

Skilled Shortage Sensible

**The recommended
shortage occupation lists
for the UK and Scotland**

Migration Advisory Committee

September 2008

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Skilled, Shortage, Sensible:
the recommended shortage
occupation lists for the
UK and Scotland

Migration Advisory Committee

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Chairman's foreword



Immigration is – and for some time has been – fiercely debated in the UK. Therefore, the Migration Advisory Committee (MAC) has a substantial and historic task. In this report we attempt to put some analytical rigour into the design of labour immigration policy. The MAC's role is to provide independent advice concerning those occupations and jobs: (a) that are skilled; (b) where there is a labour shortage; and (c) where it is sensible to fill that shortage via immigration from outside the European Economic Area (EEA).

The MAC focuses on the economics of the labour market. The Migration Impacts Forum is a parallel body examining the social and community aspects of immigration.

The recommended shortage lists for the UK and Scotland are detailed in Chapters 10 and 11. These present occupations that the MAC analysis suggests pass the skill, shortage and sensible hurdles. We are conscious that our recommendations will affect many businesses, organisations and individuals inside and outside the country.

The MAC is comprised of myself as Chair, four appointed economists and two *ex officio* members. This unusual composition of a non-governmental non-statutory advisory body was deliberately chosen by the Government as the best mechanism to secure an impartial analysis of the labour economics of immigration. But it must be emphasised that the MAC has operated

in a spirit of social partnership. We sought and received evidence from firms and a wide variety of other organisations, including employer bodies, government departments, unions and Sector Skills Councils in relation to both the UK and Scotland lists.

We submit this report against a background of emerging policy in other areas. In particular, the UK Commission for Employment and Skills is tasked to make the UK a world-class leader in employment and skills by 2020. The Government aims to help more people into work, ensure business success in an increasingly competitive world, and achieve sustainable economic growth and rising prosperity. This will all have important consequences for future immigration requirements and I look forward to the MAC making a contribution to that.

Our recommendations are based on an open, transparent, evidence-based, rigorous analysis of the labour market. The MAC has both commissioned research and done its own research, received written evidence, been to all regions of the UK and taken evidence from well over 100 individual organisations, as well as organising several larger events. We are grateful to all the stakeholders who have participated in this process, particularly members of our stakeholder panel and forum where we received strong endorsement of our proposed method of investigation as set out in our February 2008 report. Our shortage lists are not set in stone. We welcome constructive criticism and intend to review the lists on a regular basis.

We are non-partisan and our recommendations are put forward for the good of the UK as a

whole. We hope they will be of direct benefit to UK business but also to the UK population as a whole, as well as to the immigrants themselves.

The UK's immigration policy has a long history. The new Points Based System (PBS) for immigration breaks new ground by emphasising both vertical and horizontal complementarity. First, the pattern of relative demand for labour has altered in favour of the skilled and this vertical element is a key component of the PBS. Second, for this skilled labour the PBS – via the MAC – focuses on occupations where there is a labour shortage, the horizontal component within the skilled category.

The MAC has analysed the whole skilled labour market whereas the previous work permit regime focused in practice on a limited number of sectors, particularly health and engineering. It is plausible, therefore, that the complexion of our shortage lists will be different and that the number of immigrants entering via the occupation shortage route will rise relative to those coming via other routes. This raises two key issues. First, it is essential that the calibration of points under the non-shortage routes – e.g. the resident labour market test and intra-company transfers – is regularly and thoroughly reviewed. Second, it is vital that firms and organisations sponsoring migrants who enter under the MAC shortage route are rigorously and regularly vetted. In particular, any deliberate attempts to abuse the shortage occupation route must be avoided and such sponsors warned or struck off.

Our recommendations are a coherent package. We do not see them as a menu. We recognise that there are some issues that the Government may need to consider that go beyond our remit, including national security, social impacts, or broader objectives such as international development goals. But the MAC believes it would be injudicious to alter the list because of evidence that was not submitted to us. We

hope to receive better evidence in the future, but the list is to be reviewed regularly and any errors of omission or commission can be speedily corrected if the evidence warrants it.

We are indebted to our secretariat for their dedicated, professional hard work, initiative and excellent organisation.

This report is unanimous (despite the MAC being a group of economists!). Committee members are privileged to participate in the new PBS and hope that we can make a continuing contribution to migration policy as it evolves.



Professor David Metcalf CBE

The Migration Advisory Committee and secretariat

Chair



Professor David Metcalf CBE

Members



Dr Diane Coyle



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Summary

The Migration Advisory Committee (MAC) was set up to provide transparent, independent and evidence-based advice to the Government on where shortages of skilled labour can sensibly be filled by immigration from outside the European Economic Area (EEA).

Our remit is as follows: *“Produce shortage occupation lists for UK and Scotland only (Tier 2 skilled employment). These lists comprise occupations where, in the MAC’s view, there are shortages which can sensibly be filled by enabling employers to recruit migrants.”*

The first meeting of the MAC was on 7 December 2007, and we have had seven formal meetings in total. But these meetings were the tip of the iceberg, with MAC members engaged in a series of activities, as set out in this report.

Part I: Context

The UK labour market and immigration context

Immigration policy can select immigrants in a way that maximises their complementarities to residents. The new Points Based System (PBS) emphasises two elements of complementarity. First, it emphasises skilled immigration rather than unskilled, in order to fit with the pattern of relative labour demand and how that is changing over time. Second, skilled immigrants supply labour where the occupation or job is currently experiencing a shortage and where there is little prospect of eliminating the shortage in the near future.

Despite the current economic slowdown, we are making our recommendations in the context

of a relatively healthy and stable labour market. Nonetheless, the composition of employment has changed over recent years, mainly due to the increased proportion of women in employment, although female participation among immigrants is still relatively low.

In terms of immigrant flows, the MAC is dealing with what, under current trends, is in the region of around 100,000 people per year. This is a significant, but relatively low, proportion of overall immigration inflows.

The current work permit system for managing immigration

There has been an increase in the numbers of work permits issued over the past decade. This has been reflected in both new applications from out-country and applications and extensions for immigrants already in the UK. The proportion of in-country applications has increased at a somewhat higher rate than out-country applications. The shortage occupation route will not be limited solely to new immigration.

The shortage occupation route currently accounts for only a small proportion of work permits. The past is not necessarily a good guide to the future, but it does raise questions about the optimum balance between the shortage route and other routes, which will need to be considered as the new system is evaluated.

Nonetheless, there is little doubt that some specific occupations are heavily dependent on the shortage route, even in the current system. It is necessary to look at occupations and job titles at a disaggregated level in order to fully understand how the system is needed, and used,

by employers. We also need to remain alert to the fact that employers will look to use the system in a way that benefits them, which may not always coincide exactly with what was anticipated.

The Points Based System for managing immigration

The Government has outlined its ambition for the UK to join the world's 'premier league' for skills by 2020, backed by financial investment and a range of new approaches to improve the skill level of the domestic population. The Government emphasised the priority it gives to improving skills in its response to our call for evidence, but also recognised the important role that immigrants play in the UK labour market.

The PBS consists of five tiers, each of which represents a possible route for non-EEA nationals to enter the UK to work, train or study. Tier 1 covers highly skilled individuals. Tier 2 covers skilled workers with a job offer to fill gaps in the UK labour force. Tier 3 relates to low-skilled workers, and is currently suspended. Tier 4 relates to students and Tier 5 to youth mobility and temporary workers.

Tier 2, our main focus in this report, will replace the current work permit system. It allows UK employers to recruit skilled non-EEA nationals into vacancies that they are not able to fill from within the EEA. Points are earned based on factors that include prospective earnings, qualifications held by the individual, and whether the occupation passes the resident labour market test (RLMT). The RLMT requires the employer to advertise the vacancy through Jobcentre Plus or as agreed in a sector code of practice.

If an applicant holds an offer of a job that has been identified as in shortage by the Government on our advice, the earnings, qualifications and RLMT criteria do not apply. Hence the shortage route facilitates access to immigrant labour in occupations where the economy would particularly benefit from it.

Part II: Analysis

Approach and issues

We have used a three-stage approach to drawing up the shortage occupation lists for the UK and Scotland. This is set out in the report as follows:

- first, we consider whether individual occupations or categories of jobs are sufficiently **skilled** to be included on the shortage occupation lists;
- then, we assess whether there is a **shortage** of labour within each skilled occupation; and
- finally, we consider whether it is **sensible** for immigrant labour from outside the EEA to be used to fill these shortages.

When addressing these questions, we used a hybrid method that combined the consistency and comprehensiveness of a 'top-down' approach using national-level data with the fine-grained detail and contextualisation of a 'bottom-up' method using evidence relating to particular categories of jobs and sectors.

The need to identify occupations in the labour market where shortages exist requires us to form and communicate a clear and consistent view of what we mean by 'occupation'. We have, where possible, worked with the Standard Occupational Classification 2000 (SOC2000), which breaks the labour market down into 353 occupations. In many cases, we have also considered specific jobs within those 353 occupations.

We recognise that many employers face real difficulties in recruiting staff from outside their area of the UK. Our work plan did not allow us to produce separate shortage occupation lists for UK countries or regions other than Scotland. We are also not convinced that separate shortage occupation lists for each region and country of the UK are desirable or practicable. Even if regional shortages, however defined, exist and can be identified, it is probably not sensible to fill vacancies with immigrants if there is not a national shortage.

Gathering and considering the evidence

'Bottom-up' evidence came from individual employers and sectoral and occupational representatives. In our February 2008 report we launched a call for evidence in order to collect information to support our work and take comments on our proposed methodology. The evidence that we received on occupations has been key to the development of our recommended lists. Comments on our methodology from most sectors were broadly supportive.

Other actions we took included carrying out visits to every country and region of the UK, engaging with the Sector Skills Councils and Sector Advisory Panels, and setting up a formal Stakeholder Panel and a larger Stakeholder Forum. We also had many other meetings with employers, employees and representative organisations and commissioned independent research into labour shortages and immigration across key sectors. In all, we took individual evidence from well over 100 stakeholders, and took evidence from many more stakeholders at group events.

We also carried out top-down analysis to establish which jobs and occupations were skilled, in shortage, and where shortages would be sensibly filled by non-EEA immigration.

Is it skilled?

There is no unique, objectively defined measure of skill. Nonetheless, individual jobs under Tier 2 of the PBS need to be skilled to at least National Qualifications Framework (NQF) level 3. It follows that the shortage occupation lists should contain only occupations and job titles at this level or above.

To assess this, we have looked at factors that might indicate whether an occupation is relatively skilled. These include qualifications held by people within that occupation, average earnings and skill level within the SOC2000. Other indicators of skill, such as on-the-job training

or experience and innate ability required to carry out the job to the appropriate level, are important too, and were considered through our bottom-up analysis.

For our purposes, we defined an occupation as top-down skilled if at least two of three criteria are satisfied: 50 per cent or more of the workforce are qualified to level 3 or above; median hourly earnings for all employees is £10 or more; and the occupation is defined as skill level 3 or 4 in the SOC2000. Applying these criteria, 192 occupations out of 353 satisfy our definition of skilled. It was mostly, for our purposes, appropriate to assume that all jobs within these occupations are skilled. In addition, our bottom-up analysis allowed for the fact that there may be some specialised skilled jobs within less skilled occupations.

Is there a shortage?

As with skill, there is no universal definition or measure of 'shortage'. However, two key lessons emerge from the UK and overseas literature. First, although these attempts at identifying shortages of skilled labour are based on different methods, it is apparent that most approaches do not rely on a single indicator of shortage. So we have examined a range of indicators in our top-down analysis of shortage.

Second, the differences between the approaches suggest that there is no single, infallible way of measuring shortage, making it crucial that quantitative analysis is contextualised by background information and knowledge of the labour market. So we have paid careful heed to the bottom-up evidence on shortage.

For our top-down analysis we identified four basic sets of indicators. These were: employer-based indicators (e.g. reports of shortage from skill surveys); price-based indicators (e.g. relatively rapid earnings growth); volume-based indicators (e.g. employment or unemployment); and other indicators of imbalance based on administrative data (e.g. vacancies or vacancy/unemployment

ratios). Within these four categories we identified 12 indicators in total and carried out analysis to determine the appropriate threshold between shortage and non-shortage for each.

We do not use our top-down analysis to draw a firm line between shortage and non-shortage occupations. However, we consider there to be particularly strong top-down evidence of potential shortage if an occupation passes our shortage threshold on 50 per cent or more of the indicators. Twenty out of 192 skilled occupations do this.

When considering the bottom-up evidence for shortages we have assessed it by looking at the same broad groups of indicators that the top-down evidence considers. This included looking at factors such as whether wages are increasing more than average and vacancies are increasing faster than jobs are being created.

Is it sensible?

The concept of 'sensible' can be interpreted in many different ways, but any definition depends on the underlying policy objectives. In some cases, government objectives or policies may relate to particular sectors or occupations. For example, immigrant labour has in recent years played a key role in supporting particular government priorities in areas such as healthcare. However, we do not assume that immigration, or the use of immigrant labour to sustain wages at below the market rate, is necessarily the best way to meet government objectives in particular sectors.

We examined the availability of alternatives to employing non-EEA immigrants in response to a shortage of skilled labour. This included considering whether immigrants are in some cases employed primarily as cheap labour, as well as efforts being made to fill the shortage by other means. We also considered whether bringing in immigrants would affect the skills acquisition of the domestic workforce, including potential disincentives to up-skill workers. Finally, we examined wider impacts on the

UK labour market and economy, including the impact on employment opportunities for UK resident workers.

In practice, the question of sensible is very likely to be specific to sectors and/or occupations. We rely heavily on bottom-up evidence. However, there are a limited number of numerical indicators available that might provide context to the bottom-up evidence, including the shares of non-EEA immigrants already employed in an occupation and the percentage of the workforce in receipt of training.

There are some issues which, although important, are beyond our remit when we consider the question of sensible. First, there are the potentially important implications that immigration has for immigrants and their countries of origin. Second, beyond any labour market and economic effects, our terms of reference do not include the social impacts of immigration. The Migration Impacts Forum was set up to look at the social effects of immigration. Third, we are not in a position to make judgements based on factors such as national security implications of immigrants working in sensitive areas.

A question that falls within our remit, but which presents a clear challenge, is the potential trade-offs between the short run and the long run. For example, bringing in immigrants to fill shortages may be essential in the short run to ensure the survival of businesses or the provision of crucial services. However, in the long run it may reduce the incentives to invest in the training and up-skilling of UK resident workers, and therefore contribute to maintaining or even increasing dependence on immigrant workers in the long term. Our approach to such difficult issues has been to make our decisions in a balanced, consistent and transparent manner.

Part III: Results and next steps

Dovetailing the evidence

In Chapter 9 we set out the evidence we have received for specific jobs and occupations and

assess whether and to what extent it met our skilled, shortage and sensible criteria. We also state whether the evidence justifies inclusion of each job or occupation considered on our recommended UK shortage occupation list.

We discuss occupations from across the labour market, including areas such as healthcare, social care, engineering, teaching, catering and the construction industry. In some cases we include whole occupations on our list, and in others we include more specific jobs within occupations. We also discuss some occupations for which evidence was submitted, but which we did not include on our shortage occupation list. This is either on the basis that insufficient evidence was provided, or that the evidence provided was not sufficiently convincing.

Results

Our recommended shortage occupation list for the UK is set out in Chapter 10. The Government will announce in due course whether it is going to accept our recommendations.

The number of occupations and jobs included on this list is larger than the last (July 2008) shortage occupation list produced by the UK Border Agency (UKBA). This is almost inevitable, because we have examined the entire labour market while the UKBA focused, in the most recent iteration of their list, on only three key areas: human and animal health; engineering; and education. Nonetheless, although it is not possible to calculate precise numbers, we estimate that the occupations on our list account for approximately 700,000 employees in the UK, well below the over one million employees covered by the July 2008 UKBA list.

We will review various occupations over the next six months, including those in healthcare and, where appropriate, those that were classed as skilled and passed on at least 50 per cent of the available top-down shortage indicators. A full list is provided in Chapter 10.

The Scotland list

By definition, a UK list includes Scotland, meaning that the UK list will apply to Scotland as well as to the rest of the UK. Because our work plan requires us to produce a Scotland shortage occupation list, in this way Scotland gets a 'second bite of the cherry'.

Official projections for 2006 estimate Scotland's population, including working-age population, to increase less rapidly than in the UK as a whole. Currently, however, the total employment rate in Scotland is slightly higher than that for the UK taken as a whole. Immigrants account for less than 7 per cent of the working-age population in Scotland, compared with 13 per cent in the UK, although the Scotland figure is three times higher than 20 years ago.

The highest numbers of skill shortage vacancies reported in Scotland (in 2006) per thousand employees are for associate professional and professional occupations. The number of skill shortage vacancies as a proportion of employment in Scotland is particularly high for associate professionals, skilled trades and professionals, both relative to other occupations in Scotland and relative to England.

Because of Scotland's smaller population, data limitations at the UK level tend to be exacerbated at the Scottish level, so bottom-up evidence was crucial. Evidence received from stakeholders in Scotland also played a role in helping us to assess where shortages exist at the whole UK level as well as Scotland. We held the fourth meeting of the MAC in Glasgow on 28 March 2008. Among other activities, we visited a number of employers around Glasgow and Aberdeen and also hosted a lunch event for Scottish employers and other organisations to gather further evidence.

Our recommended shortage occupation list for Scotland is set out in Chapter 11.

Again, the UK Government will announce in due course whether it wishes to accept our recommendations.

Next steps

Assuming that the Government asks us to keep the shortage occupation lists under review, we plan to carry out a partial review of the shortage occupation lists for Scotland and the UK within the next six months. We will also fully review the lists at least every two years. We may recommend more frequent changes. We will publish our recommendations.

Stakeholder input is essential to the evidence base on which we are working to advise the Government. We continue to welcome this evidence. Please see Chapter 12 for further details of how to submit evidence.

Our potential future research plans include looking in more detail at how skill might be defined and measured at the occupational level; further research into our shortage indicators; and exploring in more detail when and where non-EEA immigrants may sensibly fill gaps in the labour market, including how employing non-EEA immigrants impacts on employer incentives, the productivity of resident workers, and the economy and public finances.

Our research programme will allow us to evaluate, and thus potentially improve, our approach. We will use the data available to us to assess the impact that the shortage occupation lists are having on migration flows, and believe that high-quality management information should be collected for this purpose. We also believe that the PBS should be evaluated rigorously and we would be happy to be involved in this process.

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Introduction

0.1 The Migration Advisory Committee

- 0.1 The Migration Advisory Committee (MAC) is a newly established non-departmental public body. It was set up to provide transparent, independent and evidence-based advice to the Government on where shortages of skilled labour exist that can sensibly be filled by immigration from outside the European Economic Area (EEA).¹
- 0.2 We have seven members, comprising the Chair, four independent economists, and representatives of the UK Commission for Employment and Skills and the UK Border Agency (UKBA). We are supported by a small secretariat team and have a dedicated research budget.
- 0.3 In 2006, the Home Office set out proposals to modernise and strengthen the UK's immigration system by introducing a new Points Based System (PBS) for immigration from outside the EEA.
- 0.4 In order to complement the new system, the Government has requested that the MAC: *"Produce shortage occupation lists for UK and Scotland only (Tier 2 skilled employment). These lists comprise occupations where, in the MAC's view, there are shortages which can sensibly be filled by enabling employers to recruit migrants. Occupations must be clearly*

specified so as to be easily understood by employers, prospective migrants and those operating the immigration system."

- 0.5 The Government has said that it may also, from time to time, ask us to advise on other matters relating to migration.
- 0.6 In January and February this year, in MAC (2008a) and MAC (2008b) we published our initial thoughts on data and methodology. This report provides our first recommended shortage occupation lists for the UK and Scotland to the Government. It sets out the process by which we produced the lists, the methodology we used and the evidence we considered. It also sets out how we expect to move forward from here, including the periodic revision of the shortage occupation lists.
- 0.7 The content of this report represents the independent view of the Committee and not necessarily that of the Government.

0.2 Our approach

- 0.8 To produce the shortage occupation lists, we used a hybrid method that combined the consistency and comprehensiveness of a 'top-down' approach using national data and surveys with the context and fine-grained detail and contextualisation of a 'bottom-up' method using other evidence submitted to us.

¹ The EEA is defined as the European Union (EU) member states with the addition of Iceland, Lichtenstein, Norway and, for the purposes of immigration, Switzerland through a bilateral agreement. Workers of these additional countries possess the same rights to work in the UK as EU nationals. In 2004 the EU was extended to eight countries in Eastern Europe (A8). In January 2007 Bulgaria and Romania (A2) became EU member states; however, separate immigration rules were applied for nationals of these countries.

- 0.9 For the top-down approach we analysed the best possible and most relevant national (i.e. mostly UK-wide) labour market data available. We carried out data analysis in-house and commissioned external research.
- 0.10 Bottom-up evidence came from examination of individual occupations. Crucially, this was informed by engagement with a wide variety of stakeholders, a series of regional visits, and further research commissioned on key sectors and occupations. We also issued a call for evidence in our February 2008 report. We have closely examined the responses to this.
- 0.11 The first meeting of the MAC was on 7 December 2007, and we have held seven formal meetings in total. But these meetings were the tip of the iceberg, with MAC members engaged in a series of activities, as set out in this report.
- 0.12 Agendas and papers from our meetings, and other background papers, including research reports we commissioned to inform our work, can be found on our website at www.ukba.homeoffice.gov.uk/mac.
- 0.14 In Part II (Chapters 4–8), we set out our analysis. Chapter 4 provides an introduction to the methodology we have used and introduces the concepts of ‘skilled’, ‘shortage’ and ‘sensible’ that will run through the remainder of the report. Chapter 5 sets out how we went about gathering bottom-up evidence on specific sectors, occupations and jobs. Chapters 6, 7 and 8 discuss the skilled, shortage and sensible concepts in turn, and set out the approach to, and the results from, our top-down analysis of national data.
- 0.15 In Part III (Chapters 9–12) we provide results and discuss next steps. Chapter 9 discusses specific occupations. Chapter 10 provides our recommended shortage occupation list for the UK. Chapter 11 gives the shortage occupation list for Scotland (which is additional to the UK list because, by definition, Scotland is covered by the UK list too) and also sets the Scotland list into context. We conclude, in Chapter 12, by discussing next steps for the MAC, both in terms of shortage occupations and other areas of work.
- 0.16 Annexes A, B and C give additional detail on the economic and statistical analysis we carried out to determine skilled, shortage and sensible respectively. Annex D lists those we took evidence from who did not ask to remain anonymous.

0.3 Report structure

- 0.13 This report is split into three parts. In Part I (Chapters 1–3), we provide some context for this work. Chapter 1 discusses general trends in, and issues in the analysis of, the UK labour market and immigration. Chapter 2 discusses the current system for economic immigration to the UK. Chapter 3 discusses the new PBS, of which our shortage occupation lists are one part.

0.4 Thank you

- 0.17 We are extremely grateful to the organisations and individuals who contributed to this report by giving us their views in person or by submitting evidence to us.

0.18 Many of those we have consulted over the past nine months will recognise their input reflected in this report. We have included quotes from people and organisations who have provided input (in boxes) throughout this report. We have confidence in the work we have done, but we have undeniably had to deal with some complex issues, and make some careful and finely balanced judgements. We are always willing to listen to views as to how we might refine or improve our approach. We will partially review the shortage occupation list over the coming months, and publish our findings in approximately six months time. We continue to welcome evidence from stakeholders that would inform that process.

Part I: Context

Chapter 1:



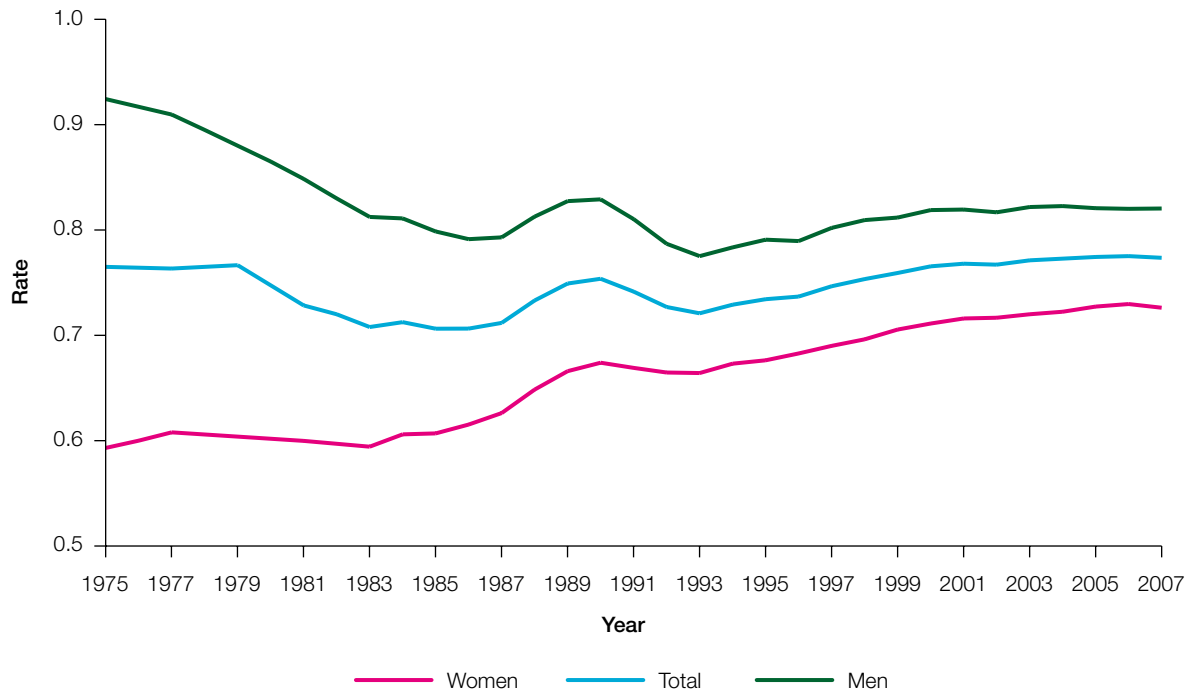
UK labour market and immigration in context

- 1.1 Our task is to produce a list of occupations and jobs that are skilled, in shortage, and where it is sensible to fill that shortage via immigrants from outside the European Economic Area (EEA). This report addresses and fulfils that task. But it is important to place it in context. Therefore, this chapter sets the scene in three important areas.
- 1.2 First, the UK labour market is described in Section 1.1 with special emphasis on the immigration stocks and the employment rate, qualifications and occupations of the UK and foreign-born working populations.
- 1.3 Second, data on immigration flows are examined in Section 1.2. In this report we are only concerned with one component of the total flow of immigrants. In 2006 immigrants (staying for more than one year) who came to the UK for work reasons comprised some two-fifths of the gross inflow. And the number of work permits issued (the analogous group under the previous immigration systems to that which the Migration Advisory Committee (MAC) is considering here) were equivalent to some two-fifths of those entering for work-related reasons. Thus the potential client-group of the MAC is equivalent to around one-sixth of the total gross inflow of annual long-term immigration.
- 1.4 Third, as this report will be used to help implement Tier 2 of the new Points Based System (PBS) for immigration, we examine the themes running through the debate on the economics of immigration. These include the impact of immigration on: income and output; pay and jobs; public spending and tax revenue. They are discussed in Section 1.3. The implications of the contents of this chapter for the MAC and its report are set out in Section 1.4.

1.1 The UK labour market and immigration stocks

- 1.5 We need to consider our recommendations against the context of relatively strong performance of the UK labour market over the past 15 years. Data in this section are from the Labour Force Survey (LFS) unless otherwise stated. As Figure 1.1 shows, the aggregate employment rate (measured as the percentage of the working-age population excluding full-time students) is now at least equal to, if not better than, levels last observed in the 1970s.

Figure 1.1: Employment rate in the UK, 1975–2007



Note: Population of working age, excluding those in full-time education (students). All figures and tables in Section 1.1 use 2003 LFS population weights for grossing purposes.
Source: LFS (1975–2007).

- 1.6 The total employment rate has remained relatively stable over the long term because the working-age population has grown in line with employment. Rising female participation has been the main contributor to labour market growth. Economic inactivity rates among men are much higher than 30 years ago, while female inactivity has declined over the same period.
- 1.7 Among the working-age population, excluding full-time students, the numbers in work have grown by over 3 million since 1979 (see Table 1.1). Nonetheless, we will continue to monitor the labour market, particularly in light of the current economic slowdown, and consider the implications for immigration flows and future shortage lists.

Table 1.1: Employment, unemployment and inactivity

	1979	1990	2000	2007
Employed (millions)				
Total	23.4	25.0	25.3	26.6
Men	14.4	14.4	14.0	14.6
Women	9.0	10.6	11.4	12.0
Unemployed (millions)				
Total	1.2	1.9	1.4	1.3
Men	0.7	1.1	0.8	0.7
Women	0.6	0.8	0.6	0.6
Inactive (millions)				
Total	5.7	5.6	6.3	6.2
Men	0.7	1.5	2.2	2.3
Women	5.0	4.1	4.1	3.9

Note: Population of working age, excluding full-time students. The expansion of tertiary and further education over the past 15 years has implications for the classification of the labour market status of many younger adults. Full-time students are therefore excluded here. There are currently approximately 1 million students in full-time education with a part-time job and an additional 1.3 million individuals above working age with a job.

Source: LFS (1979–2007).

- 1.8 Average (median) hourly wages for individuals with a degree are around twice those of individuals with qualifications below National Qualifications Framework (NQF) level 3 (see Table 1.2). The NQF framework is described in more detail in Chapter 4, but NQF level 3 is equivalent to two or more A levels.

Table 1.2: Median hourly wages by education (£), 2007

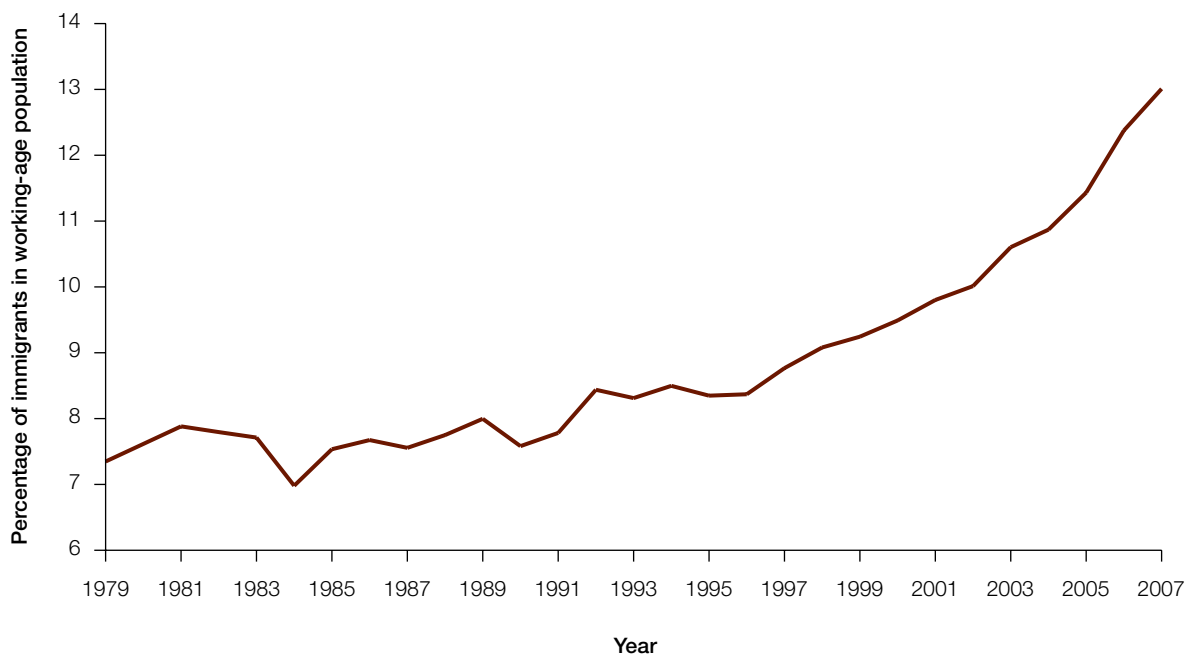
Degree or equivalent	15.20
NQF level 3	9.60
Other or no qualifications	7.60
Total	9.40

Note: Wages for people of working age in employment, including students.

Source: LFS (2007).

- 1.9 Alongside the growing economy, UK immigration has risen strongly since the end of the last recession in 1993. As shown in Figure 1.2, immigrants, defined as foreign-born individuals, currently comprise around 13 per cent of the population of working age, up from 8 per cent in 1993.

Figure 1.2: Share of immigrants in the UK working-age population, 1979–2007



Note: Rates describe working-age population, including students.
Source: LFS (1979–2007).

- 1.10 As a result of the recent increase in net immigration, the fraction of immigrants in the stock of the working-age population is now higher than at any time in the last 30 years. In 2007 foreign-born individuals accounted for 11 per cent of the total population, 11 per cent of the adult population, and 13 per cent of the working-age population. There are now around 4.7 million immigrants of working age resident in the UK.
- 1.11 Although there has been a recent surge in net immigration from the A8 countries (the eight countries in Eastern Europe that joined the EU in 2004), A8 immigrants still account for only a small fraction of the total population. The 11 per cent of the foreign-born total population consists of 1 per cent from A8 countries, 2 per cent from the remainder of EU and 7 per cent from the rest of the world.
- 1.12 It is important not to confuse foreign born and citizenship. Only six out of ten of the foreign-born people have foreign nationality. Putting it the other way round, 4.5 per cent of UK citizens were born abroad. This “reflects the degree to which foreign born people have naturalised to British citizenship or, in some cases, retained a British citizenship already held before immigration” (Salt, 2007).

1.13 As we will discuss in later chapters, some occupations historically attract immigrants from particular countries. As Table 1.3 shows, immigrants are drawn from many different countries. India has provided the highest number of immigrants, closely followed by Poland. Poles comprise more than a quarter of the 970,000 working-age immigrants who have arrived and remained in the UK since the beginning of 2005. Immigrants from within the enlarged EU represent around a quarter of the stock of immigrants but account for over half of new entrants in 2005.

Table 1.3: Stock of immigrants by country of birth, 2007

All immigrants			New entrants		
Country	Thousands	% of all immigrants	Country	Thousands	% of all new entrants
1. India	430	8.6	1. Poland	260	26.9
2. Poland	380	7.6	2. India	90	9.4
3. Pakistan	330	6.6	3. Pakistan	34	3.5
4. Ireland	230	4.6	4. China	31	3.2
5. Germany	200	4.1	5. Slovakia	30	3.0
6. Other	3,120	68.5	6. Other	530	54.0
Total	4,690	100	Total	975	100

Note: Figures describe working-age population. New entrants include all those who arrived in the UK between 2005 and 2007 inclusive. The LFS probably underestimates the number of students in the UK (and therefore the number of new entrants) because it does not sample halls of residence.
Source: LFS (2007).

1.14 There are over 10 million university graduates (or equivalent) of working age in the UK and more than 16 million individuals with a qualification at least equal to NQF level 3 or equivalent (see Table 1.4). Together these workers make up around 45 per cent of the working-age population and 50 per cent of those of working age in employment.

1.15 Qualifications held by many immigrants are not well recorded in the LFS. Given this caveat, compared with the UK-born

population, the stock of immigrants among the population of working age contains a similar proportion of individuals educated to graduate level but a lower proportion of individuals educated to NQF level 3 or equivalent. For instance, 8 per cent of immigrants of working age have a level 3 or equivalent qualification, compared with 17 per cent of the UK-born working-age population.

Table 1.4: Highest qualifications in the population of working age, 2007

	Total, millions (% of total)	UK-born, millions (% of total)	Immigrants, millions (% of total)
Degree or equivalent	10.6 (29)	9.0 (29)	1.5 (31)
NQF level 3 or equivalent	5.9 (16)	5.4 (17)	0.4 (8)
Other or no qualifications	19.9 (55)	17.1 (54)	3.0 (61)
Total	36.4 (100)	31.5 (100)	4.9 (100)

Note: Proportions describe working-age population, excluding those who do not record a highest qualification.
Source: LFS (September–December 2007).

- 1.16 Employment rates typically rise with the level of educational attainment (see Table 1.5). The employment rate for graduates is currently 19 percentage points higher than that for those individuals with qualifications below NQF level 3 or equivalent.
- 1.17 There is a growing literature studying the determinants of immigrant performance in the host country labour market. Education, skill, length of stay and English language skills can all be key determinants of immigrants' wages and employment chances. Immigrants are often found to be disadvantaged on arrival, but the wages and employment chances of immigrant groups tend to converge towards those of residents as their time spent in the host country increases. There are, however, often significant differences in economic performance between different groups of immigrants (see Dustmann and Fabbri, 2005).
- 1.18 Employment rates for UK-born men and immigrant men are similar at any level of educational attainment. Employment rates among immigrant women are, however, significantly lower at any level of education than those for UK-born women.

Table 1.5: Employment rates by highest qualification, 2007

	Total (%)	Men (%)		Women (%)	
		UK-born	Immigrant	UK-born	Immigrant
Degree or equivalent	88	91	89	89	73
NQF level 3 or equivalent	84	87	85	82	67
Other or no qualifications	69	75	74	65	46
Total	78	83	83	75	62

Note: Rates describe working-age population, excluding those who do not record a qualification and students.
Source: LFS (September–December 2007).

1.19 The distribution of immigrants across occupations in the UK labour market does not completely mirror that for the UK-born population, as Table 1.6 illustrates. The most common occupations for UK-born men are managerial, driving and warehouse work. Chefs, software professionals and medical practitioners comprise a larger share of occupations among immigrant men than UK-born men. Immigrants account for a disproportionate number of nurses and care assistants within the female working population.

**Table 1.6: Distribution of employment across occupations, 2007
(and percentage of working-age population)**

Men		Women	
UK-born (% of total)	Immigrant (% of total)	UK-born (% of total)	Immigrant (% of total)
1. Works managers (2.4)	1. Chefs (3.0)	1. Sales assistants (5.6)	1. Nurses (5.8)
2. Sales managers (2.4)	2. Warehouse workers (2.7)	2. Office clerks (4.2)	2. Care assistants (5.2)
3. Heavy goods drivers (2.3)	3. Taxi drivers (2.6)	3. Care assistants (4.1)	3. Cleaners (4.8)
4. Warehouse workers (2.1)	4. Software professionals (2.3)	4. Nurses (3.5)	4. Sales assistants (3.9)
5. Sales assistants (2.0)	5. Medical practitioners (2.1)	5. Educational assistants (3.4)	5. Kitchen assistants (2.9)

Note: Population of working age, excluding those who do not record an occupation and students. Occupations are ranked in order of the working population share. For example nurses account for 5.8% of employment among immigrant women.

Source: LFS (September–December 2007).

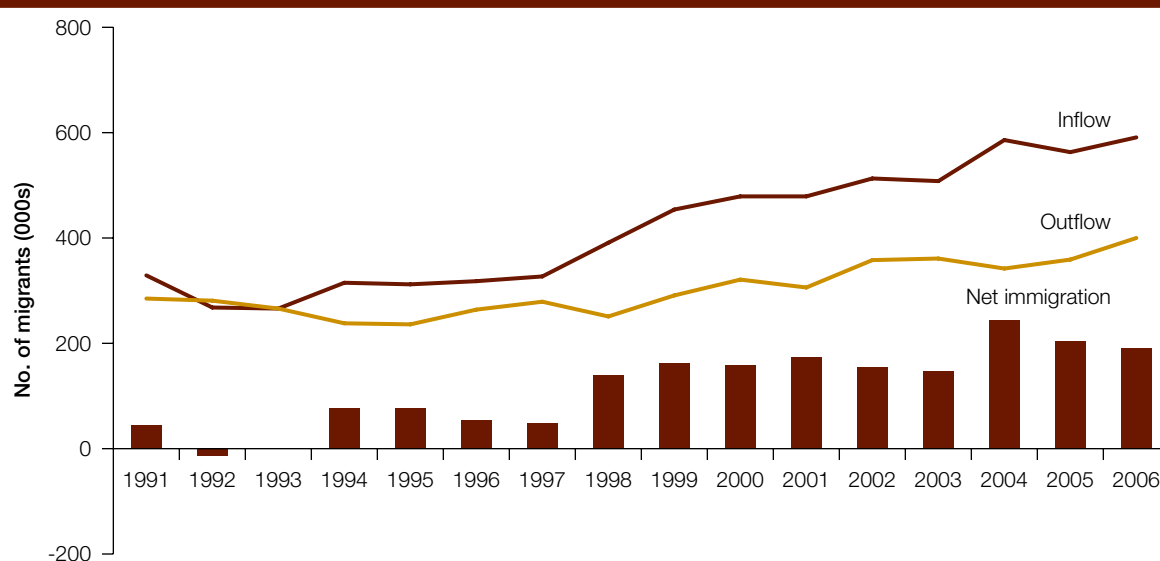
1.2 Immigration flows

Total international migration

1.20 International migration data for the last 15 years are set out in Figure 1.3. They are from the Total International Migration (TIM) information provided by the Office for National Statistics (ONS). TIM is the only official estimate of long-term civilian migration covering flows both to and from

the UK. They refer to long-term migration. A long-term international migrant is defined as someone who changes their country of usual residence for a period of at least a year so that the country of destination becomes the country of usual residence. TIM is based on International Passenger Survey data, with adjustments for people who change their immigration or emigration intentions, migration between the UK and Ireland and those refused asylum.

Figure 1.3: Total international migration to and from the UK, 1991–2006



Source: International Passenger Survey (2006), published in Office for National Statistics (ONS) (2007a).

1.21 Both immigration and emigration have increased substantially since 1997. Immigration has exceeded emigration in each year since 1994 and this net immigration has been a driving force in UK population growth. In 2006 (the latest year for which data are available), immigration was 591,000 and emigration was 400,000 – yielding a net balance of plus 191,000. The gross inflow by country of citizenship in 2006 is presented in Table 1.7. The non-British, non-EU component was 343,000 (58 per cent) of the total inflow.

1.22 The International Passenger Survey also provides information on the main reason for immigration. Table 1.8 lists the main reasons reported in 2006.

Table 1.7: Gross inflow by country of citizenship, 2006

	Thousands
British	81
European Union	167
Commonwealth	201
Other foreign	142
Total	591

Source: International Passenger Survey (2006), published in ONS (2007b).

Table 1.8: Main reasons for immigration, 2006

	Thousands
Definite job	161
Looking for work	70
Accompany/join	104
Formal study	157
Other, e.g. asylum, working holiday	56
No reason stated	43
Total	591

Source: International Passenger Survey (2006), published in ONS (2007b), Table 2.

1.23 We are focused on work-related reasons. Those coming for a definite job or looking for work account for 231,000 (39 per cent) of the total gross inflow. A proportion of these will be UK or EEA nationals. The non-EEA nationals come in either on a work permit or on another specialist scheme. Work permits and other routes for non-EEA nationals to work in the UK are described in more detail in Chapter 2.

