. Employment in primary & utilities and manufacturing is expected to decline over the period 2007-17 while again, the greatest growth in

employment is projected in business & other services.

The *South East* is expected to have growth in GVA and employment just below those rates projected for London and similarly greater than the UK average rates. Growth of 3.5 per cent per annum is expected for GVA in business & other services while GVA is projected to increase by less than 1 per cent per annum in primary & utilities. Employment is expected to decline in the primary sector & utilities and manufacturing while growth is projected in the other broad sectors.

In the *East of England*, both output and employment growth over the period 2007-17 is expected to be greater than that projected for the whole of the UK. Growth in GVA is projected to be greater in 2007-17 than it was from 1997 to 2007 in primary & utilities, manufacturing, construction and non-marketed services. The greatest growth is forecast for business & other services, a common feature of the projections for the southern regions. In those sectors where employment is expected to decline, the rate of decline is projected to be slower than that observed between 1997 and 2007. Where growth was observed over the decade to 2007, the projections show slower growth.

Output and employment growth from 2007 to 2017 in the *South West* is expected to be faster than the UK average growth. Again, the greatest growth in GVA and employment is projected for business & other services.

Growth in the *West Midlands* is expected to be just under the UK average for both output and employment growth over the period 2007-17. GVA growth of 3.1 per cent per annum is projected in this region's business & other services sector. This region is projected to witness the greatest decline in employment in primary & utilities (3.6 per cent decrease per annum compared to 2.3 per cent decline per annum across the entire UK).

The *East Midlands* is projected to experience output and employment growth just below the UK average rates. The highest rates of growth in GVA in this region are projected for business & other services (3.3 per cent per annum) and distribution, transport, etc. (2.7 per cent per annum). Employment is forecast to decline in primary & utilities and in manufacturing, with growth projected in the four other broad sectors.

The projections for *Yorkshire & the Humber* indicate that over the decade to 2017, GVA will grow by 2.2 per cent per annum and employment by 0.6 per cent per annum. Business & other services is expected to exhibit the fastest growth in this region, while the primary sector & utilities is expected to grow most slowly. The region's projected rate of decline in manufacturing employment is less than that projected for the whole of the UK, while employment growth rates in Yorkshire & the Humber are expected to be around the UK average rates in the other major sectors.

Output and employment growth rates in the *North West* are projected to be about the same as those forecast for Yorkshire & the Humber. Between 1997 and 2007, GVA in primary & utilities declined in this region but it is projected to increase by around 0.6 per cent per annum between 2007 and 2017. In all broad sectors, except construction, employment growth rates in this region are very similar to the UK average rates.

In the *North East*, output is projected to grow by 2.0 per cent per annum, and employment by 0.3 per cent per annum, between 2007 and 2017. The highest growth in GVA is expected in business & other services. Employment growth in primary & utilities was 2.3 per cent per annum between 2007 and 2017 but the forecast for 2007-17 is a decline of 1.5 per cent per annum. This is slower than the projected decline of 2.3 per cent per annum for the whole of the UK.

In *Wales*, the output and employment growth rates are projected to be just lower

than the UK average rates between 2007 and 2017. In the manufacturing sector, between 1997 and 2007 GVA declined by 0.6 per cent per annum but the 2007-17 projection is for growth of 1.6 per cent per annum. This is greater than the expected average across the UK. In sectors where employment growth is projected for Wales the rates are similar to the UK average rates of growth.

Projected output and employment rates of growth for *Scotland* are lower than the projections for the entire UK. Between 1997 and 2007 GVA in primary & utilities declined by just under 1 per cent per annum however it is projected to remain stable over the decade to 2017. Employment in that sector is projected to decline by 2.5 per cent per annum over the period.

The rates of output and employment growth projected for *Northern Ireland* are very similar to the UK-wide projections. The projected rate of growth of GVA in primary & utilities and non-marketed services are higher in *Northern Ireland*

than elsewhere in the UK. Where there is growth projected for employment in Northern Ireland, it is expected to be similar to or greater than the rates projected for the UK as a whole.

On the basis of the macroeconomic indicators presented in Tables 5.1-5.3, the three regions of south-eastern England, London, the South East and the East of England, emerge as the fastest growing regions, in terms of employment and output, in the UK. This is as observed in previous projections.

Together, the whole of London and most of the South East and East of England regions may be thought of as a London-dominated "mega-city-region". The South West is expected to experience employment and output growth at rates similar to the UK average. Scotland and the North East display the slowest projected output growth and employment growth of any part of the UK over the period to 2017. The general trends identified here are deep-seated and persistent.

Table 5.3: Long-term Changes in Employment by Broad Sector

	% p.a.					
	Primary sector & utilities		Manufacturing		Construction	
	1997-2007	2007-2017	1997-2007	2007-2017	1997-2007	2007-2017
London	-1.5	-1.6	-3.9	-1.3	3.4	1.1
South East	-2.3	-0.7	-2.5	-1.7	1.0	1.0
East of England	-3.0	-2.9	-2.6	-1.5	2.6	0.9
South West	-3.0	-3.6	-2.5	-1.8	1.1	0.6
West Midlands	-3.1	-3.7	-4.7	-1.5	3.1	0.9
East Midlands	-1.9	-2.3	-3.5	-1.1	2.6	1.1
Yorks & the Humber	-2.8	-2.4	-2.9	-0.7	3.7	0.6
North West	-6.5	-2.3	-3.7	-1.6	2.1	0.1
North East	2.3	-1.5	-3.8	-1.5	1.6	0.5
England	-2.7	-2.3	-3.4	-1.4	2.3	0.8
Wales	-3.3	-1.7	-2.7	-1.6	3.0	0.7
Scotland	-0.8	-2.5	-4.0	-1.8	2.1	0.7
Northern Ireland	-2.3	-1.2	-1.9	-1.2	4.4	1.0
United Kingdom	-2.5	-2.3	-3.3	-1.4	2.4	0.8

	% p.a.					
	Distribution, transport etc		Business & other services		Non-marketed services	
	1997-2007	2007-2017	1997-2007	2007-2017	1997-2007	2007-2017
London	1.1	0.5	2.2	1.5	1.6	0.6
South East	0.6	0.6	2.8	1.4	1.6	0.8
East of England	0.9	0.7	2.7	1.5	2.6	0.7
South West	1.0	0.9	2.9	1.7	2.1	0.7
West Midlands	0.7	0.6	2.3	1.1	2.4	0.8
East Midlands	0.9	0.6	2.6	1.4	1.4	0.7
Yorks & the Humber	0.4	0.6	2.7	1.5	2.5	0.5
North West	0.5	0.5	2.6	1.5	1.7	0.5
North East	1.0	0.4	2.7	1.3	2.0	0.2
England	0.8	0.6	2.6	1.4	1.9	0.6
Wales	1.3	0.7	3.4	1.3	2.4	0.7
Scotland	0.3	0.4	2.9	1.3	2.1	0.4
Northern Ireland	2.6	0.8	4.5	1.4	1.5	0.6
United Kingdom	0.8	0.6	2.6	1.4	2.0	0.6

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.3)

5.3 Labour Supply and Demand

It is interesting to contrast the expected changing patterns of employment with developments on the supply side. Summary statistics on labour supply and demand are presented in *Table 5.4*.

Some data in the table relating to the supply-side (e.g. economic activity rates) are residence-based, including the number of employed residents, while other data (e.g. workplace employment [jobs]) relate to the place where people actually work. Part (but not all) of the difference between these measures of employment reflects commuting flows. The latter are especially significant in London and the neighbouring regions of the South East and East of England. Other factors include double jobbing and various statistical and measurement errors. The various

indicators and measures used are defined in detail in Box 2.1 in Chapter 2 (page 15).

The UK *total population* is now expected to increase by nearly 4 million over the decade to 2017, reflecting various factors including net inward migration. There is some considerable variation within the UK. In Scotland, total population is projected to grow only slightly and in the North East, North West and West Midlands population growth is projected to be quite modest. Projected population gains are greatest in London and the South East (each by around 700 thousand) and in the South West and the East of England (each increasing by around half a million).

The *population aged 16+* is projected to grow by almost 3.4 million. The patterns across the UK are similar to those for the total population. In the south of England

growth in the 16+ population is much greater than in the north of the UK.

The projected gain in *working age population* is also greater in London and the South East (around half a million). Annual rates of growth in the working age population are around 10 per cent over the decade in the southern parts of the UK compared to just 2- 3 per cent in the North East and Scotland.

The overall *economic activity rate* (defined as the labour force expressed as a percentage of the population aged 16 years and over) is projected to remain relatively steady over the period to 2017, at around 61 per cent. However, there is some regional variation around this average. The only significant projected increase is in London (with a 0.8 percentage point increase). Small decreases are projected for most other areas, with especially large reductions in the North East, Wales and Scotland. (Note that the ageing of the population is an important factor in these reductions). The North East and Wales are expected to continue to record the lowest economic activity rates.

In the UK as a whole, the *workforce* (workplace employment plus claimant unemployment, plus those on government training schemes) is projected to increase by around 2 million to reach almost 34½ million by 2017. All parts of the UK are expected to share in this increase, with London and the South East recording the largest expected gains. The North East and Scotland display the slowest projected rates of growth.

The labour force (employed residents plus ILO unemployment) exhibits a similar pattern of change. The overall increase projected between 2007 and 2017 is around 1.9 million. The patterns of change are similar to those of the workforce, with the largest and fastest increases in London and the rest of southern England and the slowest in the North East (actually projected to decline) and in Scotland.

ILO unemployment measures the number of people actively searching for work regardless of whether or not they are registered as claimants. Some increase is expected in the short term. By 2017 the overall level is projected to be around 1.74 million compared to 1.56 million in 2007. The projected ILO unemployment **rate** (i.e. ILO unemployment as a percentage of the labour force) varies in 2017 from around 6 per cent in London to below 4 per cent in the South East.

Claimant unemployment is projected to increase by around 150 thousand across the UK over the period to 2017, to reach just over 1 million. A modest increase in the UK claimant unemployment rate is projected, reaching almost 2½ per cent in 2017. All areas share in the modest projected increases in claimant rates. Regional variations in claimant rates are expected to alter little, with London, the West Midlands and the North East displaying the highest rates.

The number of *employed residents* (heads) is projected to increase by around 1.7 million across the UK as a whole. London and the South East are projected to show the largest absolute increases, but most areas are expected to see some growth. The fastest increases are again in London and the South East (0.7 per cent per annum or more). The North East and Scotland show the weakest growth (both with slight declines).

Workplace employment measures the total number of jobs. This is projected to rise at a similar rate to the number of employed residents, with the total number of jobs increasing by just under 2 million. This is the main measure used to assess the changing patterns of employment by sector occupation, gender and status throughout *Working Futures 2007-2017*. Again, it is London and the South East that are projected to show the largest increases, workplace employment growing between 2007 and 2017 by 300-400 thousand jobs in both cases. The North East and Scotland are again projected to show some of the smallest gains and the slowest rates of increase.

Finally, the *labour market residual* measures the difference between the number of employed residents (heads) and workplace employment (jobs). At a UK level, the main element of this is “double jobbing” (some people have more than one job). In the UK, the labour market residual in 2007 is nearly 3 million (compared to just less than 2.3 million in 2004). At a more disaggregated level, net commuting across geographical boundaries plays a significant role. The latter is especially significant for the London and the South East. Statistical errors and other differences in measurement between data from different sources also contribute to the residual.

Further information on national and regional employment shares and changes over the recent (1997 to 2007) and projection (2007 to 2017) periods is

presented in *Table 5.5*. The focus here is on workplace jobs.

All nations and regions are projected to see an increase in total employment over the period to 2017.

The largest absolute increases in employment are expected in London and the South East (421 and 322 thousand respectively), followed by the East of England (around 192 thousand). Together these regions account for almost half of the projected job gains between 2007 and 2017. Apart from the South West, these are the only regions with projected rates of employment growth in excess of the UK average over the period to 2017 (0.6 per cent per annum).

Scotland and the North East display the slowest employment growth rates.

Table 5.4: Changes in Population, Economic Activity Rates and Unemployment

	Population		Working age		Labour Force		Economic activity		Unemployment		ILO		Claimant		Employment		Workplace		Labour Market		
	000s	16+ 000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	level 000s	rate %	level 000s	rate %	Employed residents 000s	employment 000s	000s	Residual		
Changes, 2017 levels-2007 levels																					
London	722	550	500	396	444	0.8	53	0.5	25	0.2	353	421	67								
South East	692	571	479	325	328	-0.6	-9	-0.5	10	0.1	299	322	18								
East of England	512	416	316	277	196	0.4	8	0.0	7	0.0	264	192	-74								
South West	521	455	355	241	191	-0.8	1	-0.2	12	0.2	214	182	-35								
West Midlands	204	159	104	68	143	-0.6	46	1.3	20	0.5	40	125	84								
East Midlands	327	272	201	150	137	-0.4	6	-0.1	12	0.3	127	126	-2								
Yorks & the Humbe	390	321	260	202	157	0.3	-16	-0.8	11	0.1	185	147	-39								
North West	226	196	122	115	185	0.0	3	-0.2	14	0.2	91	171	80								
North East	42	39	24	-5	41	-1.2	0	-0.2	6	0.3	-14	36	50								
England	3,636	2,979	2,361	1,769	1,822	-0.1	92	0.0	117	0.2	1,557	1,723	150								
Wales	153	147	99	50	79	-1.4	22	1.2	8	0.3	35	73	37								
Scotland	114	135	74	27	120	-1.3	56	1.8	18	0.5	-4	102	106								
Northern Ireland	118	112	87	68	54	0.2	12	1.1	3	0.1	65	52	-13								
United Kingdom	4,021	3,373	2,621	1,913	2,075	-0.3	183	0.2	146	0.2	1,652	1,949	280								
2007 levels																					
London	7,573	6,121	5,070	3,839	4,797	62.7	259	5.4	145	2.9	3,581	4,638	1,068								
South East	8,307	6,724	5,103	4,321	4,439	64.3	182	4.1	72	1.4	4,139	4,320	226								
East of England	5,660	4,579	3,453	2,820	2,895	61.6	125	4.3	61	1.8	2,695	2,806	135								
South West	5,172	4,250	3,108	2,592	2,719	61.0	96	3.5	43	1.4	2,497	2,627	178								
West Midlands	5,387	4,334	3,288	2,588	2,789	59.7	147	5.3	102	3.1	2,441	2,675	241								
East Midlands	4,398	3,580	2,727	2,191	2,203	61.2	113	5.1	58	2.1	2,078	2,132	64								
Yorks & the Humbe	5,183	4,206	3,223	2,468	2,657	58.7	132	5.0	81	2.5	2,337	2,558	235								
North West	6,879	5,567	4,246	3,262	3,525	58.6	188	5.3	110	2.6	3,074	3,405	335								
North East	2,562	2,096	1,587	1,202	1,235	57.3	80	6.5	49	3.1	1,122	1,180	60								
England	51,121	41,458	31,805	25,284	27,259	61.0	1,320	4.8	721	2.3	23,964	26,341	2,541								
Wales	2,981	2,425	1,796	1,394	1,447	57.5	75	5.2	41	2.3	1,319	1,395	82								
Scotland	5,133	4,219	3,215	2,600	2,761	61.6	129	4.7	76	2.4	2,471	2,662	208								
Northern Ireland	1,755	1,378	1,086	808	878	58.6	34	3.8	24	2.2	774	836	73								
United Kingdom	60,990	49,480	37,902	30,085	32,345	60.8	1,558	4.8	862	2.3	28,527	31,234	2,905								

Source: CE/IER estimates, MDM01R1 C51F8A Forecast, CrossRegional.xls (Table R.4).

(continued)

Table 5.4: Changes in Population, Economic Activity Rates and Unemployment (continued)

	Population		Working age		Labour Force		Economic activity		Unemployment		ILO		Claimant level		Employment		Labour Market		
	Total 000s	16+ 000s	000s	000s	000s	000s	rate %	rate %	level 000s	level 000s	rate %	rate %	level 000s	level 000s	rate %	rate %	000s	000s	
	2017 levels																		
London	8,295	6,671	5,570	4,236	5,241	63.5	311	5.9	170	3.1	3,933	5,059	1,135						
South East	8,999	7,295	5,582	4,646	4,767	63.7	173	3.6	82	1.5	4,438	4,642	244						
East of England	6,172	4,995	3,769	3,097	3,091	62.0	133	4.3	68	1.8	2,959	2,998	61						
South West	5,693	4,705	3,463	2,833	2,910	60.2	97	3.3	55	1.6	2,711	2,810	142						
West Midlands	5,591	4,492	3,392	2,656	2,932	59.1	193	6.6	122	3.6	2,481	2,800	325						
East Midlands	4,725	3,852	2,928	2,341	2,340	60.8	119	5.1	70	2.4	2,204	2,258	63						
Yorks & the Humber	5,573	4,527	3,483	2,671	2,814	59.0	116	4.1	92	2.6	2,521	2,705	197						
North West	7,105	5,763	4,368	3,377	3,710	58.6	190	5.1	124	2.8	3,165	3,576	415						
North East	2,604	2,135	1,611	1,197	1,276	56.1	80	6.3	55	3.4	1,108	1,216	110						
England	54,757	44,437	34,166	27,053	29,081	60.9	1,412	4.9	838	2.5	25,521	28,064	2,692						
Wales	3,134	2,571	1,895	1,443	1,526	56.1	97	6.4	49	2.6	1,353	1,467	119						
Scotland	5,247	4,354	3,289	2,626	2,881	60.3	185	6.4	94	2.9	2,467	2,764	314						
Northern Ireland	1,873	1,490	1,173	876	932	58.8	46	4.9	27	2.3	838	888	60						
United Kingdom	65,011	52,853	40,523	31,998	34,420	60.5	1,740	5.1	1,008	2.5	30,180	33,184	3,185						

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.4).

Table 5.5: Total Employment by Country and Region

	Total employment (000s)		% share of UK total		change 1997-2007		change 2007-2017	
	1987	2017	1987	2017	000s	%	000s	%
London	4,188	4,025	15.7	14.3	613	15.2	421	9.1
South East	3,587	4,320	13.5	13.8	437	11.3	322	7.5
East of England	2,304	2,470	8.6	9.0	336	13.6	192	6.8
South West	2,127	2,356	8.0	8.4	271	11.5	182	6.9
West Midlands	2,365	2,548	8.9	8.6	127	5.0	125	4.7
East Midlands	1,825	2,006	6.8	7.1	126	6.3	126	5.9
Yorks & the Humber	2,172	2,318	8.2	8.2	240	10.3	147	5.7
North West	3,055	3,190	11.5	11.3	215	6.7	171	5.0
North East	1,059	1,076	4.0	3.8	104	9.7	36	3.0
England	22,682	23,872	85.1	84.6	2,469	10.3	1,723	6.5
Wales	1,126	1,219	4.2	4.3	176	14.4	73	5.2
Scotland	2,231	2,437	8.4	8.5	225	9.2	102	3.8
Northern Ireland	603	698	2.3	2.5	138	19.8	52	6.2
United Kingdom	26,642	28,227	100.0	100.0	3,008	10.7	1,949	6.2

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.5)

5.4 Sectoral Prospects

Information on projected employment change by broad sector over the period to 2017 is presented in *Table 5.6*. Similar statistics disaggregated by gender are presented in *Table 5.7* (for males) and *Table 5.8* (for females), but only limited reference is made to these tables in the present commentary.

At the broad sectoral level, significant job losses are projected over the period to 2017 for the *primary sector & utilities* and in manufacturing. A loss of more than 400 thousand jobs is anticipated in the *manufacturing* sector while around 130 thousand job losses are expected in *primary sector & utilities* across the UK. In relative terms, the projected losses in the *primary sector & utilities* are greater (a contraction of employment of nearly 2.3 per cent per annum between 2007 and 2017) than in *manufacturing* (-1.4 per cent per annum).

A small increase is projected for the decade as a whole in *construction* (175 thousand jobs; +0.8 per cent per annum). The greatest increases in the number of jobs are projected for *business & other services*, with an expected gain of over 1.3 million jobs across the UK as a whole. This represents a projected growth rate of 1.4 per cent per annum. Smaller, but still substantial, gains of over 500 thousand jobs (an increase of 0.6 per cent per annum) are projected in *distribution, transport, etc.*, and nearly 500 thousand (representing a growth rate of 0.6 per cent per annum) in *non-marketed services* for the period 2007-17.

All regions share in the projected decline in employment in the *primary sector & utilities*. Males account for nearly all of this decrease. The South East and Northern Ireland record the slowest projected rates of employment decline (at 0.7 and 1.2 per cent per annum, respectively).

The largest regional job losses in *manufacturing* employment are expected in the North West and the North West (60 thousand job losses) and the South East

(56 thousand job losses) but most regions are expected to witness similar rates of decline, with projected annual changes ranging from -0.7 per cent per annum Yorkshire & the Humber to -1.8 per cent per annum in Scotland and -1.7 per cent per annum

The South West is projected to experience the largest decline in *manufacturing* employment as a share of employment (16.6 per cent) however, these projections are based on the assumptions that current trends and policies continue. Employment in *manufacturing* in the South West region will most likely continue to decline if past patterns of behaviour and performance continue. As in a number of other regions, the activities of the South West Regional Development Agency are often designed to try to change such trends. If successful, they may result in a rate of decline more in line with the UK average. It should be noted that the impact of such bodies in any of the regions and nations of the UK may help to influence employment and output in the future in a way that has not been fully accounted for in the current set of projections. The results indicate likely outcomes in the absence of such interventions.

Across the UK as a whole, males account for the majority of the projected job losses in *manufacturing* (almost 300 thousand) but rates of decline are often faster for females in many regions.

Projected increases in employment in *construction* are concentrated in England and especially in the southern parts. Since males account for the vast majority of employment in *construction*; they also dominate the picture of employment change for this sector.

Regional variations in projected employment growth rates in *distribution, transport, etc.* are relatively limited, with annual rates of change ranging from 0.4 per cent in Scotland and in the North East to 0.9 per cent in the South West. Elsewhere rates of growth are similar to the UK average (0.6 per cent per annum). Across the UK, males account for around

364 thousand of the net projected increase in jobs, compared with a projected net gain of around 172 thousand for females. However, there are some regional differences in patterns of employment gains by gender – for instance, in the South East females account for 52 thousand of the 71 thousand jobs projected to be gained in the region. Such variations differences reflect more detailed structural variations within the broad sectors.

London is projected to experience the largest absolute increase in employment in *business & other services* over the period to 2017, with a net gain of over 300 thousand jobs. This is indicative of London's role as a global financial and business services centre. The South East, the South West and the East of England are projected to witness the next largest gains. This broad sector represents the largest share of employment gains in

every region over the period to 2017. The projected annual rate of change in the UK is 1.4 per cent. The range of annual rates of change is relatively narrow across the regions – ranging from 1.1 per cent per annum in the West Midlands to 1.7 per cent per annum in the South West.

Males account for about two-thirds of the projected job gains in this broad sector, and they dominate projected employment increases in all regions and countries of the UK.

The West Midlands displays one of the highest rates (0.8 per cent per annum) of projected employment growth in *non-marketed services* over the period to 2017, (only equalled by the South East). However, apart from Scotland and the North East, most other regions are expected to see growth at rates close to the UK average of 0.6 per cent per annum.

Table 5.6: Projected Employment Growth by Broad Sector, 2007-2017

a) change in thousands						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	-3	-27	28	65	301	57
South East	-6	-56	31	71	195	87
East of England	-14	-40	22	59	118	49
South West	-26	-46	11	73	121	49
West Midlands	-17	-50	17	47	73	56
East Midlands	-11	-32	18	39	75	37
Yorks & the Humber	-11	-24	11	42	98	30
North West	-6	-60	3	53	136	45
North East	-4	-20	4	12	36	7
<i>England</i>	-99	-355	145	462	1,152	417
Wales	-6	-26	8	29	40	27
Scotland	-21	-40	14	26	90	33
Northern Ireland	-4	-11	8	19	24	16
<i>United Kingdom</i>	-130	-432	175	537	1,306	494
b) per cent change						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	-15.1	-12.1	11.6	5.1	15.9	5.8
South East	-6.3	-15.8	10.2	5.7	14.8	8.7
East of England	-25.4	-14.0	9.0	7.0	16.0	7.5
South West	-30.8	-16.6	6.3	9.5	18.7	7.3
West Midlands	-31.2	-13.8	9.1	6.1	11.4	8.4
East Midlands	-20.8	-10.4	11.0	6.5	15.2	7.3
Yorks & the Humber	-21.7	-7.2	5.7	5.9	16.3	4.6
North West	-20.8	-15.2	1.5	5.4	15.7	5.1
North East	-14.1	-14.1	5.0	3.9	13.9	2.0
<i>England</i>	-21.1	-13.2	8.0	6.1	15.5	6.6
Wales	-16.0	-15.3	7.2	7.7	13.4	6.7
Scotland	-22.4	-16.8	7.4	3.6	13.6	4.5
Northern Ireland	-11.6	-11.3	10.7	8.6	15.3	6.2
<i>United Kingdom</i>	-20.5	-13.6	8.0	6.0	15.2	6.3
c) per cent per annum change						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	-1.6	-1.3	1.1	0.5	1.5	0.6
South East	-0.7	-1.7	1.0	0.6	1.4	0.8
East of England	-2.9	-1.5	0.9	0.7	1.5	0.7
South West	-3.6	-1.8	0.6	0.9	1.7	0.7
West Midlands	-3.7	-1.5	0.9	0.6	1.1	0.8
East Midlands	-2.3	-1.1	1.1	0.6	1.4	0.7
Yorks & the Humber	-2.4	-0.7	0.6	0.6	1.5	0.5
North West	-2.3	-1.6	0.1	0.5	1.5	0.5
North East	-1.5	-1.5	0.5	0.4	1.3	0.2
<i>England</i>	-2.3	-1.4	0.8	0.6	1.4	0.6
Wales	-1.7	-1.6	0.7	0.7	1.3	0.7
Scotland	-2.5	-1.8	0.7	0.4	1.3	0.4
Northern Ireland	-1.2	-1.2	1.0	0.8	1.4	0.6
<i>United Kingdom</i>	-2.3	-1.4	0.8	0.6	1.4	0.6

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.6)

Table 5.7: Projected Male Employment Growth by Broad Sector, 2007-2017

a) change in thousands						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	-3	-21	27	26	208	35
South East	-9	-40	24	19	127	40
East of England	-13	-31	20	48	78	-7
South West	-21	-33	10	52	73	17
West Midlands	-13	-35	16	27	80	10
East Midlands	-12	-17	17	36	59	19
Yorks & the Humber	-9	-12	8	33	59	16
North West	-5	-41	3	48	88	22
North East	-3	-12	3	9	20	8
<i>England</i>	-88	-243	128	300	792	160
Wales	-4	-19	7	28	28	11
Scotland	-22	-24	14	26	68	20
Northern Ireland	-3	-7	7	10	14	-3
<i>United Kingdom</i>	-117	-293	155	364	902	188
b) per cent change						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	-20.5	-14.3	12.5	3.4	19.6	10.7
South East	-15.9	-15.6	9.0	2.9	18.1	14.3
East of England	-34.7	-14.7	9.0	10.3	19.8	-4.3
South West	-34.3	-16.0	6.3	13.1	22.2	9.2
West Midlands	-34.1	-12.5	9.6	6.5	23.0	5.7
East Midlands	-30.5	-7.4	11.4	11.0	23.0	13.9
Yorks & the Humber	-24.1	-4.6	4.5	8.4	19.0	8.6
North West	-22.0	-13.6	1.2	8.8	18.7	8.8
North East	-14.5	-10.8	4.1	5.4	14.5	8.2
<i>England</i>	-26.7	-12.1	7.8	7.2	19.7	8.8
Wales	-13.2	-14.6	6.9	14.3	17.3	9.2
Scotland	-30.1	-13.7	8.0	6.7	19.2	9.0
Northern Ireland	-11.0	-9.7	10.6	8.9	17.6	-3.5
<i>United Kingdom</i>	-25.3	-12.3	7.9	7.5	19.6	8.5
c) per cent per annum change						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	-2.3	-1.5	1.2	0.3	1.8	1.0
South East	-1.7	-1.7	0.9	0.3	1.7	1.3
East of England	-4.2	-1.6	0.9	1.0	1.8	-0.4
South West	-4.1	-1.7	0.6	1.2	2.0	0.9
West Midlands	-4.1	-1.3	0.9	0.6	2.1	0.6
East Midlands	-3.6	-0.8	1.1	1.1	2.1	1.3
Yorks & the Humber	-2.7	-0.5	0.4	0.8	1.8	0.8
North West	-2.5	-1.5	0.1	0.8	1.7	0.8
North East	-1.6	-1.1	0.4	0.5	1.4	0.8
<i>England</i>	-3.1	-1.3	0.8	0.7	1.8	0.9
Wales	-1.4	-1.6	0.7	1.3	1.6	0.9
Scotland	-3.5	-1.5	0.8	0.7	1.8	0.9
Northern Ireland	-1.2	-1.0	1.0	0.9	1.6	-0.4
<i>United Kingdom</i>	-2.9	-1.3	0.8	0.7	1.8	0.8

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.7)

Table 5.8: Projected Female Employment Growth by Broad Sector, 2007-2017

a) change in thousands						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	0	-6	1	39	93	22
South East	4	-16	7	52	68	47
East of England	-2	-9	2	11	40	56
South West	-5	-12	1	21	48	32
West Midlands	-4	-15	1	19	-7	46
East Midlands	0	-15	1	2	15	19
Yorks & the Humber	-2	-12	3	9	39	14
North West	-2	-19	1	5	48	23
North East	-1	-8	1	3	16	-1
<i>England</i>	-11	-112	18	163	359	257
Wales	-2	-7	1	1	12	16
Scotland	1	-16	0	0	22	14
Northern Ireland	-1	-3	1	8	10	19
<i>United Kingdom</i>	-12	-139	20	172	403	306
b) per cent change						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	2.1	-7.6	3.2	7.6	11.1	3.4
South East	12.2	-16.1	20.1	9.1	11.1	6.5
East of England	-8.1	-12.3	9.1	2.9	11.6	11.7
South West	-22.3	-18.3	6.6	5.7	15.0	6.5
West Midlands	-24.2	-18.2	5.3	5.6	-2.6	9.4
East Midlands	2.1	-19.0	7.0	0.9	6.6	4.9
Yorks & the Humber	-13.9	-15.5	15.2	2.8	13.5	3.0
North West	-17.6	-20.5	3.6	1.1	12.1	3.6
North East	-12.7	-27.4	13.1	2.2	13.3	-0.6
<i>England</i>	-7.9	-16.6	9.7	4.8	10.4	5.6
Wales	-28.1	-17.6	10.2	0.6	8.9	5.7
Scotland	5.0	-25.9	1.8	0.0	7.1	2.6
Northern Ireland	-17.5	-17.2	11.8	8.2	12.8	10.2
<i>United Kingdom</i>	-7.3	-17.3	9.1	4.3	10.2	5.5
c) per cent per annum change						
	Primary & utilities	Manufacturing	Construction	Distribution, transport etc	Business & other services	Non-marketed services
London	0.2	-0.8	0.3	0.7	1.1	0.3
South East	1.2	-1.7	1.8	0.9	1.1	0.6
East of England	-0.8	-1.3	0.9	0.3	1.1	1.1
South West	-2.5	-2.0	0.6	0.6	1.4	0.6
West Midlands	-2.7	-2.0	0.5	0.5	-0.3	0.9
East Midlands	0.2	-2.1	0.7	0.1	0.6	0.5
Yorks & the Humber	-1.5	-1.7	1.4	0.3	1.3	0.3
North West	-1.9	-2.3	0.4	0.1	1.2	0.4
North East	-1.3	-3.1	1.2	0.2	1.3	-0.1
<i>England</i>	-0.8	-1.8	0.9	0.5	1.0	0.6
Wales	-3.2	-1.9	1.0	0.1	0.9	0.6
Scotland	0.5	-2.9	0.2	0.0	0.7	0.3
Northern Ireland	-1.9	-1.9	1.1	0.8	1.2	1.0
<i>United Kingdom</i>	-0.8	-1.9	0.9	0.4	1.0	0.5

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.8)

5.5 Employment by Gender and Status

Table 5.9 shows the shares of total employment accounted for by gender and employment status, distinguishing:

- (a) males,
- (b) females,
- (c)-(e) full-time employees (disaggregated by gender),
- (f)-(h) part-time employees (disaggregated by gender), and
- (i) self-employment.