1.24 The International Passenger Survey, on which Tables 1.7 and 1.8 are based, is a sample survey covering some 3,000 immigrants (see ONS, 2007b, p. 35). Concerns have been expressed, including in House of Lords (2008), about the quality of these data. It is remarkable to compare the numbers surveyed now with the past. As set out in Winder (2004), in 1573 the Elizabethans conducted a full survey of “strangers” coming to these shores. A total of 7,173 were quizzed, of whom a third stated that they had come “*onlie to seeke woorck for their livinge*”. These work-seekers were summarily deported whereas those who had come “*for consciens sake*” were allowed to remain.

Other data sources

1.25 In addition to the International Passenger Survey, other potential sources of information on immigrants entering for work include data collected in relation to:

- work permit applications;
- the Worker Registration Scheme (WRS); and
- the allocation of National Insurance numbers.

1.26 However, these three sources include migrants entering for less than one year and cannot be directly compared with the TIM data. They are presented here in order to give a full picture of immigration flows.

1.27 The number of work permit holders given leave to enter the UK in 2006 is set out in Table 1.9. Thus, in 2006 the number of workers to whom our work is relevant was some 97,000. Nearly one-third of these people came from the Indian sub-continent, over one-quarter from the Americas and the remaining two-fifths from the rest of the world. Immigration under the work permit regime is discussed fully in the next chapter.

Table 1.9: Work permit holders given leave to enter the UK, 2006

	Thousands
Employment for 12 months or more	57.5
Employment for less than 12 months	39.1
Dependants of work permit holders	48.5
Total	145.1

Source: Control of Immigration Statistics 2006, published in Home Office (2007).

- 1.28 The WRS covers workers from the new member states of the EU and is not directly affected by our work. However, it is illuminating to set out the scale of the flows. On 1 May 2004 ten countries joined the EU. They were Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia. From that date nationals of Malta and Cyprus have had full free movement rights and rights to work throughout the EU. The 15 existing EU member states prior to the enlargement had the right to regulate access to their labour markets by nationals of the other eight countries known as the Accession or A8 countries for a maximum of seven years under transitional arrangements.
- 1.29 The UK Government put in place transitional measures to regulate A8 nationals' access to the labour market via the WRS and to restrict access to benefits (see UK Border Agency *et al.*, 2008). The flow of approved applicants to the WRS from the A8 countries rose from 126,000 in 2004 to 228,000 in 2006, then fell back a little in 2007 to 207,000.
- 1.30 In 2006 the number of workers coming from the A8 countries (228,000) was more than double the number entering from outside the EU via work permits (97,000). Over two-thirds of these 228,000 came from Poland. The majority of those first registering stated that they intended to stay in the UK for under one year. Overall, however, there has been a sizeable amount of EU labour in the country that UK employers can tap into before recruiting from outside the EU.
- 1.31 The allocation of National Insurance numbers is a further source of potential information on immigration inflows. The total number of National Insurance numbers registered to overseas nationals in 2006/07 was 713,000 (Department for Work and Pensions (DWP), 2007). National Insurance numbers are required for employment/self-employment or to claim benefits and tax credits. Overseas nationals entering the UK apply to Jobcentre Plus for a National Insurance number. The applicant then attends an interview and must be able to prove their identity and, in an employment-related application, prove that they have the right to work in the UK.
- 1.32 Table 1.10 describes the continent of origin of foreign nationals entering the UK and allocated a National Insurance number during 2006/07.

Table 1.10: Continent of origin for foreign nationals in the UK who were allocated a National Insurance number, 2006/07

	Thousands
Europe – EU excluding Accession countries	104
Europe – EU Accession countries	321
Europe – Non-EU	16
Asia and Middle East	145
Australasia and Oceania	33
Americas	32
Africa	61
Other/unknown	1
All	714

Source: DWP (2007), Table 2.

1.33 The total of National Insurance numbers issued to foreign nationals from outside the EU was 289,000. This is substantially higher than the number of work permits issued. The difference between the work permit numbers and National Insurance numbers arises because data related to the latter cover people allocated a National Insurance number for all types of work, including the workers on the Highly Skilled Migrant Programme (new Tier 1), the self-employed, working holiday-makers, students working part-time and dependants of migrants eligible to work without a permit. It also covers foreign nationals allocated a National Insurance number to claim benefits or tax credits.

1.34 Thus, the four main sources of data on the inflow of immigrants measure different things and, not surprisingly, yield different numbers. The TIM data refer to people intending to stay for more than one year. In 2006 the gross inflow was 591,000 of which two-fifths was for work reasons. The other three sources include people staying for under one year. There were 713,000 National Insurance numbers issued in

2006/07 and 207,000 A8 migrants were counted by the WRS in 2007. Finally, the number of work permit holders given leave to enter for work in 2006 was 97,000.

1.35 Our work should be seen in the context of these figures. Tier 2 of the new PBS (see Chapter 3), including the MAC, is essentially replacing the previous work permit system. Therefore, any effect of our recommendations – whether to increase or decrease immigration – will be relevant to the 97,000 work permit figure. The Committee has, via this report, no direct influence on the WRS inflow and may also only have a very modest effect on the TIM and National Insurance number figures. But the trends are of interest to us because EU and non-EU migrants do not operate in completely separate labour markets.

1.3 Key themes in the economics of immigration

1.36 This section briefly examines the main issues in the current debate on the economics of immigration. We return to many of these in Chapter 8 of this report.

- 1.37 The economic analysis of international migration has been concerned primarily with the economic impact on non-migrants in the receiving and sending states and on the economic performance (or 'economic assimilation') of migrants relative to that of local workers in the receiving country's labour market. In net-immigration countries (i.e. where immigration flows exceed emigration flows) such as the UK, the focus of public and policy debates has typically been on the economic and other impacts of immigration on the resident population and economy.
- 1.38 A recent report by the Economic Affairs Select Committee of the House of Lords (House of Lords, 2008) concluded that the economic impacts of net immigration to the resident UK population are small, especially in the long run. This conclusion contrasts with the assessment of the Government and the business community that immigration creates significant economic benefits to the UK. See, for instance, Home Office and DWP (2007). Part of the disagreement stems from insufficient data on immigration and migrants in the UK and from differences in the interpretation of the limited (although gradually growing) empirical evidence on the economic consequences.
- 1.39 This section briefly reviews some of the theoretical issues underlying three key themes in the current debate: income and output effects; labour market and price effects; and fiscal effects of immigration.
- 1.41 Since net immigration also increases the population, the impact on GDP per capita depends on how the increase in GDP compares with the increase in the population. Prior to the House of Lords inquiry into the economics of immigration that was completed earlier this year (House of Lords, 2008), there had been no systematic efforts to estimate empirically the impact of immigration on the total and per capita income of the resident population in the UK. Consequently, debates about the impacts have been largely based on economic theory, which suggests various different possible outcomes.
- 1.42 Economic theory suggests that the impact of immigration on the incomes of the resident population depends on the skills of immigrants relative to those of the resident population and on the characteristics of the host economy. The latter influences the speed and the ways the economy and employers' demand for labour adjust to the immigration-induced increase in labour supply. Adjustments may include, for example, a change in capital accumulation (investment), a change in production technology, and/or a change in the output mix (i.e. in the mix of products produced and services provided).
- 1.43 Analysis based on basic models of the labour market (e.g. Borjas, 1999) suggests that immigration has two separate effects: it increases the income of the resident population (efficiency effect) and, at the same time, redistributes income (distribution effect) from residents whose work is a substitute for immigrant labour, to residents with skills that are complementary to those immigrants. For example, unskilled immigration is likely to lower the wages of unskilled resident workers, but raise the wages of skilled workers and/or the returns to capital. In other words, immigration is

Immigration effects on output and income

- 1.40 Immigration adds workers to the labour force, thereby raising total output. The Treasury has calculated that immigration accounted for 15–20 per cent of annual trend output growth of 2.7 per cent during 2001–2006, increasing gross domestic product (GDP) by £6 billion in 2006 (Home Office and DWP, 2007).

likely to raise total and average incomes of the resident population, but there are winners and losers.

- 1.44 This theoretical insight is based on a 'static' analysis of one-off economic effects. But much of the recent discussion about the impact of immigration on the resident population in the UK stems from disagreement about the importance and impact of 'dynamic' and 'spillover' effects. Positive spillover effects that raise the productivity of the resident population could stem from, for example, having a bigger economy, a more diverse society and a greater share of highly skilled and motivated people. At the same time, a higher population density and more congested living and working spaces could generate negative effects that lower the productivity of resident workers.
- 1.45 Economists are divided about the existence and likely direction of such effects (see, for example, House of Lords, 2008). There is, however, a broad consensus that dynamic and spillover effects of immigration are very difficult to identify and measure in practice.

Immigration effects on labour market and price

- 1.46 As in other high-income countries, most of the public debate about the impact of immigration on the UK labour market has focused on wages and unemployment. In the simplest theoretical models, immigration can be expected to lower the wages of workers competing with immigrants and raise the wages of workers whose skill levels complement those of immigrants. In theory, immigration may also generate unemployment or greater inactivity among resident workers.
- 1.47 However, since economies and labour demand can adjust to immigration in various different ways, as described
- above, it is also theoretically possible that immigration has no effects on wages and on employment rates of resident workers, especially in the long run.
- 1.48 As explained in House of Lords (2008), the empirical analysis of the impact of immigration on the labour market faces a number of methodological challenges:
- Since immigrants tend to be attracted to economically successful areas with rising labour demand and rising wages, it can be difficult to determine causality in the relationship between immigration and wages.
 - If the analysis is restricted to local labour markets (e.g. a specific town or region), immigration from abroad may be associated with out-migration of resident workers and capital or both. If this is the case, the labour market impact of immigration will be dissipated throughout the economy, which makes it harder or impossible to measure through local labour market analysis.
 - The data used in the analysis of labour market effects of immigration are often characterised by small sample sizes with potentially significant measurement errors.
- 1.49 Given these challenges, there is still a debate about the best method of investigation of the impact of immigration on the labour market. There are two main approaches. The first uses national-level data on the share of immigrants in specific skill groups (e.g. defined by age or education) and relates that share to the level of pay or employment or unemployment. This method is termed the factor proportions approach (e.g. Manacorda *et al.*, 2006). The second uses local labour market data and relates the share of immigrants in the local population

- to pay, employment or unemployment. This method is termed the spatial correlation approach (e.g. Lemos and Portes, 2008, Gilpin *et al.*, 2006).
- 1.50 The empirical evidence available suggests small effects. For example, a recent DWP study of the impact of immigration from the new EU member states on the labour market outcomes of UK natives concludes: “...we find no statistically significant impact of A8 migration on claimant unemployment, either overall or for any identifiable subgroup. In particular we find no adverse impacts on the young or low-skilled. Nor do we find a statistically significant impact on wages, either on average or at any point on the wage distribution” (Lemos and Portes, 2008).
- 1.51 A recent review of all the relevant literature in the UK concluded that: “the evidence so far suggests that, overall, immigration has had few adverse effects on the labour market performance of the UK-born workforce, although this average may disguise some negative effects in the low wage market and positive effects in the higher wage labour markets” (Wadsworth, 2007).
- 1.52 And a review of the international literature and evidence concluded that the labour market impacts of immigration are quantitatively small and that the impacts of immigration on employment may be greater than those on average wages (Longhi *et al.*, 2008).
- 1.53 Although gradually growing, the evidence base on the labour market effects of immigration in the UK is still fairly limited and subject to various methodological caveats, which are usually emphasised in research publications but frequently ignored in public debates.
- 1.54 Since economic theory alone cannot provide a definite answer to the expected impact of immigration on the labour market, there is a clear need for more empirical research, especially in areas that have so far received relatively little attention. Little is known, for example, about how immigration impacts on activity rates of the resident population, including some ethnic minority groups with low participation rates such as women of Pakistani and Bangladeshi origin. House of Lords (2008) also drew attention to the possibility that immigration may have an adverse impact on the incentives to train and up-skill resident workers.
- 1.55 If immigration lowers wages or the growth of wages, it could also impact on prices and lower the rate of inflation. However, the impact of immigration on inflation depends on how immigration affects both aggregate supply and aggregate demand. If immigrants raise aggregate supply more than they raise aggregate demand, this could reduce inflationary pressures for a period of time (Bank of England evidence submitted to the Select Committee on Economic Affairs, House of Lords, 2008).

Fiscal impacts of immigration

- 1.56 In theory, the net fiscal impacts of immigration, defined as the difference between taxes immigrants pay and the costs of public services and benefits immigrants consume, largely depend on:
- immigrants’ age;
 - their earnings;
 - their eligibility for and take-up of government benefits and services;

- the nature of the welfare system, especially the extent to which it redistributes income from high to low income earners; and
 - how immigration affects non-immigrants' contribution to and use of the welfare state (e.g. through positive or negative impacts on employment rates of non-immigrants).
- 1.57 Immigrants' eligibility to access public services and benefits depends on their immigration status in the UK. Different types of immigration status are associated with different rights and restrictions. Immigrants with lower than average incomes tend to pay lower taxes and may also use more government services than average, especially if their families are with them in the UK.
- 1.58 Empirical assessments of the net fiscal impacts of immigration in practice depend on the methodology adopted, the items included under costs and benefits, and decisions about how to allocate certain costs or benefits between immigrants and non-immigrants.
- 1.59 In terms of methodology, the 'static' approach calculates the net fiscal contribution of immigrants as the difference between the taxes they pay and the public expenditure they absorb in a given period (e.g. in a certain year). The 'dynamic approach' considers the entire stream of future taxes and expenditures associated with immigrants and their descendants.
- 1.60 All the existing studies for the UK are of the static type. Some of them found positive net fiscal impacts of immigration (e.g. Gott and Johnston, 2002) and that the net contribution of immigrants was greater than that of non-immigrants (e.g. Sriskandarajah *et al.*, 2005), while others suggested that there could be negative impacts (e.g. Coleman and Rowthorn, 2004). A recent review suggested that the net fiscal impacts of immigration in the UK are likely to be small, ranging from minus 0.47 per cent to plus 0.23 per cent of GDP (Rowthorn, 2007).
- 1.61 One of the main reasons for the discrepancies in the findings of existing studies stems from their different treatment of children born to parents that include one foreign-born and one UK-born parent. The Government's position is that the fiscal costs of such children should be fully attributed to the UK-born population (HM Government, 2008), while others argue that they should be split 50:50 between immigrants and non-immigrants.
- 1.62 Another issue of controversy concerns which items of expenditure to include in the fiscal accounting. For example, to what extent, if at all, should the analysis take account of the costs associated with promoting the economic and social integration of immigrants after they have arrived in the UK?
- 1.63 There appears to be a broad consensus that, because of a lack of adequate data, some types of public expenditure have so far not been adequately costed in existing studies. In particular, there is very little systematic evidence on how immigration has altered the provision of and demand for public services, including health and education. The Government has set up the Migration Impacts Forum to help gather more robust evidence on immigrants' impact on public services.

1.4 Implications for the MAC

- 1.64 A key implication of existing theories about the economics of immigration is that, to the extent that immigration can be regulated, policy can help maximise the economic benefits and minimise the costs to the

- resident population in at least two ways. Both ways emphasise the importance of immigrants bringing skills that complement the skill-set of the existing workforce.
- 1.65 First, because the impacts of immigration on the resident population depend on the skills of immigrants relative to those of residents, immigration policy can select immigrants in a way that maximises their complementarities to residents. The demand for skilled labour is rising relative to that of unskilled labour. The new PBS, which permits some immigration of skilled labour (from outside the EEA) but not of unskilled labour, ties in with the changing pattern of relative labour demand.
- 1.66 Second, immigration policy can set conditions under which employers are permitted to recruit and employ immigrant workers. Identifying shortages and deciding whether or not immigration is a sensible response constitute our core tasks.
- 1.67 Therefore, there are two elements of complementarity. First, vertical, which emphasises skilled immigration rather than unskilled, in order to fit with the pattern of relative labour demand favouring skilled versus unskilled workers. Second, horizontal, such that skilled immigrants supply labour where the occupation or job is at present experiencing a shortage and where there is little alternative prospect of eliminating the shortage in the near future. As we will discuss in Chapter 3 of the report, the new PBS is designed in accordance with these principles.
- 1.68 There are some other implications for our work that can be drawn from the discussion in this chapter. First, it should be noted that the MAC is making its recommendations in the context of a relatively healthy and stable labour market. The composition of employment has changed over recent years, mainly thanks to the increased proportion of women in employment, although female participation among immigrants as a whole is still relatively low.
- 1.69 Second, we are dealing with what, under current trends, would be in the region of around 100,000 people per year. This is a significant proportion of people, but a relatively low proportion of overall immigration inflows.
- 1.70 Finally, we acknowledge that economic research has been done on the impacts of immigration on wages and employment and the wider economy. In principle, we would want to take this into account when considering 'sensible', but it is difficult to do at the detailed occupational level at which we have conducted our analysis.

Chapter 2:



The current work permit system for managing immigration

- 2.1 This chapter describes the current system for managed migration that is being replaced by the new Points Based System (PBS). We set the shortage occupation list in context and provide a rudimentary baseline against which we can compare flows through the current shortage occupation route against those that will occur under the PBS.
- 2.2 We limit the scope of this chapter to consideration of immigration (in-migration), for the purposes of work, of foreign nationals who do not already have the right to work in the UK. There are other routes through which foreign nationals may enter the UK, for example by claiming asylum, as a student or as a dependant of a UK national or immigrant, which also affect gross immigration and the economy. Equally, we do not consider the migration of nationals of countries within the European Economic Area (EEA), as they are generally free to live and work in the UK. Finally, emigration of UK or foreign nationals is not considered.
- ### 2.1 Immigration policy
- 2.3 At present, the employment of people who are subject to immigration control is regulated through a number of schemes that grant temporary permits to work in the UK, the largest of which is the work permit system. Under the 1971 Immigration Act, a work permit is granted to a specific employer for a named person for a specific job.
- 2.4 The work permit system is administered by the UK Border Agency (UKBA). The work permit system was previously administered by Work Permits UK, which was a Home Office directorate. It has recently been subsumed within the UKBA, so we reference data and information about the work permit system to the UKBA.
- 2.5 For most occupations, to work in the UK, a work permit must be granted if an immigrant is abroad, or a first permission granted if the immigrant is in the UK already. There are a small number of occupations, for example ministers of religion, who do not require permits. Some occupations, such as seasonal agricultural workers or domestic servants, are covered by separate schemes. In addition, some categories of immigrants, such as working holiday-makers and dependants of immigrants, do not require occupation-specific permits to work in the UK.
- 2.6 Currently, a work permit may be granted for up to five years, although most are granted for less than this. Many short-term permits are issued to sportspeople and entertainers, and longer-duration permits to managerial and professional staff. There are a number of different terms ascribed to applications in the work permit system, according to the current status of the immigrant (Box 2.1).

Box 2.1: Terminology of applications under the work permit system

The term 'work permits' is usually used to indicate both the overall system and a more specific category of work permit. In this chapter we describe the broader category as 'the work permit system' or a 'permit', and the specific category as 'work permits'.

Work permit: a work permit is granted to an employer on behalf of a non-EEA foreign worker living outside the UK at the time of application. If granted, the permit is to work for that employer in the particular job specified on the application for a set period of time.

First permission: similar to the work permit, but granted to employers on behalf of foreign workers who are applying from within the UK and who do not already have a permit to work. Applicants may include dependants of immigrants and people already in the UK for purposes other than work.

In-country extension: application from an employer who wishes to extend the employment of a non-EEA foreign worker currently working in the UK.

In-country change of employment: application from an employer who wishes to employ an individual currently on a work permit, either a) for a different employer or b) for the same employer but different job.

In addition, there are minor categories involving changes to name and address of employer and for extensions where the worker is at present outside the UK. Some work permits allow the holder to undertake a limited amount of supplementary employment without making another application.

Source: Salt and Millar (2006a).

- 2.7 Immigration policy has been subject to frequent change and revision. Nevertheless, the broad principles underlying the work permit system have remained broadly similar since its inception following the First World War.
- 2.8 Work permits constitute the bulk of economic immigration to the UK from outside the EEA. However, as noted earlier, a number of other schemes also provide a route to working in the UK. These schemes generally depend on the characteristics of the immigrants as well as on the job that they are going to fill. Skill is the key factor here, usually measured by proxy through qualifications, wages and, in some cases, specialist jobs. Work permits are aimed at skilled immigrants; jobs filled through this route must involve a certain level of skill. At present, this skill level is defined as requiring a degree, relevant HND, any HND plus one year's experience, or three years' experience in a job skilled to level 3 of the National Qualifications Framework (NQF). The NQF is described in more detail in Chapter 4.
- 2.9 Table 2.1 presents a broad framework setting out how the current immigration schemes for non-EEA immigrants differentiate by skill level. It also maps the skill levels to the equivalent tiers in the new PBS.

Table 2.1: Summary of immigration schemes by skill

Skill level	Rationale	Current scheme(s)	New PBS tier
Highly skilled	Some categories of immigrants have been able to enter the UK freely to look for work or take advantage of business opportunities.	Highly Skilled Migrant Programme; investors; innovators.	Tier 1
Skilled	Skilled immigrants need to work for a specified employer in a specified job. Currently, this is further subdivided by categories of job into those where an employer must undertake a resident labour market test (RLMT, discussed in more detail in Section 3.3) – Tier 2, and those that do not require an RLMT – Tier 1. The RLMT is intended to ensure that a post is only offered to immigrants if it cannot be filled by resident workers. Tier 1 provides exemption from the RLMT for posts that are: a) intra-company transfers; b) board-level posts; c) essential to inward investment; d) recognised as shortage occupations; or e) sponsored researcher posts.	Work permits (old tier 1, old tier 2 – note: these tiers are defined differently to those in the new PBS).	Tier 2
Low skill	A number of schemes have existed for low-skilled occupations, particularly in agriculture, food processing and hospitality, to cope with seasonal variation in demand and for some specific jobs that the domestic labour-supply does not meet.	Sectors Based Scheme; Seasonal Agricultural Workers Scheme	Tier 3 (will be suspended except for A2 nationals).
Other	Separate arrangements have generally been made for students. A variety of other rules cover particular groups, such as sportspeople, ministers of religion, touring musicians, domestic workers, au pairs, etc.	Key routes include: work permits for sports and entertainment; working holiday-makers; students.	Tiers 4 and 5 and other arrangements.

Source: Migration Advisory Committee (MAC), gathered from a number of sources.

2.10 Some immigrants may bring dependants and some may also use parts of the welfare state and government services. While initial immigration is on a temporary basis, immigrants holding a work permit achieve the right to apply for indefinite leave to remain after five years and may apply for citizenship one year after that. The processes of obtaining indefinite leave to remain in the UK and applying for citizenship are separate from applying for a work permit. The Government recently set out new proposals for how highly skilled and skilled workers will have a route to citizenship or permanent residence in UK Border Agency (2008a) and UK Border Agency (2008b).

2.2 Trends in immigration to the UK

2.11 This section gives a brief overview of the history of UK immigration policy for the purposes of work, with a focus on the work permit system.

2.12 Analysis in this chapter is, unless otherwise stated, based on management information collected by the UKBA. This describes the numbers of applications approved under different routes for the work permit system. It does not define an immigrant by length of stay, so short-term immigration is included in these figures. A small number of people whose applications are approved may, in fact, not take up work in the UK. Box 2.2 describes other sources that exist on stocks and flows of economic immigrants to the UK.

Box 2.2: Sources of immigration data

No single set of statistics provides the full picture of immigration: different sources are useful for different applications. Taken as a whole, the statistics available at present have been criticised for their limitations in scope and lack of detail in some crucial areas (House of Lords, 2008). Different sources of data yield different estimates for immigration, as their definitions and scope differ. The Government has commenced a programme for improving immigration and population statistics (HM Government, 2008).

Key sources of data on immigration include the following.

- The International Passenger Survey is a sample survey of passengers leaving and entering the UK. This is the key source for national statistics on immigration and emigration, termed Total International Migration (TIM). TIM defines migrants as those that enter or leave the country for one year or more; it is based on International Passenger Survey data, with adjustments for people who change their immigration or emigration intentions, migration between the UK and Ireland and those refused asylum.
- The Home Office publishes a separate time-series on work permit holders and their dependants who are given entry clearance. This is split into long term and short term.
- The number of foreign nationals registering for National Insurance numbers is published by the Department for Work and Pensions. This represents new workers with the addition of those registering for other reasons, for example social security and tax credits. It may include those registering for short periods and those undertaking a small amount of work while visiting the UK primarily for other purposes, for example students.

Box 2.2: Sources of immigration data (continued)

- The Labour Force Survey is a sample survey of households in the UK and can provide data on the stocks of immigrant workers in the UK, alongside a detailed set of socio-demographic characteristics not available in administrative data.
- Management information collected through the Worker Registration Scheme can be used to estimate the numbers of employees coming from the A8 countries. This is not a measure of net migration, as it cannot show those leaving employment or the UK. It also does not cover self-employed workers, and some workers may not register.

2.13 In 2005 some 170,800 non-EEA immigrants came to the UK for the purposes of work. Table 2.2 shows the different routes available to immigrants who wish to come to work in the UK.

It is estimated that in 2005, 230,200 EEA nationals joined the UK labour force, a large proportion from the A8 countries through the Worker Registration Scheme.

Table 2.2: Foreign labour inflows to the UK, 2005

	Number	% of all inflows
Work permit system	86,200	21.5
Working holiday-makers	20,100	5.0
Highly Skilled Migrant Programme	17,600	4.4
Seasonal Agricultural Workers Scheme	15,500	3.9
Domestic servants	10,100	2.5
UK ancestry	8,300	2.1
Sectors Based Scheme	7,400	1.8
Science and Engineering Graduates Scheme	2,700	0.7
Au pairs	2,400	0.6
Ministers of religion	500	0.1
Non-EEA routes total	170,800	42.6
Worker Registration Scheme	195,000	48.6
EU and European Free Trade Association	35,200	8.8
EEA routes total	230,200	57.4
Total labour inflows for 2005	400,900	100

Notes: Data are rounded to the nearest 100. Data are derived from different sources; no more recent comparable data are available.

Sources: Salt and Millar (2006a) using data from Work Permits UK, UK Visas, Immigration Research and Statistics (UKBA), Home Office and International Passenger Survey (data from 2004).

2.14 The longer-term immigrant labour trends reveal some of the more significant changes in immigration policy and changes in the UK and global economies. While this chapter is primarily concerned with work permits, it is necessary to consider some of the alternative routes – primarily, the Highly Skilled Migrant Programme, the Sectors Based Scheme and the Seasonal Agricultural Workers Scheme.

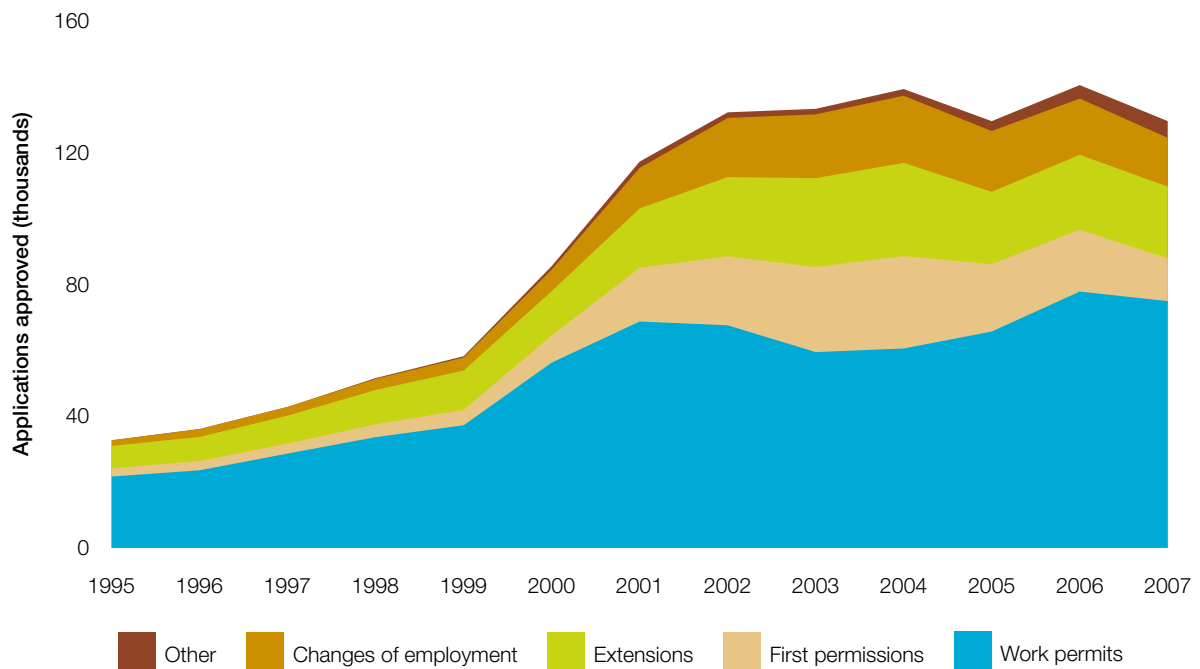
Skilled immigration: work permits, first permissions and extensions

2.15 UKBA management information data show that in 2007 there were approximately 131,000 permits approved, just over half of which (75,600) were work permits. The remaining approvals were split among first permissions (13,100), extensions (23,000) and changes in employment (14,700). Figure 2.1 and Table 2.3 show

a considerable increase in the number of applications approved from 1999, levelling off from 2002 onwards. The number of applications approved in 2007 was more than treble what it was a decade earlier.

2.16 The distinction between in-country and out-country applications is important when considering the stocks and flows of immigrant labour. The major growth in applications in the last decade has been from in-country, rather than from out-country, applications. In Birrell *et al.* (2006), Professor John Salt described the system in 2004 as follows: “the system is now one which turns foreigners already living in the country, perhaps as visitors or with a work permit already, into permitted foreign workers rather than one bringing in labour currently living abroad”. From 2005 out-country permits have once again exceeded in-country.

Figure 2.1: Applications approved under the work permit system, 1995–2007



Notes: (1) Total permits approved refers to permits issued under the work permit system. It excludes the lower-skilled schemes such as the Sectors Based Scheme and Seasonal Agricultural Workers Scheme applications; (2) ‘Other’ includes self-certification and in-country technical change.
Source: Salt (2007); management information collected by the UKBA.

Table 2.3: Applications approved under the work permit system, 1995–2007

	Total permits approved (000s) (1)	Approved as a percentage of total applications received	Breakdown of total permits approved (000s)				
			Work permits	First permissions	Extensions	Changes of employment	Other (2)
1995	32.7	84.7	21.7	2.5	6.8	1.7	0.0
1996	36.1	86.6	23.6	2.8	7.3	2.4	–
1997	42.8	87.7	28.7	3.1	8.5	2.6	0.0
1998	51.6	88.1	33.7	3.9	10.4	3.4	0.2
1999	58.2	88.3	37.3	4.7	11.9	3.9	0.4
2000	85.6	91.5	56.3	8.3	13.5	6.5	1.1
2001	117.4	90.6	68.8	16.4	18.0	12.3	1.9
2002	132.3	85.3	67.6	21.0	24.0	18.0	1.7
2003	133.4	82.5	59.5	25.8	27.0	19.4	1.7
2004	139.4	82.6	60.6	28.1	28.3	20.4	2.0
2005	129.7	82.1	65.7	20.5	22.0	18.5	3.0
2006	140.6	84.5	77.9	18.9	22.7	17.1	4.1
2007	129.7	79.0	75.0	13.0	21.8	14.8	5.1

(1), (2) Notes and source as Figure 2.1.

2.17 The total number of applications under the work permit system is higher than the number approved. In 2007 some 79 per cent of applications were approved, 14 per cent refused and 7 per cent withdrawn.

2.18 Permit holders may bring dependants to the UK if they demonstrate that they can support them without recourse to public funds. In 2006 approximately one dependant (of a newly arrived or already in-country work permit holder) was admitted for every two newly arrived work permit

holders (Table 2.4). Holders of work permits may also apply for settlement in the UK after five years. However, for immigrants requiring a permit to work, the number granted settlement is only a small fraction of those entering the country, because many will not be granted a five-year permit. Settlement of permit holders and their dependants is also a small fraction of overall settlement of immigrants, which largely comprises spouses and dependants of UK residents.

Table 2.4: Work permits resulting in dependants and settlement, 1995–2006

	Total permit holders issued entry clearance (000s) (1)	Total dependants of permit holders issued entry clearance (000s) (2)	Settlement granted to permit holders and their dependants (000s)	Total settlement granted (to all migrants, e.g. spouses and dependants of UK citizens, asylum, etc.) (000s)
1995	37.8	11.7	Comparable data on dependants unavailable	
1996	40.7	17.4		
1997	43.7	19.3	6.4	58.7
1998	48.2	20.2	6.9	69.8
1999	53.6	22.6	6.9	97.1
2000	67.0	25.0	9.6	125.9
2001	81.1	27.8	9.4	108.4
2002	85.6	34.5	12.7	116.0
2003	81.4	37.8	19.8	139.3
2004	82.7	41.5	33.3	139.2
2005	91.5	45.5	52.8	179.1
2006	96.6	48.5	23.6	134.4

Notes: (1) Total entry clearance for permit holders includes all routes requiring a permit. It therefore includes routes such as the Sectors Based Scheme and the Seasonal Agricultural Workers Scheme. (2) There may be a time lag between permit holders first entering the UK and their dependants, which is not accounted for in this estimate.

Source: Entry clearance and settlement granted statistics, published in *Control of Immigration Statistics*, 2006, 2001.

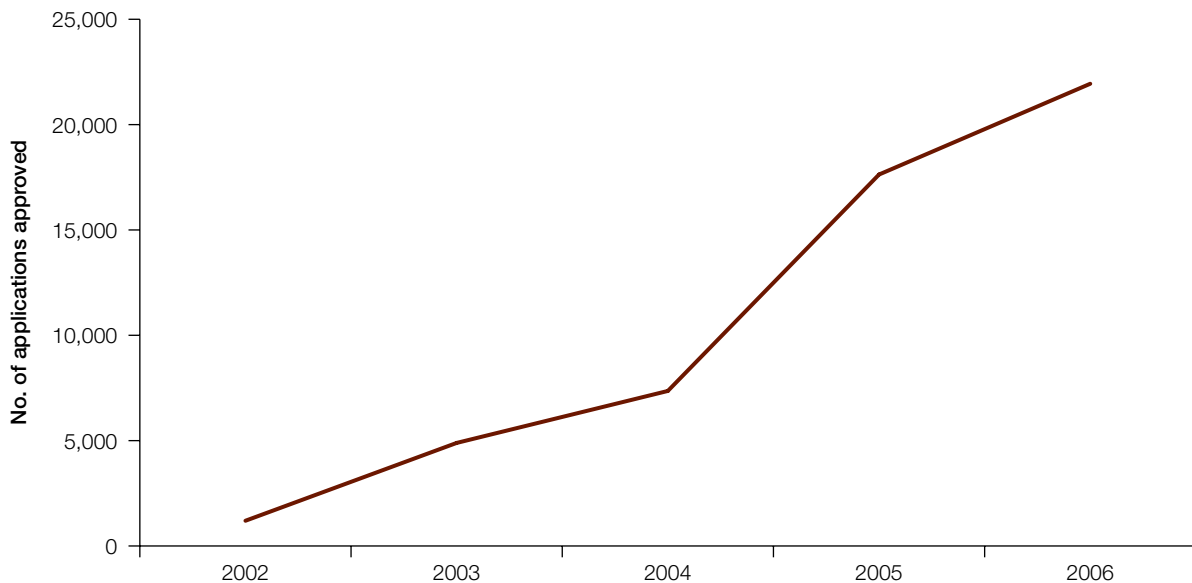
Highly skilled immigration: the Highly Skilled Migrant Programme

2.19 The Highly Skilled Migrant Programme was launched in January 2002 and was points based, along similar lines to the new PBS. It differs from other routes in that the permit is issued to the immigrant, without a confirmed employer, who was then permitted to seek employment once in the UK. The programme was targeted at exceptionally skilled individuals who were allocated points on the basis of age, qualifications, work experience, recent

earnings and achievement in the applicant's chosen field. Take-up of the Highly Skilled Migrant Programme increased since its launch from 4,900 new applications in 2003 to 22,000 in 2006. This represents some 10 per cent of the increment to the labour force from non-EEA immigrants over that period (Salt in Birrell *et al.*, 2006).

2.20 Take-up of the Highly Skilled Migrant Programme (Figure 2.2) can be expected to have included some immigrants who might otherwise have applied through the work permit system.

Figure 2.2: Take-up of Highly Skilled Migrant Programme, 2002–2006



Notes: The Highly Skilled Migrant Programme was launched in February 2002.
Source: Management information data collected by the UKBA, formerly Work Permits UK.

Low-skilled immigration for agriculture, food processing and hospitality

2.21 The **Seasonal Agricultural Workers Scheme** was one of the more significant low-skill temporary immigration routes. Beginning after the Second World War, it sought to bring in additional labour for harvest times. Participants are mostly students, who are allocated to farms through nine 'operators' and may be granted a permit for up to six months. Numbers are limited by an annual quota, which, from a level of 10,000 through much of the 1990s, began to increase in 2000, reaching a peak of 25,000 in 2003. This was reduced following the accession of new EU member states, and from 2006 to 2008 has been set at 16,250. The scheme is currently restricted to Bulgarian and Romanian nationals.

2.22 The **Sectors Based Scheme** was introduced in 2003 as a low-skill work permit, which provided a route for immigrants into specific food processing and hospitality occupations. The Sectors Based Scheme was a type of application under the work permit system, but is separated for analysis as it is a concession designed to address shortages in low-skill occupations within an otherwise more skilled work permit system. The scheme operates on the basis of a quota. The Sectors Based Scheme was closed to the hospitality sector in 2005 and was due to be suspended at the end of 2006, but has in fact been retained for nationals of Bulgaria and Romania for employment in the food manufacturing industry.

2.3 Skilled immigrants to the UK: who and what?

- 2.23 This section describes recent immigration flows of non-EEA immigrants through the work permit system by relevant occupation and industry (what) and country of origin (who).
- 2.24 We focus on the increment to the labour force, which consists of the first two categories in Box 2.1: approved work permits and first permissions.
- 2.25 When interpreting data on work permits, note that a substantial fraction of work permits and extensions consists of intra-company transfers where a multinational firm brings into the UK an employee currently working for that firm in a foreign country. In addition, a small fraction of people with approved permits are refused a visa, and a small fraction are also refused entry clearance.

By industrial sector

- 2.26 Computer services and administration, business and management services were the largest users of immigrants (work permits plus first permissions) in 2007. The situation is, however, highly changeable from year to year according to employer demand. Salt and Millar (2006a) note that: *“There has been a shift from traditional domination of commercial orientated services to the health and IT sectors”*. This trend, most striking for computer services, is illustrated in Table 2.5. However, as Figure 2.3 shows, granting of permits for health and medical services in 2007 was just over a quarter of what it was in 2004. Other sectors also show variation, although trends in some sectors, notably administration, business and management and financial services appear to be more stable.

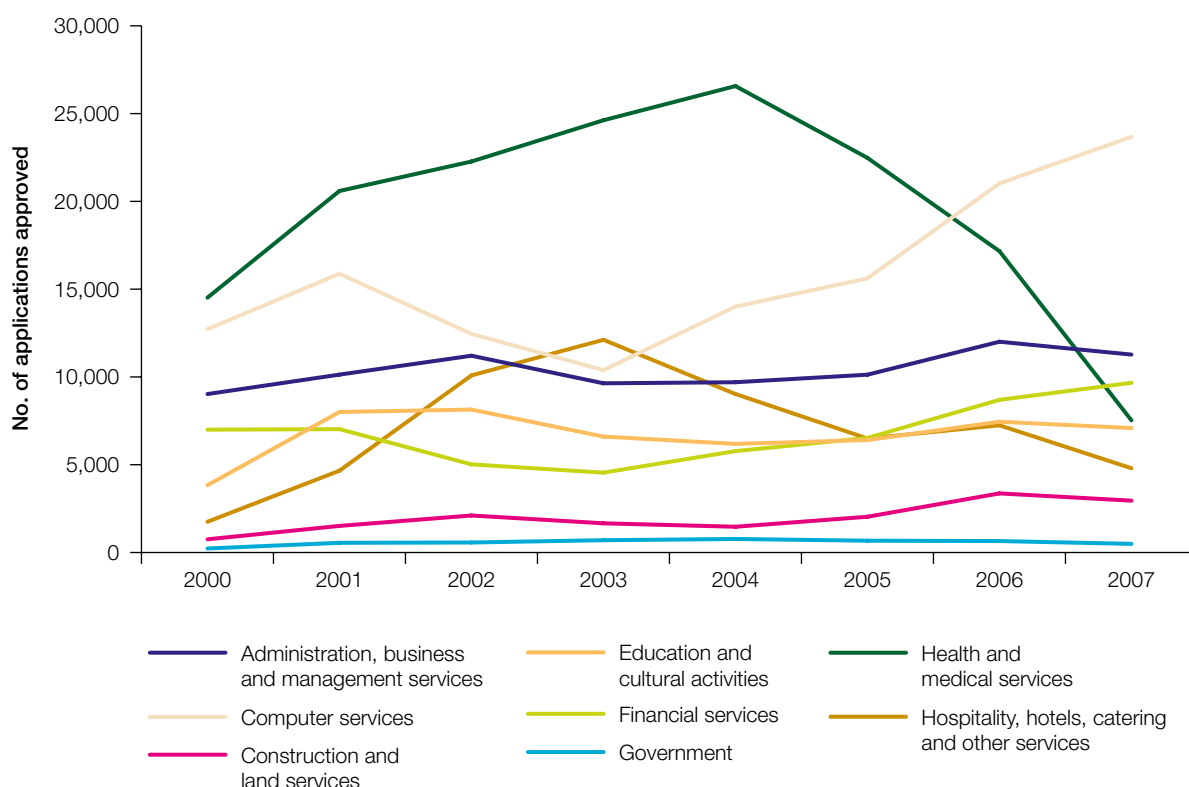
Table 2.5: Work permits and first permissions granted by industry, 1995 and 2007

	1995		2007	
	Number (nearest 100)	%	Number (nearest 100)	%
Computer services	1,800	7.6	23,700	26.9
Administration, business and management services	4,000	16.7	11,300	12.8
Financial services	3,200	13.2	9,700	11.0
Health and medical services	1,800	7.3	7,500	8.6
Education and cultural activities	1,900	7.9	7,100	8.1
Hospitality, hotels, catering and other services	300	1.3	4,800	5.5
Entertainment and leisure services	2,900	12.1	4,600	5.3
Telecommunications	500	1.9	3,700	4.2
Manufacturing	2,000	8.2	3,000	3.4
Construction and land services	200	0.8	3,000	3.4
Sporting activities	500	2.3	2,400	2.7
Retail and related services	2,800	11.7	1,500	1.7
Extraction industries	400	1.8	1,400	1.6
Law-related services	300	1.1	1,200	1.4
Transport	300	1.4	800	0.9
Unconfirmed	–	–	800	0.9
Government	<100	0.2	500	0.6
Agriculture activities	1000	3.9	400	0.5
Real estate and property services	<100	0	300	0.4
Utilities: gas, electricity, water	200	0.7	200	0.2
Security and protective services	<100	0	100	0.2
Total	24,161	100	87,968	100

Note: Work permits and first permissions are presented against the Home Office sector classification. This does not correspond with the Standard Industrial Classification.