Gender

In 1987, females comprised 44.5 per cent of those in employment in the UK. There was an increase in the number of females in employment over the following decade, and by 1997 females accounted for just under half of those in employment. Since then male and female shares of total employment have remained, and are projected to remain, much more stable, with females accounting for around 47 per cent of total employment, as both males and females share in further employment gains.

The North East recorded the highest share of total employment accounted for by females (46.4 per cent) in 1987, while Northern Ireland displayed the smallest proportion (42.2 per cent). All regions exhibited the increase in total employment accounted for by females during the late 1980s, the 1990s and beyond. By 2007, shares of total employment accounted for by females ranged from around 45.4 per cent in London to over 49 per cent in the South West. These developments reflected the changing sectoral structures of the regional economies.

By 2017, projected shares are expected to range from just under 45 per cent in London to just under 49 per cent in the South West. The stabilisation in the share of females in total employment reflects the fact that males have moved into many areas of the labour market previously dominated by females.

Full-time and part-time employees by gender

In 1987, 64 per cent of employees in the UK worked full-time. By 1997, this share had decreased to below 60 per cent. There was a modest further reduction over the subsequent period to 2007. Over the next decade, the share of employees working full-time is projected to continue fall slightly to below 58 per cent. Again, this reflects changing sectoral structures of employment, as well as changing ways of working, including the introduction of more flexible work patterns to suit women trying to balance formal work with the demands of a family.

The proportion of total employment accounted for by full-time employees fell steadily in all regions between 1987 and 1997. Over the subsequent period and the projection period to 2017, few regions have bucked the trend of continuing and steady decreases in the share of employees working full-time.

The share of employees working full-time does vary significantly, reflecting, amongst other things, the industrial/sectoral specialisation of employment within the regions. The overall shares range from 53 per cent in the South West in 2007 to 65 per cent in London. Throughout the period under consideration here, a distinctive feature of London is the higher than average share of employees working on a full-time basis. By 2017, it is expected that well over 60 per cent of employment in London will still be full-time, significantly above most other regions.

At regional level, the share of total employment accounted for by part-time employees is highest in the South West. There are marked differences between males and females in these patterns.

All regions have shared in the national increase of total employment accounted for by part-time employees: at UK level part-time employees comprised 22.6 per cent of all employees in the UK in 1987. This rose to 27 per cent by 1997 and even

further by 2007. In 2017, it is projected to be around 29 percent of all jobs.

Females have been the main beneficiaries of additional part-time employment. They currently account for over two thirds of the total, but males are projected to increase their share of this type of job.

Self-employed

The overall share of self-employment in the UK fell back slightly from 13.7 per cent in 1987 to 13.5 per cent share in 2007. By 2017 this share is not projected to have changed much, falling to just 13.3 per cent. Trends here are difficult to judge due to changing regulations about the tax treatment of some self-employed and conflicting trends in some sectors. The overall patterns shown here represent the combination of these factors.

When interpreting trends in self-employment it should be borne in mind that changes reflect a number of different factors. In addition to taxation, these include, the balance of incentives and disincentives to becoming self-employed, and different motivations (some individuals make a positive decision to become self-employed, while others feel 'pushed' into self-employment).

In 2007, the share of total employment accounted for by the self-employed ranged from 10.7 per cent in Scotland to around 16 per cent in the East of England and the South West. These inter-regional differentials reflect different sectoral structures in the geographical areas concerned. They are projected to persist over the period to 2017, with all southern regions displaying shares of self-employed in excess of the UK average, along with Northern Ireland and Wales.

It is again important to note that these projections are based on a continuation of observed historical trends. The figures that actually emerge in the future will be influenced by regional and national policies and the activity of regional development agencies and other bodies. If such interventions are substantial enough to alter the trends on which the model projections are based, then the reported projections and the actual outcomes could alter significantly. However, given current circumstances and the available data, the projections are expected to provide robust estimates of likely outcomes, given a continuation of past patterns of behaviour and performance.

Table 5.9: Employment by Gender and Employment Status, 1987-2017

a) males								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	2,384	56.9	2,150	53.4	2,534	54.6	2,806	55.5
South East	1,959	54.6	2,054	52.9	2,249	52.1	2,411	51.9
East of England	1,290	56.0	1,310	53.0	1,490	53.1	1,584	52.8
South West	1,177	55.3	1,223	51.9	1,340	51.0	1,438	51.2
West Midlands	1,346	56.9	1,382	54.3	1,426	53.3	1,511	54.0
East Midlands	1,015	55.6	1,007	50.2	1,142	53.6	1,245	55.2
Yorks & the Humber	1,190	54.8	1,197	51.6	1,358	53.1	1,453	53.7
North West	1,666	54.6	1,659	52.0	1,800	52.9	1,914	53.5
North East	567	53.6	562	52.3	618	52.4	643	52.9
<i>England</i>	12,597	55.5	12,545	52.6	13,957	53.0	15,007	53.5
Wales	618	54.9	625	51.3	736	52.8	787	53.7
Scotland	1,214	54.4	1,229	50.4	1,380	51.9	1,461	52.9
Northern Ireland	349	57.8	378	54.1	445	53.2	464	52.2
<i>United Kingdom</i>	14,777	55.5	14,777	52.4	16,520	52.9	17,719	53.4
b) females								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	1,804	43.1	1,875	46.6	2,104	45.4	2,253	44.5
South East	1,627	45.4	1,829	47.1	2,071	47.9	2,231	48.1
East of England	1,014	44.0	1,160	47.0	1,316	46.9	1,414	47.2
South West	950	44.7	1,133	48.1	1,287	49.0	1,371	48.8
West Midlands	1,019	43.1	1,166	45.7	1,249	46.7	1,289	46.0
East Midlands	809	44.4	999	49.8	990	46.4	1,013	44.8
Yorks & the Humber	981	45.2	1,121	48.4	1,200	46.9	1,252	46.3
North West	1,388	45.4	1,531	48.0	1,605	47.1	1,662	46.5
North East	492	46.4	513	47.7	562	47.6	573	47.1
<i>England</i>	10,085	44.5	11,327	47.4	12,384	47.0	13,058	46.5
Wales	508	45.1	594	48.7	659	47.2	680	46.3
Scotland	1,017	45.6	1,208	49.6	1,281	48.1	1,303	47.1
Northern Ireland	254	42.2	321	45.9	391	46.8	424	47.8
<i>United Kingdom</i>	11,865	44.5	13,450	47.6	14,715	47.1	15,465	46.6

Table 5.9: Employment by Gender and Employment Status, 1987- 2017 (continued)

c) total full time employees								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	2,961	70.7	2,635	65.5	2,992	64.5	3,128	61.8
South East	2,134	59.5	2,155	55.5	2,468	57.1	2,627	56.6
East of England	1,390	60.3	1,393	56.4	1,572	56.0	1,636	54.6
South West	1,236	58.1	1,254	53.2	1,393	53.0	1,472	52.4
West Midlands	1,567	66.2	1,578	61.9	1,612	60.3	1,662	59.4
East Midlands	1,148	62.9	1,170	58.3	1,233	57.8	1,301	57.6
Yorks & the Humber	1,328	61.2	1,347	58.1	1,503	58.8	1,561	57.7
North West	1,946	63.7	1,928	60.4	2,072	60.9	2,179	60.9
North East	681	64.3	667	62.0	699	59.3	698	57.4
<i>England</i>	14,391	63.4	14,127	59.2	15,545	59.0	16,264	58.0
Wales	705	62.6	706	57.9	785	56.3	799	54.5
Scotland	1,504	67.4	1,508	61.9	1,597	60.0	1,607	58.2
Northern Ireland	379	62.9	410	58.7	475	56.8	507	57.1
<i>United Kingdom</i>	16,979	63.7	16,751	59.3	18,402	58.9	19,178	57.8
d) male full time employees								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	1,869	44.6	1,566	38.9	1,759	37.9	1,840	36.4
South East	1,386	38.6	1,373	35.4	1,513	35.0	1,593	34.3
East of England	934	40.5	902	36.5	978	34.9	1,007	33.6
South West	823	38.7	803	34.1	858	32.6	910	32.4
West Midlands	1,060	44.8	1,036	40.7	1,018	38.1	1,055	37.7
East Midlands	767	42.1	725	36.2	803	37.7	873	38.7
Yorks & the Humber	912	42.0	870	37.5	948	37.0	970	35.9
North West	1,287	42.1	1,212	38.0	1,298	38.1	1,370	38.3
North East	455	43.0	426	39.6	439	37.2	438	36.0
<i>England</i>	9,493	41.9	8,914	37.3	9,614	36.5	10,057	35.8
Wales	471	41.8	433	35.5	482	34.6	488	33.3
Scotland	972	43.6	919	37.7	1,000	37.6	1,028	37.2
Northern Ireland	234	38.8	249	35.7	288	34.4	302	34.0
<i>United Kingdom</i>	11,171	41.9	10,516	37.3	11,384	36.4	11,875	35.8
e) female full time employees								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	1,093	26.1	1,069	26.6	1,232	26.6	1,287	25.4
South East	748	20.8	782	20.1	955	22.1	1,034	22.3
East of England	456	19.8	492	19.9	594	21.2	629	21.0
South West	412	19.4	450	19.1	535	20.4	562	20.0
West Midlands	506	21.4	542	21.3	594	22.2	608	21.7
East Midlands	381	20.9	444	22.1	430	20.2	428	18.9
Yorks & the Humber	417	19.2	477	20.6	555	21.7	591	21.9
North West	659	21.6	716	22.5	774	22.7	809	22.6
North East	226	21.3	240	22.4	260	22.1	260	21.4
<i>England</i>	4,898	21.6	5,213	21.8	5,931	22.5	6,208	22.1
Wales	234	20.8	273	22.4	303	21.7	311	21.2
Scotland	531	23.8	589	24.2	597	22.4	579	21.0
Northern Ireland	145	24.0	160	23.0	187	22.3	205	23.1
<i>United Kingdom</i>	5,808	21.8	6,235	22.1	7,018	22.5	7,303	22.0

Table 5.9: Employment by Gender and Employment Status, 1987- 2017 (continued)

f) total part time employees								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	720	17.2	894	22.2	1,027	22.1	1,139	22.5
South East	852	23.7	1,083	27.9	1,188	27.5	1,306	28.1
East of England	534	23.2	694	28.1	787	28.1	898	29.9
South West	507	23.8	688	29.2	815	31.0	952	33.9
West Midlands	530	22.4	657	25.8	759	28.4	846	30.2
East Midlands	429	23.5	588	29.3	608	28.5	658	29.1
Yorks & the Humber	556	25.6	679	29.3	736	28.8	816	30.2
North West	720	23.6	872	27.3	930	27.3	1,013	28.3
North East	272	25.7	302	28.1	350	29.7	381	31.3
<i>England</i>	5,120	22.6	6,458	27.1	7,199	27.3	8,007	28.5
Wales	263	23.3	324	26.6	407	29.2	471	32.1
Scotland	511	22.9	659	27.0	780	29.3	869	31.5
Northern Ireland	123	20.4	186	26.7	242	29.0	261	29.4
<i>United Kingdom</i>	6,016	22.6	7,626	27.0	8,628	27.6	9,609	29.0
g) male part time employees								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	143	3.4	241	6.0	340	7.3	448	8.9
South East	143	4.0	224	5.8	295	6.8	365	7.9
East of England	83	3.6	136	5.5	186	6.6	241	8.0
South West	79	3.7	139	5.9	198	7.5	276	9.8
West Midlands	82	3.5	119	4.7	177	6.6	228	8.1
East Midlands	65	3.6	104	5.2	139	6.5	176	7.8
Yorks & the Humber	76	3.5	115	5.0	180	7.0	249	9.2
North West	100	3.3	162	5.1	213	6.3	277	7.8
North East	39	3.7	54	5.0	82	7.0	104	8.6
<i>England</i>	811	3.6	1,295	5.4	1,810	6.9	2,364	8.4
Wales	42	3.7	56	4.6	108	7.7	152	10.3
Scotland	77	3.4	116	4.8	184	6.9	248	9.0
Northern Ireland	31	5.2	47	6.7	62	7.4	70	7.9
<i>United Kingdom</i>	960	3.6	1,514	5.4	2,163	6.9	2,834	8.5
h) female part time employees								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	578	13.8	653	16.2	687	14.8	691	13.7
South East	709	19.8	858	22.1	893	20.7	941	20.3
East of England	451	19.6	558	22.6	602	21.4	657	21.9
South West	428	20.1	549	23.3	617	23.5	676	24.1
West Midlands	448	18.9	537	21.1	582	21.7	618	22.1
East Midlands	364	20.0	484	24.1	469	22.0	481	21.3
Yorks & the Humber	479	22.1	564	24.3	556	21.7	567	21.0
North West	619	20.3	710	22.3	717	21.1	736	20.6
North East	233	22.0	248	23.1	268	22.7	277	22.8
<i>England</i>	4,309	19.0	5,163	21.6	5,390	20.5	5,643	20.1
Wales	221	19.6	268	22.0	299	21.4	320	21.8
Scotland	434	19.5	543	22.3	596	22.4	621	22.5
Northern Ireland	92	15.2	140	20.0	180	21.5	191	21.5
<i>United Kingdom</i>	5,056	19.0	6,113	21.7	6,465	20.7	6,775	20.4

**Table 5.9: Employment by Gender and Employment Status, 1987- 2017
(continued)**

i) total self employed								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	506	12.1	495	12.3	619	13.4	792	15.7
South East	601	16.8	645	16.6	663	15.4	709	15.3
East of England	380	16.5	383	15.5	447	15.9	464	15.5
South West	385	18.1	414	17.6	420	16.0	386	13.7
West Midlands	269	11.4	313	12.3	304	11.4	292	10.4
East Midlands	248	13.6	249	12.4	292	13.7	299	13.3
Yorks & the Humber	288	13.2	292	12.6	319	12.5	328	12.1
North West	389	12.7	390	12.2	403	11.8	385	10.8
North East	106	10.0	107	9.9	130	11.0	137	11.3
<i>England</i>	3,171	14.0	3,288	13.8	3,597	13.7	3,793	13.5
Wales	158	14.0	190	15.6	203	14.6	197	13.4
Scotland	217	9.7	270	11.1	285	10.7	287	10.4
Northern Ireland	101	16.8	102	14.7	119	14.3	120	13.5
<i>United Kingdom</i>	3,647	13.7	3,850	13.6	4,204	13.5	4,397	13.3

All employment								
	1987		1997		2007		2017	
	000s	%	000s	%	000s	%	000s	%
London	4,188	100.0	4,025	100.0	4,638	100.0	5,059	100.0
South East	3,587	100.0	3,883	100.0	4,320	100.0	4,642	100.0
East of England	2,304	100.0	2,470	100.0	2,806	100.0	2,998	100.0
South West	2,127	100.0	2,356	100.0	2,627	100.0	2,810	100.0
West Midlands	2,365	100.0	2,548	100.0	2,675	100.0	2,800	100.0
East Midlands	1,825	100.0	2,006	100.0	2,132	100.0	2,258	100.0
Yorks & the Humber	2,172	100.0	2,318	100.0	2,558	100.0	2,705	100.0
North West	3,055	100.0	3,190	100.0	3,405	100.0	3,576	100.0
North East	1,059	100.0	1,076	100.0	1,180	100.0	1,216	100.0
<i>England</i>	22,682	100.0	23,872	100.0	26,341	100.0	28,064	100.0
Wales	1,126	100.0	1,219	100.0	1,395	100.0	1,467	100.0
Scotland	2,231	100.0	2,437	100.0	2,662	100.0	2,764	100.0
Northern Ireland	603	100.0	698	100.0	836	100.0	888	100.0
<i>United Kingdom</i>	26,642	100.0	28,227	100.0	31,234	100.0	33,184	100.0

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.9)

Table 5.10 summarises projected changes in full-time employees, part-time employees and the self-employed by gender across all the regions.