Source: Salt and Millar (2006a) and forthcoming based on management information data collected by the UKBA.

Figure 2.3: Use of work permits for heaviest-using sectors, 2000–2007



Notes: Work permits and first permissions are presented against the Home Office sector classification. This does not correspond with the Standard Industrial Classification.

Source: Salt and Millar (2006a) and forthcoming based on management information data collected by the UKBA.

By occupation

2.27 Table 2.6 shows that approved work permits are dominated by professional, associate professional and technical occupations, particularly managers and professionals in information and communication technology (who constitute nearly 70 per cent of science and technology professionals).

2.28 Notable changes in the use of work permits have occurred in some occupations. For example, approved work permits for health and social welfare associate professionals nearly halved between 2005 and 2006, in line with the sector data in Figure 2.3. However, more detailed data reveal that this broad category consists of skilled health occupations such as nurses, midwives and radiographers. Numbers of 'health

professionals', which includes doctors and consultants, have remained relatively stable.

2.29 These trends are not entirely confined to the UK, suggesting that there will be global competition for workers in many of these occupations. Manpower (2008) surveyed over 28,000 employers across 27 countries and territories to determine the extent to which companies are utilising foreign talent to fill positions where they are experiencing skill shortages. The most common job that employers were filling with global talent was 'labourers' (who would not generally qualify under the skill criteria for a work permit), but also in the top ten jobs were engineers (second), technicians (fourth) and IT staff (fifth) and senior executives/board members (tenth).

Table 2.6: Breakdown of approved work permits and first permissions by occupation

Occupation	2006	
	No.	% of total
Managers and senior officials	16,500	17.1
Corporate managers	3,200	3.3
Managers and proprietors in agriculture and service	13,300	13.7
Professional occupations	46,100	47.7
Science and technology professionals	34,400	35.5
Health professionals	3,300	3.4
Teaching and research professionals	4,300	4.4
Business and public service professionals	4,200	4.3
Associate professional and technical occupations	21,000	21.7
Science and technology associate professionals	200	0.2
Health and social welfare associate professionals	9,600	9.9
Culture, media and sports occupations	5,200	5.3
Business and finance associate professionals	5,900	6.1
Administrative and secretarial occupations	100	0.1
Secretarial and related occupations	100	0.1
Skilled trades occupations	5,100	5.3
Skilled metal and electrical trades	<100	0
Skilled construction and building trades	600	0.7
Textiles, printing and other skilled trades	4,500	4.6
Personal service occupations	5,000	5.1
Leisure and other personal service occupations	<100	0
Sales and customer service occupations (1 subgroup: Sales occupations)	100	0.1
Process, plant and machine operatives (1 subgroup: Transport and mobile machine drivers and operatives)	100	0.1
Elementary occupations	2,800	2.9
Elementary trades, plant and storage related occupations	600	0.6
Elementary administration and service occupations	2,200	2.3
All occupations	96,700	100

Note: Work permits and first permissions are presented against major and sub-major groups of the Standard Occupational Classification 2000 (SOC2000); data exclude Sectors Based Scheme and groups.

Source: Salt (2007).

By country of origin

- 2.30 In 1995 one-third of new permits (work permits and first permissions) were granted to workers from the United States. In second place, comprising 10 per cent of approved permits, were workers from Japan. By 2005 the total number of new permits had grown substantially and the mix of nationalities had altered radically. India contributed one-third, and the United States contributed only 10 per cent of the total. Other countries sending more immigrants to the UK over this period are the Philippines, South Africa and China.
- 2.31 It is worth noting that the changing nationalities reflect, to some extent, the changing sectoral and occupational distributions. For example, India is associated with information technology, computer analysts and programmers and nurses, and the Philippines is an important sending country for nurses. The changing proportion of different nationalities may have some knock-on effects in terms of dependants and settlement.

2.4 Routes

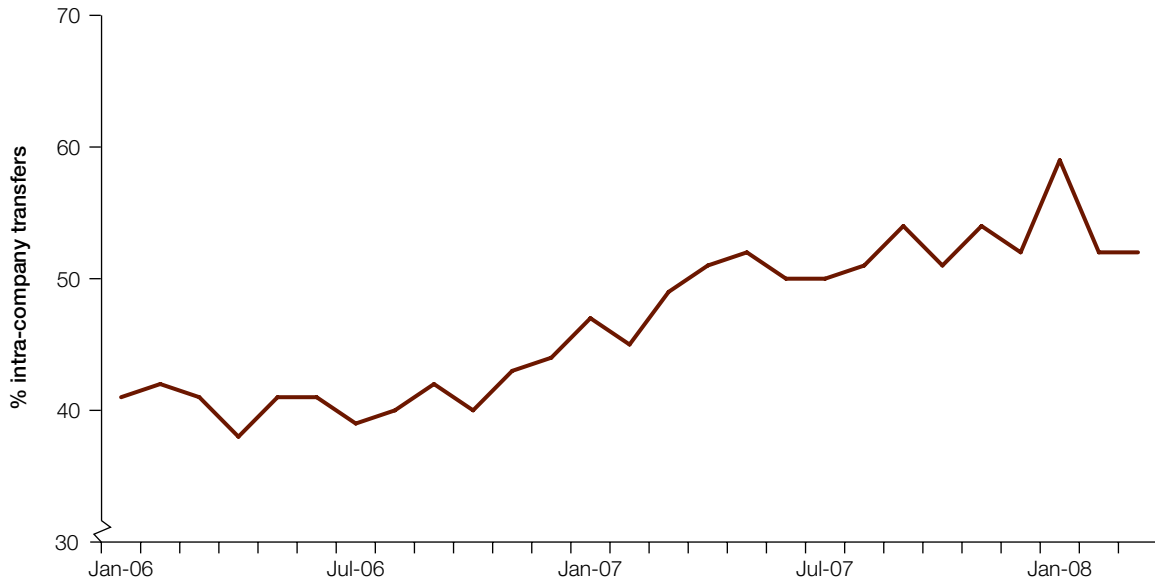
- 2.32 Here we discuss two routes of particular interest. Both are part of tier 1 in the current work permit system, and are exempt from the RLMT. The first route, intra-company

transfers, is of interest because their use has become increasingly common in recent years. The second route, shortage occupations, is of interest because of its relevance to our remit.

Intra-company transfers

- 2.33 A company may apply to transfer a foreign employee who is not currently in the UK to work for that company in the UK. The number of new permits granted for intra-company transfers in 2007 was 38,100, approximately 43 per cent of all new permits. If we consider the proportion of applications for immigrants currently outside the UK (i.e. work permits only), intra-company transfers as a proportion of work permits is 50 per cent.
- 2.34 Looking back a decade, intra-company transfers accounted for 39 per cent of permits approved, and 15 years ago 28 per cent. One factor behind this trend might be the growth in the number of multinational firms that are able to make use of this route. We have also noted shorter-term trends, perhaps indicating that at a time when criteria for other routes are tightened, intra-company transfers become marginally more desirable as a route to bring in immigrants (Figure 2.4).

Figure 2.4: Intra-company transfers as a proportion of work permits approved, 2006-2008



Notes: Data show intra-company transfers as a proportion of work permits only.
 Source: Management information data collected by the UKBA.

2.35 Changing flows over time may also represent changes in the ways that different sectors use intra-company transfers. For instance work by (Salt and Millar, 2006b) suggests that the information technology sector is more reliant on intra-company transfers than others, putting teams together on a project basis.

2.37 This narrow focus is reflected in the overall proportion of successful applications that the shortage occupation route accounts for. Nevertheless, if we put intra-company transfers aside, shortage occupations accounted for around 18 per cent of work permits and first permissions in 2006 and 9 per cent in 2007 (Table 2.7).

Shortage occupations under the current system

2.36 The current shortage occupation list under the work permit system is a route that does not require an RLMT. It has been maintained by the UKBA, taking into account evidence submitted on shortages. Although there is no restriction on the scope in terms of the sectors the list can cover, the present list is focused on a narrow range of occupations, the majority of which fall under engineering, healthcare (including social care) and teaching.

Table 2.7: Shortage occupation route, 2006–2007

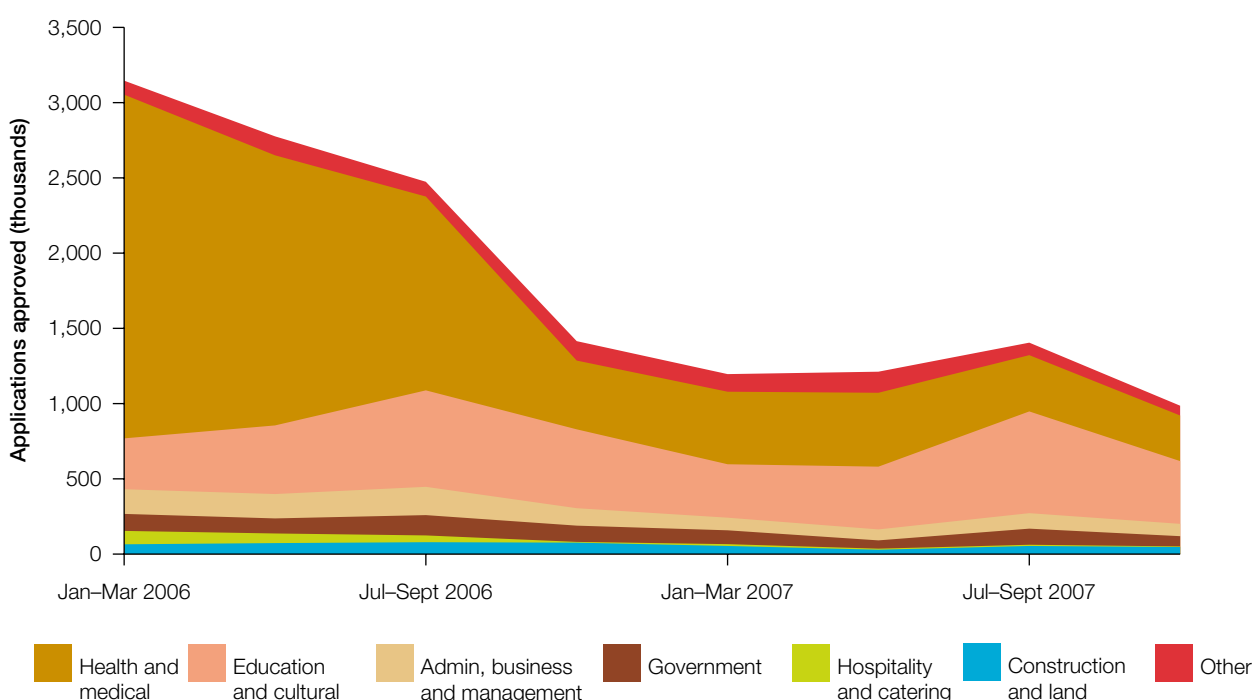
	2006	2007
Total applications approved	141,000	129,600
Shortage occupation route	19,700	8,400
% of total	13.6	6.4
% of total excluding intra-company transfers	17.9	9.3
Work permits and first permissions approved	97,400	87,400
Shortage occupation route	9,800	4,800
% of total	10.1	5.5
% of total excluding intra-company transfers	14.6	9.5

Notes: Figures are rounded to the nearest hundred. Data exclude the Sectors Based Scheme.
Source: Management information data collected by the UKBA, formerly Work Permits UK.

2.38 Even within the range of occupations covered by the shortage occupation list, different sectors make use of the shortage occupation route to differing extents. In 2006 the sector bringing most people in through the shortage occupation route was

health and medical services (Figure 2.5), although this has declined substantially as more UK workers are trained as health professionals. The education and cultural sector became the largest user of the shortage route by the end of 2007.

Figure 2.5: Use of shortage occupation route by sector

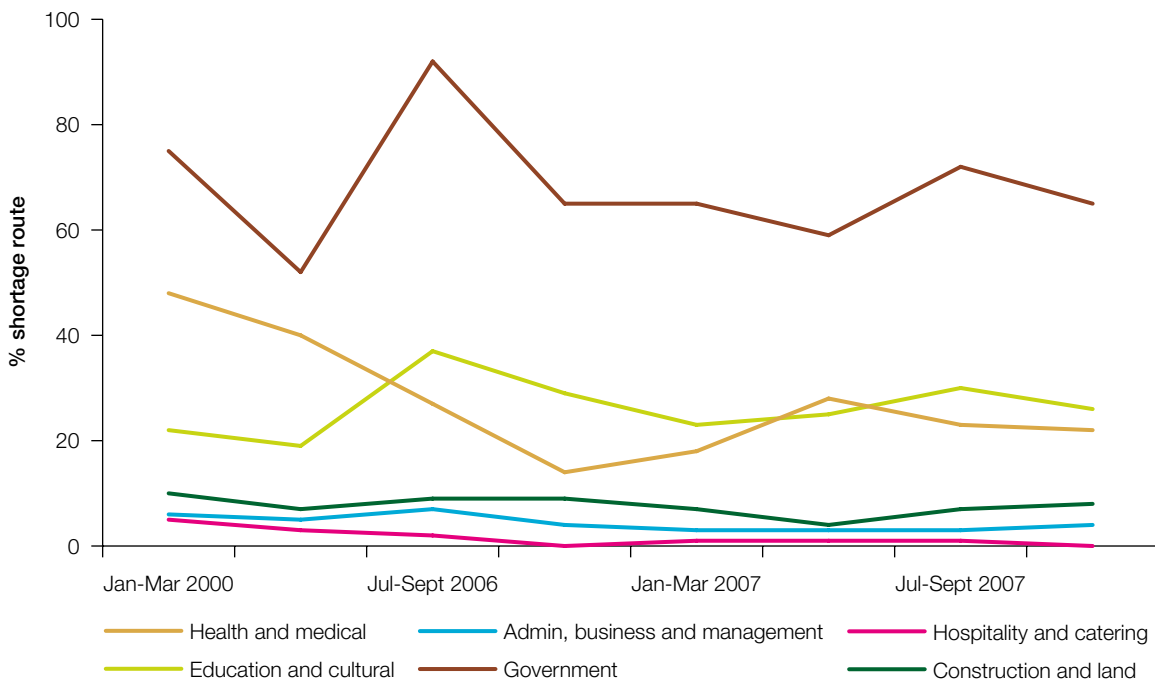


Notes: Work permits and first permissions through the shortage route per quarter are presented against the Home Office sector classification. This does not correspond with the Standard Industrial Classification.
Source: Management information data collected by the UKBA, formerly Work Permits UK.

2.39 If, however, we look at use of the shortage route as a proportion of all work permits and first permissions (Figure 2.6), for health and medical services it has settled at around 20 per cent in 2007. The government sector brings in a high proportion of immigrants through the

shortage route, although overall numbers are very low – averaging 125 work permits and first permissions per quarter in 2007. At the sector level, no sector is solely reliant on the shortage occupation route as a means of bringing in immigrants.

Figure 2.6: Use of shortage occupation route by sector as a proportion of all routes



Notes: Proportion of work permits and first permissions through the shortage route per quarter are presented against the Home Office sector classification. This does not correspond with the Standard Industrial Classification. Source: Management information data collected by the UKBA, formerly Work Permits UK.

2.40 Table 2.8 examines the most detailed level of job titles. If we look at job titles that correspond with those specified in the shortage occupation list, we can see it is an important, but not the sole, route for employers to bring in immigrants.

Table 2.8: Shortage occupation route by job title, 2007

Occupation where job title(s) are eligible for shortage occupation route	Shortage occupation work permits and first permissions	% of permits issued for shortage occupations	Total work permits and first permissions	% of total work permits and first permissions coming through shortage route
Teacher (school/college)	1936	40.3	2,166	89.4
Other health/medical	420	8.8	1,673	25.1
Pharmacist	403	8.4	466	86.5
Social worker	331	6.9	346	95.7
Nurse	304	6.3	2,500	12.2
Other engineer	279	5.8	5,610	5.0
Radiographer	268	5.6	280	95.7
Veterinary surgeon	87	1.8	99	87.9
Doctor	79	1.6	433	18.2
Occupational therapist	67	1.4	79	84.8
Physiotherapist	58	1.2	91	63.7
Other education/cultural occupation	54	1.1	1,217	4.4
Geologist	46	1.0	117	39.3
Other construction/land occupation	39	0.8	604	6.5
Civil/structural engineer	33	0.7	259	12.7
Dental surgeon	31	0.6	83	37.3
Hospital consultant	31	0.6	35	88.6
Transport and highways engineer	31	0.6	43	72.1
Biomedical scientist	30	0.6	48	62.5
Other job titles eligible for shortage occupation route	272	5.7	53,524	0.5
Total for job titles eligible for shortage occupation route	4,799	100	69,673	

Notes: These occupations are not classified according to the SOC2000, but are more specific job titles recorded in the management information system. Nevertheless, some encompass a number of job titles, some or all of which may have been eligible for the shortage occupation route.

Source: Management information data collected by the UKBA.

2.5 Implications for the MAC

2.41 This chapter has presented a number of trends that we believe are important to understanding the current system, and have implications for how we approach our recommended shortage occupation lists.

2.42 Some conclusions we draw are as follows.

- There has been an increase in the numbers of work permits issued over the past decade. This has been reflected in both new applications from out-country and applications and extensions for immigrants already residing in the UK. The proportion of in-country applications has increased at a somewhat higher rate than out-country applications. We need to recognise that use of the shortage occupation route will not be limited solely to new immigration.
 - Employers can choose between a number of routes to bring in immigrants. Intra-company transfers account for about half of applications approved for immigrants who are not already in the UK, and their use has grown. This may indicate that the relative ease of bringing in immigrants through different routes (e.g. where there is no requirement to conduct an RLMT) affects the routes employers choose.
 - The shortage occupation route currently accounts for only a small proportion of work permits, and occupations on the list do not necessarily use the list as the main route to immigration. The past is not necessarily a good guide to the future in this sense, but it does raise questions about the optimum balance between the shortage route and other routes, which will need to be considered as the new system is evaluated.
- However, there is little doubt that some specific occupations are heavily dependent on the shortage route, even in the current system. It is necessary to look at occupations and job titles at a disaggregated level in order to fully understand how the system is needed, and used, by employers.
 - There has been considerable change in the use of the work permit system over time. This becomes apparent when the system is analysed at a detailed and disaggregated level. We need to remain alert to the fact that employers will look to use the system in a way that benefits them, which may not always coincide exactly with what was anticipated.

2.43 In Chapter 3 we discuss the new PBS that replaces the current system.

Chapter 3:



The new Points Based System for managing immigration

3.1 Background

- 3.1 This chapter describes the new Points Based System (PBS) for managing immigration, focusing in particular on Tier 2 and the shortage occupation lists. We also compare the new system with the previous work permit system and with the system currently operating in Australia.
- 3.2 Much of this chapter draws on Home Office (2006), where the Government published its proposals for reforming the immigration system into a PBS, citing this rationale: *“Because the system has developed over time in a piecemeal fashion,*

it is hard to know whether overall it is delivering the migrants that the UK wants and needs. Because it is complex and difficult to use, it does not reflect the UK’s competitive position in the global economy as a destination for the brightest and best migrants...All this means that the system is not doing as well as it could in identifying and attracting the migrants who are of most benefit to the UK.”

- 3.3 In introducing the above proposals, the Government specified that the new system would be based on the model currently in use in Australia, discussed in Box 3.1.

Box 3.1: The Australian system for skilled immigration

In Australia the skilled independent migration route allows offshore immigrants to enter and work in the country permanently under a PBS. Applicants must meet a set of minimum requirements: they must be under 45 years old, must meet an English language requirement, and must meet certain health and character requirements. The applicant must also work in an occupation on the Skilled Occupation List, and either must have been employed in that occupation for 12 of the previous 24 months or must have finished a 2-year period of study in a related discipline within the previous 6 months.

If these requirements are met, points are awarded for a range of criteria, including the

level of the nominated occupation, age of the applicant, English language ability, specific work experience and qualifications. A certain threshold must be passed for the applicant to be allowed to enter and work in the country permanently.

Applicants unable to meet the required criteria for a permanent visa may apply through the Skilled Regionally Sponsored route. Applicants must be nominated either by a State or Territory government agency or an eligible relative living in designated areas of the country, and may be granted a three-year visa. After two years the applicant can apply for permanent residency.

3.4 The Government proposed a similar system, with the aim of delivering the following key benefits:

- better identification and attracting of immigrants who have most to contribute to the UK;
- a more efficient, transparent and objective application process; and
- improved compliance and reduced scope for abuse (Home Office, 2006).

3.5 In response to these proposals, the House of Lords (2008) questioned the degree to which the PBS would differ from the old system: *“Plans for Tier 2 suggest that it will essentially remain a work permit system that is not too dissimilar from current policies for skilled migrants.”* However, it also noted that: *“There are some important changes, in particular the requirement for an English language test and the establishment of the Migration Advisory Committee that will now recommend the list of shortage occupations.”*

3.6 In addition, the new arrangements for Tier 2 may give more emphasis to the shortage occupation list than the work permit system, because points have to be earned in order to come through the non-shortage route. However, this change is accompanied by other changes from the old work permit system, notably in relation to the resident labour market test (RLMT). These issues are discussed in more detail in Section 3.3.

3.2 The five tiers of the PBS

3.7 The PBS consists of five tiers, each of which represents a possible route for non-EEA nationals to enter the UK to work, train or study. These were described in Home Office (2006) as follows:

- **Tier 1:** highly skilled individuals to contribute to growth and productivity;
- **Tier 2:** skilled workers with a job offer to fill gaps in the UK labour force;
- **Tier 3:** limited numbers of low-skilled workers needed to fill specific temporary labour shortages (note that this route is currently suspended);
- **Tier 4:** students; and
- **Tier 5:** youth mobility and temporary workers.

3.8 For each tier of the PBS, applicants need to gain a set number of points by satisfying certain criteria. Points are scored for attributes that predict an applicant’s likely success in the labour market, and/or control factors, relating to whether someone is expected to comply with the conditions of their leave to remain.

3.9 Skills are clearly key to the Government’s agenda in this area. The Leitch Review of Skills (2006) articulated the importance of skills: *“The global economy is changing rapidly, with emerging economies such as India and China growing dramatically, altering UK competitiveness. The population is ageing, technological change and global migration flows are increasing. There is a direct correlation between skills, productivity and employment. Unless the UK can build on reforms to schools, colleges and universities and make its skills base one of its strengths, UK businesses will find it increasingly difficult to compete. As a result of low skills, the UK risks increasing inequality, deprivation and child poverty, and risks a generation cut off permanently from labour market opportunity. The best form of welfare is to ensure that people can adapt to change. Skills were once a key lever for prosperity and fairness. Skills are now increasingly the key lever. A radical step-change is necessary.”*

- 3.10 As Campbell (2008) argues, migration is a key stimulus in matching skills required in the host nation with skills available in the origin nation. The labour market operates so as to provide a valuable source of labour supply and a mechanism through which unmet labour market needs are met. Thus, Campbell argues, migration policy is a key control mechanism too, regulating the relationship and the volume and type of skills that can be made available to meet domestic labour market requirements. There appears to be a close, but not complete, connection between immigrant jobs and skill shortages as measured by the National Employers Skills Survey: *“For example, in respect of those with work permits, there is a considerable concentration in the high skill shortage occupation of ‘associate professionals’.”* Associate professional and technical occupations include a range of occupations in areas including healthcare, engineering and IT that we discuss later on in this report.
- 3.11 Following the Leitch Review, the Government has outlined its ambition for the UK to join the world’s ‘premier league’ for skills by 2020, backed by financial investment and a range of new approaches to improve the skill level of the domestic population. These initiatives include Train to Gain, joining up the employment and skills systems to produce a new universal adult careers service, and the establishment of the new UK Commission for Employment for Skills. The Government emphasised the priority it gives to improving skills in its response to our call for evidence, but also recognised the important role that immigrants play in the UK labour market.

“Not all the needs in our economy can be met by this development in our skills base. Migration plays a key role here. Migrants fill crucial gaps in our economy and in our public services.”

HM Government response to the Migration Advisory Committee’s (MAC’s) call for evidence

- 3.12 UK Border Agency (UKBA) (2007) set out plans for Tier 1 of the PBS, subsuming the current Highly Skilled Migrant Programme. Tier 1 aims to benefit the UK economy by attracting and retaining people who will increase the skills and knowledge base of the UK. Highly skilled immigrants do not require a job offer to enter and are free to seek employment anywhere within the UK.
- 3.13 General entry under Tier 1 requires the applicant to satisfy points criteria in terms of age, qualifications, previous earnings and previous work experience or qualifications gained in the UK. The applicant also has to satisfy English language and maintenance requirements. Entrepreneurs, investors and persons carrying out post-study work may also enter under Tier 1.
- 3.14 Tier 2 replaces the current work permit system. Under this tier, UK employers can recruit skilled nationals from outside the European Economic Area (EEA) into vacancies that they are not able to fill from within the EEA workforce. It is discussed in detail in Section 3.3.
- 3.15 Tier 3 will consist of quota-based, low-skilled schemes only for countries with which the UK has effective returns arrangements, and in response to labour market shortages that are clearly temporary. The Government aims to phase out low-skilled, non-EEA immigration in response to the increasing pool of EEA

labour available following expansion of the EEA, and so Tier 3 is currently suspended.

- 3.16 Tier 4 allows students to enter and remain in the UK for the length of their period of study. These applicants must have accepted an offer from an approved UK educational institution, and must remain tied to this institution for the duration of their stay in the UK.
- 3.17 Tier 5 is designed to satisfy mainly non-economic objectives. Temporary workers are people who come to work in the UK for a limited period of time who might not qualify under other tiers, and are allowed in for cultural, charitable, religious or international development reasons or to satisfy the UK's obligations under certain international treaties.

3.3 Tier 2 of the PBS

- 3.18 Tier 2 is the tier we are concerned with for the purposes of this report. Proposals for this tier were set out in detail in UKBA (2008c).
- 3.19 Tier 2 applicants require both a Certificate of Sponsorship and prior entry clearance in order to come to the UK. Initially, the sponsor, usually a business or educational institution, must gain a sponsor's licence by approved application to the UKBA. This then allows the employer to issue a Certificate of Sponsorship to the applicant. However, it is still up to the UKBA to determine whether the applicant has gained the sufficient number of points, and therefore to grant prior entry clearance. Sponsorship plays two main roles in the application process:
- to provide evidence that the applicant will fill a vacancy that the sponsor is unable to fill from the EEA labour pool; and
 - to pledge that the sponsor will accept the responsibilities of sponsorship.

- 3.20 In order to grant a Certificate of Sponsorship, the job to be filled by the applicant must be skilled to level 3 of the National Qualifications Framework (NQF), equivalent to NVQ level 3. In addition, the salary offered must be 'reasonable'. The level of reasonable earnings will be set by the UKBA. This will help to ensure that immigrant workers will not undercut existing domestic pay. We have had to consider a similar question in relation to a small number of occupations in this report, where the majority of the employees are less skilled, and we have had to define the minimum amount a skilled worker in that occupation should be paid.

Points under Tier 2

- 3.21 The criteria for which points are awarded under Tier 2 are set out in Table 3.1, and explained in the following sections. The Committee has not been involved in setting points for Tier 2.

Gaining 20 points (mandatory requirements)

- 3.22 To be allowed entry under Tier 2, an applicant must gain 20 points in relation to the mandatory requirements in Sections B and C of Table 3.1, and 50 additional points relating to sponsorship, earnings and qualifications in Section A, making a total of at least 70 points.
- 3.23 Those wishing to enter through Tier 2 must first satisfy two mandatory conditions:
- they will be required to display basic competence in English, including an ability to understand and use familiar everyday expressions and very basic phrases. This is closest to A1 of the Council of Europe scale. Specifically, they must either have passed an appropriate English language test, or have taken a degree taught in English. This is verified using National Academic Recognition Information Centre data. Applicants from majority English-speaking countries will be deemed to meet this requirement; and

Table 3.1: Points under Tier 2

Section	Certificate of Sponsorship		Qualifications (or equivalents)		Prospective earnings (£)	
A (50 points needed)	Offer of job in shortage occupation	50	No qualifications	0	17,000 – 19,999	5
	Offer of job that passes the RLMT	30	NVQ level 3	5	20,000 – 21,999	10
	Intra-company transfer	30	Bachelors or Masters	10	22,000 – 23,999	15
			PhD	15	24,000 +	20
B	Maintenance requirement (mandatory)					10
C	Competence in English (mandatory)					10

Notes: Prospective earnings are before tax, and can be adjusted periodically to reflect inflation and/or labour market requirements. Allowances will be taken into consideration in calculation of salary.

Source: UKBA (2008c).

- they must satisfy the maintenance requirement, which ensures that the applicant, without access to state benefits in the UK, will be able to support themselves until they receive their first salary. This requires the individual to hold funds of at least £800, plus two-thirds of this value for each dependant they intend to bring with them.

An applicant who is unable to satisfy these criteria will be denied entry under Tier 2, regardless of how many points they gain in Section A.

Gaining 50 points (sponsorship, earnings and qualifications)

3.24 In Section A, 50 points will be obtained if an applicant holds an offer of a job that has been identified as in shortage by the Government on the MAC's advice. The shortage occupation list comprises skilled occupations where there are shortages that can sensibly be filled by non-EEA immigration. The shortage occupation list is the main focus of this report and is discussed further in the chapters that follow.

3.25 Otherwise, the job must pass the RLMT or be an intra-company transfer, where 30 points are awarded for sponsorship. In these latter two cases, the applicant must gain additional points through the qualifications they hold and the prospective earnings of the job being offered.

3.26 The RLMT requires the employer to advertise the relevant vacancy through Jobcentre Plus or as agreed in a sector code of practice (for example in a trade magazine) for at least two weeks at a level of earnings deemed reasonable by the UKBA. For jobs paying in excess of £40,000, this period is reduced to a single week. When issuing a Certificate of Sponsorship, the sponsor must either confirm that the test has been conducted, or that it does not apply.

3.27 The applicant must also gain additional points through their qualifications and prospective earnings. For example, if earnings from the offered job exceed £24,000, this will yield the 20 points required to reach the 50 point threshold,

even if the applicant holds no qualifications (although the job still has to be skilled to level 3). Alternatively, a combination of earnings and qualifications may be sufficient.

3.28 There are two areas where the RLMT is not required (other than for those occupations that appear on the shortage list). Under Tier 1, international students who have studied full-time for a degree in the UK are entitled to post-study work leave upon completion of their education. The maximum period of this leave is two years, and during this time they will be free to seek employment without sponsorship. However, they must switch to another tier by the end of their period of leave in order to stay in the UK. If during their leave they have been in employment for at least six months, the RLMT will not apply for those switching to Tier 2.

3.29 Intra-company transfers are the second area where the RLMT is not required. This allows companies to transfer their employees to a UK-based location of the company, where the applicant has been working outside the UK for the sponsoring company for at least six months. As with the RLMT, additional points from earnings and qualifications are required to meet the 50 point threshold.

Other aspects of Tier 2

3.30 In the case of sportspeople or ministers of religion, a Certificate of Sponsorship, along with satisfaction of the maintenance and competence in English requirements, yields the required 70 points.

3.31 Applications for a licence to issue a Certificate of Sponsorship under the sportsperson subcategory must be accompanied by approval from the relevant governing body for the sport.

3.32 Religious institutions wishing to recruit immigrant ministers of religion must also apply for a licence, by providing evidence that they are a bona fide religious institution and that they are a registered, excepted or exempt UK charity, as well as additional background information. Under this subcategory, the sponsoring institution must vouch that the applicant is qualified to do the job in question, intends to base themselves in the UK and will comply with the conditions of their permission to stay, and will leave the UK when their permission to stay expires. They must also provide an undertaking to support or accommodate the applicant and confirm that the RLMT has been passed. Applicants will be required to meet a level of English equivalent to the Council of Europe level B2, rather than A1 for the general route.

3.33 Tier 2 applicants will be able to undertake supplementary work, without the need for the RLMT or additional sponsorship. Any such work must be in the same profession and at the same professional level as their main employment. The immigrant must not be employed by an agency and must not exceed 20 hours per week, falling outside normal working hours only, in their additional employment.

3.34 Successful applicants will be entitled to bring dependants (specifically children, spouses, civil partners, same-sex partners and unmarried partners) into the UK, provided that the applicant can support them without claiming benefits. Dependants will be able to seek employment but, as this is tied to the leave of the principal immigrant, they will not be able to switch into any points system tier. If dependants subsequently wish to apply to be in the UK in their own right, they will need to leave the UK in order to apply.

3.35 The new system will be regulated and enforced by the UKBA. As a condition of keeping their licence, sponsors will need to alert the UKBA if the immigrant does not comply with their immigration conditions – for example, if they do not turn up for their job. Any sponsor that does not comply with this requirement will risk losing its licence.

3.4 Reviewing Tier 2

3.36 The criteria for Tier 2, including the points awarded for each attribute and required thresholds, will be kept under review by the UKBA, with advice from both the MAC and the Migration Impacts Forum. The Forum informs the Government on how migration affects public services and local communities and advises on the effect of any future migration policies.

3.37 To date, our primary focus has been on developing the shortage occupation lists. However, we believe that the PBS should be evaluated rigorously in order to assess whether it is delivering the maximum economic benefit to the UK. High-quality management information should be collected in order to facilitate this. Furthermore, the shortage occupation route, including its optimal level of importance as a route of entry compared with the alternative routes under this tier, should be considered alongside the rest of Tier 2 when the system is reviewed. We would be happy to be involved in this evaluation process as required.

Part II: Analysis

Chapter 4:



Approach and Issues

4.1 In this chapter, we summarise the approach we adopted to compiling the recommended shortage occupation lists. We also discuss how occupations and individual job titles have been considered, and how we used the top-down and bottom-up evidence. We then set out some relevant issues relating to the European Economic Area (EEA), the Scotland shortage occupation list, and the UK countries and regions.

4.1 Conceptual approach

The three S's: skilled, shortage and sensible

4.2 Our report of February 2008 set out a three-stage approach to drawing up the

shortage occupation lists for the UK and Scotland:

- first, we consider whether individual occupations or categories of jobs are sufficiently **skilled** to be included on the shortage occupation list;
- then, we assess whether there is a **shortage** of labour within each skilled occupation; and
- finally, we consider whether it is **sensible** for immigrant labour from outside the EEA to be used to fill these shortages.

4.3 The Government expressed broad approval of this approach.

“Government accepts that the three questions relating to the skill level of an occupation, whether a shortage exists, and whether it is sensible to fill that shortage with migrants, are complex and difficult. That is why the Government set up the independent MAC to give us expert advice on them. The proposed approach to answering these questions the Committee has set out in this report is robust and rigorous.

“In general, the Government considers that the report contains a remarkably thorough and accurate presentation of the issues concerning skills shortages and use of migration to fill skill shortage vacancies. Given the many constraints resulting from both data availability and the many complex and unresolved theoretical concepts, the report develops a good understanding of this area of policy. We are confident that the MAC using this approach will be able to develop a credible process for identifying skill shortages that can be sensibly filled by migration.”

HM Government response to the Migration Advisory Committee's (MAC's) call for evidence

Skilled occupations and the National Qualifications Framework

4.4 UK Border Agency (UKBA) (2008c) states that a job in Tier 2 must be at NVQ level 3 or above. For the purposes of this report, we equate this to level 3 in the National Qualifications Framework (NQF), hereafter referred to as level 3 or NQF level 3. Further information on NQF level 3 is provided in Box 4.1.

Box 4.1: Skill level 3 (National Qualifications Framework)

The NQF describes the equivalence of different qualifications in the UK. Examples of qualifications that meet level 3 or above include:

- a higher degree, first/foundation or other degree;
- NVQ levels 3, 4 and 5;
- diploma in higher education;
- HNC/HND/BTEC higher, etc;
- teaching or nursing qualifications;
- RSA higher diploma;
- international baccalaureate;
- GNVQ/GSVQ advanced;
- two or more A levels or equivalent;
- four or more AS levels or equivalent; and
- other higher education below degree level.

We estimated the number of working-age people in the UK holding level 3 or above qualifications at just over 16 million people, or 45 per cent of the working-age population.

4.5 Because individual jobs under Tier 2 of the Points Based System (PBS) need to be skilled to NQF level 3, it follows that the shortage occupation lists should contain only occupations and job titles skilled to this level. To assess this, we have looked at factors that might indicate whether an occupation is skilled to level 3. These include qualifications held by people within that occupation and average earnings and skill level within the Standard Occupational Classification (SOC), a classification applicable to all paid jobs performed by economically active persons in the UK.

Shortage

4.6 There is no universal definition or measure of labour shortage. Our February report (MAC, 2008b) set out some of the economic theory and evidence on shortages of labour. We subsequently commissioned York Consulting (2008) to carry out a review of labour shortages, skills shortages and skill gaps to inform our work. Building on this, when considering whether an occupation is experiencing shortage we have looked at a range of indicators, including earnings, vacancies and unemployment, and skill survey data.

Sensible

- 4.7 Regarding whether it is sensible to fill a shortage with non-EEA labour, it is worth emphasising that ‘sensible’ can be interpreted in many different ways based on a wide variety of considerations. Any definition depends on the underlying policy objectives. These are determined by the Government and not this Committee. In some cases it might be necessary to prioritise among policy objectives, which requires judgement. We aim in this report to make sure that any judgements we have had to make are consistent and transparent.
- 4.8 For our consideration of ‘sensible’, we looked at four sets of indicators. The first was the availability of alternatives to employing non-EEA immigrants in response to a shortage of skilled labour. This included consideration of whether immigrants are in some cases employed primarily because they are cheap labour, as well as the efforts being made to fill the shortage by other means. The second set of indicators related to whether bringing in immigrants would affect the skills acquisition of the domestic workforce, including through providing potential disincentives to up-skill existing workers. The third set related to the impact on innovation/productivity growth and international competitiveness. The final set related to the wider impacts on the UK labour market and economy, including the impact on employment opportunities for UK resident workers.

Occupations and job titles

- 4.9 The need to identify occupations in the labour market where shortages exist requires us to form and communicate a clear and consistent view of what we mean by ‘occupation’. We have, where possible, worked with the Standard Occupational Classification 2000 (SOC2000).
- 4.10 The SOC utilises four levels of aggregation. The level of most interest to us is the ‘unit group’ level. This breaks down the labour market into 353 occupations. It is the most detailed occupational breakdown available. Some national-level data can be disaggregated to this level.
- 4.11 The Office for National Statistics has commissioned an update of the SOC for 2010. Some stakeholders have commented to us that specific jobs where they wish to assert shortage do not fit neatly into the current SOC classification. Jobs where this is an issue include transport planning and some engineering occupations. We are monitoring that work.
- 4.12 Use of the SOC is central to this report, but it has limitations. Employers often think of skills and shortages in much more specific terms. In some cases we will need to look beyond ‘occupations’ and instead look at more specific job titles.

“The MAC has rightly recognised the relationship between ‘occupations’ and the considerably larger number of Job Titles that broadly relate to an ‘occupation’...But the reality is that, for many employers, it is Job Title, rather than Occupation, that is relevant for their ‘skill needs’.”

Semta response to the MAC’s call for evidence

4.13 The notion of a job represents a basic element in the employment relationship. It is defined as a set of tasks or duties to be carried out by one person. Jobs are recognised primarily by the associated job title. Via an elaborate coding index, and through the application of rules designed to cope with ambiguous information, each of 26,000 official job titles can be coded

to one of the 353 unit groups. Much of the evidence submitted to us did not use the official job titles, but we use them where practical. No relevant national-level data are available at the job title level. Box 4.2 presents an example of a job title and how it relates to the occupational structure.

Box 4.2: A job title and associated occupations

Major group: **2** Professional occupations

Sub-major group: **21** Science and technology professionals

Minor group: **212** Engineering professionals

Unit group: **2122** Mechanical engineers

Job title: Engineer, aerospace

Individual jobs

4.14 For the purposes of this report, we are concerned with job titles and occupations. However, all individual jobs have to be skilled to level 3 to qualify for Tier 2. The UKBA will provide guidance for employers to assess the skill level of individual jobs. To promote consistency, we recommend that the UKBA develop its guidance in a manner that is consistent with the approach taken in this report. UKBA (2008c) states that the guidance will be drawn up with our advice.

Top-down and bottom-up

4.15 To produce the shortage occupation lists, we used a hybrid method that combined the consistency and comprehensiveness of a 'top-down' approach with the fine-grained detail and contextualisation of a 'bottom-up' method. In terms of top-down

analysis, we looked closely at the best available national (i.e. usually UK-wide) labour market data.

4.16 As set out in our January 2008 report (MAC, 2008a), while national data are crucially important to achieving our task, for various reasons they are not sufficient. There is a general issue with sample size with many of the national surveys. Even for surveys based on large data sets, sample sizes rapidly diminish once disaggregation is attempted, such as by occupation, sector or skill level, or by distinguishing immigrants from non-immigrants. A further limitation is that national data may sometimes identify a trend but not fully explain why that trend is occurring. It is unlikely that all occupations with significant shortages of skilled labour can be identified from top-down sources alone.

4.17 It was therefore clear from the outset of our work that we could not rely on top-down sources alone. Bottom-up evidence relating to particular categories of jobs and sectors has also been central to our analysis. This came from gathering evidence from individual employers and sectoral and occupational representatives. The analysis was heavily informed by a call for evidence, visits across the UK, a series of meetings and events, and engagement with a wide variety of stakeholders. We also commissioned independent research on staff shortages and immigration in key sectors and occupations in the UK.

“We agree with the proposed ‘hybrid’ method of analysis of skills shortages. It will support the use of national datasets with a bottom-up approach which makes use of the varying levels of information and detail available across different occupations. This will allow the analysis to achieve more granularity across all occupation types than could be achieved through a methodology drawing purely on national datasets.”

HM Government response to the MAC’s call for evidence

Data sources

4.18 Throughout this report, we refer to various key data sources we use for our top-down analysis, including the Labour Force Survey, the Annual Survey of Hours and Earnings, the National Employers Skills Survey and Jobcentre Plus vacancy data. In MAC (2008a) we published a paper setting out in more detail the potential data sources we could use, and their usefulness for our purposes.

Dovetailing top-down and bottom-up

4.19 Dovetailing the evidence has been a key issue for us. We hoped to see

correspondence between top-down and bottom-up evidence. In some cases there was good correspondence between the top-down and bottom-up data, but not in every case.

4.20 The top-down and bottom-up data sometimes pointed to conflicting conclusions because evidence related to different levels of disaggregation. Using Box 4.2 above to illustrate this point, bottom-up evidence might have indicated a shortage of aerospace engineers. At the same time, the national data may plausibly have told us that mechanical engineers, the corresponding occupational group, was not experiencing shortage. If specific skills and knowledge are required to be an aerospace engineer, the top-down and the bottom-up evidence could both have been presenting an accurate picture.