Between 2007 and 2017, increases of nearly a million part-time employees and nearly 780 thousand full-time employees are expected across the UK as a whole. Over the same period, self-employment is projected to rise by just under 200 thousand.

All regions and countries of the UK are expected to share in the increases in full-time employees and part-time employees.

The projected increase in self-employment is confined mainly to London.

Projected rates of increase in *male part-time employees* are quite rapid in most regions. By contrast, projected gains in *female part-time employees* are generally at a similar rate to those for in *female full-time employees*. Nearly all parts of the UK are projected to share in gains in female full-time employees.

Projected rates of change in self-employment are generally more positive for females than for males, but some regions are expected to benefit much more than others.

Table 5.10: Change in Employment Status by Gender, 2007-2017

a) change in thousands									
	Males			Females			Total		
	FT	PT	SE	FT	PT	SE	FT	PT	SE
London	81	108	83	55	5	90	136	113	173
South East	80	70	12	78	48	35	159	117	46
East of England	29	56	10	35	55	8	64	111	18
South West	53	78	-32	27	59	-2	80	137	-34
West Midlands	36	51	-2	14	36	-10	50	87	-12
East Midlands	70	37	-5	-2	13	13	68	50	8
Yorks & the Humber	22	69	4	36	12	4	58	81	9
North West	72	64	-22	34	18	4	107	83	-18
North East	-1	22	5	0	9	2	-1	30	7
<i>England</i>	443	554	51	276	254	144	720	808	196
Wales	6	44	1	8	20	-7	14	64	-6
Scotland	28	64	-12	-18	25	14	10	89	2
Northern Ireland	14	8	-4	18	11	4	32	19	1
<i>United Kingdom</i>	491	671	37	285	310	156	776	981	193
b) per cent change									
	Males			Females			Total		
	FT	PT	SE	FT	PT	SE	FT	PT	SE
London	4.6	31.8	19.0	4.5	0.7	48.7	4.6	11.0	27.9
South East	5.3	23.6	2.6	8.2	5.3	15.6	6.4	9.9	7.0
East of England	3.0	30.0	3.1	5.8	9.1	6.6	4.0	14.1	4.0
South West	6.1	39.3	-11.3	5.0	9.6	-1.4	5.7	16.8	-8.1
West Midlands	3.6	28.9	-1.0	2.3	6.2	-13.4	3.1	11.5	-4.0
East Midlands	8.8	27.0	-2.4	-0.6	2.7	13.8	5.5	8.2	2.6
Yorks & the Humber	2.3	38.2	1.8	6.4	2.1	4.9	3.9	10.9	2.7
North West	5.6	30.1	-7.7	4.4	2.6	3.9	5.1	8.9	-4.4
North East	-0.3	26.5	4.7	0.0	3.2	6.5	-0.2	8.7	5.2
<i>England</i>	4.6	30.6	2.0	4.7	4.7	13.6	4.6	11.2	5.4
Wales	1.2	40.8	0.9	2.7	6.8	-12.4	1.8	15.8	-2.8
Scotland	2.8	35.1	-6.1	-3.0	4.2	16.1	0.6	11.5	0.7
Northern Ireland	4.8	13.3	-3.8	9.8	6.0	17.5	6.8	7.9	0.5
<i>United Kingdom</i>	4.3	31.0	1.2	4.1	4.8	12.6	4.2	11.4	4.6
c) per cent per annum change									
	Males			Females			Total		
	FT	PT	SE	FT	PT	SE	FT	PT	SE
London	0.5	2.8	1.8	0.4	0.1	4.0	0.4	1.0	2.5
South East	0.5	2.1	0.3	0.8	0.5	1.5	0.6	0.9	0.7
East of England	0.3	2.7	0.3	0.6	0.9	0.6	0.4	1.3	0.4
South West	0.6	3.4	-1.2	0.5	0.9	-0.1	0.6	1.6	-0.8
West Midlands	0.4	2.6	-0.1	0.2	0.6	-1.4	0.3	1.1	-0.4
East Midlands	0.8	2.4	-0.2	-0.1	0.3	1.3	0.5	0.8	0.3
Yorks & the Humber	0.2	3.3	0.2	0.6	0.2	0.5	0.4	1.0	0.3
North West	0.5	2.7	-0.8	0.4	0.3	0.4	0.5	0.9	-0.5
North East	0.0	2.4	0.5	0.0	0.3	0.6	0.0	0.8	0.5
<i>England</i>	0.5	2.7	0.2	0.5	0.5	1.3	0.5	1.1	0.5
Wales	0.1	3.5	0.1	0.3	0.7	-1.3	0.2	1.5	-0.3
Scotland	0.3	3.1	-0.6	-0.3	0.4	1.5	0.1	1.1	0.1
Northern Ireland	0.5	1.3	-0.4	0.9	0.6	1.6	0.7	0.8	0.0
<i>United Kingdom</i>	0.4	2.7	0.1	0.4	0.5	1.2	0.4	1.1	0.4

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.10)

5.6 Occupational Prospects

Table 5.11 presents projected change in total employment by occupation by region for the nine SOC Major Groups over the period to 2017. Similar statistics disaggregated by gender are presented in *Table 5.12* (for males) and *Table 5.13* (for females). These tables are included for reference purposes only. The statistics presented relate to structural demand (i.e. 'expansion demand' changes). For a fuller picture of the changing demand for different occupations it is necessary to bear in mind the impacts of retirements, inter-occupational moves, etc, as captured by 'replacement demand' (as discussed in the next section).

Overview

There are some quite marked differences in occupational structure across regions and nations. These reflect their different industrial employment structures. For example, the concentration of skilled trades in certain regions reflects the importance of manufacturing in particular parts of the country. Likewise, the concentration of business services in London and the South East is a key reason for their above average employment shares in managerial, professional and associate professional occupations. Despite such differences, the main changes in occupational structure within industries are common across all regions.

The largest increases in employment at the level of SOC Major Groups across the UK between 2007 and 2017 are expected for Managers & senior officials (a gain of nearly 900 thousand jobs), for Professional occupations (an increase of almost 650 thousand) and for Associate professional & technical occupations (a gain of over 650 thousand jobs). Job gains are also projected for Personal service occupations and Sales & customer service occupations.

The greatest loss of jobs between 2007 and 2017 is projected for Administrative, clerical and secretarial occupations, with a decline of 400 thousand jobs expected

across the UK. Skilled trades occupations is expected to lose around 230 thousand jobs. Losses of around 120 thousand jobs for Machine & transport operatives are also expected, while a decrease of just less than 30 thousand jobs is projected for Elementary occupations.

The main implications of employment change by region and devolved nation in each Major Group are outlined in the remainder of this section.

Managers & senior officials

In 2007, managers & senior officials accounted for just over 15 per cent of total employment in the UK, but for about 18 per cent of the total in London and the South East. The East of England was the only other region to display a share of employment in this Major Group in excess of the UK average. By contrast, managers & senior officials accounted for only around 12-13 per cent of total employment in Scotland, Northern Ireland, Wales and the North East.

The bulk of employment gains, in absolute terms, for managers & senior officials are expected in London, the South East and the East of England. As a result, the above average representation of managers & senior officials in total employment is projected to become even more prominent in southern England. All regions are expected to experience an increase in employment over the period to 2017. The annual rate of increase ranges from 1.0 per cent per annum in the North East to 2.1 per cent per annum in London, while the UK average rate is 1.7 per cent per annum.

Professional occupations

The share of total employment accounted for by professional occupations is by far greatest in London (at almost 17 per cent in 2007, compared with the UK average of 13 per cent). This share in London is projected to increase to almost 19 per cent. All regions are expected to witness an increase in their shares of employment in professional occupations over the period to 2017.

London is projected to display the largest projected employment gains (160 thousand jobs) and has the fastest rate of projected employment growth (1.9 per cent per annum, compared to the UK average of 1.5 per cent per annum). This serves to reinforce the occupational uniqueness of London. The North East is expected to have the slowest rates of annual average employment increase (0.7 per cent). Most other regions display rates of employment growth close to the UK average for professional occupations.

Associate professional & technical occupations

Similar to the case of professional occupations, London's share of employment in associate professional & technical occupations at 19 per cent of total employment is above the UK average of just over 14 per cent. By contrast, the share of employment in this occupational group falls below the UK average in the North East, East Midlands, Yorkshire & the Humber and Wales.

Once again, as for professional occupations, easily the fastest rate of employment growth in associate professional & technical occupations is expected in London (2.1 per cent per annum, compared with the UK average of 1.4 per cent per annum). Scotland and the North East are expected to have the slowest projected growth rates for this occupational group.

Administrative, clerical & secretarial occupations

Less variation across regions is apparent in the proportion of total employment accounted for by administrative, clerical & secretarial occupations than in the case of higher level non-manual occupations. There is little variation about the average share of total employment of 12 per cent in 2007.

The regional pattern of projected employment change is also markedly

different from that for the higher level non-manual occupations. Employment in administrative, clerical & secretarial occupations is projected to decline by almost 400 thousand across the UK between 2007 and 2017. London is expected to experience the greatest absolute change in employment as well as the greatest annual decline (3.1 per cent per annum). The slowest rates of job losses are projected for Yorkshire & the Humber, the North West, the North East and the West Midlands (for all the annual rate of decrease is projected to be less than 1 per cent per annum). This regional pattern of projected employment losses is indicative of a shift of such functions away from London. The projected annual rates of job losses in administrative, clerical & secretarial occupations are also less than 1 per cent per annum for Northern Ireland and Wales whilst England's annual rate of decline is expected to be 1.2 per cent.

Skilled trades occupations

Northern Ireland, and a few other regions, such as the West Midlands, display higher than average shares of total employment accounted for by skilled trades occupations (more than 12 per cent in 2007). In contrast, London and to a lesser extent, the South East, exhibit lower than UK average proportions of total employment for skilled trades occupations.

Employment in skilled trades occupations is projected to decline by 0.7 per cent per annum over the period to 2017 across the whole of the UK, with losses in all regions and nations. The East of England and London are expected to have rates of employment loss that are slower than the UK average. The greatest loss in absolute terms is projected for the North West (34 thousand jobs to be lost over 2007-17) whilst the North East is expected to witness the least job losses (11 thousand).

Personal service occupations

Employment in personal service occupations accounts for a smaller proportion of total employment (8 per cent) than many of the Major Groups in 2007. Across the UK, the share of total employment in personal service occupations varies from just over 6 per cent in London to almost 10 per cent in Northern Ireland (which is markedly higher than any other region).

The projected growth rate for personal service occupations at UK level is similar to that expected for managerial occupations at 1.7 per cent per annum. Employment is projected to grow in this occupational group in all regions and nations with annual growth rates ranging from 2 per cent in the South West to just 0.8 per cent in the North East.

Sales & customer service occupations

This occupational group also accounted for about 8 per cent of total employment in 2007. Shares ranged from 6 per cent in London to just less than 10 per cent in the North East.

All regions are projected to see some growth in employment in sales & customer service occupations between 2007 and 2017, although this growth is expected to be quite modest. The annual growth rate is expected to be slowest in London (0 per cent per annum) and the East Midlands (0.1 per cent per annum). The North East is projected to see the fastest growth (1.2 per cent per annum) whilst the UK average is projected to be 0.4 per cent per annum. .

Machine & transport operatives

While this occupational group is one of the smallest in terms of share of total employment, there are significant inter-regional disparities in the share of total employment accounted for by machine & transport operatives. In 2007, only 4 per cent of total employment in London was accounted for by machine & transport operatives, compared with almost 10 per cent in Wales.

Job losses are projected for all areas of the UK for this group over the period to 2017. The greatest absolute employment decrease is expected for the West Midlands (18 thousand jobs) while the rates of employment decline are anticipated to be fastest in Northern Ireland and the North East (0.9 and 0.8 per cent per annum, respectively).

Elementary occupations

The smallest proportion of employment in elementary occupations is found in London (around 9 per cent) whilst the greatest share is observed in Scotland (about 13 per cent). Across the whole of the UK, elementary occupations account for about 11 per cent of total employment.

Some further job losses are projected but the previous sharp downward trend appears to be showing signs of slowing overall and, in some sectors and geographical areas, reversing. The net effect is that across the UK as a whole, employment in elementary occupations is expected to show little change over the period to 2017. The fastest rates of job loss are projected for the West Midlands and the East Midlands but modest increases are projected elsewhere.