4.21 In addition, the strengths of different indicators varied between top-down and bottom-up. For instance, it was difficult to obtain robust information on earnings growth within some occupations from individual employers, while the national-level data did provide this. In contrast, it was difficult to measure the level of on-the-job training in some occupations using national-level data. This limits the extent to which we could corroborate top-down and bottom-up data against each other.

4.22 How have we resolved this? Broadly speaking, we looked for indicators of the three S’s in both the top-down and bottom-up evidence before placing occupations on the shortage list. However, our approach distinguished between cases where top-down data were highly relevant and where they were less so. Box 4.3 describes in more detail how we did this.

4.23 Ultimately, judgement was required when weighing ‘strong’ top-down evidence against ‘weak’ bottom-up evidence, or vice

Box 4.3: Dovetailing of top-down and bottom-up evidence

Consider the following cases where a shortage is asserted and bottom-up evidence has been provided:

- The top-down data **were** highly relevant, in that the assertion related to broad 4-digit occupation or a large part of one: here we included the occupation or relevant jobs on the shortage occupation lists if, overall, there was **a combination of good top-down and good bottom-up evidence**.
- The top-down data **were not** highly relevant, in that the assertion related to a narrow category within the relevant SOC (this included SOC unit groups where the majority of jobs were unskilled but we were looking at a subset of skilled jobs): we included the occupation or relevant jobs on the lists if there was **very good bottom-up evidence**.

In the latter case, it seemed reasonable to apply a slightly higher burden of proof to the bottom-up evidence, assuming that some top-down corroboration was provided. In some cases this meant that we required the bottom-

up evidence to have come from a range of sources or to have addressed a larger number of our indicators of ‘skilled’ and ‘shortage’.

Broadly speaking, we did not include occupations on the shortage occupation lists where bottom-up evidence:

- did not meet our criteria: the evidence that we received indicated either that the occupation is not skilled, and/or was not in shortage, and/or that it was not sensible to fill a shortage through migration; or
- sufficient appropriate evidence was not provided: the evidence was partial, inconclusive or not relevant, making it impossible to form a judgement.

Where no relevant bottom-up evidence was provided, we omitted the occupation or job title from the shortage occupation lists. We do, however, commit to further examination of some occupations where top-down evidence points particularly to potential shortage.

versa. Where we made such judgements, we make this as explicit as possible in this report. Our specific approach to this is discussed more in the following chapters.

Process for producing the lists

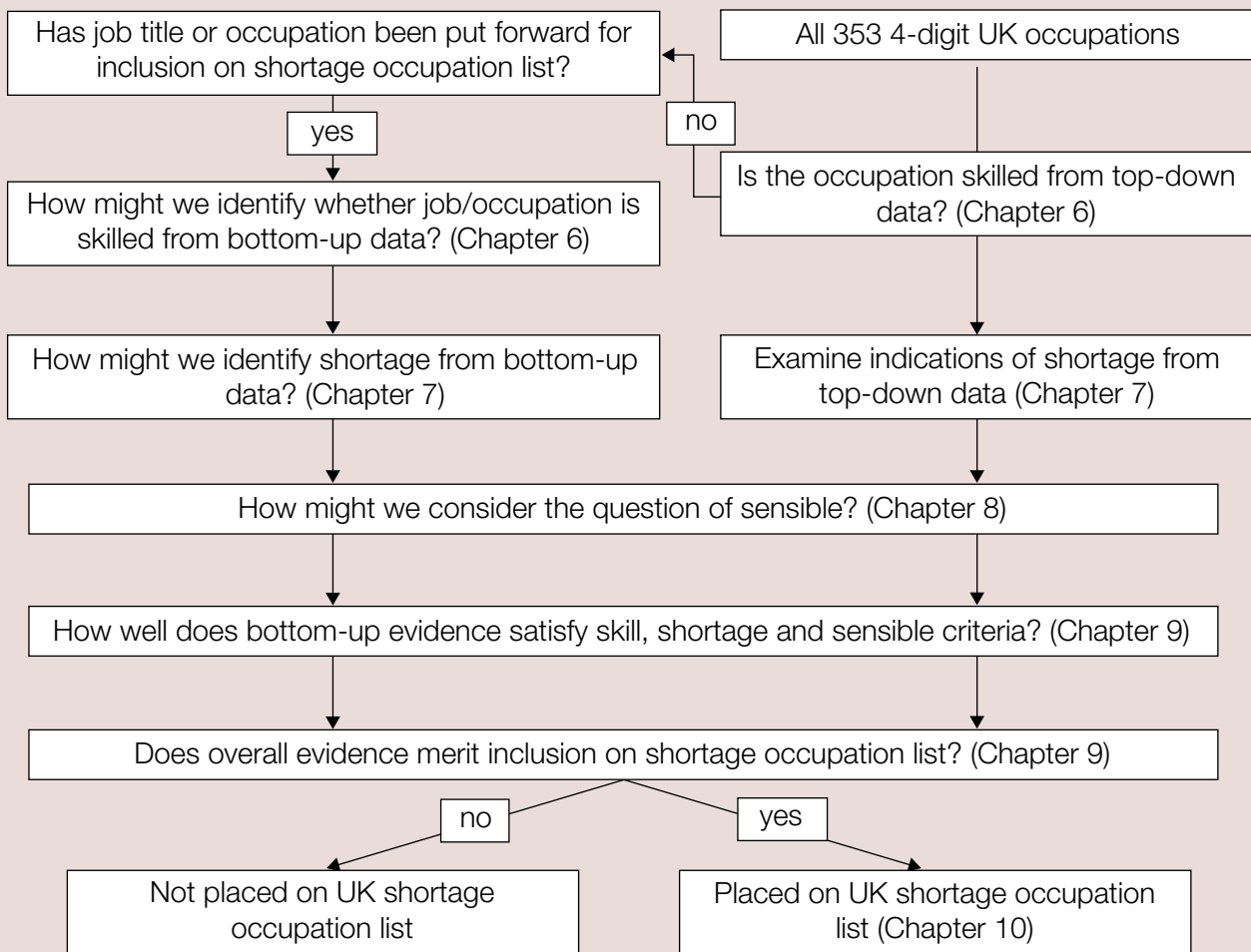
4.24 The process we have used to integrate the top-down and bottom-up evidence, and therefore to produce the UK shortage occupation list, is illustrated in Box 4.4. This box also indicates the relevant chapter of this report for each stage of our approach. Our top-down analysis starts with all 353 4-digit occupations (see top right-hand corner of the box). In Chapter 6 we produce our list of skilled occupations. In Chapter 7 we look at

the indicators of ‘shortage’ for each of those occupations. Chapters 6 and 7 also set out potential bottom-up indicators of ‘skilled’ and ‘shortage’ (see top left-hand corner).

4.25 We consider the issue of ‘sensible’ in Chapter 8. In Chapter 9 we then summarise and evaluate the bottom-up evidence on ‘skilled’, ‘shortage’ and ‘sensible’ for the specific occupations for which we received evidence from employers. We also consider whether this is corroborated against the top-down evidence where that is relevant. Chapter 10 provides the resulting shortage occupation list for the UK.

4.26 Chapter 11 provides the additions list for Scotland, discussed below. The process used to produce this is effectively the same as the bottom-up approach for the UK, but with a specific focus on Scotland.

Box 4.4: Report structure



4.2 Country and regional analysis

The European Economic Area

4.27 The shortage occupation lists set out one route through which employers can access labour from outside the EEA. In principle, it is desirable to assess the potential supply of labour within the EEA

using top-down analysis. In practice, this is difficult. Nonetheless, for the purposes of this report, we took account of this in the bottom-up analysis. Efforts that employers have made to recruit employees from within the EEA are one of the criteria we have considered in relation to ‘sensible’.

The Scotland list

- 4.28 By definition, a UK list includes Scotland, meaning that the UK list will apply to Scotland as well as to the rest of the UK. Our work plan also requires us to produce a separate shortage occupation list for Scotland only, containing any additional occupations that satisfy the three ‘S’s in Scotland. In this way Scotland gets a ‘second bite of the cherry’.
- 4.29 Because of Scotland’s smaller population, data limitations at the UK level tend to be exacerbated at the Scottish level, so bottom-up evidence was crucial.
- 4.30 As part of our consideration of the Scotland list, we asked employers what efforts were being made to recruit people from elsewhere in the UK and the reasons why those efforts were not proving successful.
- 4.31 Evidence received from stakeholders in Scotland also played a role in helping us to assess where shortages exist at the UK level.
- 4.35 We recognise that many employers face real difficulties in recruiting staff from other parts of the UK. When discussing individual occupations, we refer to some of these issues. We also plan to further examine the existence and impact of shortages of skilled labour at the sub-national level. We will return to this theme in future reports.

Regional analysis

- 4.32 We took evidence from across Northern Ireland, Scotland and Wales as well as visiting every region in England.
- 4.33 Our work plan did not allow us to produce separate shortage occupation lists for UK countries or regions other than Scotland. But regional shortages have been a recurring theme in our work.
- 4.34 However, we are not convinced that separate shortage occupation lists for each region and country of the UK are desirable or practicable. Even if regional shortages, however defined, exist and can be identified, it is probably not sensible to fill vacancies with immigrants if there is not a national shortage.

Chapter 5:



Gathering and considering the evidence

5.1 Introduction

- 5.1 Here we set out the methods we used to gather bottom-up evidence and indicate some common general themes.
- 5.2 Gathering bottom-up evidence has been essential in tackling our task effectively. We established early on that top-down evidence would only give us part of what we needed to know. Bottom-up evidence enabled us to get more detail and more fully understand the context for the data trends we were considering. It enabled us to drill down to occupations that were often very specialised. Working with a wide variety of stakeholders to gather this evidence also provided the opportunity to refine further our methodological approach.

5.2 How we gathered bottom-up evidence

- 5.3 The bottom-up evidence was gathered by extensive, open and transparent engagement with stakeholders. This is something we are committed to continue.
- 5.4 We developed a number of strategies to ensure that we are effective in accessing bottom-up evidence. These were:
- launching a call for evidence with our February report (MAC, 2008b);
 - carrying out visits to every country and region of the UK;
 - engaging with the Sector Skills Councils and Sector Advisory Panels;

- setting up a formal Stakeholder Panel;
- establishing a broader Stakeholder Forum;
- other meetings with employers, employees and representative organisations; and
- commissioning some independent research into staff shortages and immigration across key sectors.

- 5.5 We discuss each of these in turn below. Because of our remit to produce a separate Scotland list there was a need to gather evidence specifically relating to Scotland. This is discussed further in Chapter 11.

Call for evidence

- 5.6 One of the main methods by which evidence has been provided to us is through our call for evidence. We found this to be a useful way to consult with as many stakeholders as possible in a relatively short period of time. We linked the call to our report published on 29 February 2008. It was placed on our website and we sent it to a wide variety of stakeholders.
- 5.7 We received 84 responses, some of which were lengthy and covered more than one occupation. A considerable number of responses nominated specific occupations for the shortage occupation lists. We asked a number of questions as set out in Box 5.1.

Box 5.1: The Migration Advisory Committee's (MAC's) call for evidence, February 2008

Q1: Skilled occupations

1a) Do you agree with our proposed indicators of whether an occupation is skilled to NVQ level 3 or above?

1b) If not, which alternative or additional indicators should we be considering?

1c) What evidence might we use for this?

Q2: Shortage occupations

2a) Do you agree with our proposed indicators of whether skilled occupations are experiencing a shortage of labour?

2b) If not, are there alternative indicators we should be considering?

2c) What evidence might we use for this?

Q3: Sensibly filling vacancies

3a) Do you agree with our proposed indicators of whether it would be sensible to fill a shortage of skilled labour by non-EEA [European Economic Area] migrants?

3b) If not, which alternative indicators should we be considering?

3c) What evidence might we use for this?

Q4: Specific occupations or job titles

4a) According to our current criteria, do you wish to nominate specific occupations or job titles as suffering from a shortage of skilled labour that might sensibly be filled by non-EEA migrants when PBS [Points Based System] Tier 2 is launched in autumn 2008? Please specify occupations or job titles according to the SOC2000 classification.

4b) How does the occupation or job title you are suggesting satisfy *each* of our criteria in relation to 'skilled', 'shortage' and 'sensible'?

Q5: Government policies and other influencing factors

5a) Which specific government policies or other factors do you think influence the availability of skilled labour in occupations where non-EEA migrants might otherwise sensibly fill shortages in the labour market?

5b) How large and what type of effect is this likely to be?

5c) On what timescale is it expected to be experienced?

5d) Which sectors and occupations do you consider are affected, and to what extent?

5.8 Some general themes emerging from the call for evidence are discussed below. Evidence on specific occupations is discussed in Chapter 9. A list of respondents, except those that wished not to be named, is in Annex D.

Regional visits

5.9 We made a series of visits throughout the UK and met with employers and other stakeholders directly.

5.10 In addition to visiting Scotland (where, as discussed in Chapter 11, we held a Committee meeting), Wales and Northern

Ireland, we elected to follow the Regional Development Agencies' structure for English regions and arrange visits to each of the following regions in England:

- North East;
- North West;
- Yorkshire and Humber;
- East Midlands;
- West Midlands;
- East of England;
- London;

- South West; and
- South East.

5.11 Figure 5.1 shows the locations of firms and organisations we visited.

Figure 5.1: MAC stakeholder visits, February to July 2008



5.12 To make the visits as targeted and informative as possible, we wrote to the Regional Development Agencies, the Government Offices for the Regions and the UK Border Agency's (UKBA's) regional directors. We asked them for their help in identifying suitable employers and representative organisations and other stakeholders for us to visit. We also added extra visits to our schedule as we became aware of additional organisations we wished to consult in the course of our work.

5.13 These visits provided an invaluable insight into how and why immigrant labour is employed in different occupations in the UK. We are very grateful for the time and effort employers and other stakeholders took in seeing us and for the contribution of colleagues in helping us arrange the visits, notably the Confederation of British Industry (CBI) in Scotland who were especially helpful.

Sector Skills Councils

- 5.14 Sector Skills Councils (SSCs) are employer-driven organisations that, together, articulate the voice of 85 per cent of the UK's employers on skills issues. We were clear from the outset that the UK's 25 SSCs were potentially key partners for us, bringing together expertise on their particular areas with a broader overview of the labour market.
- 5.15 In December 2007 we wrote to the SSCs informing them of our work and providing advance notice that we welcomed their input. The letter offered the opportunity to put forward any bottom-up analysis or evidence believed to be relevant. However, we made it clear that there was no compulsion to do this.
- 5.16 We continue to see the SSCs as a key source of evidence. However, their input of evidence in support of the production of our shortage occupation lists to date has been of variable utility. In all, just 11 out of 25 SSCs replied formally to our call for evidence, asserting that there were skilled shortages that might sensibly be addressed using immigrant labour. Some offered general comments on our methodology but did not offer substantive commentary on their particular sectors. Overall, the contributions from the SSCs as a whole were patchy in terms of the evidence supplied and the analysis carried out, in particular where a sector was complex or spanned a number of different occupations. A more substantive input from the SSCs would have been helpful.
- 5.17 It is important to emphasise that some SSC evidence was nevertheless useful, and has played a role in forming our conclusions. Some asserted shortage in their areas, but others expressed the opinion that it would not be appropriate to place specific occupations on the shortage occupation list at this time because, for instance, there was no shortage, or efforts were already in place to up-skill the UK workforce.
- 5.18 We also recognise that this has been a new process for everyone and that in many cases the SSCs have not had sufficient time to carry out any significant new research. The timescale associated with our call for evidence was, necessarily, tight. An additional complication comes from the fact that SSCs have a sectoral, rather than occupational, remit. For instance, some engineering occupations are within the remit of about nine different SSCs.
- 5.19 We have had constructive discussions with Lantra, the SSC for the environmental and land-based sector, which has co-ordination responsibility for migration issues among SSCs. It has offered to work with us to ensure that the Committee receives input that reflects the best possible contribution that SSCs can make to future versions of the shortage occupation list. We will give Lantra our detailed comments on what we thought were helpful contributions and which were less so. We are grateful for Lantra's offer of assistance and look forward to working with them on this.

Sector Advisory Panels

- 5.20 Sector Advisory Panels were set up by the UKBA to provide stakeholder input to the shortage occupation list. Panels included representatives from SSCs, trade unions, professional bodies and employers.
- 5.21 Sector Advisory Panels were established for the following sectors:
- healthcare;
 - education;
 - information technology, communication and electronics;
 - engineering; and
 - hospitality.

5.22 The panels were invited to provide evidence directly to the Committee and we attended meetings of each of the panels to hear this evidence and to ask questions about it.

5.23 It has been put to us on a number of occasions that the Sector Advisory Panels play a valuable role and should be maintained in the future. If the relevant SSC (or other body if appropriate) were to keep the panels running, we would welcome that and would be keen to continue to take evidence from meetings of the panels.

“We would hope that the MAC take into account the expertise of [the Sector Advisory Panels] and ensure that this expertise is not lost.”

Trades Union Congress (TUC) response to the MAC’s call for evidence

Stakeholder Panel and Forum

5.24 Under the terms in which we were set up, we were required to establish and maintain a formal Stakeholder Panel, comprising representatives from:

- the Confederation of British Industry (CBI);
- the Trades Union Congress (TUC);
- the British Chambers of Commerce (BCC); and
- the National Health Service (NHS).

5.25 The Panel held its first meeting in May 2008 and discussed the Committee’s methodology and overall approach to the work. Members of the Panel were supportive of what they heard and offered help with gathering the bottom-up evidence.

5.26 We recognised the need to share our thoughts with a broader, more widely representative group and so established a Stakeholder Forum.

5.27 At the first meeting of the Forum, also in May 2008, over 90 organisations were invited and approximately 50 delegates attended (lists of attendees are at Annex D). We gave a presentation of our methodology for producing the shortage lists and this was followed by a wider group discussion.

5.28 We intend that the Panel will meet approximately three times a year and that the Forum will meet once or twice a year.

Meetings

5.29 In addition to stakeholder events, we have attended face-to-face meetings with various stakeholders ranging from trade unions, small and large employers, consultants, financial institutions, government departments and groups of representatives from the ethnic catering and social care industries. A full list of organisations we have met with is at Annex D.

Research

5.30 We commissioned independent research on a number of key sectors, resulting in a series of short papers written by academic experts in the relevant fields. The papers were based on a review and discussion of existing information rather than on new research or data collection, and gave us a critical overview of the key conceptual issues and existing data to inform our further research and thinking.

5.31 Each paper considered some common questions and provided information on the structure and key features of the labour market in the sector, the role of immigrant labour over time, training of local workers, whether or not employers recruit UK resident workers, what skills employers are looking for in practice, the potential consequences of reducing access to immigrant labour, the feasibility of alternatives to immigration for responding to labour shortages, and other relevant questions.

- 5.32 Copies of the reports are accessible on our website: www.ukba.homeoffice.gov.uk/mac. A list of the relevant papers and their authors follows.
- Bach, S. (2008) ‘Staff shortages and immigration in the health sector’;
 - Chan, P., Clarke, L. and Dainty, A. (2008) ‘Staff shortages and immigration in construction’;
 - Geddes, A. (2008) ‘Staff shortages and immigration in food processing’;
 - Jones, A. (2008) ‘Staff shortages and immigration in the financial services sector’;
 - Lucas, R. and Mansfield, S. (2008) ‘Staff shortages and immigration in the hospitality sector’;
 - Moriarty, J., Manthorpe, J., Hussein, S. and Cornes, M. (2008) ‘Staff shortages and immigration in the social care sector’; and
 - Scott, S. (2008) ‘Staff shortages and immigration in agriculture’.
- 5.34 In addition, we received one response from Christine Lee & Co (Solicitors) Ltd which contained 145 individual responses from the Chinese catering sector. We discuss these in paragraph 5.40 but include them as one response in the figures immediately below, as to do otherwise would skew the overall results towards one particular industry.
- 5.35 Bearing the above caveats in mind, of those respondents who commented (52 per cent), 71 per cent agreed with our proposed indicators of whether an occupation is skilled to level 3 or above. Of those who said they did not agree, many mentioned that earnings were not always a good measure of skill, especially in the public sector. Respondents also pointed out that earnings can be subject to regional variations and stressed that competency, on-the-job training, experience and innate ability, which the MAC is taking into account through ‘bottom-up’ evidence, were important when assessing the level of skill required.

5.3 Common themes in the bottom-up evidence

Themes from the call for evidence

5.33 Some general themes emerging from the call for evidence are discussed below, including summary statistics relating to our call for evidence. We present the headline statistics in the interests of openness and transparency, but they provide an incomplete picture of the responses we received. Some stakeholders indicated that they agreed with our approach, yet commented on how they thought aspects of it could be improved. Conversely, some indicated disagreement but, through their detailed comments, indicated either implicit or explicit agreement with many of the aspects of our methodology.

“...too often current qualifications do not deliver the skills that business needs. For this reason, it is important that the MAC uses an approach that is competency equivalence based – and not purely qualifications based. This will more accurately capture the skills that employees possess.”

CBI response to the MAC’s call for evidence

5.36 Of respondents who commented (49 per cent), 74 per cent agreed with the MAC’s proposed indicators of whether skilled occupations are experiencing a shortage of labour. Some who did not agree pointed out, again, that the earnings indicator was not relevant to public sector occupations or those dependent on public funds. Others mentioned that the use of temporary workers was not always an

indicator of a shortage, and many stressed the importance of gaining evidence on shortages at a local or regional level by liaising with local employers, recruitment agencies, professional and trade associations, and local and regional skills councils. Several organisations requested that the Committee should look at future large-scale projects, such as the Olympics and Crossrail, and that these should be used to identify potential future shortages in the relevant occupations.

“It is vital that the MAC looks beyond the Sector Skills Councils to employers themselves for information about labour shortages. The labour market is always going to move more quickly than statistics and consultation with employers and recruitment agencies directly will offer an opportunity to respond to future challenges quickly.”

Recruitment and Employment Confederation response to the MAC’s call for evidence

5.37 Of those who responded to the question (58 per cent), 81 per cent agreed with our proposed indicators of whether it would be sensible to fill a shortage of skilled labour by non-EEA immigrants. Of the 19 per cent who did not agree, the majority thought that the alternative of offshoring was either not possible for their business or that it would have a detrimental effect on the existing domestic workforce. For others, switching production to a less labour-intensive method was not considered possible, and increasing wages either would render the product or service unprofitable or would not increase the supply of labour, as the required skills were simply not available in the domestic workforce.

5.38 With regard to the above question, and also our question about the impact of government policies, a strong theme was the importance of up-skilling the existing workforce through high-quality, job-relevant education and sound career guidance.

“More needs to be done within the education system to...ensure that information, advice and guidance offered to young people is impartial, accurate, tailored to their individual needs and also represents the true needs of the UK economy.”

Energy and Utility Skills response to the MAC’s call for evidence

5.39 Generally, responses to the policy question covered a wide range of migration-related issues, including the new PBS, the Welfare Reform Agenda, the raising of the retirement age, the withdrawal of the Sectors Based Scheme, the weakness of the pound in comparison with the euro (and the consequent effect this has on the numbers of EEA workers willing to come to work in the UK), and the clampdown on illegal working.

“The Chamber would suggest that all Government policies have the potential to impact the level of skilled labour required in varying occupations. Whether it is a housing, transport, health or environmental policy. If an unexpected demand is created it is likely that a shortage will occur. An example of this is the 2012 Olympics.”

Birmingham Chamber of Commerce and Industry response to the MAC’s call for evidence

5.40 In terms of the headline statistics, the responses collated by Christine Lee & Co (Solicitors) Ltd were less supportive of our approach than the overall responses. We believe these responses reflect particular concerns that the ethnic catering industry has regarding the PBS as well as the MAC, but we have looked closely at this industry, and we return to it in Chapter 9.

Themes from visits

5.41 Unsurprisingly, but reassuringly, many of the themes that emerged from our call for evidence were also cited during our visits. We briefly recount below some of the general issues raised.

5.42 A common theme was problems with recruiting sufficiently skilled staff, in particular difficulties in recruiting staff with several years' experience. Also, many employers emphasised the importance of on-the-job-training and experience, and argued that qualifications are neither a good substitute nor a good proxy for this.

5.43 A number of reasons were cited for current shortages, including uncompetitive wages, the profession not being seen as an attractive career option, lack of 'new blood', retirement patterns and geographical isolation. Some stakeholders told us that shortages relate to very specific skills that are not generally reflected in standard occupational codes or even job titles.

5.44 We heard a good deal of evidence setting out the future staffing needs of an employer or sector. These were often well-argued cases and included relevant data about future demands on the business, the age of the current workforce, the rates of 'churn' across occupations, and so on. We have listened carefully to this evidence and reflected upon it in drawing up our shortage lists.

"...the shortage occupation list should reflect not only current skill shortages but also anticipate future skill shortages. It is only in this way that the shortage occupation list can accurately meet its purpose of enabling UK employers to fill gaps with overseas workers."

A multinational UK company's response to the MAC's call for evidence

5.45 As in the call for evidence responses, some stakeholders argued that raising wages would not increase the supply of workers; either because there is a finite number of people with the required skills or because wages are not the primary reason why people enter the profession. It was often argued that it would not be financially viable to raise wages, because it would drive firms out of business or because of public sector controls on spending.

5.46 It was also asserted that restricting the availability of immigrants to some occupations may damage the UK's international competitiveness. Some sectors regard it as essential to be able to recruit from around the world for a global business. Again, this theme also emerged in the responses to our call for evidence.

"London has managed to attract and retain international business by being one of the foremost cities in the world in which to do business. This position relies on London's employers having access to a world-class workforce, regardless of their origin."

London First response to the MAC's call for evidence

Other issues

- 5.47 Finally, certain other themes recurred during our engagement with stakeholders that do not fit strictly within our remit, but they are briefly recounted here.
- 5.48 Concerns were expressed about the impact of the English language requirement on an employer's ability to recruit the right staff, particularly where ability to speak English to a high standard is not a key requirement of the job. It may be that the decision earlier this year to lower the required level may have eased those concerns. Other employers stressed that they felt they had a real need to only recruit from among those with a high standard of English, or, in the case of the ethnic catering industry, from among those who could speak another language.
- 5.49 Some employers stated that regional shortages are a real issue. They said that sometimes it is particularly difficult for businesses to relocate, and there is a limited extent to which people with the required skills can be encouraged to move within the UK.
- 5.50 The Resident Labour Market Test was frequently raised as an area of employer concern, particularly in terms of the appropriateness of Jobcentre Plus as a forum for seeking UK labour for particular occupations. It may be that the decision earlier this year to allow sector-specific recruitment practices may have eased these concerns. Some stakeholders also asked how, in practice, the test would be enforced.

Chapter 6:



Is it skilled?

- 6.1 Tier 2 of the Points Based System (PBS) targets skilled migrants. The shortage occupation list will comprise occupations identified as skilled to a level equivalent to level 3 or above in the National Qualifications Framework (NQF) as described in Chapter 4. Consequently, our first task has been to identify which occupations in the UK are skilled at this level, so that a subsequent analysis could be carried out to identify shortages within these occupations.
- 6.2 This chapter sets out possible top-down and bottom-up measures of skill. It also discusses the top-down approach used to identify which Standard Occupational Classification 2000 (SOC2000) occupations are skilled at level 3 or above.
- 6.3 First, we present the indicators and related data sources used. Second, the method for classifying occupations as skilled or not is set out. Finally, a top-down list of skilled occupations is presented. Additional occupations and, more likely, job titles may be considered skilled on the basis of bottom-up evidence, discussed in Chapter 9.
- 6.4 This chapter provides a summary of our analysis. Further detail on the methodology employed is contained in Annex A.
- ### 6.1 Defining skill
- 6.5 The National Skills Task Force (2000) reported that: *“At the core of the term skill is the idea of competence or proficiency... Skill is the ability to perform a task to a pre-defined standard of competence... but also connotes a dimension of increasing ability (i.e. a hierarchy of skill). Skills therefore go hand in hand with knowledge.”* However, their definition of skill does not identify any unique, objectively-defined measures of skill.
- 6.6 Wilson *et al.* (2003) argue that two broad, practical approaches to defining skill can be identified in the literature. First, skills can be defined by the attributes of individuals – their formal qualifications, and/or the skills that individuals say they possess. Second, skills can be defined by the characteristics of the jobs that people do – their occupations, or employers’ assessment of the work that they do and the skills they use. Clearly, these two approaches can lead to rather different assessments of skills and skill needs.
- 6.7 Even within these two broad approaches, there is still considerable scope for disagreement as to what constitutes a skill, and how much of that particular skill individuals possess, or use in their jobs. Sociologists have tended to focus historically on the social construction and social context of skills. Economists’ concepts of skills have typically been

based on quantitative measures of formal academic qualifications, work experience and training. The economics approach is narrowly defined within the human capital paradigm that dominates this sort of analysis and understanding of the wage-setting process. However, one key advantage of the approach is that it provides estimates of the rates of return to skills, which can in turn inform policymaking.

- 6.8 Psychologists have made considerable progress in recent years in terms of measuring skills used. In particular, methods of formal job analysis have been used in an attempt to provide objective measures of differences between jobs. Job evaluations using very detailed questionnaires have been used to help companies set pay for comparable jobs. The use of such methods is widespread in the US.
- 6.9 The Leitch Review of Skills (2006) argued that there are a large number of different types of skills, which can be split into various categories. Basic skills, such as literacy and numeracy, and generic skills, such as team working and communication, are applicable in most jobs. Specific skills tend to be less transferable between occupations. Most occupations use a mix of different types of skill and within each skill there are different levels of ability. The Leitch report states that there is no perfect measure of skills. The most common measure is qualifications, although it is recognised that it is possible to have skills without having formal qualifications.
- 6.10 Anderson and Ruhs (2008) point out that skills can be credentialised as, for example, vocational and professional qualifications, and apprenticeships. They may alternatively, or additionally, be highly specialised, as in financial services or

in information technology occupations. However:

- what is and is not credentialised changes over time, and jobs can shift from ‘low-skilled’ to ‘skilled’ and vice versa without necessarily changing their content. Moriarty *et al.* (2008) raise the example of some care workers’ skills in, for example, massage, which may not be recognised even though they may significantly increase the quality of care provided; and
 - the adequacy of NVQs and other formal qualifications to capture the skills requirement is regarded with some scepticism across many sectors. The existence of sufficient numbers of people with the right formal qualifications does not guarantee the absence of recruitment difficulties. Employers often place more emphasis on experience than skills.
- 6.11 What are referred to as ‘soft’ skills may be important to performing a job but may not be captured through formal qualifications. They cover a broad range of competences, transferable across occupations – from problem solving to team working. These skills are identified by Autor *et al.* (2003) as increasingly required as a result of technological change. As pointed out by Chan *et al.* (2008), they can also be important complements to ‘hard’ skills, particularly when formal qualifications have an overly narrow focus.
- 6.12 At the same time, soft behavioural skills can shade into personal characteristics. Employers may find certain qualities and attitudes desirable because they suggest workers will be compliant, easy to discipline and co-operative. Demeanour, accent, style, and even physical appearance may also be important. There is a growing literature that acknowledges the importance of physical characteristics – see Wolkowitz (2006) for a review.

- 6.13 Taking these sorts of factors into account can raise some tricky issues. For example, the argument was put to us several times that in an ethnic restaurant, customers expect to be served by a waiter or waitress who looks as if they are from the country where the type of food being served originates from. A similar requirement for particular ethnicities in other occupations may be more usually recognised as potentially discriminatory.
- 6.14 We plan to look further at soft skills over the long term, but they will be reflected in our proposed approach to the extent that if employers value these skills, they will, in many cases, be willing to pay a premium to people who possess them.

6.2 Indicators of skill

- 6.15 In all, we have identified five main indicators that we believe are relevant to determining a skilled occupation. These are:
- the skill levels defined in the Standard Occupational Classification (SOC) hierarchy;
 - formal qualifications;
 - earnings;
 - on-the-job training or experience required to carry out the job to the appropriate level; and
 - innate ability required to carry out the job to the appropriate level.
- 6.16 The first three can be analysed via our top-down approach using UK-wide data sources. The last two indicators, on-the-job training or experience and innate ability, require evidence from bottom-up information. These indicators are not accounted for in the analysis in this chapter, but will be taken into account when considering bottom-up information in Chapter 9.

Skill levels defined in the SOC

- 6.17 We have decided to use the SOC skill level as one of the indicators. The SOC2000 has four skill levels based on the time required to become fully competent, the time taken to gain the required formal or work-based training, and the experience required. The first (lowest) skill level equates with the competences associated with a general education; the second level covers the occupations that require, in addition to a good general education, a longer period of work-related training or work experience; the third level applies to occupations that normally require a body of knowledge usually associated with a period of post-compulsory education but not at degree level; and the fourth skill level relates to the so-called 'professional' occupations and managerial positions that normally require a degree or equivalent period of relevant work experience.
- 6.18 The link between the SOC and skills has been extensively analysed by Elias and McKnight (2001) who conclude that: *"occupation-based measures can incorporate information on the whole range of skills necessary to perform a job and appear to side-step problems of over-qualification or under-qualification of the workforce"*. This latter point is important. The occupation reflects the inherent skills required. Bar staff come low down in this hierarchy, yet 45 per cent of bar staff are in fact qualified at level 3 or above. This may reflect, for example, students working part-time in this occupation.

Formal qualifications

- 6.19 Regarding our next category of indicators – formal qualifications – the skill requirement for the PBS Tier 2 is that a job must be of level 3 or equivalent to be considered

as skilled. This suggests two possible key indicators relating to the labour force stock and inflow:

- stock of level 3 or equivalent qualifications: a '4 digit' or 'unit group' occupation is considered 'skilled' if a particular proportion of its workforce has level 3+ qualifications. The method of deciding on the right proportion which, for instance, could be 50 per cent, 67 per cent or 75 per cent, is set out in Section 6.5; and
- entry-level qualification at equivalent to level 3+: if the occupation normally requires its recruits to have qualifications at level 3+, this suggests it is skilled, as required by Tier 2. While this is sufficient, it may not be a necessary condition. Many employers prefer to take on less qualified employees and train them on the job.

6.20 Entry-level qualifications can probably only be determined by bottom-up evidence. Therefore, in this chapter, we focus on the stock of level 3+ qualifications. The main source of information on formal qualifications for the UK is the Labour Force Survey (LFS), which provides detailed information on qualifications of people employed in the 353 occupations. We used an extract from the LFS covering eight quarters (2006 and 2007).

Earnings

6.21 The next category – earnings – is likely to be, in general, a good indicator of skill. Theoretically, a rational employer would not pay an employee more than the value of their productive output. Equally, an employee would not accept less, because they would be able to secure a higher wage with a different employer. Assuming that skills are associated with productivity, they will therefore also be associated with earnings. Another reason for expecting

earnings to be positively associated with skill is that the labour market should provide, on average, a compensating wage differential as a return on the investment in education and training.

6.22 However, skill and earnings will not always be positively related. For instance, an unpleasant or dangerous unskilled job may attract a compensating differential and thus yield relatively high pay. Conversely, some skilled jobs may pay relatively less because of non-monetary compensations.

"...using earnings to verify whether an occupation is skilled or not, would not always portray an accurate picture. It would be fair to say that a skilled job such as stonemasonry, for example, would not necessarily be highly paid."

Birmingham Chamber of Commerce and Industry response to the Migration Advisory Committee's (MAC's) call for evidence

6.23 It is also possible that some jobs are undervalued, perhaps mainly in the public sector. This may be because their employer has monopoly power (few competitors) over the demand for labour. The Low Pay Commission (2008) has discussed labour market frictions, for example imperfect information, which may also cause workers to be undervalued.

"While earnings may provide some indication of skill, the labour market does not work perfectly and many occupations are undervalued...There are also downward pressures on pay in a sector such as residential care, in the context of scarce public resources and affordability of care."

Trades Union Congress response to the MAC's call for evidence

6.24 On balance, it seems reasonable to us to assume that skills and high relative earnings will frequently go together, so that relative

pay can be useful as one of a range of indicators. However, we recognise that while high relative pay is often indicative of high skill, low pay does not necessarily indicate that a job is low skilled.

- 6.25 We take the median per hour earnings for all employees as our indicator of earnings. The main data source for earnings is the Annual Survey of Hours and Earnings (ASHE). For this analysis we use the April 2007 data, which are the latest available.

Other indicators

- 6.26 The other possible indicators of a skilled occupation are:
- **on-the-job training or experience:** this may result in the job or occupation being skilled at level 3+, even in cases where many job holders do not have formal qualifications. For example, in occupation 5231 – motor mechanics – only 40 per cent have formal qualifications at level 3 or above. Presumably, a fraction of the remainder have acquired the requisite skills via on-the-job training; and
 - **innate ability:** some occupations require skills that cannot readily be taught or learnt – what we refer to as ‘innate ability’. This, for many of us, implies a high level of skill, even though many in the occupation may not have formal qualifications. Consider, for example, occupation 3414 – dancers and choreographers. Only 30 per cent in this occupation have formal qualifications at level 3 or above. Yet there will be a limited supply of individuals with the ability to become what most people will regard as a skilled practitioner of this occupation.
- 6.27 We will have to rely on bottom-up evidence in order to reach a conclusion on whether or not an occupation can be considered skilled at level 3 on the basis

of innate ability or on-the-job training. The alternative would be to ignore factors such as innate ability, because they are difficult to measure. We accept that careful judgement is required but, on balance, we have decided that it is preferable to use the widest possible definition of what constitutes a skilled job, including listening to what employers think is skilled.

“...too often current qualifications do not deliver the skills that business needs. For this reason, it is important that the MAC uses an approach that is competency equivalence based – and not purely qualifications based. This will more accurately capture the skills that employees possess.”

Confederation of British Industry (CBI)
response to the MAC’s call for evidence

6.3 Identifying skilled occupations: our approach

- 6.28 Our top-down approach to identifying which occupations are skilled uses the first three indicators:
- SOC skill level;
 - qualifications; and
 - earnings.
- 6.29 In Section 6.4 we look at previous research into graduate-level, or level 4+, occupations. The graduate occupations provide a pre-existing list of skilled occupations against which we can corroborate our three indicators to check whether they provide an appropriate proxy for graduate-level skills.
- 6.30 Having satisfied ourselves that our indicators are good measures of skilled occupations, Section 6.5 uses them to determine which occupations are skilled to level 3 and above.

6.4 Graduate-level jobs

6.31 Elias and Purcell (2004) analysed the 353 4-digit occupations to identify ‘graduate’ occupations. Their analysis looked at changing qualifications in the workforce, together with survey evidence. It also incorporated more fine-grained information acquired during the development of the SOC2000 on behalf of the Office for National Statistics. Four categories of graduate occupations emerged from their analysis: traditional, modern, new and niche. These graduate occupations comprise 148 out of the 353 unit groups (42 per cent of occupations).

6.32 The Elias and Purcell research is useful to us because it provides a well-researched starting point for a list of skilled occupations, albeit at graduate level rather than NQF level 3+. Furthermore, because their research used a different approach and validated the ‘graduate’ occupations

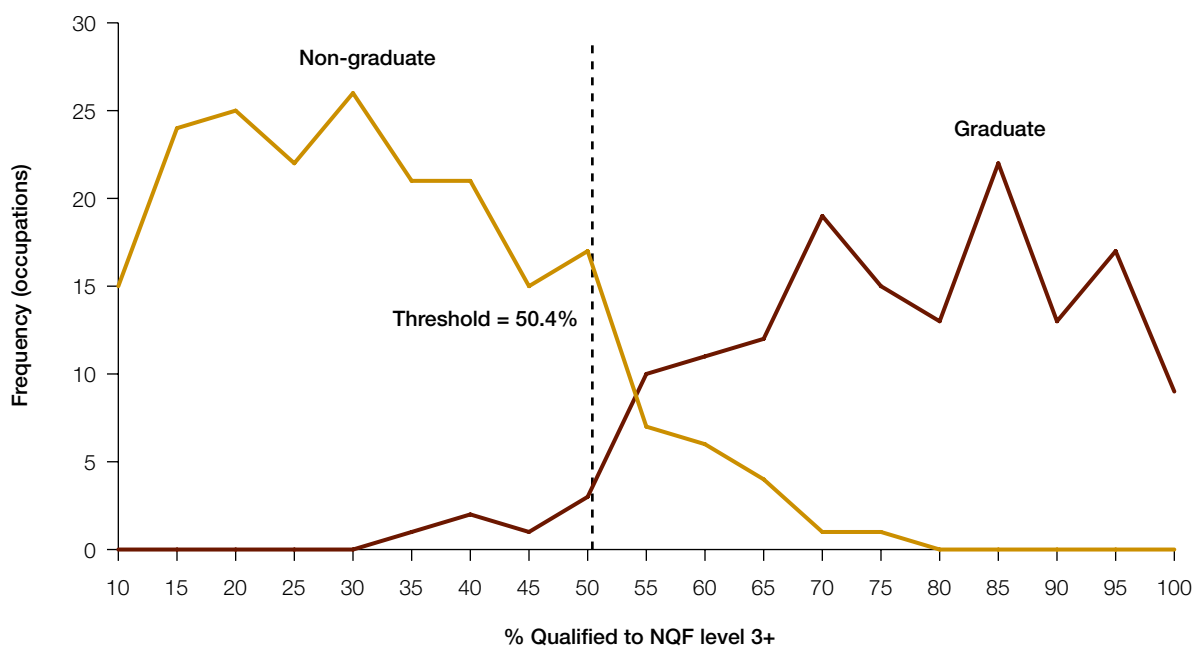
against survey evidence, it provides an independent benchmark against which we can corroborate our indicators.

Corroborating our top-down indicators

6.33 In order to corroborate our proposed indicators against the Elias and Purcell list of graduate occupations, we looked at the distributions of their ‘graduate’ occupations against each of our indicators. A perfect indicator would completely separate graduate occupations from the non-graduate at a given threshold. In practice, this is unlikely: there will be some misclassified occupations on each side of the threshold.

6.34 Nevertheless, the occupations defined as graduate would be expected to have a higher proportion of the workforce with level 3+ qualifications than those defined as non-graduate. As illustrated in Figure 6.1, this is indeed generally the case. Similar points apply to our other indicators.

Figure 6.1: Distribution of graduate occupations against our qualifications indicator



Note: ‘Graduate’ and ‘Non-graduate’ as defined by Elias and Purcell (2004). The basis for the graduate/non-graduate threshold is described in paragraphs 6.33 to 6.40.

Source: MAC calculations based on LFS (2006 and 2007).