Table 5.11: Projected Change in Total Employment by Occupation, 2007-2017

a) change in thousands										
	Occupational Group									
	1	2	3	4	5	6	7	8	9	All
London	196	159	200	-147	-12	40	0	-11	-4	421
South East	152	83	95	-64	-20	70	10	-14	11	322
East of England	81	56	57	-32	-18	44	10	-7	1	192
South West	70	50	49	-28	-26	51	12	-9	13	182
West Midlands	62	44	53	-25	-25	40	7	-18	-15	125
East Midlands	70	44	39	-23	-23	35	2	-5	-13	126
Yorks & the Humber	65	39	34	-10	-20	40	12	-4	-10	147
North West	60	62	48	-15	-34	54	21	-14	-9	171
North East	15	10	11	-6	-11	8	14	-8	4	36
England	773	545	585	-349	-188	382	88	-91	-22	1,723
Wales	25	26	22	-10	-8	24	4	-7	-3	73
Scotland	54	55	29	-33	-23	23	10	-14	1	102
Northern Ireland	21	16	18	-4	-6	14	3	-5	-4	52
United Kingdom	872	643	654	-396	-226	443	104	-117	-29	1,949
b) per cent change										
	Occupational Group									
	1	2	3	4	5	6	7	8	9	All
London	23.0	20.6	22.6	-27.3	-3.3	14.0	0.0	-5.4	-1.0	9.1
South East	19.4	14.2	14.7	-12.3	-4.5	20.7	3.0	-5.8	2.5	7.5
East of England	17.3	15.5	14.7	-9.8	-5.5	20.4	4.7	-3.5	0.4	6.8
South West	17.6	15.5	13.9	-9.3	-8.3	21.7	5.5	-5.2	4.3	6.9
West Midlands	16.5	14.2	15.0	-7.8	-7.5	17.8	3.5	-7.2	-5.2	4.7
East Midlands	21.4	17.2	14.6	-9.5	-9.3	18.8	0.9	-2.7	-5.3	5.9
Yorks & the Humber	17.8	13.0	10.7	-3.1	-6.7	18.4	5.7	-1.6	-3.2	5.7
North West	12.7	14.0	10.4	-3.4	-9.3	18.7	7.2	-5.1	-2.3	5.0
North East	10.6	7.3	7.4	-4.6	-7.5	8.0	12.1	-7.8	2.3	3.0
England	18.4	15.7	15.3	-11.2	-6.6	18.3	4.3	-4.8	-0.8	6.5
Wales	14.0	15.3	12.4	-6.6	-4.9	19.3	3.6	-5.3	-1.6	5.2
Scotland	15.2	16.0	7.8	-9.9	-8.0	12.4	4.9	-6.5	0.2	3.8
Northern Ireland	20.6	15.1	16.1	-3.6	-5.7	17.1	3.8	-9.0	-4.4	6.2
United Kingdom	18.1	15.7	14.6	-10.7	-6.6	17.9	4.3	-5.1	-0.8	6.2
c) per cent per annum change										
	Occupational Group									
	1	2	3	4	5	6	7	8	9	All
London	2.1	1.9	2.1	-3.1	-0.3	1.3	0.0	-0.6	-0.1	0.9
South East	1.8	1.3	1.4	-1.3	-0.5	1.9	0.3	-0.6	0.2	0.7
East of England	1.6	1.5	1.4	-1.0	-0.6	1.9	0.5	-0.4	0.0	0.7
South West	1.6	1.5	1.3	-1.0	-0.9	2.0	0.5	-0.5	0.4	0.7
West Midlands	1.5	1.3	1.4	-0.8	-0.8	1.7	0.3	-0.7	-0.5	0.5
East Midlands	2.0	1.6	1.4	-1.0	-1.0	1.7	0.1	-0.3	-0.5	0.6
Yorks & the Humber	1.6	1.2	1.0	-0.3	-0.7	1.7	0.6	-0.2	-0.3	0.6
North West	1.2	1.3	1.0	-0.3	-1.0	1.7	0.7	-0.5	-0.2	0.5
North East	1.0	0.7	0.7	-0.5	-0.8	0.8	1.2	-0.8	0.2	0.3
England	1.7	1.5	1.4	-1.2	-0.7	1.7	0.4	-0.5	-0.1	0.6
Wales	1.3	1.4	1.2	-0.7	-0.5	1.8	0.4	-0.5	-0.2	0.5
Scotland	1.4	1.5	0.8	-1.0	-0.8	1.2	0.5	-0.7	0.0	0.4
Northern Ireland	1.9	1.4	1.5	-0.4	-0.6	1.6	0.4	-0.9	-0.5	0.6
United Kingdom	1.7	1.5	1.4	-1.1	-0.7	1.7	0.4	-0.5	-0.1	0.6

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.11)

Occupational groups:

1 Managers & senior officials

2 Professional

3 Associate professional & technical

4 Administrative, clerical & secretarial

5 Skilled trades

6 Personal service

7 Sales & customer service

8 Machine & transport operatives

9 Elementary

Table 5.12: Projected Change in Male Employment by Occupation, 2007-2017

a) change in thousands										
	Occupational Group									All
	1	2	3	4	5	6	7	8	9	
London	100	84	94	-35	-2	17	14	-6	8	272
South East	72	34	25	-8	-8	22	7	-8	24	162
East of England	43	16	17	-5	-9	9	9	-1	16	95
South West	40	20	18	-2	-15	10	11	-4	20	98
West Midlands	35	19	22	13	-16	8	8	-7	3	85
East Midlands	50	26	18	0	-16	12	3	3	7	103
Yorks & the Humber	28	12	10	18	-12	9	11	4	14	95
North West	35	23	13	24	-24	14	13	-3	20	114
North East	8	4	2	4	-7	4	6	-4	9	25
England	412	238	219	8	-108	104	81	-26	121	1,049
Wales	18	6	10	5	-4	6	5	-2	7	51
Scotland	27	17	5	8	-15	14	10	-7	21	80
Northern Ireland	11	4	2	5	-4	1	2	-3	1	19
United Kingdom	468	264	235	26	-131	125	98	-38	151	1,199
b) per cent change										
	Occupational Group									All
	1	2	3	4	5	6	7	8	9	
London	18.5	19.2	20.7	-25.4	-0.7	25.3	11.0	-3.2	3.2	10.7
South East	14.7	10.2	7.9	-7.9	-2.0	40.6	6.7	-3.5	10.2	7.2
East of England	14.2	7.8	8.8	-8.6	-3.0	26.4	14.0	-0.5	9.5	6.4
South West	16.1	11.6	11.3	-3.5	-5.2	32.4	16.6	-2.7	12.8	7.3
West Midlands	14.4	10.9	12.2	18.0	-5.1	27.7	12.6	-3.4	2.2	6.0
East Midlands	23.0	17.6	13.1	0.5	-7.1	44.2	6.3	1.8	5.6	9.0
Yorks & the Humber	12.3	7.7	6.2	23.0	-4.3	28.7	16.5	2.1	8.9	7.0
North West	11.3	9.1	5.9	23.1	-7.0	32.0	15.3	-1.4	10.1	6.3
North East	8.4	5.1	2.2	13.4	-5.2	27.2	19.5	-4.0	10.9	4.1
England	15.4	12.2	11.5	1.2	-4.2	31.7	12.5	-1.6	8.0	7.5
Wales	15.6	6.7	11.8	14.8	-2.6	32.7	15.8	-1.8	7.7	6.9
Scotland	12.3	9.7	3.2	9.8	-5.7	32.7	17.9	-3.5	11.0	5.8
Northern Ireland	16.7	6.4	3.3	18.7	-4.0	12.3	8.7	-6.2	2.4	4.2
United Kingdom	15.2	11.6	10.7	3.1	-4.2	31.2	12.9	-1.9	8.1	7.3
c) per cent per annum change										
	Occupational Group									All
	1	2	3	4	5	6	7	8	9	
London	1.7	1.8	1.9	-2.9	-0.1	2.3	1.0	-0.3	0.3	1.0
South East	1.4	1.0	0.8	-0.8	-0.2	3.5	0.6	-0.4	1.0	0.7
East of England	1.3	0.8	0.9	-0.9	-0.3	2.4	1.3	0.0	0.9	0.6
South West	1.5	1.1	1.1	-0.4	-0.5	2.8	1.5	-0.3	1.2	0.7
West Midlands	1.4	1.0	1.2	1.7	-0.5	2.5	1.2	-0.3	0.2	0.6
East Midlands	2.1	1.6	1.2	0.1	-0.7	3.7	0.6	0.2	0.6	0.9
Yorks & the Humber	1.2	0.7	0.6	2.1	-0.4	2.6	1.5	0.2	0.9	0.7
North West	1.1	0.9	0.6	2.1	-0.7	2.8	1.4	-0.1	1.0	0.6
North East	0.8	0.5	0.2	1.3	-0.5	2.4	1.8	-0.4	1.0	0.4
England	1.4	1.2	1.1	0.1	-0.4	2.8	1.2	-0.2	0.8	0.7
Wales	1.5	0.7	1.1	1.4	-0.3	2.9	1.5	-0.2	0.7	0.7
Scotland	1.2	0.9	0.3	0.9	-0.6	2.9	1.7	-0.4	1.1	0.6
Northern Ireland	1.6	0.6	0.3	1.7	-0.4	1.2	0.8	-0.6	0.2	0.4
United Kingdom	1.4	1.1	1.0	0.3	-0.4	2.8	1.2	-0.2	0.8	0.7

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.12)

Occupational groups:

- | | | |
|--------------------------------------|--|----------------------------------|
| 1 Managers & senior officials | 4 Administrative, clerical & secretarial | 7 Sales & customer service |
| 2 Professional | 5 Skilled trades | 8 Machine & transport operatives |
| 3 Associate professional & technical | 6 Personal service | 9 Elementary |

Table 5.13: Projected Change in Female Employment by Occupation, 2007-2017

a) change in thousands										
	Occupational Group									All
	1	2	3	4	5	6	7	8	9	
London	97	75	106	-111	-10	23	-14	-5	-12	149
South East	80	49	69	-56	-12	48	2	-6	-13	161
East of England	38	40	40	-27	-9	35	1	-6	-15	98
South West	30	30	30	-26	-11	42	1	-5	-7	84
West Midlands	28	25	32	-38	-9	32	0	-11	-19	40
East Midlands	20	17	21	-23	-7	23	-1	-8	-20	23
Yorks & the Humber	37	27	24	-27	-8	31	1	-8	-24	52
North West	25	39	34	-39	-11	40	8	-11	-29	57
North East	8	6	10	-10	-4	3	8	-4	-5	11
England	361	307	367	-357	-80	278	6	-65	-143	674
Wales	7	20	12	-15	-4	19	-1	-5	-10	22
Scotland	27	39	23	-41	-8	9	0	-7	-21	21
Northern Ireland	10	13	17	-8	-2	12	0	-2	-6	33
United Kingdom	404	378	419	-422	-95	318	6	-79	-180	750
b) per cent change										
	Occupational Group									All
	1	2	3	4	5	6	7	8	9	
London	30.7	22.6	24.6	-27.9	-30.6	10.7	-8.3	-29.9	-6.5	7.1
South East	27.5	19.5	21.2	-13.4	-26.7	16.9	1.1	-22.8	-5.9	7.8
East of England	22.8	25.7	20.6	-10.1	-31.6	19.3	0.6	-23.7	-9.9	7.4
South West	20.2	20.1	16.2	-10.7	-38.2	20.2	0.9	-20.9	-4.6	6.5
West Midlands	20.2	18.7	17.8	-14.9	-35.0	16.3	-0.3	-32.8	-12.8	3.2
East Midlands	18.2	16.5	16.1	-11.9	-33.0	14.6	-1.2	-29.4	-17.1	2.3
Yorks & the Humber	26.8	19.0	15.1	-11.8	-31.9	16.7	0.7	-26.6	-16.6	4.3
North West	15.3	20.6	14.9	-11.9	-34.8	16.4	4.0	-33.6	-15.3	3.6
North East	14.2	9.9	12.2	-9.4	-35.3	4.3	9.5	-40.0	-7.3	1.9
England	23.8	20.3	19.1	-14.7	-32.5	15.8	0.5	-28.3	-10.4	5.4
Wales	11.1	23.8	12.9	-13.1	-32.0	17.1	-1.3	-27.8	-12.5	3.3
Scotland	20.2	22.1	11.4	-15.9	-30.9	6.4	0.0	-29.9	-11.9	1.7
Northern Ireland	28.1	24.3	25.9	-10.9	-32.7	17.9	0.9	-38.8	-13.6	8.5
United Kingdom	23.1	20.8	18.4	-14.6	-32.3	15.3	0.4	-28.6	-10.8	5.1
c) per cent per annum change										
	Occupational Group									All
	1	2	3	4	5	6	7	8	9	
London	2.7	2.1	2.2	-3.2	-3.6	1.0	-0.9	-3.5	-0.7	0.7
South East	2.5	1.8	1.9	-1.4	-3.1	1.6	0.1	-2.6	-0.6	0.8
East of England	2.1	2.3	1.9	-1.1	-3.7	1.8	0.1	-2.7	-1.0	0.7
South West	1.9	1.8	1.5	-1.1	-4.7	1.9	0.1	-2.3	-0.5	0.6
West Midlands	1.9	1.7	1.7	-1.6	-4.2	1.5	0.0	-3.9	-1.4	0.3
East Midlands	1.7	1.5	1.5	-1.3	-3.9	1.4	-0.1	-3.4	-1.9	0.2
Yorks & the Humber	2.4	1.8	1.4	-1.2	-3.8	1.6	0.1	-3.0	-1.8	0.4
North West	1.4	1.9	1.4	-1.3	-4.2	1.5	0.4	-4.0	-1.6	0.4
North East	1.3	1.0	1.2	-1.0	-4.3	0.4	0.9	-5.0	-0.8	0.2
England	2.2	1.9	1.8	-1.6	-3.8	1.5	0.0	-3.3	-1.1	0.5
Wales	1.1	2.2	1.2	-1.4	-3.8	1.6	-0.1	-3.2	-1.3	0.3
Scotland	1.9	2.0	1.1	-1.7	-3.6	0.6	0.0	-3.5	-1.3	0.2
Northern Ireland	2.5	2.2	2.3	-1.2	-3.9	1.7	0.1	-4.8	-1.4	0.8
United Kingdom	2.1	1.9	1.7	-1.6	-3.8	1.4	0.0	-3.3	-1.1	0.5

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), CrossRegional.xls (Table R.13)

Occupational groups:

1 Managers & senior officials

2 Professional

3 Associate professional & technical

4 Administrative, clerical & secretarial

5 Skilled trades

6 Personal service

7 Sales & customer service

8 Machine & transport operatives

9 Elementary

5.7 Replacement Demands

Table 5.14 shows expansion demands, replacement demands and overall requirements by occupation for the regions and countries of the UK.

The key component of replacement demands is retirements from the workforce, especially those of older workers. However, replacement demands for specific occupational groups, in particular geographical areas, can also arise for a number of other reasons. These include occupational mobility, as individuals change jobs for reasons of career progression (as well as other causes), and geographical mobility. Potentially, the latter may be quite important at a regional level. Unfortunately, there are few reliable data on such flows, so the estimates presented here exclude replacement needs arising as a consequence of both occupational and geographical mobility. In both cases, there may be offsetting inflows to counter-balance some of the losses.

Despite projected job losses for elementary occupations, skilled trades occupations, machine & transport operatives and administrative, clerical & secretarial occupations, the net requirements are positive for **all** SOC Major Groups in **all** countries and regions.

Net requirements tend to be particularly large for associate professional & technical occupations, managers & senior officials and professional occupations. These three

occupational groups account for the largest net requirements in all regions.

The dominance of the higher level occupations (SOC Major Groups 1-3) in the pattern of overall net requirements in south-eastern England is greater than elsewhere, and underlines the continuing south-eastern bias of the 'knowledge economy'.

At UK level, the next largest net requirements are for personal service occupations followed by administrative, clerical & secretarial occupations and elementary occupations.

In London and the South East, requirements for skilled trades occupations exceed those for administrative, clerical & secretarial occupations.

In all regions the smallest net requirement over the decade to 2017 is projected for elementary occupations.

The projections for each region and devolved nation in the UK are set out in detail in *Table 5.14*. The table outlines expansion demand, replacement demand and overall requirements for each of the nine occupational groups in each of the English regions and the countries in the UK. It is important to look at the regional balances between expansion and replacement demands in order to understand likely increases in skills requirements.

Table 5.14: Replacement Demand by Occupation, 2007-2017

a) expansion demand (000s)										
	Occupational Group									9 all occs.
	1	2	3	4	5	6	7	8		
London	196	159	200	-147	-12	40	0	-11	-4	421
South East	152	83	95	-64	-20	70	10	-14	11	322
East of England	81	56	57	-32	-18	44	10	-7	1	192
South West	70	50	49	-28	-26	51	12	-9	13	182
West Midlands	62	44	53	-25	-25	40	7	-18	-15	125
East Midlands	70	44	39	-23	-23	35	2	-5	-13	126
Yorks & the Humber	65	39	34	-10	-20	40	12	-4	-10	147
North West	60	62	48	-15	-34	54	21	-14	-9	171
North East	15	10	11	-6	-11	8	14	-8	4	36
England	773	545	585	-349	-188	382	88	-91	-22	1,723
Wales	25	26	22	-10	-8	24	4	-7	-3	73
Scotland	54	55	29	-33	-23	23	10	-14	1	102
Northern Ireland	21	16	18	-4	-6	14	3	-5	-4	52
United Kingdom	872	643	654	-396	-226	443	104	-117	-29	1,949
b) replacement demand (000s)										
	Occupational Group									9 all occs.
	1	2	3	4	5	6	7	8		
London	312	287	306	222	122	112	97	74	160	1,692
South East	286	214	224	220	144	137	112	88	168	1,593
East of England	171	133	134	139	105	87	78	70	116	1,032
South West	147	121	123	126	104	96	80	65	114	975
West Midlands	138	115	124	135	109	93	73	86	111	984
East Midlands	120	93	92	100	81	76	61	70	91	785
Yorks & the Humber	135	112	110	128	97	87	77	83	112	942
North West	172	164	159	177	120	117	102	101	143	1,255
North East	54	50	52	58	47	39	41	37	57	435
England	1,536	1,289	1,324	1,305	930	843	721	674	1,072	9,694
Wales	65	65	63	64	56	51	40	47	65	516
Scotland	130	132	129	138	96	75	73	76	136	985
Northern Ireland	36	40	41	42	37	33	23	20	36	308
United Kingdom	1,767	1,526	1,557	1,549	1,119	1,002	858	816	1,309	11,501
c) overall requirement (000s)										
	Occupational Group									9 all occs.
	1	2	3	4	5	6	7	8		
London	509	446	507	75	109	152	97	63	156	2,114
South East	438	297	318	156	125	207	121	74	179	1,915
East of England	252	189	191	107	87	131	88	63	117	1,225
South West	217	171	171	98	78	147	92	55	127	1,157
West Midlands	201	159	177	110	84	133	81	69	96	1,109
East Midlands	191	137	131	78	58	111	63	65	78	910
Yorks & the Humber	200	151	144	119	78	127	90	79	102	1,089
North West	232	225	207	163	86	171	123	86	134	1,427
North East	69	60	63	51	37	46	55	28	61	471
England	2,309	1,834	1,909	956	742	1,225	809	583	1,050	11,417
Wales	90	90	85	54	48	76	44	40	62	588
Scotland	184	187	158	105	73	98	83	62	137	1,086
Northern Ireland	57	57	59	38	30	46	26	15	32	360
United Kingdom	2,640	2,168	2,211	1,153	893	1,445	962	699	1,280	13,451

Source: CE/IER estimates, CE projections MDM C81F9A (revision 900), Replacement Demands.xls (Regional Summary)

Occupational groups:

1 Managers & senior officials	4 Administrative, clerical & secretarial	7 Sales & customer service
2 Professional	5 Skilled trades	8 Machine & transport operatives
3 Associate professional & technical	6 Personal service	9 Elementary

5.8 Comparison with Previous Results

It is also interesting to make comparisons with the projections presented in *Working Futures 2004-2014* at a spatial level. This needs to be done with some care. In broad terms the results are very similar in the two sets of projections. Nevertheless, the detailed numbers are, of course, all different in the two sets of projections. This is for a whole host of reasons, including choice of different periods, revisions to historical data and models, as well as changing economic circumstances between the times at which the projections were made.

There is a danger that if too much attention is placed on the detailed differences between two sets of projections (especially when focussing on differences in differences), the general messages can get lost. Many of the tables focus upon percentage changes which can be sensitive to the period covered. Others focus on net changes.

The broad patterns across industries, regions and time show more similarities than differences between the two sets of projections. There are a few notable changes. For example, the assessment of employment prospects for the construction sector has been revised between the two sets of forecasts. But even here, too great a focus on the difference between a previously projected small decline in overall employment levels over the coming decade, and now small increases, should not be overstated. The important messages are about broad differences between sectors, across regions and over time.

The broad patterns between this and the previous set of projections are very similar (with a few notable exceptions which are highlighted below). To go into more detailed discussion of differences between the two sets of forecasts would require a much longer exposition than is feasible in this chapter, which is intended to provide a broad brush overview, rather than a detailed report on the spatial analysis.

Annex B to the present document compares the latest projections with those from *Working Futures 2004-14* at an aggregate level. The separate Technical Report (Wilson and Homenidou, 2008) provides more details. However, some comparisons at the spatial level between the two sets of projections are provided here.

Comparison of overall prospects

Compared to the *Working Futures 2004-14* projections, the current set of projections are similar in that substantial increases in employment are expected for all regions over the next decade. However, the magnitudes of projected increases are greater in the 2007-17 projections again for all spatial areas. For example, the projected increase in total employment in the South East was 287 thousand for the decade to 2014 but is now projected to be 322 thousand for 2007-17. Similar differences are seen across the regions and nations of the UK, but none are of great significance. The annual rate of increase in the total employment is also projected to be greater for 2007-17 than for 2004-14 for all English regions and countries in the UK, but again the differences between the two sets of projections are not very significant.

Differences in labour market residuals are also observed between the *Working Futures 2004-14* projections and the current forecasts. The general patterns in the two sets of projections are similar but the forecasts differ in the precise numbers, in most instances. These differences may reflect changes in patterns of commuting across geographical boundaries but are more likely to be the result of other statistical errors and problems of measurement.

Comparison by broad sector

The 2007-17 projections by broad sector are very similar to those reported in *Working Futures 2004-14*. For all 6 broad sectors, except *construction*, the two sets of employment projections do not differ

greatly. The most significant differences in the medium to longer term outlook are found in *construction*. In all areas, except *London*, the *South East* and the *South West*, reductions in employment were projected for the years between 2004 and 2014. However, the current projections estimate modest growth in employment in *construction* between 2007-2017 (ranging from 0.1 per cent per annum in the *North West* to 1.1 per cent per annum in *London* and the *East Midlands*). The main reason for this change is a reassessment of likely prospects for productivity growth which are projected to rise less rapidly in the latest forecasts.

Comparing the two sets of forecasts for each region and devolved nation in turn, differences between the projected 2004-14 and 2007-17 annual employment growth rates are greatest in the *primary sector & utilities* for *London*, the *South West*, and the *North West*. However, in both sets of projections the annual projected growth rates for this sector are negative for all regions and devolved nations.

Other than differences in precise numbers, and those cases noted for the *construction* sector, the general patterns of change are broadly similar in the two sets of forecasts. As noted in the introduction to this chapter, the latest results do not take account of the fall out from the credit crunch and the financial crisis that occurred in the Autumn of 2008. This can be expected to have some significant implications in the short term, especially for the banking and finance sectors and in construction. Spatial areas dependent upon such sectors are likely to be particularly affected.

Comparison by occupation

Both sets of projections indicate gains in employment for the same occupations. However, around 200 thousand more jobs are now projected than were expected for 2004-14 for Managers & senior officials and Associate professional & technical occupations. In contrast, for Sales & customer service occupations, an increase of 375 thousand jobs was projected for

2004-14 whilst an increase of just over 100 thousand jobs is now expected for 2007-17. Sales & customer service employment is also projected to increase by less between 2007 and 2017 than for 2004-14. The number of jobs in elementary occupations was forecast to decrease by 675 thousand jobs between 2004 and 2014 but the projections for 2007-17 indicate a loss of only 29 thousand jobs across the whole of the UK.

These differences are reflected in the results for individual countries and regions. For example, in *London*, employment in sales & customer service occupations was projected to increase by 1½ per cent per annum between 2004 and 2014, whilst the 2007-17 projection is for the number of jobs in this group to remain stable. In elementary occupations, the earlier set of projections indicated a greater rate of decline than shown in the 2007-17 projections for London.

In the *South East*, the *East of England* and the *South West*, the *Working Futures 2004-14* projections indicate falling employment in elementary occupations while the current projections indicate small, but positive, annual rates of growth in such occupations. The same pattern is observed for the *North East* of England and for *Scotland*.

Overall, small, but largely insignificant, differences are found between the projected rates of employment change reported in the two sets of forecasts for most occupations, other than those indicated above.

Annex A: SOURCES AND METHODS

This annex provides a brief technical description of the methods and data sources used to produce the projections. A more detailed explanation may be found in the separate *Technical Report* (Wilson *et al.* (2008)).

A.1 *The Macroeconomic Model: Sectoral and Regional Dimensions*

Labour market projections need to be firmly grounded on an understanding of how the economy as a whole is changing. Analysis of changes in employment structure is therefore intimately tied up with a detailed analysis of the development of the economy more generally. This has been operationalised in the form of the multi-sectoral dynamic model of the economy (MDM) developed by Cambridge Econometrics (CE). Details of MDM and its relationship with other model elements are given in the *Technical Report*.¹

MDM is based on a detailed analysis of economic and other behavioural relationships, statistically estimated via robust econometric methods. The current version is based on a “bottom-up” treatment of regional economic prospects. The model offers a combination of great detail and a high level of sophistication. The use of a fully specified, formal macroeconomic regional multi-sectoral model provides a number of advantages over more *ad hoc* extrapolation methods. These include enforcement of logical and accounting constraints, and emphasis on making explicit the underlying assumptions built into the projections.

MDM therefore projects future trends using a complex set of behavioural equations. Together these provide an explanation of the various phenomena which have resulted in past patterns of structural change. These relate the

derived demand for labour to the prospects for output growth in each sector and the relative costs of labour and other inputs. The model reflects the various sources of demand for goods and services. It also incorporates the various technical linkages between different sectors, including the impact of technological change on productivity levels as well as the effects of changes in the way activities are classified as a result of the sub-contracting out of many functions.

The sectoral analysis therefore derives directly from the multi-sectoral regional macroeconomic model of the economy as described above. This model is used to generate estimates for output and productivity for the main industrial sectors and projections of total employment by industry, based on the 2003 Standard Industrial Classification (SIC2003). In all, 67 industries are distinguished, although for presentational purposes these have often been reduced to much more aggregate groups. The estimates and projections of employment produced are consistent with the official ONS estimates.

The latest version of MDM incorporates the system of UK National Accounts consistent with ESA95, the 2001 price base and the input-output table for 2001 estimated from official data. The latest National Accounts and associated data from the ONS have also been incorporated into the model database and equation estimates.

A.2 *Occupational Projections*

The methods for projecting occupational employment change are based on extrapolative procedures. The present methodology is based on the use of the SOC2000 classification. Projections were developed for the 25 Sub-major Groups (see Table A.12 for details). The approach involves two stages. First, projections of the likely changes in industrial

¹ See Wilson *et al.* (2008).

employment by region are made using the multi-sectoral dynamic macroeconomic model of the economy. Secondly, projections of the occupational structure of employment within each industry are made using material from the Censuses of Population (basically extrapolations of past trends). These occupational coefficients are then combined with the projected levels of industrial employment to obtain projected levels of employment by occupation. All this is undertaken at a regional level for the 25 sub-major groups.

The occupational employment projections are therefore based on a sub-model which takes as input the regional/industrial projections produced by the macroeconomic model. It is a 'top-down' approach, the industrial and regional employment projections being disaggregated into the 25 occupational categories for each industry.

A further important element is the use of data from recent Labour Force Surveys (LFS). This information is used to calibrate the occupation model over the recent past and to modify the projections in the light of the latest information on emerging trends. These trends are compared with that emerging from the occupational model. The results of this exercise are used to modify the projected changes in the light of recent and current developments in occupational structure that may not reflect a simple continuation of long-term trends between Census years.

The results incorporate data from the Census of Population for 2001. This enabled a reassessment of trends over the 1990s decade. For many detailed sectors and geographies, this resulted in quite significant changes to the perception of detailed historical developments and therefore future prospects. The overall trends observed here are very similar to those presented in previous *Working Futures* reports.

Users of the results are cautioned that the detailed projections should not be seen as precise predictions but rather indicative of general trends and tendencies. This

applies with particular force to the more detailed disaggregations.

Margins of Error

The employment estimates make use of a wide variety of sources, as described in more detail below. As a consequence, it is not possible to calculate precise margins of error.² From an analysis of previous projections it is clear that these margins can be quite large.³ Industry employment levels are typically projected within ± 10 per cent over a 5-10 year horizon. The directions of change are projected correctly in almost 90 per cent of cases. The errors in terms of annual percentage growth rates are usually of the same order of magnitude as the observed changes.

Occupational employment levels are typically projected with ± 7 per cent over a 5-10 year horizon. The direction of change is correctly projected in about 80 per cent of all cases. Occupational shares are usually projected within ± 2 percentage points. (The typical share is around 4 percentage points).

Historical revisions to the data account for a very large part of the forecast errors. However, it is important to appreciate that the purpose of the projections is not to make precise forecasts of employment **levels**. Rather, the aim is to provide policy analysts with useful information about the general nature of **changing employment patterns** and their implications for skill requirements.

The results provide a useful benchmark for debate and policy deliberations about underlying employment trends. However, they should not be regarded as more precise than the general statements in the text. Many years of international research have demonstrated that detailed manpower planning is not a practicable proposition. The results presented here should be regarded as indicative of

² For further discussion see the *Technical Report* (Wilson *et al.*, 2008).

³ See Wilson *et al.* (2004c).

general trends and orders of magnitude, given the assumptions set out below, rather than precise forecasts of what will necessarily happen.⁴

A.3 Development of Databases and Procedures

Data Sources and Methods: The Database

A new employment database was developed for *Working Futures 2002-2012* in order to meet the requirements of the SSDA and its partners for more detailed data. This involved:

- extended sectoral detail, covering all 2-digit SIC2003 categories;
- revised geographies covering the LLSC areas;
- revised treatment of occupations, including development of SOC2000 historical data series and projections for the new sectors and local areas described above.

This process had a number of important elements:

- establishing a new historical database of employment and output by detailed sector and LLSC area;
- development of occupational data and relating to the new sectors and geographical areas;
- development of models and procedures to generate consistent projections across these various dimensions;
- development of a new replacement demand (RD) module to generate RD estimates across the various dimensions.

This database was extended to 2014 for WF II using the latest ABI and LFS information then available and it has now been extended further to 2017.

Detailed Sectoral estimates

Historical data on employees in employment for male and female, full-time and part-time and estimates for self-employment, were available based on information from the ABI and the LFS. This was adjusted using various other official data to develop a consistent data set covering 67 SIC two digit categories and all 47 LLSC areas. The latest results incorporate the most up to date sectoral employment data available from ONS, including the 2006 Annual Business Inquiry.

For economic indicators such as GDP, the total employment estimates by 41 industries for the counties was multiplied by regional productivity to create an estimate of GDP for the area. Other variables were treated in an analogous fashion, using data from CE's counties databank to do the reallocation and create historical data.

Occupation, Gender and Status

Historical data on employment for male and female, full-time and part-time and estimates for self-employment by 41 industries for all the local authority districts were available original from an IER database developed for work conducted for DfES. These were expanded for WF I to provide an occupation dimension within each sector using data from the Census of Population and LFS. These were extended to 67 SIC categories assuming common patterns of occupation, gender and status mix as for the broader sectoral categories.

The revised occupational employment projections are based on data taken from the Census of Population (CoP), supplemented by information from the Labour Force Survey (LFS). Together these were used to generate a series of employment matrices based on 41 industries (SIC2003) and initially the old 22 SOC1990 Sub-Major occupational groups for each of the new RDA areas. These were then converted to SOC 2000 using detailed mappings developed by

⁴ See Wilson and Briscoe (2002) for further discussion.

IER in collaboration with ONS. Details of the new SOC 2000 based occupational groupings are shown in Table A.10. Further information on the conversion process from SOC1990 are given in the separate *Technical Report*.