- 6.35 In order to assess the suitability of our indicators, we needed to determine the appropriate threshold between graduate and non-graduate. Looking at one indicator at a time, it is possible to identify a threshold above which occupations can be classed as graduate, and below which occupations can be classed as non-graduate.
- 6.36 For example, an occupation with a sufficiently high proportion qualified to level 3 was classed as graduate, and an occupation with a lower proportion qualified to level 3+ was classed as non-graduate. As Figure 6.1 shows, in the case of proportion qualified to level 3+, the threshold was 50.4 per cent.
- 6.37 We undertook a similar process with our other two indicators, with the threshold being determined by the shape of the distribution of 'graduate' and 'non-graduate' occupations.
- 6.38 For each of our indicators, we chose a threshold that ensured that a relatively low number of Elias and Purcell's graduate occupations were classified as non-graduate. There are therefore more 'misclassified' non-graduate than graduate occupations. Table 6.1 presents the resulting thresholds for each indicator that we identified. It shows for each indicator, the number of misclassifications that would occur if we used that threshold alone to classify occupations into graduate and non-graduate.
- 6.39 The qualifications indicator is the best indicator for predicting 'graduate' occupations. If we say that any occupation above the threshold of 50.4 per cent can be classed as graduate, we agree with Elias and Purcell 92 per cent of the time. The earnings indicator is less accurate, although we still agree with Elias and Purcell for 82 per cent of occupations. The SOC skill level indicator corroborates 78 per cent of occupations. This indicator consists of only four possible levels (1 to 4), so we would expect it to be a relatively crude indicator.

Table 6.1: Thresholds identified for graduate occupations

Threshold for graduate (% of total)	Misclassified graduates (% of total)	Misclassified non-graduates (% of total)	Total misclassifications (% of total)
SOC skill level			
Skill levels 3 and 4	3 (2%)	73 (36%)	76 (22%)
per cent qualified to NQF level 3 or above			
Above 50.4%	9 (6%)	20 (10%)	29 (8%)
Median hourly earnings for all employees			
Above £10.83	17 (11%)	48 (23%)	65 (18%)

Source: MAC calculations based on ONS (2000a); LFS (2006 and 2007) and ASHE (2007).

6.40 Overall, therefore, we were satisfied that the indicators we proposed to use to identify skilled occupations are corroborated by this pre-existing classification.

6.5 NQF level 3+ occupations

6.41 We have corroborated our indicators against the Elias and Purcell list of graduate occupations. Therefore, we are satisfied that our indicators are good indicators of the skill level in different occupations.

6.42 Here we set out how we used the indicators to identify occupations that are skilled to level 3+. To do so, first we had to determine how to combine the three indicators into a single definition of skill. Then we had to adapt the thresholds to reflect the fact that we are interested in level 3+ occupations rather than just graduate occupations.

6.43 With regard to combining the indicators, we chose to regard an occupation as skilled if it passes at least two out of three of our indicators of skill.

6.44 Before applying the above decision rule to level 3+ occupations, it was sensible to double-check that it would be successful in predicting Elias and Purcell's graduate occupations. A total of 143 of the 148 graduate occupations pass on two or more indicators. The remaining five pass on only one indicator. These five are among those classified by Elias and Purcell as 'niche'. A niche occupation is defined as one where the majority of incumbents are not graduates, but in which there are growing specialist niches that require higher education, skills and knowledge.

6.45 If we consider the thresholds we could use to identify level 3+ occupations, it is clear that these have to be equal to or lower than those for a job skilled to graduate level, as set out in the first column of Table 6.1.

6.46 So what would sensible thresholds for a level 3+ occupation be? In considering this, we have taken the following into account:

- approximately 50 per cent of the workforce and 45 per cent of the working-age population have level 3+ or equivalent qualifications;
- the median pay per hour for all employees is approximately £10.14;
- SOC skill level 3, although not directly associated with NQF level 3, relates to occupations normally requiring a period of post-compulsory education, either formally or through significant work experience on the job.

6.47 The thresholds we have chosen for earnings and qualifications are round numbers, both for simplicity and because our analysis has shown that the resulting classifications are not sensitive to small changes in thresholds for a particular indicator. Box 6.1 presents the resulting definition of a 'skilled' occupation.

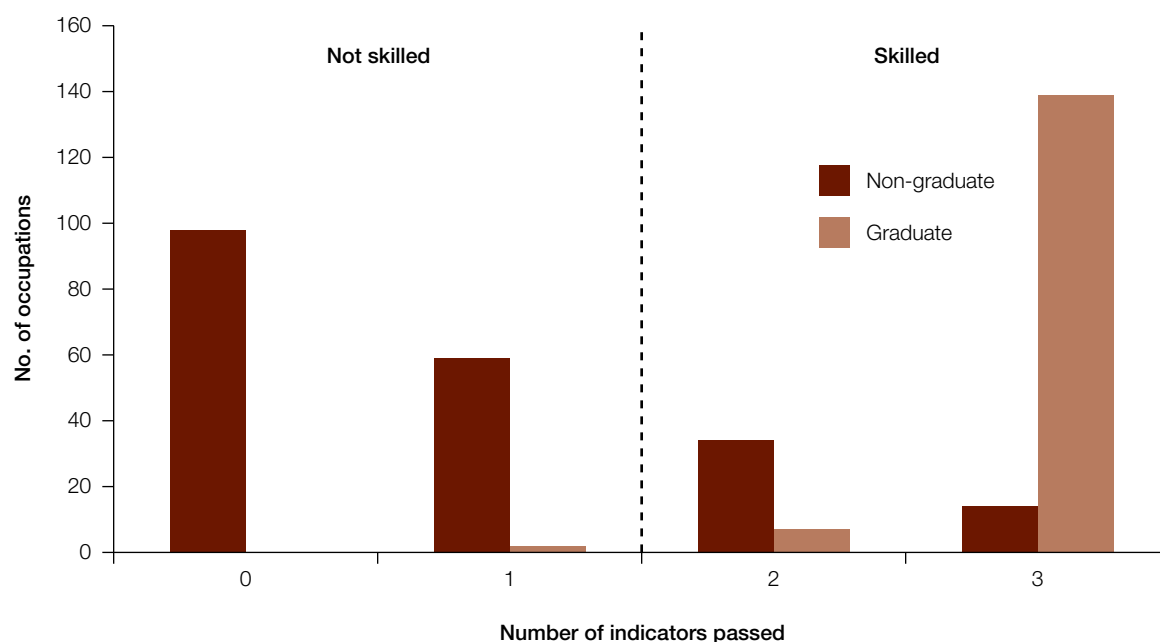
Box 6.1: Thresholds for defining a skilled occupation

An occupation is defined as 'skilled' at the 4-digit level if it satisfies two or more of the following:

- **50 per cent** or more of the workforce are qualified to NQF level 3 or above;
- median hourly earnings for all employees is **£10** or more; and
- the occupation is defined as **skill level 3 or 4** in the SOC2000.

- 6.48 Applying these criteria, 182 occupations out of 353 satisfy our level 3+ definition of skilled. In finalising the list of skilled occupations, however, we need to take into account the reliability of the data used. Some occupations have relatively low numbers of people in them, and therefore the earnings and qualifications data are statistically less reliable. This is because both indicators are derived from sample surveys.
- 6.49 There are 68 occupations that pass on only one indicator. Of these, six fail our earnings criteria because pay data from the ASHE are considered unreliable (due to the small sample size). A further four fail on qualifications, but the estimates from the LFS are not reliable enough to say for sure whether the occupation passes the threshold or not.
- 6.50 We would not want to rule out an occupation simply because we cannot make reliable estimates. Therefore, we have decided to consider these ten occupations as skilled, so that the final list of skilled occupations totals 192. Of these ten additional occupations, three are among the five 'niche' graduate occupations that were initially excluded.
- 6.51 Figure 6.2 shows the numbers of occupations achieving and not achieving our definition of skilled. The 353 occupations are broken down on the basis of the number of indicators they pass on, and split further according to whether they are on the graduate list discussed earlier in this chapter. We have classified the 192 occupations on the right-hand side of the line as skilled to level 3+.

Figure 6.2: Number of occupations passing the skilled threshold on the three indicators



Note: 'Graduate' and 'Non-graduate' as defined by Elias and Purcell (2004).
Source: MAC calculations.

- 6.52 The full list of these skilled occupations is provided at the end of this chapter in Table 6.2. These occupations account for 52 per cent of the 4-digit occupations and 49 per cent of the UK's working-age population in employment. The proportion employed in skilled occupations (49 per cent) is therefore roughly equivalent to the proportion of the working-age population in employment qualified to NQF level 3+ (50 per cent). The occupations encompass all but two of the 148 graduate occupations identified by Elias and Purcell. These two occupations are publicans and managers of licensed premises and market research interviewers.
- 6.53 Full tables of the indicators for each occupation and further details on the methodology used in this chapter are given in Annex A. This includes discussion of the decision rules used to determine the thresholds between different skill levels and the impact of small sample sizes for some occupations.
- 6.54 As stated earlier in this chapter, this is a top-down list of skilled occupations. Although it would be unrealistic to expect every job in every one of these occupations to be skilled, for the purposes of the analysis in this report we generally assume this to be the case unless there is a good reason to do otherwise. Innate ability and a requirement for training and relevant work experience may also indicate that an occupation is skilled. Chapter 9 examines the bottom-up evidence we have received for each occupation. We have retained the option to decide whether further occupations and jobs are skilled to level 3+ based on bottom-up evidence. We have, where possible, validated evidence submitted concerning earnings and qualifications against the top-down indicators in this chapter.

6.6 Next steps

- 6.55 Subject to any changes in our methodology, we expect our list of skilled occupations to remain valid in the immediate future. However, we need to bear in mind that earnings and qualifications held by the workforce tend to rise over time, reflecting not only changes in the occupational and sectoral mix but also increased demand for skilled workers within specific sectors and occupations. We plan to review our list of skilled occupations when we next carry out a full review of the top-down data, around two years from now.
- 6.56 The Office for National Statistics is revising the SOC for 2010 to line up with the updated International Labour Organization international occupational classification. In addition, we understand that Peter Elias is developing the methodology used in his original paper (Elias and Purcell, 2004). We will continue to keep track of developments in this area and consider the implications for our list of skilled occupations.
- 6.57 In Section 6.1 we raised some tricky issues in terms of how skill might be defined and taken into account within our approach, including soft skills. In the longer term, we plan to look in more detail at how 'skill' might be defined and measured at the occupational level and we will, on the basis of that, consider whether any improvements can be made to our methodology for identifying skilled occupations. We plan to commission research into this subject, which is likely to consist of a combination of literature review, data analysis and structured interviews with employers.

Table 6.2: Occupations identified as skilled in top-down analysis

Corporate managers

1112 Directors and chief executives of major organisations	1141 Quality assurance managers
1113 Senior officials in local government	1142 Customer care managers
1114 Senior officials of special interest organisations	1151 Financial institution managers
1121 Production, works and maintenance managers	1152 Office managers
1122 Managers in construction	1161 Transport and distribution managers
1123 Managers in mining and energy	1162 Storage and warehouse managers
1131 Financial managers and chartered secretaries	1163 Retail and wholesale managers
1132 Marketing and sales managers	1171 Officers in armed forces
1133 Purchasing managers	1172 Police officers (inspectors and above)
1134 Advertising and public relations managers	1173 Senior officers in fire, ambulance, prison and related services
1135 Personnel, training and industrial relations managers	1174 Security managers
1136 Information and communication technology managers	1181 Hospital and health service managers
1137 Research and development managers	1182 Pharmacy managers
	1183 Healthcare practice managers
	1184 Social services managers
	1185 Residential and day care managers

Managers and proprietors in agriculture and services

1211 Farm managers	1232 Garage managers and proprietors
1212 Natural environment and conservation managers	1233 Hairdressing and beauty salon managers and proprietors
1219 Managers in animal husbandry, forestry and fishing n.e.c.	1234 Shopkeepers and wholesale/retail dealers
1221 Hotel and accommodation managers	1235 Recycling and refuse disposal managers
1222 Conference and exhibition managers	1239 Managers and proprietors in other services n.e.c.
1225 Leisure and sports managers	
1226 Travel agency managers	
1231 Property, housing and land managers	

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 6.2: Occupations identified as skilled in top-down analysis (continued)

Science and technology professionals	
2111 Chemists	2126 Design and development engineers
2112 Biological scientists and biochemists	2127 Production and process engineers
2113 Physicists, geologists and meteorologists	2128 Planning and quality control engineers
2121 Civil engineers	2129 Engineering professionals n.e.c.
2122 Mechanical engineers	2131 IT strategy and planning professionals
2123 Electrical engineers	2132 Software professionals
2124 Electronics engineers	
2125 Chemical engineers	
Health professionals	
2211 Medical practitioners	2214 Ophthalmic opticians
2212 Psychologists	2215 Dental practitioners
2213 Pharmacists/pharmacologists	2216 Veterinarians
Teaching and research professionals	
2311 Higher education teaching professionals	2317 Registrars and senior administrators of educational establishments
2312 Further education teaching professionals	2319 Teaching professionals n.e.c.
2313 Education officers, school inspectors	2321 Scientific researchers
2314 Secondary education teaching professionals	2322 Social science researchers
2315 Primary and nursery education teaching professionals	2329 Researchers n.e.c.
2316 Special needs education teaching professionals	
Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.	

Table 6.2: Occupations identified as skilled in top-down analysis (*continued*)

Business and public service professionals	
2411 Solicitors and lawyers, judges and coroners	2434 Chartered surveyors (not quantity surveyors)
2419 Legal professionals n.e.c.	2441 Public service administrative professionals
2421 Chartered and certified accountants	2442 Social workers
2422 Management accountants	2443 Probation officers
2423 Management consultants, actuaries, economists and statisticians	2444 Clergy
2431 Architects	2451 Librarians
2432 Town planners	2452 Archivists and curators
2433 Quantity surveyors	
Science and technology associate professionals	
3111 Laboratory technicians	3121 Architectural technologists and town planning technicians
3112 Electrical/electronics technicians	3122 Draughtspersons
3113 Engineering technicians	3123 Building inspectors
3114 Building and civil engineering technicians	3131 IT operations technicians
3115 Quality assurance technicians	3132 IT user support technicians
3119 Science and engineering technicians n.e.c.	
Health and social welfare associate professionals	
3211 Nurses	3218 Medical and dental technicians
3212 Midwives	3221 Physiotherapists
3213 Paramedics	3222 Occupational therapists
3214 Medical radiographers	3223 Speech and language therapists
3215 Chiropodists	3229 Therapists n.e.c.
3216 Dispensing opticians	3231 Youth and community workers
3217 Pharmaceutical dispensers	3232 Housing and welfare officers

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 6.2: Occupations identified as skilled in top-down analysis (continued)

Protective service occupations	
3311 NCOs and other ranks	3314 Prison service officers (below principal officer)
3312 Police officers (sergeant and below)	3319 Protective service associate professionals n.e.c.
3313 Fire service officers (leading fire officer and below)	
Culture, media and sports occupations	
3411 Artists	3432 Broadcasting associate professionals
3412 Authors, writers	3433 Public relations officers
3413 Actors, entertainers	3434 Photographers and audio-visual equipment operators
3414 Dancers and choreographers	3441 Sports players
3415 Musicians	3442 Sports coaches, instructors and officials
3416 Arts officers, producers and directors	3443 Fitness instructors
3421 Graphic designers	3449 Sports and fitness occupations n.e.c.
3422 Product, clothing and related designers	
3431 Journalists, newspaper and periodical editors	
Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.	

Table 6.2: Occupations identified as skilled in top-down analysis (*continued*)

Business and public service associate professionals	
3511 Air traffic controllers	3544 Estate agents, auctioneers
3512 Aircraft pilots and flight engineers	3551 Conservation and environmental protection officers
3513 Ship and hovercraft officers	3552 Countryside and park rangers
3514 Train drivers	3561 Public service associate professionals
3520 Legal associate professionals	3562 Personnel and industrial relations officers
3531 Estimators, valuers and assessors	3563 Vocational and industrial trainers and instructors
3532 Brokers	3564 Careers advisers and vocational guidance specialists
3533 Insurance underwriters	3565 Inspectors of factories, utilities and trading standards
3534 Finance and investment analysts/advisers	3566 Statutory examiners
3535 Taxation experts	3567 Occupational hygienists and safety officers (health and safety)
3536 Importers, exporters	3568 Environmental health officers
3537 Financial and accounting technicians	
3539 Business and related associate professionals n.e.c.	
3541 Buyers and purchasing officers	
3542 Sales representatives	
3543 Marketing associate professionals	
Administrative occupations	
4111 Civil Service executive officers	4142 Communication operators
4114 Officers of non-governmental organisations	

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 6.2: Occupations identified as skilled in top-down analysis (continued)

Skilled metal and electrical trades	
5211 Smiths and forge workers	5224 Precision instrument makers and repairers
5212 Moulders, core makers, die casters	5233 Auto electricians
5214 Metal plate workers, shipwrights, riveters	5241 Electricians, electrical fitters
5215 Welding trades	5242 Telecommunications engineers
5216 Pipe fitters	5243 Lines repairers and cable jointers
5221 Metal machining setters and setter-operators	5245 Computer engineers, installation and maintenance
5222 Tool makers, tool fitters and markers-out	5249 Electrical/electronics engineers n.e.c.
5223 Metal working production and maintenance fitters	
Skilled construction and building trades	
5311 Steel erectors	5315 Carpenters and joiners
5312 Bricklayers, masons	5319 Construction trades n.e.c.
5314 Plumbers, heating and ventilating engineers	
Textiles, printing and other skilled trades	
5414 Tailors and dressmakers	5493 Pattern makers (moulds)
5421 Originators, compositors and print preparers	5495 Goldsmiths, silversmiths, precious stone workers
5422 Printers	5496 Floral arrangers, florists
Process, plant and machine operatives	
8124 Energy plant operatives	
<p>Notes: Unit group (4-digit) occupations are organised by their corresponding sub-major groups (2-digit) in the SOC2000. 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000. Source: MAC calculations based on LFS (2006 and 2007), ASHE (2007), and ONS (2000).</p>	



Is there a shortage?

7.1 Context

- 7.1 Here we set out how we have assessed the extent of labour shortage in skilled occupations. We begin with some context and underpinning theory. Then we discuss the 12 indicators of shortage that we will be using, how we arrived at them, and how and where we draw the line between shortage and non-shortage for each indicator. Finally, we present results for the intensity of top-down shortage in each of the 192 skilled occupations discussed in Chapter 6.
- 7.2 There is no universal definition or measure of skill or labour shortage. Veneri (1999) states that: *“no single empirical measure of occupational shortages exists, nor does it appear that one can easily be developed”*. According to Zaidi and Cohen (2003) *“there are no objective measures of direct indication of skill shortages”*. Bosworth (1993) describes measuring skill shortage as *“a ‘notoriously difficult’ task”* and says that *“there is no one ‘best way’ to do it”*. Many other experts have highlighted difficulties in measuring shortages.
- 7.3 In light of the above challenge, we commissioned York Consulting (2008) to produce a paper reviewing concepts of labour shortages, skills shortages and skills gaps. We have drawn on that work for this chapter. The research concurred with our view that shortage is not a straightforward concept: *“Perhaps the most important message is that no single measure of skill shortages is sufficient, and that it is necessary to use a range of indicators to ensure an accurate estimation... This is one area where there is almost complete consensus in the literature.”*
- 7.4 Several countries have attempted to define and measure shortages of skilled labour in their labour markets and Box 7.1 presents some examples.

Box 7.1: Measurement of shortage of skilled labour in other countries

The international literature indicates that shortage indicators are applied for two broad purposes:

- as a driver of policy advice in labour market and migration arenas; and
- as key variables in economic and labour market forecasting models.

The **US** Bureau of Labor Statistics (Veneri, 1999) recommends using a method of investigating shortages that considers three indicators:

- its employment growth rate is at least 50 per cent greater than the average;
- wage increases are at least 30 per cent greater than the average; and
- the unemployment rate is at least 30 per cent less than the average.

In **Canada**, the Strategic Policy Research Directorate (2006) defines an occupation as being in an excess-demand situation using the three indicators suggested in Veneri (1999). It also extended the analysis to consider as being in shortage those occupations that experience unemployment rates close to their lowest historical levels, even if the above threshold for unemployment is not met. This takes into account that unemployment rates vary among occupations. The US and Canada use information on shortage occupations to inform decisions about investment in training rather than immigration.

The Department of Education, Employment and Workplace Relations in **Australia** maintains the Migration Occupations in Demand List. This list prioritises occupations that are in short supply and offers extra points to immigrants filling vacancies within these occupations, as part of their points-test system. The methodology to compile this list involves a detailed telephone survey of employers who have recently advertised vacancies. The list is updated twice a year to take into account existing and emerging skill shortages. The same department compiles the National Skill Needs List, which identifies trades that are deemed to be in national skill shortage. This list is used to determine eligibility for a variety of government initiatives to up-skill the local workforce. Shah and Burke (2005) note that skill shortages are measured by the Australian Department of Education, Employment and Workplace Relations. The department identifies shortages for 'specialised and experienced workers' which may be subgroups within an occupation. It recognises that it is possible to have shortages within a particular skill. For example, there may be a good supply of teachers, but a shortage of experienced mathematics teachers.

Box 7.1: Measurement of shortage of skilled labour in other countries (continued)

The Department of Labour in **New Zealand** currently maintains the Long Term Skill Shortage List and the Immediate Skill Shortage List. The first list identifies those occupations where there is an absolute shortage of skilled workers throughout New Zealand. The points based system to manage immigration includes bonus points for migration applicants who have an offer of employment, work experience or qualifications in an area of absolute skill shortage identified in this list. The Immediate Skill Shortage List is for occupations that have an immediate shortage of skilled workers in New Zealand and it is designed to facilitate the approval of temporary work visa and permit applications. Both the lists are reviewed twice a year as a result of evidence collected through submissions by and consultations with employers and other stakeholders and research carried out by the department. According to Infometrics (2006), the methodology used to determine shortage is based on a number of indicators for which the main source of information is the Job Vacancy Monitoring Programme. This programme includes:

- a monthly analysis of job advertisements appearing in newspapers and IT vacancies on internet job boards;
- a Survey of Employers who have Recently Advertised (SERA): a large-sample survey of employers to establish whether the advertised positions were filled, along with an in-depth survey of a small number of employers who advertised vacancies in occupations in shortage; and
- occupation reports where SERA results are combined with data from other sources to produce a series of annual occupational reports.

7.5 There are two key lessons for our approach from the international literature. First, although these attempts at identifying shortages of skilled labour are based on different methods, it is apparent that most approaches do not rely on a single indicator of shortage. In our work for this report, as with our analysis of skill, we used a range of economic indicators. Our choice of indicators is underpinned by the concept of shortage as an imbalance or mismatch between demand and supply, as discussed in Section 7.2.

7.6 Second, the differences between the approaches reinforce the suggestion that there is no single, infallible way of measuring shortage. This suggests the need to contextualise any data.

Veneri (1999) concludes that data can only reveal information on shortages if they are contextualised by background information and knowledge of the labour market of the occupation in question: *“Labour market data should be combined with background information on the occupation and knowledge of the workings of the labour market.”*

7.7 We contextualised the data we used for this report by taking evidence and research from employers and other key stakeholders. Obtaining information from employers about their vacancies, and which of these they are struggling to fill because of shortages of skilled labour, is one useful way to identify potential shortages. However, we are aware that

some employers may have incentives to exaggerate shortages of skilled labour. We discuss our approach to gathering evidence from employers later on in this chapter.

7.2 Theory of shortage

- 7.8 A lay definition of shortage is that demand for labour exceeds supply at the current wages and conditions. Box 7.2 provides basic economic descriptions of static and dynamic labour shortages, where there is a mismatch between supply and demand or a lack of equilibrium in the labour market.
- 7.9 Partly because of the difficulties associated with identifying and measuring shortage, we recognise that more emphasis is sometimes given to needs rather than shortages. We use the concept of shortage here because we think it better encapsulates the concept of disequilibrium and the role of prices as a correction mechanism. Nevertheless, we plan to consider this issue further in our future research.

Prices and wages

- 7.10 Box 7.2 helps to illustrate why economists emphasise that to fully understand the concept of demand and supply it is necessary to look at price and wage signals. In the case of a shortage, such as when the wage is below the equilibrium level in the first chart, market pressure should increase the wage, helping to raise supply and reduce demand, thus restoring equilibrium.
- 7.11 However, even in a labour market that is moving towards a new equilibrium, signals can be distorted. Labour markets do not always clear in the manner that the simple

textbook model suggests. For instance, wages may be sticky and not move freely up and down with changes in labour demand and supply. This may happen more often in the public sector than in the private sector. Furthermore, it may take time for employees to acquire the skills the market needs, and the availability of state benefits may affect incentives to work.

“In the public sector, pay tends to be less responsive to the forces of demand and supply. In consequence, skills shortages in the public sector are more likely to show up in high or increasing proportions of jobs being vacant...”

GLA Economics response to the Migration Advisory Committee's (MAC's) call for evidence

Vacancies, employment and unemployment

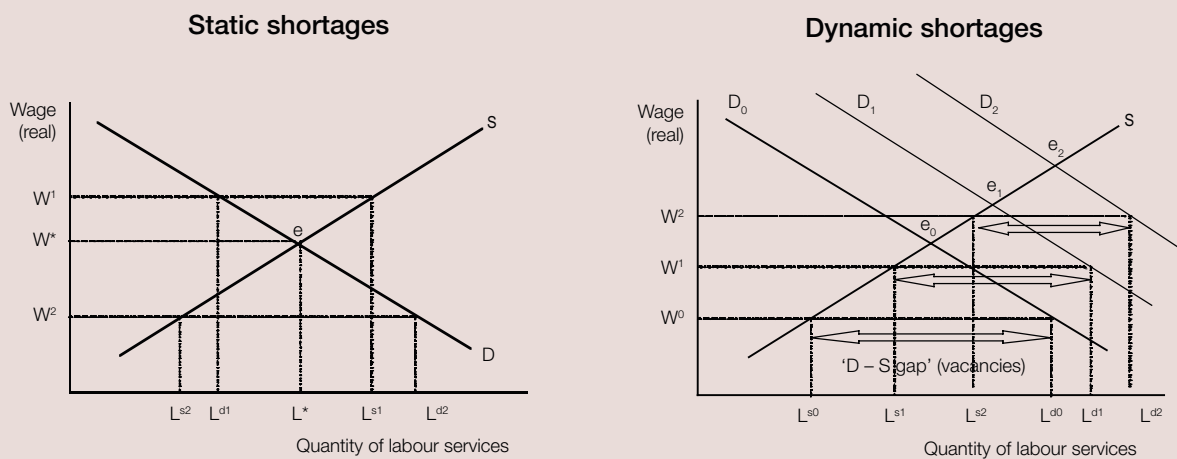
- 7.12 Low or falling unemployment among people previously employed in, or seeking work in, an occupation may indicate shortage. Rising employment may indicate rising demand, which may exist alongside labour shortage. High vacancy levels, or rising vacancy rates, may also suggest that employers are finding it hard to fill jobs.
- 7.13 Box 7.2 highlights the potential value of such measures but also the need to look at a range of indicators. The second chart shows that shortages could exist in a situation where we observe rising employment, rising real wages and declining vacancies. If the situation were to reverse, we could have a situation where shortages did not exist but we observe declining employment and falling wages but increasing vacancies.

Box 7.2: Economic definition of a shortage: demand and supply curves

A **static shortage** occurs when demand is greater than supply at a given wage. For example at wage W^2 in the left-hand chart, demand is L^{d2} whereas supply is L^{s2} . The difference L^{d2} minus L^{s2} is a measure of the shortfall, or unfilled vacancies.

This problem is only short term if the markets operate efficiently. If the real wage (W) increases, this encourages supply and reduces demand. At point e , with the market clearing wage W^* , demand and supply are in balance, with L^* level of labour services being both demanded and supplied. Putting aside complications such as hours worked, L^* is basically the observed level of employment (E).

Conversely, at wage level W^1 , there would be a surplus, with L^{s1} supplied compared with demand at level L^{d1} .



In a classic study, Arrow and Capron (1959) emphasised that labour markets are not static.

Dynamic shortages shift over time, and the study highlighted various factors that limit the speed with which labour markets can adjust.

The second chart illustrates that if the demand curve is shifting outwards, perhaps because of rising demand for the relevant goods and services, the equilibrium point gradually moves up the supply curve (from e_0 to e_1 and then e_2). The level of labour services supplied and any shortfall between demand and supply will depend on the wage and whether or not this keeps pace.

In the example, the wage rises from W^0 to W^2 , and the level of labour services supplied increases from L^{s0} to L^{s2} , reducing the gap between supply and demand but not removing it. It is perfectly possible to envisage a situation where both the rate of the wage increase is slowing and the gap between supply and demand is falling, but yet a shortage still exists.

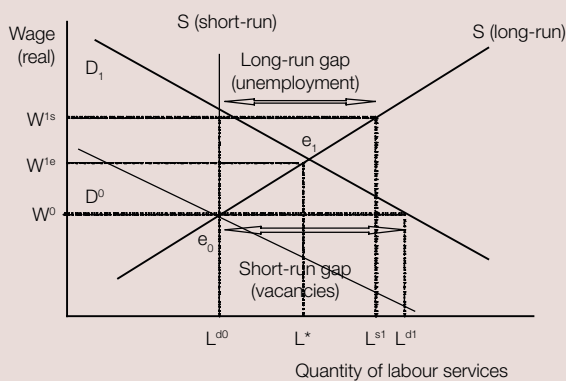
Vacancy/unemployment ratios

7.14 Box 7.3 highlights the need to focus on relative levels of vacancies and unemployment, as well as earnings. The box also illustrates how demand movements can sometimes result in

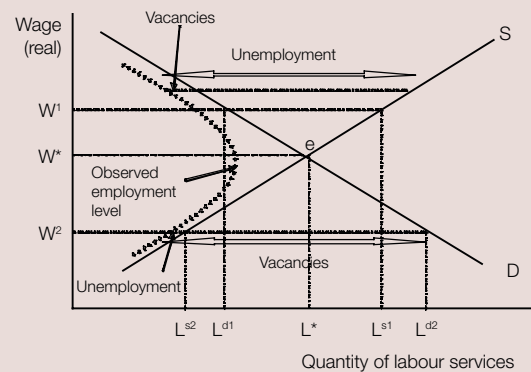
complex cobweb patterns of adjustment, with wages and supply and demand numbers fluctuating before reaching a balance, emphasising the need to treat earnings data with caution.

Box 7.3: Imbalances in the labour market

Short- and long-run supply



Employment set by the short side of the market



The supply of skilled labour can be quite inelastic in the short term. It may take months or years to train and educate new entrants. This is illustrated by the vertical short-term supply curve S in the left-hand chart.

If the market was initially in equilibrium at the point where the long-run supply curve crosses the demand curve D^0 , the wage W^0 ensures a balance between supply and demand. If the demand curve then shifts out to D^1 as the result of an external shock, the market will no longer be in equilibrium. At the initial market clearing wage W^0 , there will now be a large gap between demand at L^{d1} and short-term supply, fixed at level L^{d0} . This will be reflected in unfilled vacancies.

Assuming that wages adjust upwards, in the longer term supply will expand until, eventually, a new equilibrium is reached at e^1 . However, it is quite possible that wages may overshoot. To restore balance between supply and demand in the short run, a wage of W^{1s} is required. But if wages rise to that level this will encourage a long-run supply of L^{s1} . This would be reflected in an excess of supply over demand, resulting in unemployment until wages adjust to W^{1e} .

While wages and employment are adjusting towards a new equilibrium, at any point in time there is always some 'churn' in the labour market, with a few temporary vacancies unfilled and some people temporarily unemployed. This is represented in the right-hand chart by the dotted curve. The gap between this curve and the supply schedule measures this 'frictional' unemployment (U), while the gap between the dotted curve and the demand schedule measures frictional vacancies (V). The total numbers of vacancies and unemployment include the supply–demand gap as well. These data can be plotted against one another to derive what economists know as the 'Beveridge curve' which shows an inverse relationship between U and V .

- 7.15 The mere presence of unfilled vacancies does not necessarily indicate a shortage that needs to be addressed through market intervention. A large number of vacancies in an occupation may simply indicate a high turnover within that occupation.
- 7.16 Some vacancies and unemployment will exist even where the labour market is in equilibrium, due to natural friction in the labour market. Firms have to spend time and money searching for the right candidate. Workers need to spend time and money finding a suitable vacancy to apply for.
- 7.17 If labour market frictions are substantial, then it may take some time to match a vacancy to the right worker. Firms find it easier to fill vacancies the higher the ratio of potential supply (or unemployment) to the total number of vacancies. Other things being equal, in looking across occupations we would expect to see a negative relationship between vacancy and unemployment rates.
- 7.18 A high vacancy/unemployment ratio within an occupation suggests that employers are having particular difficulty filling vacancies given the supply of workers available. This may indicate a shortage of workers with the skills, experience or characteristics required. Vacancy/unemployment ratios therefore indicate employer demand relative to potential labour supply.
- 7.19 The literature review we commissioned from York Consulting (2008) also concluded that vacancy to unemployment (and employment) ratios are useful as indicators of shortage: *“Vacancy ratios appear to be well-regarded as measures of skill shortages in the literature. The number of vacancies relative to unemployment (V/U) or employment (V/E), vacancy rates across occupations and vacancy fill-rate relative to unemployment or employment are seen as good measures of the severity of skill shortages.”*
- 7.20 However, York Consulting (2008) also point out that the use of vacancy ratios as a measure of skill shortages comes with several health warnings. In particular, as we mentioned in paragraph 7.15, large numbers of unfilled vacancies can exist due to labour turnover, which is not an indicator of an underlying shortage of skilled labour.
- 7.21 Of course, labour markets are more complex than the discussion in Boxes 7.1 to 7.3 suggests. In particular, many labour markets are often segmented rather than operating with a homogeneous quantity of labour services, as they assume. The detailed analysis of particular sectors and occupations that we have conducted highlights that heterogeneity is a feature of many of the labour markets where immigrant labour is widely used. As discussed at length in Anderson and Ruhs (2008), this may include the possibility that employers develop a specific demand and preference for immigrant workers, for example, because they may be willing to work under terms and conditions that domestic workers may not be prepared to accept.

7.3 Indicators of shortage

- 7.22 We have identified four basic sets of indicators:
- employer-based indicators (e.g. reports of shortage);
 - price-based indicators (e.g. earnings growth);
 - volume-based indicators (e.g. employment or unemployment); and
 - other indicators of imbalance based on administrative data (e.g. vacancies or vacancy/unemployment ratios).
- 7.23 Most of the indicators will be expected to move, to a greater or lesser extent, with the economic cycle. Employer needs will tend to decrease where aggregate

demand is lower. Likewise, the supply of some immigrant labour may fall during an economic downturn. However, changes will not be ongoing across occupations and there may be other longstanding needs and shortages that transcend the economic cycle.

- 7.24 This raises a general issue about where we are now in the economic cycle, and how this might affect our indicators. There is much discussion in the media at present about the impact of the ‘credit crunch’ and high commodity prices (especially for oil and food) on the UK economy. The latest *Working Futures* employment projections being undertaken at national level for the Learning and Skills Council and UK Commission for Employment and Skills suggest that there will be some slowdown in overall growth rates. They suggest that while there is a risk of a more severe downturn, the most likely outcome for the economy as a whole may not be as severe as some fear, and the prospects for the medium term are for continued employment growth (Wilson and Homenidou, 2008). If a slowdown were experienced in 2008/09, it is likely that the demand pressures for some skills would reduce in the short term. It is not in our remit to predict the precise impact, but we will keep the shortage occupation list under regular review.
- 7.25 We now discuss the four sets of indicators we identified in more detail, and set out some of the theoretical and practical limitations associated with using each of them. Annex B contains more extensive information on the data sources we have used.

Employer-based indicators

- 7.26 Employer-based indicators are derived from surveys that ask employers direct questions about their businesses. Green *et al.* (1998) argue that although employers have no problem interpreting questions on skill shortages, their assessments are not necessarily consistent or accurate. Surveys such as the National Employers Skills Survey (NESS) represent employer perceptions, in that they rely on employers’ interpretations of shortages.
- 7.27 York Consulting (2008) reported that accidental reporting can occur when employers confuse skill shortages in their industry with other types of hard-to-fill vacancies, or with long-term macroeconomic fluctuations. Also, these surveys may suffer from deliberate over-reporting of shortages of skilled labour, where an employer believes that it is in their interest to misreport the level of shortage. Therefore, it is important not to rely solely on these measures, but rather to combine the information the surveys provide with additional quantitative indicators as discussed below.
- 7.28 In England, the NESS gathers evidence on both recruitment difficulties and inadequate skills among the existing workforce. There are separate employer skills surveys for Wales, Scotland and Northern Ireland. Information on these different surveys is provided in Table 7.1.

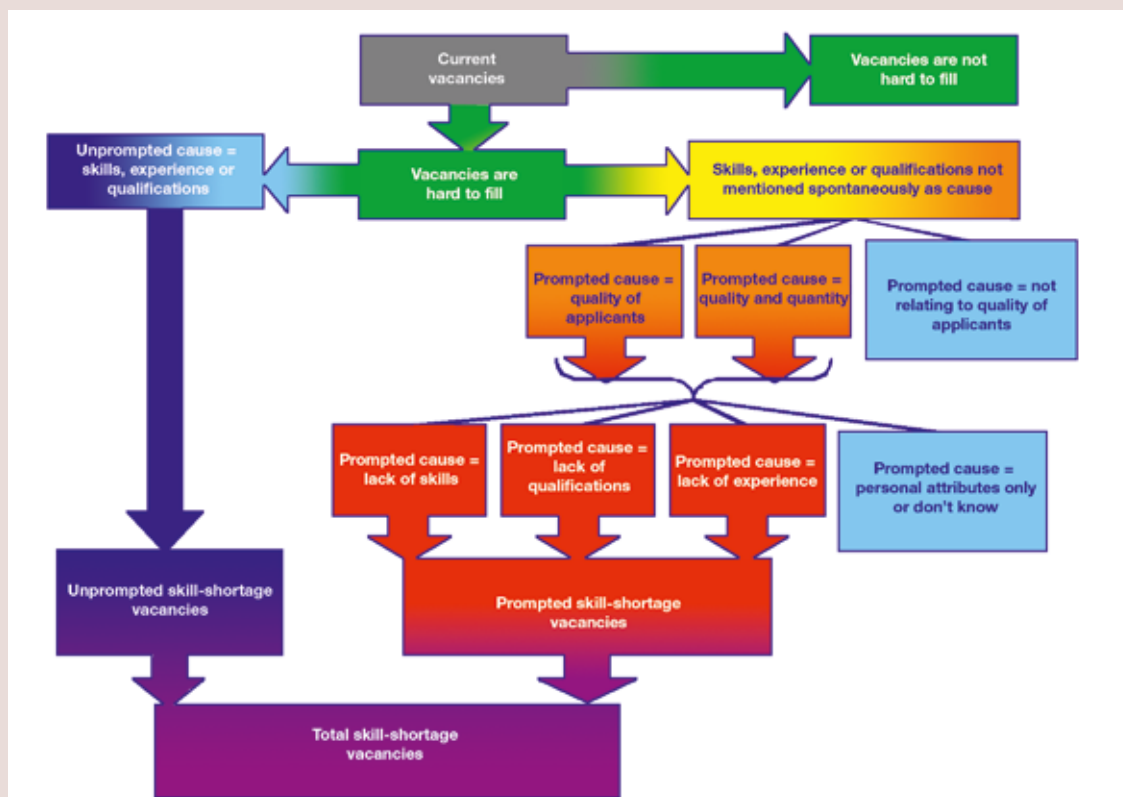
Table 7.1: Employer skill surveys in the UK

Country	Survey	Last carried out (published)	No. of establishments surveyed
England	National Employers Skills Survey (NESS)	2007 (2008)	79,000
Northern Ireland	Skills Monitoring Survey	2005 (2006)	4,126
Scotland	Skills in Scotland	2006 (2007)	6,300
Wales	Sector Skills Survey	2005 (2006)	6,719

Sources: Learning and Skills Council (2008), Department for Employment and Learning (2006a), Future Skills Scotland (2007), Future Skills Wales (2006)

- 7.29 It was not possible to combine the four UK surveys, as they are carried out in different years and the methodologies differ slightly in each. The NESS has two particular characteristics that mean we have been able to make particular use of it for this report. First, it is the largest of the four surveys, and covers the largest proportion of the UK workforce. This makes it easier to obtain results at a disaggregated occupational level. Second, of the four surveys it is the one that has been conducted most recently. Results were published in May 2008 in Learning and Skills Council (2008).
- 7.30 We commissioned IFF Research to recode relevant data at the 4-digit Standard Occupational Classification (SOC) level, which is a more detailed level than in the official published report. The outputs of this research are published on our website (www.ukba.homeoffice.gov.uk/mac) alongside this report.
- 7.31 We used the NESS to obtain data on current vacancies, hard-to-fill vacancies and skill-shortage vacancies at the 4-digit SOC level. Box 7.4 sets out the derivation of these indicators from the survey.

Box 7.4: Derivation of the vacancy indicators from the NESS



Source: IFF Research (2008)

7.32 NESS first asks establishments whether they have any current vacancies. For each of the job roles where a vacancy is reported, the employer is then asked whether they consider this vacancy to be hard to fill. Reasons that a vacancy may become hard to fill often include skills-related issues, but can simply involve such aspects as poor pay or conditions of employment, or the employer being based in a remote location. Any vacancies that are reported as being hard to fill because of applicants having a lack of skills, qualifications or experience (on either a prompted or unprompted basis) are defined as skill-shortage vacancies.

Price-based indicators

7.33 In a freely operating market, the response to imbalance between demand and supply of labour is the adjustment of wages, as outlined in Box 7.2. In the case of a labour shortage, market pressure should increase wages, helping to raise supply and reduce demand, thus restoring labour market equilibrium. Rising wages within an occupation may then constitute an indication of shortage and we consider this as one of our indicators. However, as mentioned previously, there are various factors that will affect the potential reliability of wages as an indicator, including wage 'stickiness', public sector constraints and the availability of state benefits.

- 7.34 Our preferred source for wage indicators is the Annual Survey of Hours and Earnings (ASHE) because this gives a larger sample size (around 142,000 returns in 2007) than the Labour Force Survey (LFS). Another advantage is that the ASHE is employer based, and so for wage data it will be less subject to reporting error than the employee-based LFS.
- 7.35 One issue to note with the ASHE data is that in certain jobs, an employee may only actually be paid for a few hours' work, and the preparation behind the few hours they work may not be counted as paid hours. For example, a dance teacher may only teach 20 hours of classes a week but may spend 10 hours preparing for the classes. This potential problem would affect the hourly wage an employee is reported earning and the hours they are reported working. We might expect the same error to occur in each time period, so when we look at the change in wages, rather than the level, this is not a problem. This is an area we plan to investigate further in the future.
- 7.36 In addition to movements in wages, we also consider the earnings premium associated with working in certain occupations, given a certain level of qualifications. A high earnings premium may indicate a shortage, as employers offer an incentive to working in particular occupations that is above what we would expect to observe for a given skill level (using, in our case, the earnings return to working in an occupation for those holding an NQF qualification at level 3 or equivalent). We use LFS data to estimate this, as it gives us information at the 4-digit level on qualifications, wages, and other variables we may want to control for, such as age and region.

Volume-based indicators

- 7.37 We have considered other indirect indicators and volume-based indicators because they represent the ways in which employers

develop coping mechanisms in an effort to minimise the impact of anticipated shortages. Examples of possible employers' responses include: increasing overtime, increasing hours worked, increasing subcontracting, recruiting staff at a lower-level standard, retaining existing staff, altering production methods to reduce the need for the skill in short supply, and increasing the level of training.

"Some employers seek to use benefits other than salaries to address particular shortages, including a commitment to training and professional development."

GoSkills submission to the MAC's call for evidence

- 7.38 We considered the use of several possible volume-based indicators and assessed the data available to measure them. We decided that the most appropriate indicators to consider, given the available data at the 4-digit SOC level, were changes in employment, unemployment, hours worked, and the proportion of new hires coming into an occupation.
- 7.39 However, these indicators may also respond to changes not associated with shortages. In addition, even if changes in employment or staff turnover relate to labour shortages, causality could run in either direction. This, therefore, gives further justification for using a range of indicators to assess shortages.
- 7.40 Our preferred data source for hours is the ASHE, because of the larger sample size. Again, we are looking at change in hours worked, so the possible errors in the levels of hours reported in the ASHE should not affect the occupational rankings in the hours indicator, assuming that the errors are constant.
- 7.41 Our preferred data source for change in employment is the LFS.

7.42 The LFS is also a reliable source for unemployment data; however, the survey asks respondents about their previously held job, rather than the job they currently seek. This, therefore, does not directly correspond to the potential labour supply in an occupation.

7.43 Another source of unemployment data is the Jobcentre Plus claimant count data. This has information on the unemployed by sought occupation and by usual occupation. One potential problem with using claimant count data by occupation sought is that people may be searching for jobs that they do not have the skills to do, and therefore this may overestimate the potential labour supply for certain occupations. The extent of the differences between unemployed by usual, past or sought occupation is something we aim to investigate further in the future.

7.44 The Jobcentre Plus claimant count statistics, rather than being a sample, account for the entire population claiming Jobseeker's Allowance, and so are not subject to sampling error. However, not everyone will, or can, claim unemployment benefits when unemployed. Thus, the claimant count is typically lower than the LFS unemployment estimates. Further, it is likely that the non-claiming rate will not be consistent across all occupations. We discuss these issues more extensively in Annex B.

7.45 Given the trade-off between using LFS unemployment data or Jobcentre Plus claimant count data, we intended to compare data from both sources to assess them further. However, we were unable to obtain the LFS data on unemployment by last occupation at the 4-digit SOC level in time for us to carry out this analysis. We therefore had to use claimant count data.

7.46 For data on new hires, the LFS is our preferred source as this gives information at the 4-digit SOC level about the length of time a person has worked in their current job.

Indicators of imbalance based on administrative data

7.47 The case for using unemployment to vacancy ratios as an indicator of shortage, and the limitations and caveats associated with doing so, has been set out in Section 7.2.

7.48 There are also some practical measurement issues associated with the use of vacancy/unemployment ratios. Vacancy data are available through two main sources: the Jobcentre Plus database and the monthly ONS Vacancy Survey. The ONS Vacancy Survey is regarded as the most reliable measure of vacancies, but cannot be disaggregated to the 4-digit SOC code. We must therefore use Jobcentre Plus vacancy data. Vacancy measures from Jobcentre Plus represent only around 35–40 per cent of all advertised vacancies. They generally underestimate vacancies for professional and highly skilled occupations, as employers in these occupations tend not to advertise in this way. The Jobcentre Plus vacancy data are available only for Great Britain rather than the UK.

7.49 Unemployment data are required to calculate the vacancy/unemployment ratio. We use the same source as our unemployment indicators, the Jobcentre Plus claimant counts. This has the advantage of being comparable to the vacancy data but is subject to the limitations mentioned previously.

7.50 Another potential indicator of imbalance is the absolute level of unemployment. This may proxy for demand within a specific occupation, where low levels of unemployment may indicate shortages of skilled labour. However, unemployment may be low for reasons other than shortage. Therefore, we are reluctant to use unemployment level alone as a direct indicator of shortage.

7.51 In summary, each of the four sets of indicators discussed above has a sound basis in terms of either common sense and/or economic theory. Each of them is also limited in terms of its explanatory power, which supports an approach that uses a range of indicators. Next, we present the specific indicators we have selected as the best indicators of shortage in our skilled occupations.

7.4 Our indicators of shortage

7.52 Taking into account the availability of data, we identified several potential indicators we could use, listed in Annex B. Below, we discuss the set of 12 indicators that we have selected that meet our criteria, and which we use to assess shortages in the remainder of the chapter.

7.53 First, however, the four criteria used to assess the suitability of the indicators are:

- **validity:** is it measuring the right thing from our point of view?
- **robustness:** specifically the sample size, as a larger sample size will give more accurate estimates for the population;
- **distribution of observations:** for example, if there are likely to be outliers at the upper end of distribution, then there are statistical reasons why it might be better to use medians rather than means as a measure of average; and
- **other data limitations:** for example, it is likely to be the case that vacancies for some occupations are unlikely to be advertised through Jobcentre Plus, which may bias these data.

The 12 indicators of shortage

7.54 After assessing the many possible indicators against the above criteria, we have chosen three employer-based indicators, three price-based indicators, four volume-based indicators and two indicators of imbalance. These indicators are listed in Table 7.2, along with how often the data are available, date or period and data source associated with each.

Table 7.2: The 12 indicators of shortage			
Indicator	Frequency available	Date/period used	Source used
Employer-based indicators			
Percentage of skill-shortage vacancies/employment by occupation	Biannually	2007	NESS and LFS
Percentage of skill-shortage vacancies/all vacancies	Biannually	2007	NESS
Percentage of skill-shortage vacancies/hard-to-fill vacancies	Biannually	2007	NESS
Price-based indicators			
Percentage change in median hourly pay for all employees	Annually	2006–07	ASHE
Percentage change in mean hourly pay for all employees	Annually	2006–07	ASHE
Relative premium to an occupation, given NQF3, controlling for region and age	Quarterly	2007	LFS
Volume-based indicators			
Percentage change in unemployed by sought occupation	Monthly	2007–08	Jobcentre Plus
Percentage change in hours worked for full-time employees	Annually	2006–07	ASHE
Percentage change in employment	Quarterly	2006–07	LFS
Absolute change in proportion of workers in occupation less than one year	Quarterly	2006–07	LFS
Indicators of imbalance based on administrative data			
Absolute change in median vacancy duration	Monthly	2007–08	Jobcentre Plus
Stock of vacancies/claimant count by sought occupation	Monthly	2007	Jobcentre Plus

7.55 One issue common to most of the 12 indicators we chose is that the data they use are a little untimely. The third column in Table 7.2 shows the extent of this for each indicator. For example, the major UK earnings survey, the ASHE, is conducted in

April each year and published in October. Therefore, the latest available data refer to April 2007. This is one of the reasons why we use bottom-up evidence alongside the top-down evidence. We discuss this later on in the chapter.

“The labour market is always going to move more quickly than statistics, and consultation with employers and recruitment agencies directly will offer an opportunity to respond to future challenges quickly.”

Recruitment and Employment Confederation response to the MAC’s call for evidence

7.56 Below, we discuss our choice of the 12 key indicators, under the same four broad categories adopted in the previous section. We also discuss how well these indicators are correlated with each other.

Employer-based indicators

7.57 For this set of indicators our main source of data has been the NESS and we have selected three indicators that are derived from the number of skill-shortage vacancies reported in an occupation. Looking only at the absolute number of skill-shortage vacancies does not take into account the natural vacancy rate for a given occupation. Therefore, we normalise the quantity of skill-shortage vacancies in these three ways:

- as a proportion of all vacancies;
- as a proportion of hard-to-fill vacancies; and
- as a proportion of employment.

7.58 Employment data are based on the LFS, as the NESS only collects employment estimates to 1-digit SOC code level. Thus, the skill-shortage vacancies/employed indicator uses two different sources of data. There are a few issues associated with doing this, and this is an area that we will review in the future.

Price-based indicators

7.59 The first two price-based indicators we selected were the change in median hourly pay and the change in mean hourly pay.

We used the changes in gross wages for both full-time and part-time workers, as this takes a larger proportion of the labour market into account. We chose the hourly wage as this had a larger sample size than annual wage, and because hourly wage information is less affected by any variation in the number of hours worked.

7.60 The median of the distribution is not affected by outliers, while the mean is more influenced by changes at either end of the distribution. For example, shortages may lead just some firms in an occupation to pay more and this is more likely to be picked up by the change in mean. Therefore, by using both median and mean pay indicators we have an overall assessment of shortage as indicated by changes in pay.

7.61 The third price-based indicator is a measure of the relative premium to working in a certain occupation for an individual with a level 3 qualification, after controlling for the age and region of the worker. We would expect that the higher the observed relative premium to an occupation, the more likely there is to be a shortage in that occupation. This is because if there were a shortage of skilled labour we would expect some firms to pay more to obtain skilled employees in certain occupations.

7.62 Another option is to consider the rate of return to qualifications, rather than the premium to occupations. This is a more complex calculation and something we will investigate in the future.

Volume-based indicators

7.63 Our first volume-based indicator is the annual percentage change in unemployment, measured by the claimant count by sought occupation. Our preferred measure would have been LFS unemployment data, but, for reasons stated in Section 7.3, we have not been able to use these data.

- 7.64 Our second volume-based indicator is the annual percentage change in hours worked for full-time employees. Our source for these data is the ASHE. Section 7.3 notes our reasons for this and potential issues in using these data.
- 7.65 Our third volume-based indicator measures the annual percentage change in employment estimates, using LFS data.
- 7.66 Our final volume-based indicator, derived from the LFS, is the absolute change in the proportion of people working in their job for less than a year.
- 7.67 As noted earlier, these indicators, in particular the latter two, may suffer from the fact that a change in either direction, depending on context, may imply shortage.

Indicators of imbalance based on administrative data

- 7.68 The first indicator of imbalance we have chosen is the absolute change in the median time that vacancies are advertised. We believe that the absolute change gives a better indication of shortage compared with the proportional change, as often we are faced with relatively small initial durations. If an occupation begins with a vacancy duration of 2 days and this increases to 4 days, this would be a 100 per cent increase. If, instead, a job was initially vacant for 40 days, increasing to 60 days, this would only be a 50 per cent increase; however, we believe that the latter gives a stronger indication of shortage.
- 7.69 Our second imbalance indicator is the vacancy/unemployment ratio, which we define as the stock of unfilled vacancies divided by the number of unemployed people in that occupation. As described previously, some vacancies and unemployment occur even when the market is in equilibrium, due to natural friction in the labour market. By using

this measure, we help to ensure that we do not mistakenly identify occupations with a high turnover (indicated by a high number of vacancies and a high number of unemployed) as being in a shortage.

- 7.70 Jobcentre Plus statistics are our source of data for these two variables. Therefore, as they both come from the same source, and are population data rather than sample data, our vacancy/unemployment ratio does not incur the same problems that it would if we used two different sources of data. However, note that the claimant count data are for the UK and the vacancy data are for Great Britain.
- 7.71 For our two imbalance indicators we require an annual change in the relevant variable. As changes were made to the way vacancies were measured in Jobcentre Plus in April 2006, data before and after this point are not comparable, and we cannot compare the averages in 2006 and 2007. Instead, our two data points for comparison are March 2007 and March 2008.

Correlation of the indicators

- 7.72 There is no single, unambiguous indicator of shortage. Factors other than occupational shortages affect all the possible shortage indicators. This is why we chose to use a range of indicators. As we believe that each of our 12 indicators partially represents shortage, we would expect there to be some correlation between the indicators. However, we also expect each of our indicators to be affected by other factors in different ways.
- 7.73 When we ran tests to look at the correlation between the 12 key indicators, we found that on average the directions of significant correlations were as we expected for most variables. Some variables were on average correlated more than others: for example, the skill-shortage vacancies/

all vacancies indicator and the vacancy/unemployment ratio have the strongest significant correlations. Some correlations between individual indicators are very high, as we would expect: for example, the employer-based indicators, which all involve skill-shortage vacancy data, present strong positive correlation. See Annex B for the correlation results.

7.5. Choosing the thresholds for each indicator

7.74 The next stage after choosing the 12 indicators was to determine at what level we considered an indicator to demonstrate shortage. We did this by setting a threshold value for each indicator, where the threshold represents the point above which shortage is indicated. Note that for every indicator, apart from percentage change in unemployment, the value of the indicator must exceed the threshold for shortage to be inferred. As we expect lower levels of unemployment to indicate shortage, this condition is reversed for the unemployment indicator.

Initial assumption

7.75 The first step was to identify a point at which we were satisfied that shortage is not indicated. There is no single 'right' answer to this question, so a degree of judgement is required.

7.76 If markets are operating efficiently, under normal circumstances, we would not expect the majority of occupations to experience shortage. We decided to start from the assumption that an occupation is not showing signs of a shortage if the occupation is at the centre of the distribution for that indicator.

7.77 We chose to use the median as our measure of central tendency rather than the mean. In a normal distribution, the mean, median and mode are equal to each other. In a skewed distribution, there are extreme values (outliers) at either side of the distribution. The median is less sensitive to extreme values than the mean. Therefore, as our indicators include outliers, it is a good measure of central tendency to use. A glossary of the statistical terms used in this chapter can be found in Annex B.

7.78 From this assumption we could say that any occupation that is equal to or less than the median does not show signs of shortage for this indicator. However, what point above the median do we consider to indicate a shortage? Box 7.5 sets out our consideration of this question.

Box 7.5: Potential approaches to thresholds

We considered various ways of deciding on the upper thresholds, including:

- a given percentile;
- median + X% of the median; and
- median + X% of the standard deviation.

When considering the advantages and disadvantages, we looked at whether thresholds took into account the relative and/or absolute distributions. By the former, we refer to whether a threshold is affected by the distance a value is from the median relative to how far all the other values are from the median. By the latter, we refer to whether a threshold is affected by the total distance a value is from the median, regardless of what the other values in the distribution are.

The main advantages and disadvantages of using each of these approaches are described below.

A given percentile

One way to decide on a threshold is to use a percentile cut-off, such as the top quartile (top 25 per cent) or top quintile (top 20 per cent). The main advantage of doing this is that it is neat and easy to understand. In addition, it is consistent across indicators and takes into account the relative distribution.

The main disadvantage is that it does not take into account the absolute distribution, and by definition, there will always be the same number of occupations suggested by an indicator to be in shortage. This is a problem because even if shortages are being filled, and the distribution is changing, we would still always have 25 per cent of occupations being presented as possible shortage occupations by each indicator.

Median + X% of the median

The advantage of using a measure such as the median plus 50 per cent of the median is that it takes into account the absolute distribution, so that an occupation has to be a given absolute distance above the median before it is considered to be in shortage. Another key advantage is that it does not imply a fixed number of occupations are in shortage.

The disadvantage is that using a percentage total of the median makes the threshold for shortage sensitive to the absolute level of the median. This threshold does not take into account the relative distribution of an indicator or the shape of the distribution. The number of occupations classified as in shortage for an indicator depends both on the absolute distribution of an indicator and how far the median is from zero. Two indicators with exactly the same shaped distribution but different medians could have a different number of occupations that were classified as in shortage.

Box 7.5: Potential approaches to thresholds (continued)**Median + X% of the standard deviation**

The advantage of using this threshold is that it takes into account both the relative and the absolute aspects of the distribution. However, unless we use only a very small percentage of the standard deviation, for example 25 per cent, few occupations would ever pass the shortage threshold.

The reason for this is that in a normal distribution we would expect no more than 16 per cent of observations to be greater than the mean or median² + 1 standard deviation. In practice, several of the shortage indicator distributions do not approximate a normal distribution well, and for some indicators very few observations are greater than the median + 1 standard deviation. See Annex B for more details.

Choice of threshold

- 7.79 After considering the pros and cons in Box 7.5, we decided that our first choice of threshold would be the median plus 50 per cent. This is one of the thresholds that has been used for identifying shortage in the Canadian labour market (see Strategic Policy Research Directorate, 2006). It also reflects our view that it is important not to predetermine how many occupations pass a given threshold, rather than changing the threshold as the distribution changes. Therefore, we will use the median plus 50 per cent of the median where suitable.
- 7.80 To judge where it is suitable to use this threshold and where it is not, it is necessary to look at the distributions of each indicator. We have made the judgement that it is not suitable to use the median plus 50 per cent of the median in certain situations, such as where the median is close to zero or because the shape of the distribution is not approximately normal. Annex B graphs each of the indicators and lists those for which we have judged it suitable to use the median plus 50 per cent of the median.
- 7.81 In cases where we believe it is not suitable to use the median plus 50 per cent, we chose to use the top quartile as our threshold. We chose to use this because, in practice, the seven indicators that use the median plus 50 per cent as the threshold together define an average of approximately 25 per cent of occupations as in shortage. We considered adding a percentage of the standard deviation to the median as our alternative measure, but, due to the issues outlined in Box 7.5, the threshold was too strict for the indicators to be meaningful. Therefore, we settled on the top quartile as our second choice of threshold for the remaining five indicators.
- 7.82 In the future we hope, on the basis of further research, to avoid using quartiles so that we do not have some indicators that always point to a quarter of occupations being in shortage.

² The median and the mean are the same in a normal distribution.

7.6 Results

7.83 This section shows how many of the 12 indicators the skilled occupations pass on, given the thresholds we have decided.

7.84 Table 7.3 shows how many occupations pass on 0–12 of the indicators. It also shows in brackets the 2007 LFS employment estimates, in thousands, for the working-age population.

Table 7.3: Distribution of skilled occupations passing our indicators of shortage

Number of indicators passed (out of 12)	Number of occupations (and employment estimates, in thousands)
9+	2 (64)
8	2 (119)
7	0
6	8 (295)
5	27 (881)
4	42 (2,734)
3	42 (2,982)
2	44 (3,904)
1	18 (1,718)
0	7 (518)
Total	192 (13,215)

Source of employment data: LFS (2007). Employment data are for working-age population (as defined by the ONS).
Note: Totals may not add up exactly due to rounding.

7.85 Table 7.3 shows that only 12 occupations pass on six or more of the indicators, together employing approximately 478,000 people. One reason why the number of occupations passing on six or more of the indicators may be low is that some of the indicators are omitted for some occupations because of a lack of reliable data. This means that, at the extreme, some occupations only have data for six³ indicators. Therefore, rather than assessing evidence of a shortage by considering the absolute number of indicators an occupation has passed on, it is advisable also to look at the percentage of available indicators an occupation has passed on.

7.86 Table 7.4 lists the skilled occupations, ordered by the percentage of shortage indicators that they pass on. Annex B shows on which indicators each occupation passes and fails.

³ This is the case for occupation SOC code 1171, Officers in armed forces.

Table 7.4: Skilled occupations ordered by % of shortage indicators passed

Standard Occupation Classification 2000 (SOC2000) description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Officers in armed forces	1171	5	6	83	28
Moulders, core makers, die casters	5212	9	11	82	4
Photographers and audio-visual equipment operators	3434	9	12	75	61
Musicians	3415	8	12	67	32
Welding trades	5215	8	12	67	87
Ship and hovercraft officers	3513	6	10	60	17
Dispensing opticians	3216	5	9	56	5
NCOs and other ranks	3311	5	9	56	53
Senior officials in national government	1111	4	8	50	12
Directors and chief executives of major organisations	1112	6	12	50	48
Hairdressing and beauty salon managers and proprietors	1233	5	10	50	22
Veterinarians	2216	5	10	50	15
Engineering technicians	3113	6	12	50	70
Midwives	3212	5	10	50	37
Pharmaceutical dispensers	3217	6	12	50	31
Dancers and choreographers	3414	5	10	50	6
Pipe fitters	5216	6	12	50	11
Metal machining setters and setter-operators	5221	6	12	50	66
Computer engineers, installation and maintenance	5245	6	12	50	39
Steel erectors	5311	6	12	50	14
 					
Farm managers	1211	5	11	45	18
Physicists, geologists and meteorologists	2113	5	11	45	17

**Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)**

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Artists	3411	4	9	44	29
Customer care managers	1142	5	12	42	85
Natural environment and conservation managers	1212	5	12	42	5
Chemists	2111	5	12	42	22
Civil engineers	2121	5	12	42	78
Education officers, school inspectors	2313	5	12	42	25
Legal professionals n.e.c.	2419	5	12	42	15
Quantity surveyors	2433	5	12	42	34
Building and civil engineering technicians	3114	5	12	42	25
Architectural technologists and town planning technicians	3121	5	12	42	29
Building inspectors	3123	5	12	42	5
Prison service officers (below principal officer)	3314	5	12	42	40
Brokers	3532	5	12	42	60
Financial and accounting technicians	3537	5	12	42	27
Estate agents, auctioneers	3544	5	12	42	31
Personnel and industrial relations officers	3562	5	12	42	150
Occupational hygienists and safety officers (health and safety)	3567	5	12	42	41
Auto electricians	5233	5	12	42	8
Pattern makers (moulds)	5493	5	12	42	2
Tailors and dressmakers	5414	4	10	40	6
Social science researchers	2322	4	10	40	15

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

**Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)**

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Police officers (inspectors and above)	1172	3	8	38	15
Pharmacy managers	1182	4	11	36	6
Scientific researchers	2321	4	11	36	14
Medical radiographers	3214	4	11	36	25
Aircraft pilots and flight engineers	3512	4	11	36	19
Train drivers	3514	4	11	36	16
Originators, composers and print preparers	5421	4	11	36	6
Managers in construction	1122	4	12	33	244
Retail and wholesale managers	1163	4	12	33	396
Social services managers	1184	4	12	33	43
Hotel and accommodation managers	1221	4	12	33	48
Conference and exhibition managers	1222	4	12	33	14
Shopkeepers and wholesale/retail dealers	1234	4	12	33	131
Recycling and refuse disposal managers	1235	4	12	33	11
Biological scientists and biochemists	2112	4	12	33	88
Chemical engineers	2125	3	9	33	10
Design and development engineers	2126	4	12	33	69
Production and process engineers	2127	4	12	33	32
Registrars and senior administrators of educational establishments	2317	4	12	33	34

**Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)**

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Architects	2431	4	12	33	52
Probation officers	2443	3	9	33	11
Quality assurance technicians	3115	4	12	33	23
Science and engineering technicians n.e.c.	3119	4	12	33	44
Draughtspersons	3122	4	12	33	43
Paramedics	3213	4	12	33	17
Journalists, newspaper and periodical editors	3431	4	12	33	55
Sports players	3441	3	9	33	14
Estimators, valuers and assessors	3531	4	12	33	65
Finance and investment analysts/advisers	3534	4	12	33	182
Taxation experts	3535	4	12	33	26
Importers, exporters	3536	4	12	33	7
Business and related associate professionals n.e.c.	3539	4	12	33	129
Sales representatives	3542	4	12	33	211
Marketing associate professionals	3543	4	12	33	129
Conservation and environmental protection officers	3551	4	12	33	20
Careers advisers and vocational guidance specialists	3564	4	12	33	27
Communication operators	4142	4	12	33	33
Smiths and forge workers	5211	4	12	33	6
Electricians, electrical fitters	5241	4	12	33	254
Telecommunications engineers	5242	4	12	33	47

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Electrical/electronics engineers n.e.c.	5249	4	12	33	91
Floral arrangers, florists	5496	4	12	33	15
Senior officers in fire, ambulance, prison and related services	1173	3	11	27	16
Protective service associate professionals n.e.c.	3319	3	11	27	29
Goldsmiths, silversmiths, precious stone workers	5495	3	11	27	10
Senior officials of special interest organisations	1114	3	12	25	21
Production, works and maintenance managers	1121	3	12	25	382
Managers in mining and energy	1123	3	12	25	15
Financial managers and chartered secretaries	1131	3	12	25	224
Advertising and public relations managers	1134	3	12	25	54
Research and development managers	1137	3	12	25	60
Storage and warehouse managers	1162	3	12	25	76
Healthcare practice managers	1183	3	12	25	19
Residential and day care managers	1185	3	12	25	47
Travel agency managers	1226	3	12	25	8
Mechanical engineers	2122	3	12	25	79
Electrical engineers	2123	3	12	25	53
Planning and quality control engineers	2128	3	12	25	32

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

**Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)**

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Engineering professionals n.e.c.	2129	3	12	25	83
Software professionals	2132	3	12	25	316
Higher education teaching professionals	2311	3	12	25	117
Secondary education teaching professionals	2314	3	12	25	386
Teaching professionals n.e.c.	2319	3	12	25	140
Researchers n.e.c.	2329	3	12	25	50
Solicitors and lawyers, judges and coroners	2411	3	12	25	161
Chartered surveyors (not quantity surveyors)	2434	3	12	25	53
Public service administrative professionals	2441	3	12	25	34
Archivists and curators	2452	3	12	25	8
Physiotherapists	3221	3	12	25	33
Speech and language therapists	3223	3	12	25	14
Therapists n.e.c.	3229	3	12	25	52
Authors, writers	3412	3	12	25	51
Arts officers, producers and directors	3416	3	12	25	31
Product, clothing and related designers	3422	3	12	25	53
Sports coaches, instructors and officials	3442	3	12	25	50
Air traffic controllers	3511	2	8	25	8
Legal associate professionals	3520	3	12	25	50
Insurance underwriters	3533	3	12	25	27
Officers of non-governmental organisations	4114	3	12	25	50

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Metal plate workers, shipwrights, riveters	5214	3	12	25	10
Printers	5422	3	12	25	35
Ophthalmic opticians	2214	2	10	20	13
Chiropodists	3215	2	10	20	10
Sports and fitness occupations n.e.c.	3449	2	10	20	11
Clergy	2444	2	11	18	39
Broadcasting associate professionals	3432	2	11	18	41
Statutory examiners	3566	2	11	18	15
Purchasing managers	1133	2	12	17	38
Personnel, training and industrial relations managers	1135	2	12	17	142
Quality assurance managers	1141	2	12	17	49
Financial institution managers	1151	2	12	17	162
Office managers	1152	2	12	17	258
Security managers	1174	2	12	17	15
Hospital and health service managers	1181	2	12	17	68
Leisure and sports managers	1225	2	12	17	49
Property, housing and land managers	1231	2	12	17	98
IT strategy and planning professionals	2131	2	12	17	144
Psychologists	2212	2	12	17	24
Pharmacists/pharmacologists	2213	2	12	17	41
Further education teaching professionals	2312	2	12	17	117

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

**Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)**

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Primary and nursery education teaching professionals	2315	2	12	17	363
Special needs education teaching professionals	2316	2	12	17	65
Chartered and certified accountants	2421	2	12	17	153
Management consultants, actuaries, economists and statisticians	2423	2	12	17	177
Town planners	2432	2	12	17	22
Electrical/electronics technicians	3112	2	12	17	34
IT operations technicians	3131	2	12	17	118
Medical and dental technicians	3218	2	12	17	30
Youth and community workers	3231	2	12	17	89
Housing and welfare officers	3232	2	12	17	149
Fire service officers (leading fire officer and below)	3313	2	12	17	39
Graphic designers	3421	2	12	17	95
Countryside and park rangers	3552	2	12	17	5
Public service associate professionals	3561	2	12	17	74
Vocational and industrial trainers and instructors	3563	2	12	17	140
Inspectors of factories, utilities and trading standards	3565	2	12	17	13
Environmental health officers	3568	2	12	17	12
Tool makers, tool fitters and markers-out	5222	2	12	17	19
Metal working production and maintenance fitters	5223	2	12	17	228

Table 7.4: Skilled occupations ordered by % of shortage indicators passed
(continued)

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Precision instrument makers and repairers	5224	2	12	17	18
Lines repairers and cable jointers	5243	2	12	17	17
Plumbers, heating and ventilating engineers	5314	2	12	17	197
Carpenters and joiners	5315	2	12	17	281
Construction trades n.e.c.	5319	2	12	17	222
Energy plant operatives	8124	1	9	11	8
Managers in animal husbandry, forestry and fishing n.e.c.	1219	1	10	10	12
Actors, entertainers	3413	1	10	10	28
Dental practitioners	2215	1	11	9	28
Civil Service executive officers	4111	1	11	9	70
Marketing and sales managers	1132	1	12	8	505
Information and communication technology managers	1136	1	12	8	295
Medical practitioners	2211	1	12	8	190
Management accountants	2422	1	12	8	77
Social workers	2442	1	12	8	92
Librarians	2451	1	12	8	32
Laboratory technicians	3111	1	12	8	62
IT user support technicians	3132	1	12	8	54
Nurses	3211	1	12	8	508
Occupational therapists	3222	1	12	8	31
Police officers (sergeant and below)	3312	1	12	8	174
Public relations officers	3433	1	12	8	32
Fitness instructors	3443	1	12	8	27

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 7.4: Skilled occupations ordered by % of shortage indicators passed (continued)

SOC2000 description and code		Total indicators passed	Total indicators available	% of indicators passed	Employment estimates (thousands) Source: LFS (2007)
Senior officials in local government	1113	0	12	0	25
Transport and distribution managers	1161	0	12	0	82
Garage managers and proprietors	1232	0	12	0	35
Managers and proprietors in other services n.e.c.	1239	0	12	0	180
Electronics engineers	2124	0	12	0	34
Buyers and purchasing officers	3541	0	12	0	60
Bricklayers, masons	5312	0	12	0	101

Source: MAC calculations, LFS (2007).

Notes: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000; the black row between occupation codes 5311 and 1211 on page 123 underlines the occupations that pass 50 per cent or more of the indicators.

Notes on employment data:

Source: pooled data from January 2007 to December 2007.

The data are weighted using the updated quarterly weights for 2007, dividing them by 4 and rounding the weight.

This has resulted in slightly different results than if we had applied the weighting then divided the estimates by 4.

The working-age population includes men aged 16–64 and women aged 16–59.

Note that the LFS population estimates are slightly lower than the ONS UK population estimates as certain groups of people are not included in the survey, for example the prison population.

- 7.87 Table 7.4 indicates for each skilled occupation the extent of top-down evidence that an occupation may be experiencing a shortage.
- 7.88 We consider there to be good top-down evidence for a potential shortage if an occupation passes on 50 per cent or more of the indicators. The 20 occupations, above the highlighted break in Table 7.4 (see page 123) pass on 50 per cent or more.

7.7 Integrating top-down shortage indicators with bottom-up evidence

- 7.89 The top-down indicators will be influenced by factors other than occupations experiencing a shortage. By using 12 indicators, rather than just a few, we have reduced the chance of the evidence suggesting a shortage where there is not one. However, it is still possible for the top-down evidence to suggest shortages where they do not exist and vice versa.

- 7.90 There is also the issue that for some of the large 4-digit occupations it may be the case that only some job titles within the occupation are in shortage and this may be what is driving the top-down indications of shortage. Alternatively, it may be that the top-down evidence is showing no indication of shortage, but certain jobs within the occupation are, in fact, experiencing shortage.
- 7.91 Therefore, limiting analysis to national level labour market statistics alone does not present a complete picture of the market for a particular occupation or job title. Background information on employer demand in the occupation and supply is needed too. This is why it is essential to supplement this top-down analysis with the bottom-up evidence we have received.
- 7.92 Box 4.3, in Chapter 4, describes our approach to dovetailing the top-down and bottom-up evidence and outlines how we used the top-down data. The top-down evidence presented in Table 7.4 and Annex B has been used in the two following scenarios:
- where we received substantive bottom-up evidence of potential shortage; and
 - where we did not receive substantive bottom-up evidence of shortage but there is good top-down evidence (i.e. an occupation passes on at least 50 per cent of the indicators) of potential shortage.
- 7.93 In the first scenario, the top-down evidence was assessed to see if it corroborated assertions that an occupation or a job within an occupation was experiencing a shortage. After considering the top-down and bottom-up evidence together, we then decided whether or not we considered the occupation or job to be in shortage. In the second scenario, because we did not receive corroborating bottom-up evidence, the occupation or job has not been put on the shortage list, but we have committed to seek bottom-up evidence for relevant⁴ occupations in the future. We discuss this further in Chapter 10.
- 7.94 When considering the bottom-up evidence for shortages, we assessed it by looking at the same broad groups of indicators that the top-down evidence considered. For example, we looked for signs that:
- wages are increasing more than average (earning indicators);
 - vacancies are increasing faster than jobs are being created (indicators of imbalance);
 - vacancies are taking longer to fill than in most occupations (indicators of imbalance);
 - employers recognise that the reason vacancies are hard to fill is due to a shortage of skilled labour (employer-based indicators); and
 - employers have need to use coping strategies to deal with shortages, e.g. staff working overtime, over-promoting (indirect indicators).
- 7.95 Chapter 9 examines the bottom-up evidence we have received for each occupation in conjunction with the top-down evidence.

⁴ For example, we will not consider SOC code 1171, Officers in armed forces or SOC code 3311, NCOs and other ranks, as these occupations are not included in the civilian workforce.

7.8 Next steps

7.96 There has been limited research in this area that is specifically focused on the questions we need to address and there are limitations to the data sources we have used, as documented above.

7.97 Although it is unlikely that we can fully address the shortcomings of the data sources currently available, at least in the short term, we would like to extend and complement our analysis of shortage. There are several likely strands to this:

- analysis to inform both the selection and, potentially, weighting of our shortage indicators: we would like to conduct econometric and other analysis to determine the appropriateness of our current shortage indicators, choice of threshold, their statistical robustness and weighting. In addition, we are planning to extend the analysis to a longer period, perhaps two or three years, to identify trends, issues with time lags and volatility of the data for some occupations;
- analysis of the available European Economic Area (EEA) labour market data to identify practical methods for taking account of potential labour shortage and potential labour supply at the EEA level;
- a theoretical and empirical analysis of sub-national shortage within the UK, including the barriers to filling regional and local shortages by recruiting from other areas of the UK, what the possible solutions are to that other than migration from outside the EEA, and how the position varies across different occupations;

- examining the relationship between shortage in individual firms and the economic cycle, including analysis of the relationship between the growth rate of the economy and the nature and severity of shortage at the occupational level; and
- further consideration of theoretical and conceptual issues, including (a) analysis of skill needs as a potential alternative (or complement) to analysis of shortage, and (b) potential interdependencies between demand and supply in labour and product markets, including the existence of a low skills equilibrium at the occupational level and the appropriate migration policy response.

7.98 Our analysis will consist of a combination of theoretical work, data analysis, literature reviews and possibly structured interviews with employers. The research will build on the research by York Consulting (2008) and IFF Research (2008) commissioned for this report.

Chapter 8:



Is it sensible?

- 8.1 If a shortage of labour in a skilled occupation or job category is identified, we need to consider whether it is sensible to fill that shortage with immigrant workers from outside the European Economic Area (EEA). This chapter sets out our understanding of ‘sensible’ in relation to the shortage occupation list, the criteria we use for assessing the evidence on this question, and some issues and next steps. We draw heavily on Anderson and Ruhs (2008), which was commissioned by us and is published on our website alongside this report: www.ukba.homeoffice.gov.uk/mac.
- 8.2 Together with the indicators of shortage discussed in the previous chapter, the discussion of ‘sensible’ in this chapter provides the framework for the decisions we make on individual occupations in Chapter 9.
- #### 8.1 What do we mean by ‘sensible’?
- 8.3 It is worth emphasising from the outset that ‘sensible’ can be interpreted in many different ways based on a wide range of considerations. Clearly, any definition of what is sensible critically depends on the underlying objectives. The objectives of immigration policy are determined by the Government and not by this Committee. Therefore, to reconcile competing interests we need to look at government policies to identify how the Government balances and/or prioritises different interests.
- 8.4 In HM Treasury (2007), the Government announced 30 new Public Service Agreements (PSAs) that included:
- raise the productivity of the UK economy (PSA1);
 - improve the skills of the population, on the way to achieving a world-class skills base by 2020 (PSA2);
 - ensure controlled, fair immigration that protects the public and contributes to economic growth (PSA3);
 - deliver the conditions for business success in the UK (PSA6);
 - improve the economic performance of all English regions and reduce the gap in economic growth rates between regions (PSA7);
 - maximise employment opportunity for all (this is underpinned by performance indicators relating to increasing the employment rate and reducing dependence on work-related benefits) (PSA8); and
 - other potentially relevant objectives around improving opportunities for young people, reducing poverty and developing stronger communities and a better way of life.
- 8.5 In responding to our call for evidence, the Government recognised that the concept of ‘sensible’ is challenging, but indicated that developing the skills of the UK workforce should be a key consideration.

“In the long term, our priority is to ensure we equip the resident population with the skills that the UK economy needs and improve participation in the domestic workforce through welfare to work policies.”

“The government believes that immigration is not the only solution to dealing with skills shortages and that other longer-term solutions such as investment in the training of the domestic workforce need to be considered.”

HM Government response to the Migration Advisory Committee’s (MAC’s) call for evidence

8.6 In some cases, government objectives or policies may relate to particular sectors or occupations. For example, immigrant labour has in recent years played a key role in supporting particular government priorities in areas such as healthcare. We discuss this and other considerations pertaining to specific occupations in Chapter 9. However, we have not been asked to, nor do we, automatically assume that immigration is necessarily the best way to meet government objectives in particular sectors. Alternatives to using immigrants to fill shortages may exist in both public and private sectors.

Our approach

8.7 Our approach is to consider the issue of sensible on a case-by-case basis with reference to four broad and inter-related lines of enquiry, which are formulated within an economic framework and based on the relevant government policy objectives.

- What are **the alternatives to employing immigrants in response to perceived staff shortages**, are these alternatives feasible, and have employers explored them fully? If not, what are the actual or perceived obstacles?

- How would bringing in immigrants relate to **skills acquisition** of the UK workforce? Are there enough UK resident workers in training/education to fill shortages? Will bringing in immigrants reduce employers’ incentives to invest in training and up-skilling of UK workers?
- How will the employment of immigrants affect **investment, innovation and productivity** growth? Is there a particular case for employing immigrants to support and maintain the UK’s international competitiveness in certain sectors?
- How will our decision affect **the wider UK labour market and economy**? How, if at all, will access to immigrant labour affect employment opportunities and conditions of the UK workforce?

8.8 Each of the above lines of enquiry relates to multiple PSA objectives. For example, the first and second link closely to PSA2, which aims to improve the skills of the population; the third links to PSA1, which aims to raise the productivity of the economy; and the fourth relates to PSA8, which relates to improved employment opportunity for all.

8.9 We emphasise that we have based our assessments of sensible on the presumption that immigration policy will be rigorously enforced. For example, when we place occupations on our recommended shortage list it is on the explicit understanding that sponsored employers will employ immigrants in jobs that are skilled to level 3, as defined by us. Robust arrangements must be in place to ensure that the shortage occupation route is not used as a back door method for employing immigrants where there are no shortages in a skilled occupation. Without these safeguards, it would not be sensible to put an occupation on the list.

8.10 Section 8.2 discusses more specific indicators within these broad lines of enquiry. Evidence for these indicators will primarily come from bottom-up evidence. We will also validate that evidence, where possible, against quantitative top-down data, as explained in more detail in Section 8.3. Bottom-up evidence available varies in scope for different occupations, but we apply a consistent economic framework to analysing the evidence we received, dovetailing the top-down and bottom-up evidence.

8.2 Indicators of ‘sensible’

8.11 This section sets out our economic framework for assessing whether it is sensible to fill shortages of skilled labour with immigration. The approach spans both top-down and bottom-up indicators. We have grouped the issues and indicators under the four broad headings discussed in Section 8.1. In some cases, top-down indicators will assist our considerations. In others, the indicator can only be assessed through bottom-up evidence. We discuss the availability of top-down data to measure ‘sensible’ in Section 8.3.

Alternatives to employing immigrants

8.12 In dealing with shortages, employers could have a number of options, in addition to recruiting immigrants. As set out in Anderson and Ruhs (2008), alternatives in responding to shortage can include:

- increasing wages and/or improving working conditions to increase the working hours of the existing workforce and/or attracting more UK resident workers who are either inactive, unemployed, or employed in other sectors;
- changing the production process to make it less labour intensive by, for example, increasing the capital and/or technology intensity;

- relocating to countries where labour costs are lower;
- switching to production (provision) of less labour-intensive commodities and services; and/or
- training and up-skilling the existing or potential workforces.

8.13 Not all options will be available to all employers at all times. For example, the work of waiters in restaurants cannot be offshored. The relative costs of each response will also vary by sector and occupation. An employer’s decision in responding to shortage will critically depend on the relative cost of each feasible option. It is possible that, if cheap immigrant labour is readily accessible, employers may not consider other alternatives. This may be sensible for the employer, but not for UK workers or the economy as a whole. We therefore critically assessed evidence from employers on the feasibility and cost of alternative responses to staff shortages other than immigration.

8.14 When making the assessment of the feasibility and potential impacts of pursuing alternative responses, we also consider the potential obstacles and wider economic and regulatory context that may discourage or make it difficult for employers to pursue particular alternatives. See the discussion of ‘system’ effects in Anderson and Ruhs (2008).

8.15 To give an example of the above, where work is done for or subcontracted by the public sector, possibilities for increasing wages may be limited in the short term by the budgets available to deliver certain public services. As set out in Moriarty *et al.* (2008), the social care sector, where a considerable proportion of care services are for local councils, could be a potential case in point. Teaching and health are other examples of occupations where public funding plays a major role.

8.16 In the long run, however, even in the public sector, we would expect the relative wage in shortage occupations to rise. This implies that the cost of supplying these services will increase. Although we recognise that many public budgets may be fixed in the short term, in the longer run it would not be sensible to supply these important services on the basis of low-paid immigrant labour.

Skills acquisition

8.17 Employers and government can respond to a shortage of skilled labour by investing in the training and up-skilling of the UK workforce. HM Treasury (2007) sets out how the Government is committed to improving the skills base of the UK.

8.18 Although there is little systematic empirical evidence to suggest that immigration has directly caused reduced investment in training, there is a danger that the availability of cheap and qualified immigrant labour discourages employers from investing in the training and up-skilling of UK resident workers. We therefore need to ensure that the decisions we make with regard to immigration are not undermining the Government's objective of up-skilling the UK workforce. There are three situations to consider that affect our assessment:

- First, an employer, or group of employers, may have invested significantly in training and up-skilling the UK workforce for some time. Where the scope for further training and up-skilling is limited (and other sensible criteria are fulfilled), we would be inclined to consider it sensible to fill this shortage through immigration.
- Second, an employer may have recently invested in training as a response to shortage. If the training period is long, and UK resident workers have not yet completed their training, there may be a

good case for placing the occupation on the shortage list until sufficient numbers of UK resident workers are available.

- Third, employers may not have invested significantly in training. Although the relationship between immigration and the incentives for employers and government to invest in training is an open and sector-specific empirical question, we would nevertheless be cautious about putting an occupation on the list where there is evidence that investment in training of UK resident workers is very low.

8.19 We therefore need to consider the impacts on skills acquisition in both the long run and the short run. In some cases we would consider placing an occupation on the recommended shortage list on the understanding that a sector continues or improves investment in training.