Information from the Census of Population 2001 was used to calibrate the estimates at an aggregate level. The resulting sector by occupation employment matrices were then used to develop projections of occupational employment in future years by applying projected occupational shares in each industry to the sectoral forecasts from the macroeconomic model. Further details of the procedures are given in the *Technical Report*.⁵

Projections of occupational shares at this level of detail place considerable demands on the data available and the situation on the ground can be changed rapidly and substantially by technological and other changes. It is important to appreciate the assumptions used and the range of factors which it is felt are likely to influence immediate future trends, including how these may diverge from previous patterns of change. These issues are discussed in more detail in the main text.

The results should be regarded as providing a benchmark for thinking about changing employment structure. They paint a broad-brush picture of such trends and should be regarded as indicative and not a precise prediction.

A.4 Replacement Demand

Net changes in occupational employment are only one indicator of future demand. Another measure, which is important for assessing education and training provision, is the replacement demand needed to offset outflows due to retirements, occupational mobility etc. Procedures have been developed to produce such estimates linked to the main occupational projections.

The analysis of occupational trends and prospects described above provide predictions of the changes in the number of people employed in particular occupational categories. However, education and training requirements are not simply dependent on which occupations are growing rapidly. Even in those occupations where employment levels are expected to decline substantially, there may be a need to train, simply to maintain the existing stock of skills at the required level. In addition to examining likely **net changes** in the numbers in each occupational category, it is also important, therefore, to assess **replacement demands**. These represent the numbers needed to maintain the existing stock of skills due to losses resulting from retirements and other outflows.

The use of common assumptions across all geographical areas and sectors ensures that the estimates add up. In practice such parameters are likely to vary across these dimensions.

The key components are:

- information on the age and gender structure of occupational employment;
- information on rates of outflows due to
- retirement (and other reasons for leaving the workforce);
- inter-occupational mobility;
- mortality.

Data on age structure are required, since many of the flows, especially retirements and mortality, are age specific. Age structures also vary significantly by occupation.

Retirement rates also vary by gender and by age. The estimates are based on data from the LFS which show the percentage of those employed one year ago who have retired from employment either temporarily or permanently. For males the main outflows are associated with retirement per se. For females, in particular, there is a significant outflow for younger age groups associated with family formation.

⁵ See Wilson *et al.* (2006b)

Another potential outflow is due to mortality. Information on mortality rates is available by age and gender from ONS. While losses due to death are not great for individual age groups up to the age of 65, they can cumulate to produce significant losses over an extended period of time. The rates used are again based on data for the whole of the UK. However, mortality rates are unlikely to vary very much across broad occupational categories.

Potentially, occupational mobility is a more important source of loss for many occupations. Some occupations tend to gain employment as people are promoted from other occupations. For other occupations, losses due to retirement understate the overall replacement demands. Although data on such flows are available from the LFS, for the whole of the UK, they proved insufficiently robust to obtain estimates customised by industry and geographical areas. The replacement demand estimates presented here therefore exclude occupational mobility flows.

A.5 Choice of Sectors for Analysis and Reporting

Industries used in RMDM

The industries used in the CE multisectoral dynamic macroeconomic model (MDM) are as set out in Table A.1. These are based on data on 41 industries available from the ONS, especially data relating to input-output information which is central to MDM. They are classified according to the 2003 Standard Industrial classification (SIC2003), as shown in the table.

Detailed Industries

This analysis has been extended to cover all 2-digit categories. These are shown in Table A.2. Including employment in private households and extra territorial organisations expands the total number of categories to 67. However, very few data are available for these last two categories. Also, it is not possible to identify any output data for Sector 6, Uranium Mining.

So effectively there are 64 substantive industries for which there are comprehensive data. These are the groupings for which most of the detailed analysis was undertaken. They are referred to as **detailed industries**

The other projections are presented at a variety of different sectoral levels using the following definitions. These are based on groups of 6, 14 or 27 sectors or industries as defined by Standard Industrial Classification (SIC 2003) codes. These preserve the traditional manufacturing, services and public sector groupings of the economy. They are hierarchically related, with the 6 **broad sectors** being a more aggregated grouping of the 14 **sectors**, and 27 industries.

Reporting at national (UK) level

The 27 industries are shown in Table A.3. However, a number of the categories used in Table A.3 are very small (notably mining and quarrying, wood and paper, other manufacturing & recycling, and electricity, gas and water). These pose problems in terms of obtaining statistically reliable historical and projected employment data, especially when additional breaks are required by gender, employment status and occupation.

For the purpose of reporting of the national projections for the UK, a slightly more aggregated set of categories (as shown in Table A.4) is used. There are 25 categories here, most of which correspond to those in Table A.3. Even so, categories 2 (Mining & quarrying and electricity, gas & water), 4 (textiles and clothing) and 10 (other manufacturing & recycling) remain small. These categories are referred to as **Industries**.

Reporting at regional level (Regional Sectors)

At regional level, the categories published by ONS for "Government Office Regions" are shown in Table A.5. These are even more aggregated than those for the UK, for obvious reasons. This level of

categorization does not present *any* detail for manufacturing industries.

In order to provide *some* detail within manufacturing, the 16 categories set out in Table A.6 have been developed. These allow for some sub-manufacturing detail (expanding the 14 ONS categories), while maintaining the minimum cell sizes required for statistical reliability across the regional dimension.

Note that these are not the same as those based on the groupings used by ONS for the “Standard Regions”. The latter do not correspond very closely with the aggregations used in Table A.4. In particular, category DL adopted by ONS, cuts across the engineering grouping used there. ONS category DL includes only SIC2003 sectors 30-33. Mechanical engineering (SIC2003, 29) is included in the remainder of manufacturing. In the present analysis the DL category and the residual “remainder of D” adopted by ONS, are replaced by two categories

based on categories or aggregations of those used in Table A.4. These are “engineering” (category 8 in Table A.4) and the corresponding residual. These are referred to as **(Regional) Sectors**.

Headline reporting at national (UK) level (Broad Sectors)

For summary/ headline reporting, a 6-fold categorization is used (referred to as **broad sectors**). This is shown in Table A.7. The purpose of the reporting at this level is to give an overview of the main sectoral developments rather than providing sectoral detail (which is presented later in the report).

This set of groupings was the main “aggregate” categorization used in previous reports produced for DfES (e.g. Wilson *et al.* (2001a)). It therefore allows comparison with earlier projections. It can also be replicated across the constituent countries and regions within the UK for comparability.

Table A.1: Classification of Industries in RMDM

Industries	SIC2003	25 industries	27 industries
1. Agriculture	01,02,05	1	1
2. Coal etc.	10	2	2
3. Oil & Gas	11,12	2	2
4. Other Mining	13,14	2	2
5. Food, Drink & Tobacco	15, 16	3	3
6. Textiles, Clothing & Leather	17, 18, 19	4	4
7. Wood & Paper	20, 21	5	5
8. Printing & Publishing	22	5	6
9. Manufactured Fuels	23	6	7
10. Pharmaceuticals	24.4	6	7
11. Chemicals nes	24 (ex 24.4)	6	7
12. Rubber & Plastics	25	6	7
13. Non-Metallic Mineral Products	26	6	7
14. Basic Metals	27	7	8
15. Metal Goods	28	7	8
16. Mechanical Engineering	29	8	9
17. Electronics	30, 32	8	9
18. Electrical Engineering & Instruments	31, 33	8	9
19. Motor Vehicles	34	9	10
20. Other Transport Equipment	35	9	10
21. Manufacturing nes	36, 37	10	11
22. Electricity	40.1	2	12
23. Gas Supply	40.2, 40.3	2	12
24. Water Supply	41	2	12
25. Construction	45	11	13
26. Distribution	50, 51	12, 13	14, 15
27. Retailing	52	14	16
28. Hotels & Catering	55	15	17
29. Land Transport	60, 63	16	18
30. Water Transport	61	16	18
31. Air Transport	62	16	18
32. Communications	64	17	19
33. Banking & Finance	65, 67	18	20
34. Insurance	66	18	20
35. Computing Services	72	20	22
36. Professional Services	70, 71, 73, 74.1-74.4	19	21
37. Other Business Services	74.5-74.8	21	23
38. Public Administration & Defence	75	22	24
39. Education	80	23	25
40. Health & Social Work	85	24	26
41. Miscellaneous Services	90-99	25	27
42. Unallocated			

Table A.2: Detailed Industries (Ind67)

Ind67	Ind67 name ⁶	SIC2003	SAM41 (MDM)	25 industries
1	Agriculture	01	1	1
2	Forestry	02	1	1
3	Fishing	05	1	1
4	Coal mining	10	2	2
5	Oil and gas	11	3	2
6	Uranium mining	12	3	2
7	Metal ores	13	4	2
8	Other mining	14	4	2
9	Food	15.1-15.8	5	3
10	Drink	15.9	5	3
11	Tobacco	16	5	3
12	Textiles	17	6	4
13	Clothing	18	6	4
14	Leather	19	6	4
15	Wood and wood products	20	7	5
16	Paper and paper products	21	7	5
17	Publishing and printing	22	8	5
18	Manufactured fuels	23	9	6
19	Pharmaceuticals	24.4	10	6
20	Chemicals nes	24 (ex 24.4)	11	6
21	Rubber and plastics	25	12	6
22	Non-metallic mineral products	26	13	6
23	Basic metals	27	14	7
24	Metal goods	28	15	7
25	Mechanical engineering	29	16	8
26	Computers and office machinery	30	17	8
27	Electrical engineering	31	18	8
28	TV and radio	32	17	8
29	Instruments	33	18	8
30	Motor vehicles	34	19	9
31	Aerospace	35.3	20	9
32	Other transport equipment	35 (ex 35.3)	20	9
33	Manufacturing nes	36	21	10
34	Recycling	37	21	10
35	Electricity	40.1	22	2
36	Gas supply	40.2, 40.3	23	2
37	Water supply	41	24	2
38	Construction	45	25	11
39	Sale and maintenance of motor vehicles	50	26	12
40	Distribution nes	51	26	12
41	Retailing nes	52	27	14
42	Hotels and catering	55	28	15
43	Rail transport	60.1	29	15
44	Other land transport	60.2, 60.3	29	15
45	Water transport	61	30	15
46	Air transport	62	31	15
47	Other transport services	63	29	15
48	Post and courier services	64.1	32	16
49	Telecommunications	64.2	32	16
50	Banking and finance	65	33	18
51	Insurance	66	34	18
52	Financial support services	67	33	18
53	Real estate	70	36	19
54	Renting of goods	71	36	19
55	Computing services	72	35	20
56	Research and development	73	36	19
57	Professional services nes	74.1-74.4	36	21
58	Other business services	74.5-74.8	37	21
59	Public administration and defence	75	38	22
60	Education	80	39	23
61	Health and social work	85	40	24
62	Waste disposal	90	41	25
63	Membership organisations	91	41	25
64	Culture and sport	92	41	25
65	Other services	93	41	25
66	Private household	95	41	25
67	Extra-territorial organisations	99	41	25

⁶ They are abbreviated from the full names used by ONS.

Table A.3 Classification of 27 Industries

Industries	SIC2003
1. Agriculture, etc	01-02, 05
2. Mining & quarrying	10-14
3. Food, drink & tobacco	15-16
4. Textiles & clothing	17-19
5. Wood, pulp & paper,	20-21
6. Printing & publishing	22
7. Chemicals, & non-metallic mineral products	23-26
8. Metals & metal goods	27-28
9. Machinery, electrical & optical equipment	29-33
10. Transport equipment	34-35
11. Other manufacturing & recycling	36-37
12. Electricity, gas & water	40-41
13. Construction	45
14. Sale & maintenance of motor vehicles	50
15. Wholesale distribution	51
16. Retailing	52
17. Hotels & restaurants	55
18. Transport	60-63
19. Communications	64
20. Financial services	65-67
21. Professional services	70, 71, 73
22. Computing services	72
23. Other business services	74
24. Public administration & defence	75
25. Education	80
26. Health & social work	85
27. Other services	90-99

Table A.4: General Classification for Presenting Sectors in *Working Futures 2007-2017*

Industries	SIC2003	MDM Industries
1. Agriculture, etc	01-02, 05	1
2. Mining & quarrying; Electricity, gas & water	10-14,40-41	2-4, 22-24
3. Food, drink & tobacco	15-16	5,
4. Textiles & clothing	17-19	6
5. Wood, pulp & paper; Printing & publishing	20-22	7,8
6. Chemicals, & non-metallic mineral products	23-26	9-13
7. Metals & metal goods	27-28	14,15
8. Machinery, electrical & optical equipment	29-33	16-18
9. Transport equipment	34-35	19,20
10. Other manufacturing & recycling	36-37	21
11. Construction	45	25
12. Sale & maintenance of motor vehicles	50	26 (part)
13. Wholesale distribution	51	26 (part)
14. Retailing	52	27
15. Hotels & restaurants	55	28
16. Transport	60-63	29-31
17. Communications	64	32
18. Financial services	65-67	33,34
19. Professional services	70, 71,73	36 (part)
20. Computing services	72	35
21. Other business services	74	36 (part), 37
22. Public administration & defence	75	38
23. Education	80	39
24. Health & social work	85	40
25. Other services	90-99	41

Note: (a) Most of these sectors are identical to the 27 industries in Table A.3. The exceptions are industries 2 and 5, which are aggregates of 2 such categories.

Table A.5: Industries for which ONS supply data for the Government Office Regions (employees only)

		SIC 2003	SAM41 (MDM)
1	Agriculture, hunting, forestry, fishing	(AB)	01 to 05 1
2	Mining & quarrying	(C)	10-14 2-4
3	Manufacturing	(D)	15-37 5-21
4	Electricity gas & water supply	(E)	40/41 22-24
5	Construction	(F)	45 25
6	Personal household goods	(G)	50 to 52 26,27
7	Hotels & restaurants	(H)	55 28
8	Transport storage & communication	(I)	60 to 64 29-32
9	Financial intermediation	(J)	65 to 67 33,34
10	Real estate renting & business activities	(K)	70 to 74 35-37
11	Public admin. & defence; compulsory social security	(L)	75 38
12	Education	(M)	80 39
13	Health & social work	(N)	85 40
14	Other community, social & personal service activities; private households organisations & bodies	(O,P,Q)	90 to 99 41

Table A.6: Sectoral Categories for Regional Reporting

	SIC 2003	SAM41 (MDM)	Broad Sector Group
1	Agriculture, etc ^(a)	(AB) 01 to 05	1 1
2	Mining & quarrying ^(a)	(C) 10-14	2-4 1
	Manufacturing, of which: ^(b)	(D) 15-37	5-21 2
3	Food drink & tobacco	(DA) 15-16	5 2
4	Engineering	(DL+) 29-33	16-18 2
5	Rest of manufacturing	(rest of D)	6-15,19-21 2
6	Electricity, gas & water ^(a)	(E) 40/41	22-24 1
7	Construction	(F) 45	25 3
8	Retail, distribution	(G) 50 to 52	26,27 4
9	Hotels & restaurants	(H) 55	28 4
10	Transport & communication	(I) 60 to 64	29-32 4
11	Financial services ^(b)	(J) 65,66,67	33,34 5
12	Other business activities ^(b)	(K) 70 to 74	35-37 5
13	Public admin. & defence	(L) 75	38 6
14	Education	(M) 80	39 6
15	Health & social work	(N) 85	40 6
16	Other services	(O,P,Q) 90 to 99	41 5

Notes: a) Although these categories are shown here, small sample sizes preclude producing some, more detailed, breaks for these sectors.
b) These categories are modified from those adopted by ONS for regional reporting in order to avoid cutting across the categories used in Table A.5.