Innovation, productivity growth and international competitiveness

8.20 We are interested in innovation, productivity and competitiveness because of their potential effect on output per head. Immigration may positively impact on innovation and productivity, because, for example, skilled immigrants bring new ideas, generate dynamic effects, and/or complement the introduction of new technology. Immigration could also impact negatively on innovation because, for example, the availability of cheap immigrant labour discourages employers from adopting labour-saving production processes.

8.21 The net effect is an empirical question that needs to be investigated at a sectoral or occupational level. Nevertheless, certain occupations use a substantial amount of immigrant labour and we do not want to incentivise increased dependence on immigrant labour for these occupations.

We therefore want to maintain incentives for firms and government to invest in training of the UK workforce, and pursue other alternatives to immigration such as capital substitution and adoption of new technology.

- 8.22 In some sectors, immigration may be important for maintaining the UK's global competitiveness. For example, the argument has been put to us that the City of London's status as a global financial centre depends partly on access to immigrants. Employing immigrants, it is argued, contributes to the position of the UK as a global hub for the finance sector, because immigrants bring in exceptional skills from elsewhere. Furthermore, many multinational companies require employees from the countries in which they operate to work around the organisation, in order to share knowledge, build relevant skills in the workforce, and also provide the local knowledge relevant to their markets.
- 8.23 Were we to prevent these employees from working in the UK, the competitiveness of the UK bases for these multinational (and often highly mobile) firms would be damaged, and other countries with more relaxed immigration policies would benefit instead. This argument suggests that it is unlikely that the UK workforce could be the sole provider of the skills required by the sector. Whether this is the case for a particular sector is, again, an empirical question.
- 8.25 The concepts of 'complementarity' and 'substitution' help us to consider the economic and labour market effects. In theory, immigrants may complement existing labour by providing different attributes and skills. Or they may substitute existing labour by providing the same labour at a cheaper price, or neither of these. For a discussion of these issues, see, for example, Dustmann and Glitz (2005).
- 8.26 The longstanding literature on labour demand, summarised in Hammermesh (1996), suggests that skilled labour tends to be a complement to capital while unskilled labour is more of a substitute for capital. The existing UK evidence (Manacorda *et al.*, 2006; Dustmann *et al.*, 2007) suggests that the more skilled the labour input, the harder it is to substitute existing workers with immigrant labour. Conversely, the less skilled the task, the easier it is to substitute the existing workforce with immigrant labour.
- 8.27 As discussed in Chapter 1 of this report, there is continuing debate about the impacts of immigration on wages, unemployment and activity rates of the UK resident workforce. While recognising that immigration can sometimes raise the average wages of UK resident workers, we need to be aware of the potentially adverse impact of immigration on the wages and employment opportunities of UK resident workers, particularly in the context of potential economic downturn. In particular, we need to critically assess the claims many employers make that immigrants are 'better' and 'more suitable' workers than UK resident workers.

Wider economic and labour market effects

- 8.24 Whether or not an occupation is on the shortage list may have consequences for the wider labour market and the economy. Overall, these are likely to be small, but for specific industries the impact may be quite substantial. We discuss some of the issues below, building on the discussion of economic and labour market impacts of immigration at the UK level in Chapter 1.
- 8.28 In this context, we need to be aware that the supply of labour is highly diverse and differentiated by, for example, gender, race, age, nationality and immigration status. Different groups of workers will face different constraints and will be differently

motivated. The skill requirements, attributes and characteristics that employers are looking for when recruiting workers for particular jobs can be critically influenced by what employers think different groups of workers may be able to offer. Anderson and Ruhs (2008) elaborate on this issue: *“This raises the possibility that employers develop a specific demand and preference for immigrant workers (or particular groups of immigrant workers) over domestic workers (and/or other immigrant groups). In the extreme case, employers could create jobs with requirements that non-immigrants will be unable or unwilling to meet.”*

8.29 In practice, many of these wider economic and labour market effects of immigration are difficult to measure and assess, partly because we would need to understand them at a very detailed occupational level, which little of the existing research has attempted to do. As the debate following the recent House of Lords (2008) report on the economic impacts of immigration in the UK has shown, there is still disagreement and uncertainty about some of these issues. Nevertheless, in principle, we believe that we should take wider economic and labour market effects into account where the evidence allows it.

8.3 Measuring ‘sensible’

8.30 We have described the considerations and criteria we have used to assess whether or not it is sensible to respond to shortages by employing immigrant labour. In practice, the question of ‘sensible’ is very likely to be specific to sectors and/or occupations. In our February report (MAC, 2008b), we noted the sector- and context-specific nature of many of the issues in deciding whether it is sensible to fill a shortage with immigration. The Government has agreed with this approach.

“It is understood that it will not always be possible or desirable to measure this concept uniformly. We therefore support the MAC’s need to retain some flexibility in the application of this stage of the analysis to reach their judgement.”

HM Government response to the MAC’s call for evidence

8.31 Most of the considerations and indicators discussed can only be assessed through bottom-up evidence, gathered through our call for evidence, regional visits, and meetings with employers and representative bodies.

8.32 We also commissioned the Centre on Migration, Policy and Society at Oxford University to co-ordinate the production of a series of sector-specific expert reports on the micro-level determinants of employer demand for immigrant labour and the alternatives to immigrant labour. These reports include a separate overview paper (Anderson and Ruhs, 2008) and eight sector papers. We are publishing these papers on our website alongside this report: www.ukba.homeoffice.gov.uk/mac.

8.33 In addition to soliciting and analysing bottom-up evidence, we investigated a number of quantitative indicators, both to generate additional evidence and to validate the bottom-up evidence received. In practice, only two top-down indicators were practically obtainable at the level of detail required:

- the shares of non-EEA immigrants and non-British EEA immigrants already employed in an occupation; and
- the percentage of the UK workforce within an occupation in receipt of training.

8.34 The first of these indicators gives an indication of the reliance on immigrant labour from

within and outside the EEA. An occupation dependent on immigrant labour from outside the EEA may suffer if access is immediately restricted. However, the ‘direction’ and impact of this particular indicator will be sector specific and cannot be determined *a priori* for all sectors and occupations. A significant share of EEA workers may suggest that employers should be able to fill at least some of their vacancies with workers from within the EEA. Conversely, a low share of non-EEA immigrants may also indicate a difficulty in recruiting immigrants that the shortage occupation route may be able to help solve.

- 8.35 The second indicator provides some measure of investment in up-skilling. An occupation with shortages despite high levels of training is likely to have less scope to respond to shortage by further up-skilling the UK resident workforce. By contrast, an occupation with a very low share of workers in training may have scope for addressing staff shortages by more investment in training.
- 8.36 The proportions of non-EEA and non-British EEA immigrants in an occupation, and limited information on levels of training received, are available from the Labour Force Survey. Annex C lists these indicators by occupation. In theory, we could also look at the current use of the work permit system, though, in practice, the management information data collected by the UK Border Agency is not currently coded to the 4-digit Standard Occupational Classification. This data source is therefore better for some occupations and sectors than for others.
- 8.37 In addition, some of the top-down indicators of shortage double-up as indicators of ‘sensible’, for example:
- change in earnings provides an indication of whether employers have

made efforts to respond to shortages by raising wages. If wages were falling for an occupation where immigrants are being used to fill a shortage of skilled labour, it is possible that immigrants are being used as a cheaper substitute for domestic labour;

- the stock of unemployed workers associated with an occupation gives an indication of the scope for increasing employment of UK resident workers (but it does not capture inactive workers). If a shortage of skilled labour was reported for an occupation where a considerable number of unemployed people were seeking work, employers could be making inadequate efforts to recruit or train domestic labour; and
- the change in hours worked for full-time employees provides an indication that employers are increasing hours as an alternative response when vacancies cannot be filled. There are legal limits to the number of hours an employee can work, so the scope for responding further to shortage in this way will depend on the absolute hours worked.

8.38 We have used these quantitative indicators to help inform our assessments of whether occupations satisfy our ‘sensible’ criteria. We have chosen indicative thresholds on the same basis as for shortage: the median plus 50 per cent of the median.

Summary framework for assessing evidence on ‘sensible’

8.39 We now summarise the framework we have applied to the evidence we have received on the question of whether it is sensible to fill shortages with non-EEA immigrants. Table 8.1 describes the key indicators or criteria we have considered, and it provides examples of bottom-up indicators and quantitative top-down indicators that are available.

Table 8.1: Our key criteria for whether it is sensible to fill shortages with immigration

Key criteria for 'sensible'	What change might indicate 'sensible'?	Possible indicators	
		Bottom-up examples	Available top-down indicators
Alternatives to employing immigrants:			
What feasible alternatives to immigration have been considered? Are there obstacles for employers in pursuing alternatives to migration?			
Recruitment efforts	High or increased spending and investment in recruitment	Spending on advertising, using different channels Using different labour pools, e.g. unemployed, part-time workers, EEA workers	% share of non-British EEA workers
Attractiveness of employment package	Increased incentives for the current workforce to remain in occupation and for new recruits to enter the labour market	Holiday allowances, bonuses, other benefits	% change in earnings
Increased working hours	Increased working hours of current workforce	–	% change in working hours
Capital substitution	Increased investment in technology to make production less labour- or skill-intensive	Installing labour-saving machinery	–
Changing production methods	Changed production methods to make production less labour- or skill-intensive	Restructuring the production line	–
Outsourcing or offshoring	Increased use of contracting in or of overseas sites	Evidence that employers are doing this	–
Current use of immigrants	High use of immigrants may mean it is difficult to respond to shortage in other ways, but may also mean employers are not doing enough to up-skill UK resident workers	Current use of immigrants	% non-EEA immigrants in occupation

Table 8.1: Our key criteria for whether it is sensible to fill shortages with immigration (*continued*)

Key criteria for 'sensible'	What change might indicate 'sensible'?	Possible indicators	
		Bottom-up examples	Available top-down indicators
Skills acquisition:			
What efforts have been, or could be, made to train and up-skill the UK resident workforce?			
Training	High or increased investment in training of current and future UK workforce	Employers working with schools/ universities New training programmes, apprenticeships	% of employees receiving training
Training length	A long training period would make it harder to respond quickly to shortage through training	Evidence of length of training required to become fully proficient	–
Availability of training or qualifications	If training for an occupation is not readily available this may increase the need for immigrants, but it may also indicate inadequate efforts by employers to ensure that qualifications are provided	Evidence that employers are working with their Sector Skills Council to develop qualifications	–
Productivity, innovation and international competitiveness:			
What impacts will access to immigrant labour have on productivity, innovation and international competitiveness of an industry?			
Productivity	Decreased productivity may indicate that it is sensible to bring in immigrants, but low productivity could imply scope to substitute labour with capital	Higher wastage Slower production process Reduced quality product Evidence of 'low skills equilibrium' of labour-intensive production	–

Table 8.1: Our key criteria for whether it is sensible to fill shortages with immigration (*continued*)

Key criteria for 'sensible'	What change might indicate 'sensible'?	Possible indicators	
		Bottom-up examples	Available top-down indicators
Innovation	Risk of reduced innovation in a sector where immigration is a source of innovation may indicate that it is sensible to bring in immigrants	Emerging technologies overseas	–
Competitiveness	Employment of immigrants may support international competitiveness of certain sectors through their skills and innovation, but it would not be sensible to bring in immigrants to maintain competitiveness only because of their willingness to accept lower pay	Sector requires highest levels of skills Immigrants bring different skills/innovation	–
Wider economic and labour market effects:			
What wider effects will access to immigrant labour have on the wider UK economy and labour market?			
Impacts on wages and employment rates	No adverse impact on wages, employment conditions and/or employment levels	Steady or rising wages and employment conditions	% change in unemployment/inactive % change in wages
Business failure	Higher numbers of businesses failing may indicate that shortages cannot be filled, but there may be other causes and it may also be a natural market correction	Closure of businesses Reduced profits	–
Public service impacts	It may be sensible to bring in immigrants if public services are jeopardised, but in the longer term it would not be sensible for public services to rely on cheap immigrant labour	Reduced quality of public services Insufficient or reduced availability of public services (e.g. increased waiting times)	–
Other regulatory and economic context	Other reasons outside the control of employers that make it difficult or impossible to pursue alternatives	–	–

8.4 Scope and challenges

8.40 Our remit is to formulate our recommendations based on the labour market and economic effects of immigration from a UK perspective. There are also other matters and considerations related to immigration that are important for society and policymaking, but beyond our formal terms of reference. The Government will need to take these additional considerations into account when it considers our recommended list of shortage occupations. Furthermore, there are issues within our remit that create practical challenges. These are discussed in turn below.

Issues beyond our remit

8.41 First, in addition to impacting on the UK, immigration has important consequences for immigrants and their countries of origin. These countries could be affected by the loss of skilled labour (the ‘brain drain’). On the other hand, remittances from immigrants may have positive impacts on source countries, and immigrants to the UK may learn valuable new skills that they later take home with them. In theory, considerations about what constitutes a ‘sensible’ UK immigration policy could – and, as some argue, should – take account of costs and benefits to immigrant-sending countries. Although recognising this as an important issue, our interpretation of ‘sensible’ does not account for such considerations.

8.42 Second, beyond any labour market and economic effects, our terms of reference do not include consideration of the social impacts of immigration. The Migration Impacts Forum (MIF) looks specifically at the social effects of immigration. Its remit is to inform the Government on how immigration affects public services and local communities. It will also advise on the

effect of any future immigration policies, including reviewing the points awarded for each attribute and required threshold. The MIF consists of representatives of experts from local government, health, education, the police and the criminal justice system, the voluntary sector, the Confederation of British Industry and the Trades Union Congress.

8.43 Third, we are not in a position to make judgements based on factors outside our area of expertise, such as national security implications of immigrants working in sensitive areas.

Difficult issues within our remit

8.44 First, although we focus on the economy and labour market, the number of potential policy objectives that the MAC could consider is large, and some of the objectives could be found to be in conflict. For instance, conflicts may occur between policies that address the interests of employers and those that address the interests of the UK workforce. Reconciling conflicting objectives is difficult, as there is typically no unambiguous hierarchy of objectives to refer to.

8.45 Second, our interest is in identifying where it might be sensible to employ immigrants from outside the EEA, but in practice we rely mainly on bottom-up evidence rather than quantitative analysis of the EEA labour market in order to assess whether employers are making sufficient efforts to tap into any potential pool of labour that might exist in the wider EEA labour market.

8.46 Finally, and crucially, there may be important trade-offs between the short run and the long run. For example, bringing in immigrants to fill shortages benefits firms in the short run but it may reduce the incentives to invest in the training and up-skilling of UK resident workers, and

therefore contribute to maintaining or even increasing dependence on immigrant workers, in the long run. Again, there is no easy answer to the tension between the short run and the long run. Where there is a considerable potential trade-off between the two, we intend to look at occupations in more detail to establish whether immigration is having a negative impact on long-term objectives.

8.47 Our approach to each of the above issues has been to make our decisions in a balanced and consistent way and to be transparent about the potential tensions.

8.5 Next steps

8.48 We will examine in more detail some of the issues around when and where non-EEA immigrants may sensibly fill gaps in the labour market. As mentioned in Chapter 7, we plan to explore how the potential supply of labour from within the EEA can be assessed, in order to be fully informed when we assess UK employers' efforts to tap into the potential workforce available within the wider EEA labour market.

8.49 We also would like to explore the possibility of further analysis at the occupational level of:

- how employing non-EEA immigrants impacts on employers' incentives to find alternative solutions to shortages of skilled labour, such as increasing wages, increasing training opportunities and switching to less labour-intensive production methods;
- the impact of immigrants on the productivity of UK resident workers, and on the productivity gap between the UK and other countries; and
- the impacts of non-EEA immigration on wages, employment, the economy and public finances.

8.50 We also intend to commission 'inside the firm' research into how employers used the work permit system to meet their specific needs, focusing on key occupations and sectors that draw heavily on non-EEA immigrant labour. This may form the first part of a 'before and after' study, where we examine how the new system, including the shortage occupation route, has affected employers' incentives, and how and why employer and employee behaviour has evolved following the introduction of the Points Based System.

8.51 As with shortage, our analysis will consist of a combination of theoretical work, data analysis, literature reviews and possibly structured interviews with employers. The research will build on the analysis by Anderson and Ruhs (2008) and the sectoral papers commissioned alongside this report.

Part III: Results and next steps



Dovetailing the evidence

9.1 Introduction

- 9.1 We explained our approach to dovetailing top-down and bottom-up, and the circumstances under which we may consider evidence sufficient to justify inclusion on our shortage occupation list, in Chapter 4. Chapters 6 to 8 set out the results from our top-down analysis and our criteria for evaluating the bottom-up evidence against the headings of skilled, shortage and sensible. In this chapter we consider the bottom-up evidence itself, drawing in the top-down data where relevant.
- 9.2 In Sections 9.2 and 9.3 we discuss specific occupations that we have considered in particular detail. Those discussed in Section 9.2 are included, in part or in full, on our recommended shortage occupation list. Those discussed in Section 9.3 are not included. At the end of Section 9.3 we also list some other occupations where shortage has been asserted.
- 9.3 We have used a great deal of evidence from a wide variety of stakeholders. Much of it was highly useful to us. Some of it was not at a sufficient level of detail, either in terms of addressing our skill, shortage and sensible criteria, or in terms of providing specific information on particular jobs or occupations. Where evidence was not sufficiently detailed, it does not play a major part in the discussion in this chapter.

- 9.4 Most of our discussion here focuses on the relevance and persuasiveness of the overall evidence rather than on the quality of individual submissions. However, we are willing to discuss particular submissions with the individual or organisation that made them to us.
- 9.5 In some cases, occupations may be included on the list, but the evidence may indicate that it would be appropriate, at this stage, to include them only for a short period of time. Perhaps the evidence is not compelling, but other factors mean that the occupation should be included. Or we may be looking at a short-term problem where remedial action will address the issue in the slightly longer term. In these cases, we will require further relevant evidence before extending the period for which occupations remain on the list. We make it clear where this is so.
- 9.6 In other cases, occupations are included on the list, due to strong evidence, with no defined date for review. However, we will keep the whole list under review and reconsider all occupations at a future date.

Dovetailing in practice

- 9.7 We set out below the evidence we have received for specific occupations and assess whether and to what extent it met our skilled, shortage and sensible criteria. The actual consideration process involved more stages and checks than mentioned here. We considered the

evidence several times from a number of different perspectives and asked in a number of cases for further information to be provided. We discussed the evidence at our formal meetings as well as at an informal workshop session. We paid particular attention to the evidence presented to those of us who had attended the different visits and meetings.

- 9.8 We have confined ourselves to considering the evidence relevant to each occupation in isolation, apart from where occupations are clearly linked such as within the health sector. In terms of our skilled and shortage criteria, we have not given any occupations particular weight or regarded some as being more meretricious than others. We recognise that occupations we have considered vary in size, whether through the numbers of persons they employ, the income they generate or their total contribution to the economy. Importantly, whether or not goods or services are regarded as essential or merely desirable has not been factored into our consideration of skilled or shortage. Where we have felt it necessary to make such judgements against our sensible criteria, the text explains this.

Structure of this chapter

- 9.9 In Section 9.2 we identify the relevant occupation or job title, followed by the appropriate Standard Occupational Classification (SOC) code. First, we discuss the largest areas for consideration in terms of the numbers of job titles involved, namely the health sector (including social care) and various engineering disciplines. We next consider some jobs and occupations related to engineering from within the construction sector, namely quantity surveyors and managers in construction. The other

larger occupations we were asked to consider come next, namely chefs, cooks and teachers. Then we discuss the other occupations that we included on the list, but that did not fall into the above categories.

- 9.10 The process of linking some of the job titles we received with the 26,000 job titles included under the SOC codes was not straightforward. We have mapped these job titles to those we consider to be closest under the SOC codes. In future we will need evidence to comply more closely with our analytical needs as set out in Chapter 12.
- 9.11 In Section 9.3 we discuss particular issues regarding the evidence we received about other occupations not recommended for inclusion on the shortage list. We set these out in an order mirroring, to a large extent, that used in Section 9.2.

9.2 Occupations included on our recommended shortage occupation list

- 9.12 The occupations and job titles discussed in this section, or certain jobs within them, are all recommended for inclusion on the UK shortage occupation list. We identify what the evidence we received told us about issues of skilled, shortage and sensible and combine this with the available top-down data. In some cases, as when we are considering a job title within an occupation but only have top-down data that relate to the occupation, we include the top-down data but say that we did not consider it to be highly relevant in that case. That is because the data relate to more job titles than the one we are considering. Nevertheless, we have included the data for the sake of completeness.

- 9.13 In some instances, we identify specifically the evidence we received. In other cases, we simply say that we received evidence. This is partially to maintain flow, but also because some organisations who submitted evidence to us requested that we retain their anonymity.

Box 9.1: Medical practitioners and Dental practitioners

Occupation(s) and SOC code(s):

Medical practitioners (2211) and Dental practitioners (2215)

Only the following job titles within these occupations are included on our recommended shortage occupation list:

consultant in the field of psychiatry; consultant with the following job titles only: anaesthetics and intensive care, chemical pathology, clinical neurophysiology, clinical oncology, dermatology, genito-urinary medicine, haematology, immunology, neurology, occupational medicine, oral and maxillo-facial surgery, orthodontics, paediatrics, paediatric dentistry, plastic surgery and renal medicine.

Stakeholder evidence:

We received evidence from NHS Employers, the NHS Workforce Review Team, the General Medical Council, Skills for Health, the London Development Agency, the Sheffield Teaching Hospitals NHS Foundation Trust, the Cardiff and Vale NHS Trust and the Golden Jubilee National Hospital in Glasgow. We also commissioned our own independent research (Bach, 2008).

- 9.14 Our decisions were mainly based on lists of shortage jobs produced by NHS Employers and the NHS Workforce Review Team. In drawing evidence together for the Committee, NHS Employers conducted a consultation exercise within the NHS in England. They asked:
- which occupations, grades and specialties employers were experiencing recruitment difficulties with;
 - how long those difficulties had lasted;
 - whether the lack of skilled labour was affecting productivity;
 - the extent to which employers were being forced to use alternatives to immigrant labour; and
 - what were the consequences and risks attached to utilising alternatives.
- 9.15 Responses were received from 93 NHS organisations. Only five reported no difficulty in recruiting suitably qualified individuals. NHS Employers reviewed responses alongside data interrogation of the website NHS Jobs.

- 9.16 Skills for Health referred to work done by the NHS Workforce Review Team that was commissioned by the Department of Health. The Workforce Review Team is a national body working on behalf of the NHS in England. In the three-month period May to July 2007, the Workforce Review Team engaged with stakeholders from all relevant healthcare sectors to ensure a thorough, UK-wide perspective of the specialties and professions on the UK Border Agency (UKBA) shortage occupation list at that time. Subsequent research and analysis identified a list of specialties that the Workforce Review Team recommended to the Home Office in August 2007 in NHS Workforce Review Team (2007). The project did not consider specialties or professions not already on the list at that time. The information is therefore of limited use.
- 9.17 Our analysis of the top-down data indicated that medical practitioners and dental practitioners are skilled. We received evidence that virtually all medical practitioners and dental practitioners have degree-level entry qualifications.
- 9.18 Our analysis of the top-down data showed that medical practitioners passed on just 1 out of 12 shortage indicators. Dental practitioners passed on just 1 out of 11 available shortage indicators. Any decision to accept job titles within these occupations as in shortage, therefore, must be justified almost entirely on the bottom-up evidence.
- 9.19 We received evidence that some newly qualified medical practitioners were not getting NHS jobs. This seemed to indicate a surplus at that level in the medical practitioners' hierarchy (Bach, 2008). In some jobs, there were indications that not all graduates gain employment in the short

term and there is a concern about over-supply.

"In particular, newly qualified healthcare professionals are still meeting competition to secure their first position, post qualification."

NHS Employers response to the MAC's call for evidence

"There is clear evidence that in some cases newly qualified healthcare professionals are not getting NHS jobs... There is also concern over the number of medical graduates and the number of training opportunities available to allow the progress of newly qualified doctors through to consultant grades."

NHS Workforce Review Team (2007)

- 9.20 Although none of our respondents referred to it, we looked at the most recent consideration by the Review Body on Doctors' and Dentists' Remuneration in 2008, which concluded that at present there were no overall problems with recruitment and retention among its remit groups: *"We do not see any major cause for concern in the recruitment and retention evidence we have received and note that, in general, medicine and dentistry continue to be attractive careers, though it is clear that some career paths are more popular than others"*.
- 9.21 Therefore, we are reassured that there is no overall shortage in these occupations. However, we were told that there is a shortfall across the NHS of experienced consultants in some areas of specialism and that it is sensible to fill this short-term gap through immigration.

- 9.22 In terms of sensible, both these occupations scored highly on our top-down training indicator, as discussed in Chapter 8 and Annex C. They are also both heavily dependent on immigrants from outside the European Economic Area (EEA).
- 9.23 Overall, the available data relating to medical professionals and to dental practitioners were of uneven quality and sometimes contradictory. We were concerned that decisions taken on incomplete or partial evidence may be harmful to the health of the nation.
- 9.24 We therefore had further discussions with both NHS Employers and the Workforce Review Team about their evidence, and for some job titles we spoke to the relevant Royal Colleges. As a result of these additional conversations, we accepted some, but not all, of the job titles put to us as being in shortage. We rejected suggestions that the consultants in the following areas should be included on the shortage list:
- forensic pathology;
 - histopathology; and
 - radiology.
- 9.25 We also took account of the evidence we received that shortages were at the consultant level rather than at the newly qualified level and that while these shortages will be addressed over time as the newly qualified move up the hierarchy, it was sensible to fill some now through immigrant workers.
- 9.26 While we do not feel we have seen a full picture of shortages across these occupations, we have taken into account the size of the health sector and the limited amount of time available to both organisations to prepare and present evidence to us. We will work with all relevant organisations over the next few months as they try to establish more comprehensive health sector data, and we will review the position of these occupations in six months' time.

Box 9.2: Nurses

Occupation and SOC code:

Nurses (3211)

Only the following job titles within this occupation are included on our recommended shortage occupation list:

registered nurse employed or engaged at band 7 or 8 of Agenda for Change bands or their independent sector equivalents; registered nurse at band 5 or above employed or engaged in the following specialties: operating theatre nurse, anaesthetic nurse, operating department practitioner, scrub nurse, theatre nurse, critical care (nurse working in critical units with a level 2 or level 3 classification).

Stakeholder evidence:

We received evidence from NHS Employers, the NHS Workforce Review Team, the General Medical Council, Skills for Health, the Association of Camphill Communities, L'Arche, the Sheffield Teaching Hospitals NHS Foundation Trust, the Cardiff and Vale NHS Trust and the Golden Jubilee National Hospital in Glasgow. We also commissioned our own independent research (Bach, 2008).

- 9.27 Our decisions were mainly based on lists of shortage jobs produced by NHS Employers and the Workforce Review Team. This evidence was discussed in detail under ‘Medical practitioners and Dental practitioners’ above. As discussed there, we have concerns about the quality and detail of this evidence that we hope will be addressed in coming months.
- 9.28 Top-down analysis of national-level data showed this occupation to be skilled. We received evidence that entry into the nursing profession is via either a diploma or a degree in nursing.
- 9.29 We received evidence that nurses are employed in various pay bands according to their level of skills and expertise. For example, band 2 includes clinical support worker; band 5 includes midwife entry level, community nurse, schools nurse and learning disabilities nurse; and band 6 includes health visitor, midwife, specialist nurse and team leader. (Bands 5 and 6 are the most common nursing entry level.) Band 7 includes specialist health visitor and team manager; and band 8 includes modern matron and nurse consultant.
- 9.30 We saw sufficient evidence to conclude that nurses at band 5 and above are skilled.
- 9.31 This occupation passed on only 1 out of the 12 shortage indicators. This strongly suggests that there is not a general shortage of nurses. However, the top-down data would not reveal shortages in specific specialisms. Therefore, the decision to accept job titles within this occupation as in shortage had to be made on the basis of bottom-up data.
- 9.32 We were told that the main shortages, at the national level, were among the most experienced nurses at bands 7 and 8.
- 9.33 Although some employers reported that they had difficulties in recruiting band 5 nurses, we did not see evidence to cause us to conclude that this was a national problem. Indeed, we received evidence that there was a surplus of nurses across the NHS. For instance, there was a 12 per cent expansion in the number of UK nurses in training between 2003 and 2006 (Bach, 2008).
- 9.34 That said, we did receive evidence that there was a national shortage among nurses at all bands working in operating theatres and in critical care. We were told that there is a time lag between recruiting nurses to work in operating theatres and in critical care and training them and giving them sufficient experience before they are able to perform effectively in these jobs. Therefore, it is sensible, in the short term, to take up the shortfall at band 5 and above through immigration.
- 9.35 While we do not feel we have seen a full picture of shortages across this occupation, we have taken into account the size of the health sector and the limited amount of time available to organisations to prepare and present evidence to us. We are also concerned that decisions taken on incomplete or partial evidence may be harmful to the health of the nation. Therefore, even though the evidence presented to us was not fully comprehensive, we have decided to accept the job titles listed for inclusion on the UK shortage occupation list on the basis that we will work with all relevant organisations over the next few months as they try to establish more comprehensive health sector data. We will review these occupations and job titles in six months’ time.

Box 9.3: Health professionals, health associate professionals and healthcare scientists

Occupation(s) and SOC code(s):

Biological scientists and biochemists (2112), Psychologists (2212), Pharmacists/pharmacologists (2213), Medical radiographers (3214), Pharmaceutical dispensers (3217), Medical and dental technicians (3218), Occupational therapists (3222), Speech and language therapists (3223), Therapists n.e.c. [not elsewhere classified] (3229)

Only the following job titles within these occupations are included on our recommended shortage occupation list:

audiological scientist (within 2112); band 6 and above biomedical scientist (within 2112); state registered scientist in cytogenetics (within 2112); clinical psychologist (within 2212); pharmacist (within 2213); ultrasonographer (within 3214); HPC registered radiographer (within 3214); pharmacy technician (within 3217); audiologist (within 3218); occupational therapists engaged at band 7 or 8 of the Agenda for Change scale or their independent sector equivalents (3222); speech and language therapists employed or engaged at bands 7 or 8 or their independent sector equivalents (3223); orthoptist (within 3229); and band 7 dietician (within 3229).

Stakeholder evidence:

We received evidence from NHS Employers, the Workforce Review Team, the General Medical Council, Skills for Health, the London Development Agency, the Sheffield Teaching Hospitals NHS Foundation Trust, the Cardiff and Vale NHS Trust and the Golden Jubilee National Hospital in Glasgow. We also commissioned our own independent research into this sector (Bach, 2008).

- 9.36 Our decisions were mainly based on lists of shortage jobs produced by NHS Employers and the Workforce Review Team. This was described in relation to the medical occupations discussed earlier in this section of the report.
- 9.37 Top-down analysis indicates that all these occupations are skilled, but only a few exhibit particular signs of shortage. Pharmaceutical dispenser passed on 6 out of 12 shortage indicators and medical radiographer passed on 4 out of 11 valid indicators.
- 9.38 The evidence we received from NHS Employers and the Workforce Review Team (via Skills for Health) stated that the jobs listed are in shortage. As discussed previously, we have concerns about the quality and detail of this evidence, but we are also concerned that decisions taken on incomplete or partial evidence may be harmful. Therefore, we have decided to accept the jobs listed for inclusion on the UK shortage occupation list on the basis that the relevant organisations will work with us over the next few months to try to establish more comprehensive health sector data. We will review these job titles and occupations in six months' time.

Box 9.4: Care assistants and home carers**Occupation(s) and SOC code(s):**

Care assistants and home carers (6115)

Only the following job title within this occupation is included on our recommended shortage occupation list:

skilled senior care worker (skilled is where there is a regulatory requirement for them to be qualified at National Qualifications Framework (NQF) level 3 or above, currently only in Scotland and Wales, or salary is at least £8.80 per hour).

Stakeholder evidence:

We received evidence from the English Community Care Association, the UK Home Care Association, the Association of Camphill Communities, L'Arche, the Recruitment and Employment Confederation, the Childcare Recruitment Company Ltd, Skills for Care and Development, the Liverpool Social Care Partnership, a care home owned by Southern Cross in Glasgow, and representatives from major care organisations. We commissioned our own independent research (Moriarty, Manthorpe, Hussein and Cornes, 2008).

- 9.39 Care assistants and home carers did not show up as skilled on our analysis of the top-down data. We received evidence that the Commission for Social Care Inspection has set national minimum standards for 50 per cent of care staff to have a level 2 or equivalent qualification. Just under a third of care assistants and home carers are qualified to level 3 or above.
- 9.40 However, we received evidence that employers in the independent care sector are reluctant to train staff beyond level 2, as many workers then leave to take up positions with local authorities and the NHS.
- 9.41 When we met with representatives from the social care sector, we were told that level 3 qualifications in social care were harder to achieve than level 3 in other areas. However, we received no further evidence in support of this.
- 9.42 We are, however, aware of the range of soft skills required for these occupations. We also recognise that there are some cases where a more senior care worker is required to work consistently at level 3.
- 9.43 Our analysis of the top-down shortage data for care assistants and home carers showed that they passed on 4 out of 12 shortage indicators. We received from Skills for Care (part of the Sector Skills Council Skills for Care and Development) a report entitled *The state of the adult social care workforce in England, 2008* (Skills for Care, 2008). This records that over 70,000 vacancies for care assistants and home carers were notified to Jobcentres in the first six months of 2007 (i.e. about 12,000 per month). The report states that “for many of the staff groups vacancy rates have been of the same order of magnitude for some years with occasional fluctuations” but that “evidence of underlying trends is not easy to discern”.

- 9.44 Moriarty *et al.* (2008) report that the vacancy rate in social care runs at around 4 to 5 per cent and is double that for all types of industrial, commercial and public employment. We were told that, with an ageing population, there will be an increasing need for carers.
- 9.45 We were told by representatives of the care sector organisations that some care homes had empty beds due to staff shortages.
- 9.46 We were also told that increasing pay to reduce vacancies was not currently an option, as the expenditure of care providers is partially limited by local authority funding. But, as set out in Chapter 8, such budgets are not set for all time. To the extent that any shortage turns on low pay and these services are a genuine priority, it is necessary for budgets to be larger so that the workers in the sector can be paid more.
- 9.47 Taking all the available evidence into account, we accept that the bottom-up evidence indicates that there are shortages of care assistant and home carer staff. However, we reiterate that many of these jobs are not skilled up to the threshold the Committee is using.
- 9.48 We heard evidence that the Government's delivery targets for the NHS could be hit if the social care sector is unable to provide aftercare service. Many targets in the health sector, such as reducing the number of people whose discharge from hospital is delayed, are reliant upon an effective care sector.
- 9.49 In reaching our conclusion, we also took account of alternatives to using non-EEA workers. For example, evidence indicated that there was a gender bias towards women in the make-up of the workforce (Moriarty *et al.*, 2008). However, there was a limit to what could be done to address this, as the majority of those requiring care were women and we were told that they, on the whole, preferred to be cared for by women.
- 9.50 We received evidence that the impact of regulatory requirements on minimum staffing levels meant that social care providers cannot reduce the overall levels of staffing. We also received evidence that currently available assistive technology would not allow care providers to reduce the ratio of workers to care recipients.
- 9.51 We are also seized of the fact that this occupation is one of those where some employers have in the past looked to use the system in a way that benefits them rather than in the manner that was perhaps anticipated, namely by attempting to bring some less skilled workers in under the work permit route. Employers must be closely monitored to ensure that they meet their obligations as sponsors.
- 9.52 We believe that the shortage of care assistants is primarily down to low pay in less skilled jobs. Allowing immigrants in to fill these jobs would do little to help redress this – indeed, it could exacerbate it. Nevertheless, **if** immigrants are needed for the short term, then a Tier 3 route in the new Points Based System would be more appropriate (although it was not within our terms of reference to look closely at this particular question).

- 9.53 With care homes operating a relatively flat pay structure, it is plausible that some shortages will be towards the top of the care worker job hierarchy. Therefore, it seems sensible to fill shortages in skilled senior care worker posts with immigrant labour. This requires us to define skilled in relation to this occupation. We define skilled as either:
- where there is a regulatory requirement for senior care workers to be qualified at NQF level 3 or above (this is currently the case only in Scotland and Wales); or
 - where the job pays a sufficient salary for it to be regarded as skilled.
- 9.54 We were told that salaries in the independent sector are lower than those in the local authority sector, but we do not accept this as a case for using two pay measures to determine what is skilled within the same occupation. Therefore our measure of skill does not distinguish between the two sectors.
- 9.55 So why have we decided to use pay as a proxy for skill, and what should the threshold be? Within a 4-digit occupation, pay will usually be positively related to the level of skill. The level qualified to NQF level 3 or above within an occupation provides a proxy for the likely number of skilled jobs within that occupation, and 31 per cent are qualified to that level.
- Using the Annual Survey of Hours and Earnings (ASHE), the corresponding 70th percentile in the wage distribution yields the hourly wage of £8.79 as shown in Table 9.1. We use this as our threshold for skilled in this occupation.
- 9.56 We have recognised the funding constraints facing this sector by setting the skill pay benchmark below the £10 figure we used for other occupations and by not adjusting the April 2007 data to account for earnings inflation.
- 9.57 In conclusion, we include senior care workers with a formal qualification at NQF level 3 or above in Scotland or Wales, or who are paid an hourly salary of at least £8.80 (rounded), on our recommended shortage occupation list.

Table 9.1: Hourly wage by percentile for SOC Occupation: care assistants and home carers (6115), April 2007

Percentile	50	60	70	75	80	90	Mean
Earnings (£)	7.53	8.11	8.79	9.21	9.79	11.36	8.07

Source: 2007 (ASHE).

Box 9.5: Civil engineers

Occupation(s) and SOC code(s):

Civil engineers (2121)

All job titles within this occupation are included on our recommended shortage occupation list, including the following job titles:

public health engineer, rail engineer, drainage engineer, structural engineer, water engineer, geotechnical engineer, geotechnical design engineer, geotechnical specialist, tunnelling engineer, marine engineer, mining engineer, mining geotechnical engineer and petroleum engineer.

Stakeholder evidence:

We received evidence from Airbus, the Association for Consultancy and Engineering, Energy & Utility Skills, the Ground Forum, BP International Ltd, SRK Consulting (UK) Ltd, Buro Happold, Charles Duthie (civil engineer), and the Engineering Sector Advisory Panel.

- 9.58 We received a lot of evidence regarding different civil engineering job titles, not all of which could readily be placed within the relevant SOC code. Having considered the evidence, we regard the job titles listed in Box 9.5 as included within the civil engineering occupation. However, there are other job titles within civil engineering and we are including the whole occupation on the shortage occupation list.
- 9.59 We received evidence from the Ground Forum and Buro Happold relating to a variety of job titles around the disciplines of engineering and geology, which they grouped together under the title of ground engineer. This title is not relevant to the SOC code categories, being already taken as a job title within the metal working production and maintenance fitters category which clearly did not relate to the skills and job descriptions we were given for these job titles. We were told that the job titles relating to the ground engineering discipline all required either civil engineering or geology first degrees followed up with secondary qualifications in rock or soil mechanics and other related disciplines. The evidence from the Ground Forum was that most of these job titles fall as subsets of the geotechnical engineer category.
- 9.60 Those job titles that relate to the geology discipline are considered under the relevant SOC code.
- 9.61 All the ground engineering job titles that feature on the current UKBA shortage occupation list feature on our list, but they are included within this and other engineering occupations that we discuss later in the report.
- 9.62 We note that the current shortage occupation list specifies that ground engineers are included solely in relation to the construction sector and not to oil or gas extraction. We received bottom-up evidence from BP International Ltd that they had vacancies within the ground engineering disciplines that fall within the oil and gas extraction sector. We are content that including civil engineers on our shortage lists will extend the application of the shortage list to

- geotechnical engineers and related jobs within the oil and gas extraction sector.
- 9.63 We received evidence that civil engineers require a degree in civil engineering and are skilled. Our analysis of national-level data confirmed this.
- 9.64 Civil engineers passed on 5 out of 12 of our shortage indicators. Therefore, this occupation is exhibiting potential signs of shortage. We received bottom-up evidence from the Association for Consultancy and Engineering about a survey it had conducted of its members in 2007. Out of 102 firms, 26 responded and reported 4,400 vacancies for civil engineers as well as 2,610 vacancies for structural engineers, which are included within the civil engineer occupation.
- 9.65 The Association's survey also indicated that within civil engineer grades at least half of all vacancies exist for more than three months, with this figure going up to over 60 per cent for engineer and senior professional grades.
- 9.66 SRK Consulting told us that the decline of the UK mining industry had led to a reduction in the number of universities offering courses in mining and mineral resources subjects, which it believes has impacted on its ability to domestically source staff with the required level of practical mining skills and experience.
- 9.67 By way of contrast to the evidence confirming that there were shortages within civil engineering, we received evidence from a civil engineer who told us that he had to work overseas as he could not get work in the UK. But this was an isolated example.
- 9.68 The top-down data do indicate a potential shortage and we had bottom-up evidence from a range of different employers confirming that they had vacancies for civil engineers and that it was hard to recruit experienced civil engineers. No significant evidence was presented regarding our other bottom-up shortage indicators as set out in our February report.
- 9.69 We received patchy evidence relating to sensible. We did not see evidence of a concerted, co-ordinated attempt to increase the numbers of UK trained civil engineers nor to reduce the numbers of civil engineering graduates not entering the occupation. We were told that 25 per cent of civil engineering graduates do not enter the engineering profession following graduation and we believe the sector may be able to do more to attract them. However, we note from the top-down data that relative earnings have risen in recent years for this occupation. We also note the example given to us showing what consultancy and engineering firms are doing with schools to encourage more engineering graduates.
- 9.70 Although we received evidence that engineers have skills that can be applied world-wide, we are concerned that this occupation may become increasingly reliant on immigrants to make up a shortfall in UK trained civil engineers – 10 per cent of workers within this occupation are non-EEA immigrants, compared with 7 per cent across all our skilled occupations. That said, we recognise that this cannot be addressed in the short term and, therefore, we will place civil engineers on the list for the time being. We will review the position in the near future and we will work with Semta, the relevant Sector Skills Council, and other relevant organisations in order to be kept updated on how shortage within this occupation is being dealt with in the long term.

Box 9.6: Chemical engineers

Occupation(s) and SOC code(s):

Chemical engineers (2125)

All job titles within this occupation are included on our recommended shortage occupation list, including the following job titles:

chemical engineer and petrophysicist.

Stakeholder evidence:

We received evidence from the Oil and Gas Forum and the Institution of Chemical Engineers, and a joint letter from the Institution of Chemical Engineers, the Institution of Mechanical Engineers and the chief executives of Chemicals Northwest, Yorkshire Chemical Focus, Humber Chemical Focus and the North East Process Industry Cluster.