Table A.7: Aggregate Sectors (and Comparison with Industry Groups used in Previous projections)

Broad Sector	Old Industry Group ^a	MDM Industries
1. Primary sector and utilities	1. Agriculture	1
	2. Mining etc.	2,3,4
	9. Utilities	22-24
2. Manufacturing	3. Food, drink and tobacco	5
	4. Textiles and clothing	6
	5. Chemicals	9-12
	6. Metals, and mineral products	13-15
	7. Engineering	16-20
	8. Other manufacturing	7,8,21
	10. Construction	25
4. Distribution, transport etc.	11. Distribution, hotels etc.	26-28
	12. Transport and communication	29-32
5. Business and other services	13. Banking and business services	33,34,37
	14. Professional services	36
	15. Other services	42
6. Non-marketed services	16. Health and education services	39,40
	17. Public administration and defence	38

Note: (a) As used in Wilson (2001a).

Table A.8: Broad Sectors, 25/27 Industries and RMDM Industries

Broad Sector	25 / 27 industries ^a	RMDM Industries
1. Primary sector and utilities	1. Agriculture, etc	1
	2. Mining & quarrying	2-4
	Electricity, gas & water ^a	22-24
2. Manufacturing	3. Food, drink and tobacco	5
	4. Textiles and clothing	6
	5. Wood, pulp & paper	7
	Printing & publishing ^a	8
	6. Chemicals, non-metallic min. prods.	9-12
	7. Metals and metal goods	13-15
	8. Machinery, electrical & optical eq.	16-18
	9. Transport Equipment	19-20
	10. Other manufacturing & recycling	21
	3. Construction	11. Construction
4. Distribution, transport etc.	12. Sale & maintenance of motors	26 (part)
	13. Wholesale distribution	26 (part)
	14. Retailing	27
	15. Hotels & restaurants	28
	16. Transport	29-31
	17. Communications	32
	5. Business and other services	18. Financial services
19. Professional services		36 (part)
20. Computing services		35
21. Other business services		37 (+ part of 36)
25. Other services		41
6. Non-marketed services	22. Public administration & defence	38
	23. Education services	39
	24. Health & social work	40

Note: (a) Most of these sectors are identical to the 27 categories in Table A.3. The exceptions are industries 2 and 5, which are aggregates of 2 such categories.

Table A.9: Relationship between Industry (25) and Detailed Industry (67)

Industry	Detailed Industry	SIC2003
1 Agriculture, etc	1 Agriculture	01
	2 Forestry	02
	3 Fishing	05
2 Mining & quarrying; Electricity, gas & water	4 Coal mining	10
	5 Oil and gas	11
	6 Uranium mining	12
	7 Metal ores	13
	8 Other mining	14
	35 Electricity	40.1, 40.3
	36 Gas supply	40.2
	37 Water supply	41
3 Food, drink and tobacco	9 Food	15.1-15.8
	10 Drink	15.9
	11 Tobacco	16
4 Textiles and clothing	12 Textiles	17
	13 Clothing	18
	14 Leather	19
5 Wood, pulp & paper; Printing and publishing	15 Wood and wood products	20
	16 Paper and paper products	21
	17 Publishing and printing	22
6 Chemicals and non-metallic mineral products	18 Manufactured fuels	23
	19 Pharmaceuticals	24.4
	20 Chemicals nes	24 (ex 24.4)
	21 Rubber and plastics	25
	22 Non-metallic mineral products	26
7 Metals & metal goods	23 Basic metals	27
	24 Metal goods	28
8 Machinery, electrical & optical equipment	25 Mechanical engineering	29
	26 Computers and office machinery	30
	27 Electrical engineering	31
	28 TV and radio	32
	29 Instruments	33
9 Transport equipment	30 Motor vehicles	34
	31 Aerospace	35.3
	32 Other transport equipment	35 (ex 35.3)
10 Other manufacturing & recycling	33 Manufacturing nes	36
	34 Recycling	37
11 Construction	38 Construction	45
12 Sale and maintenance of motor vehicles	39 Distribution relating to motors	50
13 Wholesale distribution	40 Distribution nes	51
14 Retailing	41 Retailing nes	52
15 Hotels & restaurants	42 Hotels and catering	55
16 Transport	43 Rail transport	60.1
	44 Other land transport	60.2, 60.3
	45 Water transport	61
	46 Air transport	62
	47 Other transport services	63
	48 Post and courier services	64.1
17 Communications	49 Telecommunications	64.2
	50 Banking and finance	65
18 Financial services	51 Insurance	66
	52 Financial support services	67
19 Professional services	53 Real estate	70
	54 Renting of goods	71
	56 Research and development	73
20 Computing services	55 Computing services	72
21 Other business services	57 Professional services nes	74.1-74.4
	58 Other business services	74.5-74.8
22 Public administration & defence	59 Public administration and defence	75
23 Education	60 Education	80
24 Health & social work	61 Health and social work	85
25 Other services	62 Waste disposal	90
	63 Membership organisations	91
	64 Culture and sport	92
	65 Other services	93
	66 Private household	95
	67 Extra-territorial organisations	99

ANNEX A

Table A.10: SOC2000 Classification of Occupational Categories (Sub-major Groups)

	Sub-major groups	Occupations	Occupation minor group number ^a
11	Corporate managers	Corporate managers and senior officials; production managers; functional managers; quality and customer care managers; financial institution and office managers; managers in distribution and storage; protective service officers; health and social services managers	111, 112, 113, 114, 115, 116, 117, 118
12	Managers/proprietors in agriculture and services	Managers in farming, horticulture, forestry and fishing; managers and proprietors in hospitality and leisure services; managers and proprietors in other service industries	121, 122, 123
21	Science and technology professionals	Engineering professionals; information and communication technology professionals	211, 212, 213
22	Health professionals	Health professionals, including medical and dental practitioners and veterinarians	221
23	Teaching and research professionals	Teaching professionals, including primary and secondary school teachers and higher and further education lecturers; research professionals (scientific)	231, 232
24	Business and public service professionals	Legal professionals; business and statistical professionals; architects, town planners, and surveyors; public service professionals; librarians and related professionals	241, 242, 243, 244, 245
31	Science and technology associate professionals	Science and engineering technicians; draughtspersons and building inspectors; IT service delivery occupations	311, 312, 313
32	Health and social welfare associate professionals	Health associate professionals, including nurses and other paramedics; therapists; social welfare associate professionals	321, 322, 323
33	Protective service occupations	Protective service occupations	331
34	Culture, media and sports occupations	Artistic and literary occupations; design associate professionals; media associate professionals; sports and fitness occupations	341, 342, 343, 344
35	Business and public service associate professionals	Transport associate professionals; legal associate professionals; financial associate professionals; business and related associate professionals; conservation associate professionals; public service and other associate professionals	351, 352, 353, 354, 355, 356
41	Administrative and clerical occupations	Administrative/clerical occupations: government and related organisations; finance; records; communications; general	411, 412, 413, 414, 415
42	Secretarial and related occupations	Secretarial and related occupations	421
51	Skilled agricultural trades	Agricultural trades	511
52	Skilled metal and electrical trades	Metal forming, welding and related trades; metal machining, fitting and instrument making trades; vehicle trades; electrical trades	521, 522, 523, 524
53	Skilled construction and building trades	Construction trades; building trades	531, 532
54	Other skilled trades	Textiles and garment trades; printing trades; food preparation trades; skilled trades n.e.c.	541, 542, 543, 549
61	Caring personal service occupations	Healthcare and related personal services; childcare and related personal services; animal care services	611, 612, 613
62	Leisure and other personal service occupations	Leisure and other personal service occupations; hairdressers and related occupations; housekeeping occupations; personal service occupations n.e.c.	621, 622, 623, 629
71	Sales occupations	Sales assistants and retail cashiers; sales related occupations	711, 712
72	Customer service occupations	Customer service occupations	721
81	Process plant and machine operatives	Process operatives; plant and machine operatives; assemblers and routine operatives	811, 812, 813
82	Transport and mobile machine drivers and operatives	Transport drivers and operatives; mobile machine drivers and operatives	821, 822
91	Elementary occupations: trades, plant and machine related	Elementary occupations: agricultural trades related; process and plant related; mobile machine related	911, 912, 913, 914
92	Elementary occupations: clerical and services related	Elementary occupations: clerical related; personal services related; cleansing services; security and safety services; sales related	921, 922, 923, 924, 925

Notes: (a) Standard Occupational Classification, ONS 2001.

Annex B: COMPARISON WITH OTHER PROJECTIONS

Overview

This annex provides a brief technical analysis of how the *Working Futures 2007-2017* (WF III) projections compare with those published in *Working Futures 2004-2014* (WF II), as well as with *Working Futures 2002-2012* (WF I). More complete details can be found in the separate *Technical Report*.⁷

Comparisons with *Working Futures 2004-2014*

In comparing the present results with those from WF II (and WF I) a number of considerations need to be borne in mind. These include:

- Different periods covered
- Revisions to historical data;
- New views about exogenous assumptions;
- Revised perceptions of underlying trends;
- Model and other forecasting errors.

Each of these will affect the levels and patterns of employment projected and can contribute to differences between the two sets of projections. The main differences can be discussed under the following headings:

- Changes to base levels;
- Gender status structure and changes in gender status trends;
- Sectoral structure and changes in sectoral trends;
- Occupational structure and changes in occupational trends;
- Replacement demands.

Each of these elements is now discussed in turn. The *Technical Report* provides a more detailed analysis.⁸

Changes to overall employment levels

The latest data from the Annual Business Inquiry and the LFS have resulted in some quite significant changes to the official perception of the historical position. Employment levels have again been revised upwards quite substantially. In WF II, the Total level of employment in the UK in 2004 was estimated as 30,099 million. The corresponding figure for 2004 in WF III is 30,333 million (over $\frac{3}{4}$ of a per cent higher). The base year for the WF III forecast is 2007, by which time a substantial further increase in employment to a total level of some 31,234 million had occurred (a difference compared to the WF II base level (2004) of almost 4 per cent.

The general assumptions about prospects for the world and domestic economies were not too different in the WF I and WF II forecasts. For WFII the situation in the short term at least is much more uncertain. On the other hand population estimates and expected growth are not much higher than in WF II.

Thus while for WF III the short term outlook in both the world and the UK economies looks more uncertain, the longer-term prospects are much brighter in terms of likely employment growth. The medium-term benchmark projection produced for WF III is therefore quite optimistic from an employment perspective.

The latest projections suggest an increase of just under 2 million jobs between 2007 and 2017. This compares with 1.3 million projected between 2004 and 2014 in WF II.

⁷ Wilson *et al.* (2008).

⁸ Wilson *et al.* (2008).

Gender / status mix

Within the overall totals discussed so far, perceptions of both historical and therefore likely future trends in gender status and occupation have changed, as a result of revised data from the ABI and the LFS.

As a consequence the estimated share of females in employment has now been revised further downwards in many sectors, especially for full-time employees. In contrast the employment shares of men have been revised upwards across the board.

This results in the projection of a significantly higher proportion of males in employment than was projected in WF I, but not very different from that in WF II. Female part-time jobs are projected to see an almost opposite effect. Self employment shares generally are now projected to be slightly higher than in WF II but the differences in aggregate are small.

Sectoral change

In general, the changing patterns of employment by sector look very similar in WF III to those projected in both WF II and WF I. The base level estimates suggest a slightly faster rate of historical decline for manufacturing industries, offset by slightly higher employment in construction and non-marketed services.

In construction, output growth rates are projected to be slightly faster over the decade as a whole whereas productivity growth is now projected to rise more slowly. As a consequence, employment growth is more optimistic over the decade as a whole.

Patterns of change over the future are also generally similar in the two sets of forecast.

Occupational Change

The latest LFS data, together with other information suggest a number of

detailed changes to both perceptions of historical changes in occupational structure and the prospects for the future.

The latest estimates suggest higher employment shares for managers & senior officials as well as for professional occupations. These are offset by lower shares for administrative, clerical & secretarial occupations and for sales occupations. For the forecast period slower rates of decline are now projected for elementary occupations than in WF II and slower growth for sales and customer service occupations. These reflect both industry and occupational effects.

Replacement demands

Estimates of replacement demands and total requirements are based on detailed information on age structures and flow rates taken from the Labour Force Survey. These estimates are subject to quite large margins of error and the resulting estimates of replacement needs can vary quite a lot as a consequence.

Nevertheless, the general pattern of the results in the latest WF III projections looks very similar to the two preceding sets of projections. The overall scale of replacement needs is slightly higher than in WF II but still significantly lower than in WF I. The latter partly reflects the gradual unwinding of demographic effects (as the effect of the "baby boom" generation reaching retirement age begins to tail off). However, given the uncertainties with some of the data, too much should not be read into this difference.

The key message remains that replacement needs are, generally speaking, quantitatively much more significant than the expansion demand (growth or decline) that is projected for each occupation.

Comparison with other forecasts

A number of other organisations produce employment projections. In particular some Sector Skills Councils conduct such exercises as a part of their assessment of skill needs in their sectors. No detailed assessment of these results and how they compare with *Working Futures 2007-2017* has been carried out as part of the present exercise.

Annex C: SSC CONTACT DETAILS

This Annex presents contact details for each Sector Skills Councils (SSC), including its web address, qualitative definition, core SIC codes and identifies problems with SIC coverage of the SSC's footprint. The SSCs are listed in the following table together with a description of the sector and a definition in terms of Standard Industrial Classification (SIC). These cover a particular footprint which includes the core business sectors, and hence employers, that the SSC represents on the ground. This is defined qualitatively using a wordy definition. They also employ

a definition based on SIC code groupings that most closely match the SSC sectoral footprint.

SSCs are specialists in their sector and therefore can provide further in-depth analysis of skills and productivity within their sector. Users should consult the SSCs' individual websites for further information as outlined below.

The category 'non-SSC employers' represent those SICs not allocated to an SSC at the time of the study.

Table C.1: SSC Sector Names, Websites and Descriptions

	SSC industry	Website	Industries
1	Asset Skills	www.assetskills.org	Property, housing, cleaning and facilities management
2	Automotive Skills/IMI	www.motor.org.uk	Retail motor industry
3	Cogent	www.cogent-ssc.com	Chemicals, pharmaceuticals, nuclear, oil & gas, petroleum & polymers
4	ConstructionSkills	www.constructionskills.net	Construction industry
5	Creative and Cultural Skills	www.ccskills.org.uk	Advertising, Crafts, Cultural Heritage, Design, Music, Performing, Literary and Visual Arts
6	Energy and Utility Skills	www.euskills.co.uk	Electricity, gas, waste management and water industries
7	e-skills UK	www.e-skills.com	IT and telecoms
8	Financial Services Skills Council	www.fssc.org.uk	Financial services industry
9	GoSkills	www.goskills.org	Passenger transport industries
10	Government Skills	www.government-skills.gov.uk	Central government
11	Improve	www.improveltd.co.uk	Food and drink manufacturing
12	Lantra	www.lantra.co.uk	Environmental and land-based sector
13	LLUK	www.lluk.org	Community learning and development, further education, higher education, libraries, archives and information services, and work-based learning
14	People 1st	www.people1st.co.uk	Hospitality, leisure, travel and tourism
15	Proskills	www.proskills.co.uk	Science, engineering and manufacturing technologies
16	SEMTA	www.semta.org.uk	Apparel, footwear and textile industry
17	Skillfast-UK	www.skillfast-uk.org	Social care including children, families and young children
18	Skills for Care and Development	www.skillsforcareanddevelopment.org.uk	NHS, independent and voluntary health organisations
19	Skills for Health	www.skillsforhealth.org.uk	Custodial care, community justice and police
20	Skills for Justice	www.skillsforjustice.com	Freight logistics industries
21	Skills for Logistics	www.skillsforlogistics.org	Active leisure and learning
22	SkillsActive	www.skillsactive.com	Broadcast, film, video, interactive media and photo imaging
23	Skillset	www.skillset.org	Retail industry
24	Skillsmart	www.skillsmartretail.com	Building services engineering
25	SummitSkills	www.summitskills.org.uk	

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