- 9.71 We received evidence that chemical engineers require a degree in chemical engineering and are skilled. Our analysis of top-down data confirmed this.
- 9.72 Chemical engineers passed on 3 out of 9 shortage indicators, which at 33 per cent is potentially significant.
- 9.73 It was put to us that the job title of petrophysicist, which falls within the chemical engineers occupation, should be included on our shortage occupation list. We did not receive detailed written evidence from them, but the Oil and Gas Forum, which is comprised of representatives from different companies in the oil and gas extraction industry, told us that shortages existed in all petrochemical-related occupations, resulting in:
- high vacancies and difficulty in filling vacancies;
 - rising relative wages;
 - increasingly attractive benefits packages;
 - poaching and other aggressive behaviour by employers in the labour market; and
 - increasing selectiveness by job candidates.
- 9.74 We went to the West Midlands and met with Dr David Brown, the Chief Executive of the Institution of Chemical Engineers. Dr Brown told us that there were concerns about a shortage of people in the oil and gas extraction industry, and that people were needed for the new production plants being built in the UK.
- 9.75 We were told that wage levels had risen quite rapidly for engineers, with a new graduate now earning some £30,000 per annum in the oil industry.
- 9.76 In a separate response to our call for evidence, the Institution of Chemical Engineers cited a study (North East Process Industry Cluster, 2007), which said that there were real shortages in chemical engineering.

“It is clear that even with the progress currently being made to improve skills supply from UK/EU sources, there is no prospect of filling the skills gaps from ‘home’ sources alone.”

Institution of Chemical Engineers response to the MAC’s call for evidence

- 9.77 We have not seen the report, but were told that the Chemical Industries Association was due to publish a report on survey data showing that:
- up to 90 per cent of companies find it difficult to recruit graduates with appropriate technical qualifications;
 - 60 per cent of companies find it necessary to recruit from abroad, often finding that the skills and knowledge of overseas recruits are superior to that of their UK staff; and
 - filling essential skills shortfalls accounts for almost half of company training budgets.
- 9.78 With regard to consideration of the question of sensible, we were told that the work was highly specialised and that the labour market is global in scope. It was argued that it is not sensible to train up UK workers for a particular specialised role and then make those workers redundant when the project is completed when there are people elsewhere in the world who could be brought in. We were also told that this global market cuts both ways in that a lot of UK trained people were moving to work abroad for lifestyle reasons, thus reducing further the available UK labour pool.
- 9.79 Dr Brown also made the point to us that a failure to recruit the right people within the oil and gas extraction industry might damage foreign investment flows, with a subsequent domino effect on related sectors. He cited recent work carried out for UK Trade and Investment which placed access to skills and knowledge at the top of the list of influences on knowledge investment in the UK from abroad. We were told that, in particular, Asian partner countries were vital investors in the process-based industries and therefore it was very important that immigration from business partner countries such as India and China was maintained.
- 9.80 Notwithstanding this, we heard examples of how efforts were being made to develop and recruit from within the UK. Schools and universities were being targeted and sponsorships being offered.
- 9.81 Dr Brown told us that the chemical engineering sector is looking to up-skill in terms of its Higher Education capacity. We were told that the sector is talking to vice chancellors with a view to increasing the numbers of chemical engineering places from the current figure of around 1,450.
- 9.82 Although some of the bottom-up evidence is anecdotal, the combination of top-down and bottom-up evidence of shortage is sufficient to cause us to accept this occupation onto our shortage list. We look forward to receiving the trailed further evidence relating to this occupation as soon as it is available, prior to reviewing whether it should remain on our list.

Box 9.7: Aircraft component manufacturing engineers

Occupation(s) and SOC code(s):

Engineering technicians (3113)

Only the following job title within this occupation is included on our recommended shortage occupation list:

aircraft component manufacturing engineer.

Stakeholder evidence:

We received evidence from Aim Aviation (Henshalls) Ltd in Byfleet, Surrey; and AMEC.

- 9.83 Our analysis of national level data confirmed that engineering technicians are skilled.
- 9.84 Engineering technicians passed on 6 out of the 12 shortage indicators, a relatively high number, although the top-down shortage data may be of limited relevance to this specific job title. Aim Aviation is the only UK manufacturer of bespoke galley units for aircraft. It told us that it currently employs 145 aircraft component manufacturing engineers to do this. Of these, 91 are UK and wider EEA permanent employees, 24 are UK and wider EEA contractors and 30 are work permit holders. It has 34 immediate vacancies, which will rise to 64 by early October if work permits are not extended.
- 9.85 We were presented with evidence that, in an attempt to fill the current vacancies from the UK and the wider EEA, Aim Aviation has contacted all the available contract organisations and run campaigns with Jobcentre Plus and the Surrey and Berkshire press, but these attempts at recruiting staff have been unsuccessful. We also received evidence that Aim Aviation runs a four-year apprenticeship scheme, but has had a very poor response to this.
- 9.86 In support of sensible we were told that, to cope with the skills shortages, Aim Aviation has set up an internal training programme and hopes to promote five to ten trainees each year to a diluted skilled status after the first two years, rather than the usual apprenticeship of four years. In addition, 6 out of the last 12 retirees have been retained on a part-time working basis.
- 9.87 We received evidence that the pay for aircraft component manufacturing engineers is between £19,927 and £21,258 per annum. We note that this places Aim Aviation in the medium to upper quartile for its key occupation.
- 9.88 Aim Aviation also told us that it is using computer-aided design linked machinery as far as it is able in the production process and therefore is unable to further change its processes at this time.
- 9.89 We note that safety is of paramount importance when interpreting the company's engineering drawings correctly, and when working in the shop floor environment. Consequently, Aim Aviation believes that individuals from countries outside the EEA with excellent English language skills often make better

employees than some individuals from the wider EEA.

- 9.90 Having reviewed the evidence available to us, we believe that there is sufficient evidence of skill, shortage and sensible for us to place the job title of aircraft

component manufacturing engineer, under the occupation of engineering technician, on the shortage occupation list for the short term. We will review the steps taken by Aim Aviation to increase the available stock within this job title.

Box 9.8: High integrity pipe welders

Occupation(s) and SOC code(s):

Pipe fitters (5216)

Only the following job title within this occupation is included on our recommended shortage occupation list:

high integrity pipe welders.

Stakeholder evidence:

We received evidence from the Engineering Construction Industry Training Board and the job was discussed at the Stakeholder Forum.

- 9.91 This occupation satisfied our top-down skill criteria. We heard that it takes a minimum of five to seven years for a new entrant to be trained and to gain the requisite experience. The 4-digit SOC occupation Pipe fitters passed on 6 out of 12 of our shortage indicators. This is a high proportion, indicative of shortage in at least some jobs.

- 9.92 There is evidence that some of the UK labour supply has moved abroad to take advantage of the growth in overseas opportunities. The number of trainees is

increasing but it requires a minimum of three years to become competent at high integrity pipe welding. Suitably qualified EAA workers are not widely available.

- 9.93 Therefore, we believe that it is sensible to include this job title for people with three or more years' documented evidence of related on-the-job experience on our recommended occupation shortage list. But we look to the Sector Skill Council to ensure that there is a significant flow of trained UK welders coming on-stream in the near future.

Box 9.9: Electricity transmission overhead linesworkers

Occupation(s) and SOC code(s):

Lines repairers and cable jointers (5243)

Only the following job title within this occupation is included on our recommended shortage occupation list:

electricity transmission overhead linesworker.

Stakeholder evidence:

We received a response to our call for evidence from Energy & Utility Skills.

- 9.94 Electricity transmission overhead linesworker is a job title within the SOC code 5243 for lines repairers and cable jointers, which is skilled according to our top-down analysis.
- 9.95 This occupation passed on only 2 out of the 12 shortage indicators. This is a low number, but not necessarily indicative of whether job-specific shortages exist within the occupation. We were asked to consider only linesworkers working in the electricity generation industry and therefore we do not consider, and indeed did not receive evidence relating to, linesworkers in other industries.
- 9.96 We received evidence that there are currently around 150 unfilled vacancies for overhead linesworkers among the electricity generation companies. We were told that there is currently a stock of 400 trainees at various stages of their training and that 130 trainees were taken on in 2007. Energy & Utility Skills estimated that between 15 to 20 per cent of these will drop out. It stated that, taking into account the increasing age of the existing workforce plus what is known of the extra future workload, the boost in supply from the (expanded) trainee route will still be inadequate to meet the labour demand.
- 9.97 At a meeting of the Engineering Sector Advisory Panel on 8 April this year, we were told that at the time of collection of the most recent data two years ago there were some 500 overhead linesworkers in the UK and 600 vacancies. Since that time, we were told that 250 linesworkers had completed training courses and 250 had been brought in on work permits. Therefore, we were told, this occupation was now at the point it should have been at two years ago and the number of present vacancies was likely to be around 200.
- 9.98 The vacancy data suggested a labour shortage for the next three years. In particular, a high proportion of the more senior grades (foremen and team leaders) will retire and be replaced via internal promotions, leaving skilled vacancies lower down the internal labour market.
- 9.99 Some of the sensible evidence is not compelling. We received evidence, for instance, that the composition of the current workforce is overwhelmingly white and male and we consider that there should be scope to improve the workforce's diversity. We were also told that it was preferable for linesworkers to be able to speak English to a good standard as they work in remote locations.

- 9.100 But the efforts to increase the number of trainees, coupled with the severe consequences of failure in the UK electricity supply, suggest that the sensible hurdle is met.
- 9.101 The arguments are finely balanced. The bulk of the evidence is predictive and turns on factors such as likely future retirements and future infrastructure investment. We have not been given full evidence on these factors. There was also a rather flimsy justification for the sector preference for workers from English-speaking countries rather than from EEA countries. Nevertheless, the sector is seized of the need to alter its labour force composition – away from the white, male dominance – and has raised the number of trainees. Further, the consequences of failure in the electricity supply would be serious.
- 9.102 We therefore include this job title on our shortage occupation list to enable the electricity generation industry to get over a short-term shortfall in the supply of electricity transmission overhead linesworkers. However, we only expect this job title to remain on the list until the flow of trainees comes through.

Box 9.10: Physicists, geologists and meteorologists

Occupation(s) and SOC code(s):

Physicists, geologists and meteorologists (2113)

Only the following job titles within this occupation are included on our recommended shortage occupation list:

geologist, geological engineer, hydrogeologist, geophysical specialist, geological advisor, geological analyst, geological associate, geophysicist, geoscientist, geosupport engineer, contaminated land engineer, geoenvironmental engineer, reservoir panel engineer, rock mechanics engineer, soil mechanics engineer, geomechanics engineer, landfill engineer, contaminated land specialist and geoenvironmentalist.

Stakeholder evidence:

We received evidence from the Ground Forum, SRK Consulting (UK) Ltd, BP International Ltd and Buro Happold.

- 9.103 We received evidence asking that the occupation of ground engineer be included on the shortage occupation list. We discussed issues around defining the job title 'ground engineer' under our discussion of civil engineers.
- 9.104 However, we received evidence that 'ground engineers' (as described to us) provide advice and undertake design on a range of activities that involve the ground, including the design and construction of foundations, tunnels, the treatment of contaminated land and the construction of landfill sites and reservoirs. We have therefore placed some job titles relating to this discipline under the occupation of physicists, geologists and meteorologists and some under the occupation of civil engineers (discussed earlier).
- 9.105 Our top-down analysis confirms that SOC code 2113 physicists, geologists and meteorologists is skilled. We also received evidence that, typically, people in the above job titles start out with a civil engineering degree, or one in geology, and then follow it up with a course of further study in a ground engineering discipline.
- 9.106 Physicists, geologists and meteorologists passed on 5 out of 11 shortage indicators. However, our interest is in the specific job titles rather than in the overall occupation. We received evidence from the Ground Forum that a survey it had conducted in 2008 indicated that 96 per cent of employers had vacancies. However, only 17 per cent of employers had responded. Those who responded had advertised 345 posts in the past 12 months and 19 per cent of those were filled by non-EEA workers. We were told that it took an average of three months to fill a post.
- 9.107 We were presented with evidence that salaries for these job titles in 2008 were 25 per cent higher than in 2003. We were also told that employers have increased benefit packages and that recruitment from the EEA has increased. We note that, despite these measures, the vacancies in these job titles have persisted.
- 9.108 We are aware that job titles related to this area have been on previous UKBA shortage occupation lists since 2004. The evidence we received stated that shortages have been evident for more than ten years. Yet no evidence was presented of co-ordinated efforts to increase the stock of UK trained employees. We are concerned that, without such concerted efforts, there may be an increasing and long-term reliance upon immigrant labour sources. We are including certain job titles on the list now because we are concerned that a sudden cut-off in the supply of non-EEA workers will be too damaging. But we look to the Sector Skills Councils and employers to produce a co-ordinated strategy to increase the stock of UK trained employees.

Box 9.11: Quantity surveyors**Occupation(s) and SOC code(s):**

Quantity surveyors (2433)

All job titles within this occupation are included on our recommended shortage occupation list.

Stakeholder evidence:

We received evidence from the Royal Institution of Chartered Surveyors (RICS), and the construction and property firm Davis Langdon LLP in Birmingham.

- 9.109 RICS presented evidence that quantity surveyors are skilled. Our analysis of national-level data confirmed this.
- 9.110 Quantity surveyors advise on financial and contractual matters relating to, and prepare bills of quantities for, construction projects and provide other support functions concerning the financing and materials required for building projects.
- 9.111 Quantity surveyors passed on 5 out of the 12 shortage indicators, a relatively high number. Research undertaken by RICS in 2007 indicated that there was a low number of suitably well-qualified and/or experienced applicants to undertake the large amount of work available. We were told that of 6,468 vacancies identified in January 2007, 49 per cent were unfilled for more than 6 months and 35 per cent for 12 months or more. RICS told us that such figures suggest a low number of applicants with the required skills.
- 9.112 We had evidence that more recent research (April 2008) confirmed that there is still a notable shortage of quantity surveyors in both large and small firms. The majority of respondents described the situation as being 'severe' or 'very severe'. We were told that all respondents reported that vacancies were advertised but unfilled for over 6 months, with a significant proportion carrying vacancies for more than 12 months.
- 9.113 There is evidence that at least 5,633 quantity surveyors, or 18 per cent of the most qualified section of the market, will retire in the next ten years.
- 9.114 We also received evidence that current qualification rates will lead to 3,000 new quantity surveyors over the next ten years, leaving a gap of at least 2,633 in the number of highly qualified quantity surveyors.
- 9.115 Davis Langdon told us that the shortage is most severe among senior people, typically those with seven years' or more experience.
- 9.116 We were also made aware of government targets, which are having an impact on the necessary stock of experienced quantity surveyors. For example, we were told that targets for improving the rail network (£15 billion investment over the next five years), and for delivering the 2012 Olympics on time and on budget, are dependent on addressing these issues. We received evidence that efforts were being made

to increase stock. For instance, Davis Langdon is currently sponsoring 100 people through their studies.

- 9.117 Having reviewed the evidence available to us, we conclude that it is appropriate to include this occupation on our list. We will review the steps taken to increase the available stock within this occupation.

Box 9.12: Project managers for property development and construction

Occupation(s) and SOC code(s):

Managers in construction (1122)

Only the following job title within this occupation is included on our recommended shortage occupation list:

project manager for property development and construction

Stakeholder evidence:

We received evidence from the Royal Institution of Chartered Surveyors (RICS).

- 9.118 RICS told us that project managers for property development and construction are skilled. We have placed the job title of project manager for property development and construction within the 1122 SOC code for Managers in Construction, as this seems the most relevant classification.
- 9.119 We heard from RICS that a project manager leads on a project or combination of projects amounting to a large financial responsibility (at least several million pounds). The work involves being employed directly or indirectly by a client to take the responsibility for project management and co-ordination of the pre- and post-contract design and cost-managing process. A project manager agrees the delivery of the project to the pre-agreed timetable, right quality and within the agreed cost parameters to meet end-users' expectations.
- 9.120 Our assessment of national-level data confirms that managers in construction are skilled.
- 9.121 The top-down evidence is that managers in construction passed on 4 out of the 12 shortage indicators. However, we do not regard this top-down evidence as crucial, because the job title is much narrower than the larger 4-digit occupation.
- 9.122 We received evidence that research undertaken by RICS in 2008 indicated that there is a shortage specifically of project managers for property development and construction, and that a majority of respondents thought that this situation was severe. We were told that the problem existed for both qualified and trainee project managers, and most respondents were able to report vacancies had been left unfilled for more than 6 months, with a significant proportion

carrying vacancies for more than 12 months. We also received evidence that over the next ten years roughly 18 per cent of the faculty would leave the profession due to retirement and other reasons. Yet the numbers entering the profession fall far short of the numbers leaving.

9.123 We received evidence of higher salaries being offered to attract more people into

this job, and also of efforts to increase the numbers recruited from within the UK.

9.124 We concluded that there was sufficient evidence on skilled, shortage and sensible to justify including this job title on our shortage list. We discuss more general issues around the construction industry in Section 9.3.

Box 9.13: Chefs

Occupation(s) and SOC code(s):

Chefs, cooks (5434)

Only the following job title within this occupation is included on our recommended shortage occupation list:

skilled chef (skilled is where salary is at least £8.10 per hour).

Stakeholder evidence:

We received evidence from the Bangladesh Caterers Association UK Ltd, the Ethnic Minority Citizens Forum, the Chinese Immigration Concern Committee, Matchworkers International, the Confederation of Chinese Associations of Scotland, the Chinese Takeaway Association, Liverpool Chinese Business Association, Christine Lee & Co (Solicitors) Ltd, Harlequin Leisure, Las Iguanas, the Confederation of Chinese Associations, Linda Gilroy MP, Wirral Chinese Association, the Llandudno Hospitality Association and the Recruitment and Employment Confederation.

We also received responses from 150 separate restaurant owners, mainly Chinese and mostly provided in a group response from Christine Lee & Co (Solicitors) Ltd.

We met with organisations and individuals and carried out visits to restaurants in Liverpool, Glasgow, Bristol, London and Kent. We attended meetings of the Hospitality Sector Advisory Panel and took evidence from sector representatives, including the Sector Skills Council for this area, People 1st. We also commissioned some independent research of our own into the sector (Lucas and Mansfield, 2008).

9.125 The top-down evidence for this occupation indicates that, in aggregate, it is not skilled. It does not score as skilled on any of our three indicators. However, we have also considered the bottom-up evidence we have received, which indicates that at least some jobs within this occupation are skilled.

9.126 We received evidence from People 1st which characterised the places of employment for this occupation into four main establishment types. Within each type of establishment we were told that chefs and cooks would be required to

possess different varieties of skill. The issue for us was defining which of these were equivalent to level 3 or above.

- 9.127 As set out in the evidence we received, there is an unwritten skills hierarchy for Chinese chefs, but it is not sufficiently precise to allow us to use it to define skilled occupations.

“You would think that the major challenge to achieve our roll out plans would be to find and acquire properties to meet our goal. However, I feel the main threat to not achieving this goal, is in fact finding skilled and able workers for our kitchens, namely chefs with sufficient experience, managerial and culinary skills.”

Restaurant chain manager’s response to the MAC’s call for evidence

- 9.128 We received a very large volume of evidence relating to those employed in creating ethnic cuisine. We were told that chefs preparing this food need to have specific knowledge and experience of using the ingredients, often combined with knowledge of the various regions in which the cuisine had its origins. We were told that these were skills that would take a long time to be taught to anyone without the relevant cultural background and understanding.

“Most of the chefs, especially the specialist chefs, specialising in specific ethnic cuisines ..., attributed their interest in the occupation to their cultural environments in their formative years. ...though one may acquire knowledge of the ingredients used in a cuisine, it takes years of painstaking effort to refine their skills, commencing from the basic level, to understand how and when each spice in the cuisine highlights and imparts the best flavour to the dish.”

Ethnic Minority Citizens Forum response to the MAC’s call for evidence

- 9.129 We were also told that familiarity with the language predominantly spoken in any particular kitchen was a key skill. This has particular relevance, of course, when the language spoken in the kitchen is not English, but is Cantonese, say, or Bangla.

“Apart from disharmony and inefficiencies, communication difficulties between staff in a busy and high pressured kitchen environment could potentially give rise to major health and safety problems.”

Chinese Immigration Concern Committee response to the MAC’s call for evidence

- 9.130 We received a significant amount of evidence specifically relating to the ethnic cuisine sector, which stated that there were shortages within this sector. Therefore, we have given careful consideration to this evidence.
- 9.131 We received evidence that pay has been rising rapidly. We were told that in Chinese establishments pay had risen by between 10 and 20 per cent so far this year, while in Indian restaurants pay had risen by up to 20 per cent in the last three years.
- 9.132 We were told that a significant proportion of Indian and Chinese restaurants were carrying vacancies. Many establishments said that they found vacancies hard to fill and that vacancies often went unfilled for long durations. As a consequence of this, overtime hours had risen and existing staff were working longer hours. We were told that this had led to some establishments operating at less than full capacity because they did not have the catering staff.

“Both my husband and I have been working 16 hours a day, sometimes older children have to come and help. ”

London takeaway owner’s response to the MAC’s call for evidence

“We are a modest sized company that prides ourselves on offering local communities job opportunities every time we open a new restaurant. However, the current situation of not being able to recruit sufficient back of house staff throws our plans for expansion and creating local jobs within the UK into serious threat.”

Restaurant chain manager’s response to the MAC’s call for evidence

9.133 We received evidence that attempts had been made to recruit EEA workers as an alternative labour supply. We were told that these workers were found to have difficulties with the language other than English spoken in the kitchen, lacked the relevant skills and knowledge to prepare the food to the required standard and were reluctant to work the necessary long hours. We also received evidence about attempts to find alternatives to recruiting immigrant labour: this had resulted in a significantly inferior quality of cuisine being served and had a serious impact on the business.

9.134 There are a number of arguments for why it may be sensible to include skilled chefs on the shortage list that we found less convincing. These were as follows.

- We were told that there has been a crackdown on illegal working – particularly employment of failed asylum seekers. This has caused a labour shortage and hence there is a case for bringing in labour from abroad. These illegal workers should not have been employed in the first place.

- It was argued that the success of the Chinese catering industry is largely, if not entirely, built on the continuous supply of immigrant labour. This suggests that the more immigrants you have, the stronger the case for more – an erroneous circular argument.
- Many people in the ethnic communities have thrived. Their children aspire to be doctors and accountants and do not wish to work in catering. Such social mobility is wholly to be welcomed but does not constitute a compelling case for filling vacancies through migration.
- It was put to us in evidence that ethnic chefs should be exempt from the English language test. This is not a matter for the Committee, but the argument can be inverted. If it is going to be so difficult to recruit English speakers, there is less reason for the occupation to be on the shortage list.
- The Bangladeshi community has a high relative unemployment rate and low employment rate (particularly among women). We were told that this reflects ‘cultural reasons’, but it begs the question why this source of labour has not been tapped more?

9.135 We also see some merit in the argument that the labour shortage being experienced across the ethnic cuisine sector should be left alone so that pay will rise – followed by a rise in the relative prices being charged by these establishments. In turn, consumers will adjust their spending and some establishments may close as a result. The sector would end up smaller, stronger and with somewhat higher relative prices and relative pay.

- 9.136 However, on balance, we are concerned that the adjustment and dislocation of the ethnic cuisine sector might be too sudden and severe if left unchecked. We consider that there is sufficient evidence to justify recommending that skilled chefs be included on the UK shortage occupation list.
- 9.137 This, however, requires us to define a ‘skilled’ chef for the purposes of the shortage occupation list. We define skilled as when the job pays a sufficient salary for it to be regarded as skilled. This should be after deductions for accommodation and meals, etc. So why have we decided to use pay as a proxy for skill, and what should the threshold be? We believe that within a 4-digit occupation, on average, pay is positively related to the level of skill. Therefore, pay can be used to proxy skill. From the Annual Survey of Hours and Earnings (ASHE) the hourly wages for this occupation are as described in Table 9.2.
- 9.138 According to the evidence we received, the fraction of skilled chefs within the SOC occupation is around one-third of the total. The proportion qualified to NQF level 3 also provides a proxy for the likely number of skilled jobs within that occupation, and 24 per cent are qualified to that level. On balance, we adopt the 70th percentile as the skill benchmark for this occupation. The associated hourly wage is £8.05. We use the £8.10 (rounded) hourly wage as the threshold for skilled chefs within this occupation.
- 9.139 Based on the evidence received by People 1st, this hourly wage approximately corresponds to the average annual pay of the senior or more experienced chefs such as chefs, chefs de partie, second chefs, sous chefs, executive chefs and head chefs.
- 9.140 We have recognised the constraints currently facing particular parts of the catering industry by setting the skill pay benchmark well below the £10 figure we used for the other occupations and by not adjusting the April 2007 data to account for earnings inflation. Chefs and cooks who are paid at least £8.10 per hour are included on our recommended shortage occupation list.

Table 9.2: Hourly wage by percentile for SOC Occupation: chefs, cooks (5434), April 2007

Percentile	50	60	70	75	80	90	Mean
Earnings (£)	5.95	7.50	8.05	8.51	8.95	10.57	7.79

Source: 2007 (ASHE).

- 9.141 We were struck by the evidence we received and the discussions we had that there appeared to be a disconnect between the Sector Skill Council, People 1st, and the industry. We were told by various individuals and groups that there was a willingness to engage in a longer-term strategy to address shortages. So far this has not happened. We look forward to the catering industry taking this on. We are aware that within ethnic communities in the UK there are significant and disproportionate amounts of unemployment, for instance. We will look to see what the industry is doing to tap into this potential source of new recruits. We will also look to see what efforts the industry is making to increase and improve the number and nature of training places available in ethnic cuisine here in the UK with a view to raising the quality of locally available chefs. The ethnic catering sector, in particular, will therefore wish to develop a more coherent training strategy, led by People 1st together with trade representatives.
- 9.142 We wish to see the ethnic catering sector thrive. But to do so it must work to adjust its labour force away from reliance on immigrants towards greater use of locally trained and EEA workers.
- 9.143 As with social care, we are aware that some employers in this sector have attempted to misuse the skilled work permit route in the past in order to bring in less skilled workers. Employers must be closely monitored in order to ensure that they meet their obligations as sponsors. On balance, for the time being, we consider it sensible that some non-EEA immigrants may be used to fill shortages in skilled jobs in the chef occupation.

“I believe it is therefore a valid request to ask that chefs are added to the shortage occupation list..., as I believe that for the long-term planning and re-establishment of a new generation of British based chefs, they will need guidance and coaching to develop into these roles over the forthcoming years.”

Restaurant chain manager’s response to the MAC’s call for evidence

Box 9.14: Secondary education teaching professionals

Occupation(s) and SOC code(s):

Secondary education teaching professionals (2314)

Only the following job titles within this occupation are included on our recommended shortage occupation list:

secondary school teacher in the subjects of maths and science.

Stakeholder evidence:

We took evidence at a meeting of the Teaching Sector Advisory Panel. We also received evidence from the Department for Children, Schools and Families (DCSF) and the Training and Development Agency (TDA) for Schools.

- 9.144 We received evidence that teaching is a skilled occupation requiring a degree plus additional teacher training. Our analysis of national-level data confirmed this.
- 9.145 This occupation passed on 3 out of 12 of our top-down shortage indicators, which is a relatively low number. Furthermore, the evidence presented to us stated explicitly that there is no national shortage of either secondary or primary teachers. DCSF annual School Census data showed the vacancy rate for secondary school teachers in January 2008 (provisional) to be 0.8 per cent. Although this is not directly comparable with other vacancy data we have looked at, it seems reasonably low. It certainly represents a significant fall from the recent peak in 2001, when the rate stood at 1.2 per cent.
- 9.146 Therefore, the evidence suggested that there is not a national shortage of secondary education teachers. DCSF told us that there were regional and localised shortages, but our remit is to consider national shortages. Also, we are not convinced that localised shortages could not be addressed through facilitating greater pay differentials between areas where there is adequate supply and those where there is not.
- 9.147 DCSF cited evidence from the Smith Review and the Organisation for Economic Co-operation and Development, which indicated particular difficulties around the areas of maths and science in terms of recruiting sufficient numbers of suitably qualified staff. DCSF is currently not meeting its recruitment targets in these subject areas and plans to increase the stock of teachers within them in order to meet the Government's objective to raise standards in those subjects. Recent research by Smithers and Robinson (2008)

has also supported claims that there is a shortage of physics teachers: *"turnover and moves to other schools were somewhat higher for physics specialists than for teachers in the core subjects."* We were also presented with evidence that the vacancy rates for maths and science teachers were relatively higher than that for teachers as a whole.

"DCSF said that teachers are not in national shortage in England but stressed there are regional shortages and national, subject specific shortages in Maths and Science."

Teaching Sector Advisory Panel minutes, 24 April 2008

- 9.148 We received evidence that the TDA for Schools has introduced a number of financial incentives, training opportunities and media campaigns to try to increase recruitment in maths and science. We were told that, although there have been modest improvements in recruitment to these subjects in recent years, recruitment targets are still not being met.
- 9.149 We asked about recruitment from non-EEA countries, and DCSF reported that teachers trained in the EEA are often unsuitable to fill vacancies in the UK because they do not have a sufficient standard of English. The education system in some countries such as Australia, New Zealand and South Africa was also argued to be more culturally similar to the UK than that in EEA countries. The TDA for Schools has funded programmes to improve the language skills of Eastern European teachers, and generally we would like to see further determined efforts to tap into the EEA as a source of labour. In the meantime, some recruitment from outside the EEA into the subjects of maths and science appears sensible.

- 9.150 Overall, therefore, we were satisfied that there was sufficient evidence to include secondary school teachers in the subjects of maths and science on our recommended shortage occupation list.

Box 9.15: Ship and hovercraft officers

Occupation(s) and SOC code(s):

Ship and hovercraft officers (3513)

All job titles within this occupation are included on our recommended shortage occupation list.

Stakeholder evidence:

We received evidence from the Chamber of Shipping, the trade association for the UK shipping industry.

- 9.151 This occupation passed our top-down analysis indicators for skill. The Chamber of Shipping also stated that qualifications for ship and hovercraft officers must be in accordance with the 1978 International Convention on Standards of Training, Certification and Watchkeeping (STCW). We were told that the Maritime and Coastguard Agency has produced training and certification guidance indicating that the UK's courses leading to Officer of the Watch certification are at level 3 equivalence, while higher-ranking certificates are at level 4.
- 9.152 We were also told that any officer obtaining an STCW qualification outside the UK must obtain a Certificate of Equivalent Competency from the Maritime and Coastguard Agency before they are allowed to take employment on a ship registered in the UK. The officer must also demonstrate sufficient knowledge of the English language in order to be awarded the certificate.
- 9.153 This occupation passed on 6 out of 11 of our top-down shortage indicators, which is a high number. The Chamber of Shipping told us that, following a period of decline, the UK shipping fleet has experienced a significant increase in demand for officers. We received evidence that salary levels are rising in response to this demand and that the numbers of new entrants to training programmes are also increasing. However, we were told that these factors were not, in themselves, sufficient to keep pace with the increase in demand. We also received evidence to the effect that the shortage of available officers was replicated throughout the EEA.
- 9.154 The Chamber of Shipping cited anecdotal evidence of salary increases in the region of 30 per cent over the last two years. Although our top-down data do not corroborate this, they do show that mean hourly pay went up by 7.7 per cent in one year, which represents a rapid increase in comparison with most occupations.

- 9.155 The Chamber stated that the increase in the number of new entrants to UK officer training programmes, from fewer than 500 in 2000 to 845 in 2007/08, has not kept pace with the increase in tonnage and, consequently, companies are struggling to recruit the required number of new entrants of the necessary quality.
- 9.156 The Chamber, together with Nautilus UK and the National Union of Rail, Maritime and Transport Workers, sent a submission entitled *Stimulating seafarer training and employment* to the Government, which outlines proposals to encourage the training and employment of UK seafarers. Comparable pay data included in the submission show that it is now considerably more expensive to train and employ British officers than Chinese, Indian, Filipino and Polish ones.
- 9.157 The Chamber of Shipping told us that many UK vessels are currently crewed by foreign officers. Failure to continue to recruit from outside the EEA would have a serious impact on other sectors of the economy.
- 9.158 We were told that legal requirements mean that vessels have to operate with a certain number of properly qualified and certificated officers and that this reduces the options open to ship owners to seek alternatives to employing non-EEA labour.
- 9.159 We were persuaded that there was sufficient evidence provided relating to the growth in the UK fleet, and the lack of easily available alternatives to non-EEA labour, to justify including this occupation on our recommended shortage occupation list.

Box 9.16: Veterinary surgeons

Occupation(s) and SOC code(s):

Veterinarians (2216)

Only the following job title within this occupation is included on our recommended shortage occupation list:

veterinary surgeon.

Stakeholder evidence:

We received evidence from the Royal College of Veterinary Surgeons, including its quantitative assessment of the labour market for veterinary surgeons. Other jobs related to veterinary surgery were nominated for the shortage list, but without supporting evidence.

- 9.160 We received evidence that veterinary surgeons are skilled, and our analysis of national top-down data confirmed this.
- 9.161 This occupation passed on 5 out of 10 shortage indicators, which is a high proportion. We received evidence that compliance with working hours legislation, increases in the numbers of women in the profession (which has led to an increase in the number of veterinary surgeons taking a career break), and increases in retirements account for a shortfall between supply and demand for veterinary surgeons.

- 9.162 These factors are predicted to increase demand for veterinary surgeons by 450 per annum. Furthermore, labour supply is forecast to fall by 850 per annum due to retirements. Only half of this total shortfall of 1,300 is predicted to be filled by new UK graduates entering the profession.
- 9.163 We were told that the number of high-quality applicants to veterinary colleges exceeds the number of places available. Therefore, we expect demand to be met in the long term by graduates from within the UK. However, the number of available places cannot be increased in the short term and the training period is lengthy.
- 9.164 We received evidence that the job of veterinary surgeon currently draws over twice as many surgeons from EEA countries as from outside the EEA, suggesting that the EEA is being tapped into as a source of labour.
- 9.165 Therefore, the job title of veterinary surgeon is included on our recommended shortage occupation list to enable the shortfall in UK trained veterinary surgeons to be addressed.

Box 9.17: Sheep shearers

Occupation(s) and SOC code(s):

Fishing and agriculture related occupations n.e.c. (9119)

Only the following job title within this occupation is included on our recommended shortage occupation list:

sheep shearer.

Stakeholder evidence:

We received evidence from the National Association of Agricultural Contractors (NAAC) and from the National Farmers' Union.

- 9.166 Sheep shearer is a job title within the SOC code 9119 for fishing and agriculture related occupations n.e.c. [not elsewhere classified], which is unskilled in our top-down analysis. However, we do not regard this as highly relevant in the case of sheep shearers and have based our assessment of skill for this job on the bottom-up evidence.
- 9.167 We received evidence that the NAAC only employs sheep shearers with the British Wool Marketing Board bronze medal (or equivalent) or above. The UKBA caseworker guidance confirms that the bronze award is rated as equivalent to level 3 qualifications. We consider that this occupation also meets the skill criteria by virtue of the manual dexterity and experience required rather than solely through qualifications and training. Therefore, we regard sheep shearers who can provide documentary evidence that they have worked at the bronze award standard for at least three years as skilled.

- 9.168 We received evidence that, despite UK training courses for sheep shearers, there continues to be a shortage of skilled shearers in the UK. The NAAC told us that it advertised every year on behalf of its members for UK shearers, but this does not usually bring any response as there are a limited number of skilled shearers in the UK who are able to shear to a high standard.
- 9.169 Sheep shearing is a seasonal operation taking place over a few months in the early spring/summer and, due to its seasonal nature, many top shearers operate internationally between the UK, Australia, New Zealand and the USA. They migrate to where the work is and will only stay in the UK for the necessary shearing season.
- 9.170 We were told that, in practice, sheep shearers get paid per sheep. The going rate is 65p per sheep, and a highly skilled shearer will be able to shear up to 400 sheep a day, making potential daily earnings of £260. Therefore, any shortage is apparently not due to low pay.
- 9.171 We received evidence from the National Farmers' Union in support of the NAAC evidence.
- 9.172 In terms of sensible, we received evidence that the UK agricultural industry currently employs approximately 500 shearers each year from Australia and New Zealand and that they are responsible for 20 per cent of the shearing done in the UK. We were told by the NAAC that the UK relies on this source of labour and that failure to recruit highly skilled individuals from these countries will have a serious impact on the sheep rearing industry.
- 9.173 We consider that we saw enough evidence of skill, shortage and sensible to justify including this job title on our recommended occupation shortage list.

Box 9.18: Work riders

Occupation(s) and SOC code(s):

Animal care occupations n.e.c. (6139)

Only the following job title within this occupation is included on our recommended shortage occupation list:

work rider (licensed by the British Horseracing Authority).

Stakeholder evidence:

We received evidence from the National Trainers Federation, the Department for Culture, Media and Sport, Mark Johnston Racing Ltd in Leyburn, and David Simcock Racing Limited in Newmarket.

- 9.174 Work rider is not a job title within the SOC. Related job titles are groom, attendant (racing stables), stable helper and stable boy/girl. All these fall within the 6139 animal care occupations n.e.c. classification, which is unskilled in our top-down analysis. However, we base our assessment of the skill level for work riders on bottom-up evidence.

- 9.175 We were told that the most important parts of a work rider's work are to exercise the horses on the gallops, to school the horses in the ways of horseracing, to assess and report to the trainer detailed information about how the horses are performing, and to give feedback on the horses' health. They have to exercise the horses without causing injury or undue stress, to ensure that they are in top physical condition prior to racing. Work riders usually have a similar physical build to the jockeys who race horses, so that the horses are exercised under conditions comparable to racing, which is vital as it allows the trainer or owner to judge where and when to race their horse. This role may also be combined with the work of a groom in caring for the horses in the stables.
- 9.176 Having considered the evidence and seen the work of work riders first-hand, we are of the opinion that the most important parts of this job do meet the skill criteria we have set, by virtue of innate ability and experience rather than through qualifications and training.
- 9.177 We also looked at previous work carried out by the UKBA on work riders. Work permits are granted to non-EEA work riders on the basis of having skills equivalent to level 3 provided that they have at least three years' relevant experience (with work responsibilities covering those acquired in a level 3 NVQ in Horse Care and Management or Racehorse Care and Management). We believe these are reasonable criteria and we will adopt them. Therefore, there should be documented evidence of at least three years' relevant paid experience for this job to be skilled.
- "The...skill set most highly valued by trainers is the ability to ride thoroughbreds at exercise and inform the trainer about an individual horse's health, fitness, aptitude and characteristics..."*
- National Trainers Federation response to the MAC's call for evidence
- 9.178 We received bottom-up evidence that, following a collective agreement between the National Trainers Federation and the National Association of Stable Staff, relative pay has risen.
- 9.179 We were also told that the ratio of horses to stable staff has steadily risen. It is now at an all-time industry high of between three and five horses per member of staff. This means that each work rider has to do more work. We note that the National Association of Stable Staff supports the inclusion of work riders on the shortage occupation list, as this will help reduce its members' workload.
- 9.180 We received evidence that, despite strenuous efforts to recruit and train stable staff, it is proving impossible to meet the demand for skilled staff and the industry is now dependent on immigrant workers to meet the shortage of workers with the appropriate skills and other attributes.
- 9.181 We noted that, since 2002, the National Trainers Federation has worked with the International Exchange Program UK (IEPUK) to source immigrant workers for the British horseracing industry. We were told that IEPUK, on behalf of numerous racehorse trainers, has advertised vacancies for work riders and grooms through the daily newspaper dedicated to horseracing, through its network of partner organisations throughout Europe and on its website. We received evidence that there was a very limited response from within the EEA.

9.182 The Department for Culture, Media and Sport supports the inclusion of work riders on the shortage occupation list.

“it is difficult to see how the racing industry could withstand the removal of this source of experienced labour without a serious detrimental effect on its ability to deliver high quality racing to the public.”

Department for Culture, Media and Sport’s letter to the MAC

9.183 After careful consideration and reviewing all the evidence, we have concluded

that work riders (licensed by the British Horseracing Authority, the governing and regulatory body for the sport) should be included on our recommended shortage occupation list. We saw for ourselves evidence that it was a skilled job and we received evidence that it was increasingly difficult to fill vacancies from within the EEA. We also heard evidence of attempts by the industry to recruit more people into this line of work and the problems it was having with this. It should be noted that grooms who do stable tasks but not ride work are **not** included on the shortage list.

Box 9.19: Ballet dancers

Occupation(s) and SOC code(s):

Dancers and choreographers (3414)

Only the following job title within this occupation is included on our recommended shortage occupation list:

classical ballet dancer who meets the standard required by internationally recognised UK ballet companies (e.g. Birmingham Royal Ballet, English National Ballet, Northern Ballet Theatre, the Royal Ballet and Scottish Ballet).

Stakeholder evidence:

We received evidence from Birmingham Royal Ballet, the Royal Opera House, the Independent Theatre Council and a combined response from the Society of London Theatre and the Theatrical Management Association, which was endorsed by the National Campaign for the Arts.

9.184 All the above respondents suggested that ballet dancer should be included on the shortage occupation list. Also suggested were contemporary dancer and dancer trained in a non-European classic dance tradition. We did not feel that we received sufficient evidence to give detailed consideration to these last two.

9.185 Ballet dancer is a job title within the SOC code 3414 for dancers and

choreographers, which is skilled in our top-down analysis.

9.186 We were told that it can take a number of years to reach the standard required at entry level to a ballet company. The degree of training involved is matched by requisite innate ability. At higher entry levels into a company, for example soloists and principals, we were told that attributes such as artistic excellence and aesthetics were even more of a determining factor.

- 9.187 The dancers and choreographers occupation passed on 5 out of the 10 shortage indicators. We received evidence that while vacancies attract plenty of applicants, very few of these applicants have the levels of innate ability, experience, artistic excellence and aesthetics required. This cannot be addressed by raising pay if the ability is not there. In a letter to us, Tony Hall, Chief Executive of the Royal Opera House, wrote that: *“ballet dancers are selected on the basis of their talent and ability to excel...(and for their) unique training and abilities”*.
- 9.188 We were told that ballet companies are engaged in raising standards in terms of training and ability, but in order to maintain the highest benchmarks of artistic excellence, it was necessary that companies are able to recruit the very best dancers.
- 9.189 In terms of sensible, our top-down data for dancers and choreographers show pay rising rapidly, above-average frequency of training, and a high level of current dependence on non-EEA immigrants relative to other occupations.
- 9.190 We consider that we received sufficient evidence on skilled, shortage and sensible to justify including some ballet dancers on the shortage occupation list. We wanted to ensure that we focused on the very best talent, which is where we believe the shortage to be, and therefore we are putting on the list classical ballet dancers who meet the standard required by internationally recognised UK ballet companies (e.g. Birmingham Royal Ballet, English National Ballet, Northern Ballet Theatre, the Royal Ballet and Scottish Ballet).
- ### 9.3 Other occupations
- 9.191 This section discusses some other occupations that came to our attention, either while we were on visits or through evidence we received, but which are not recommended for inclusion on the UK shortage list because the evidence did not meet our criteria.
- 9.192 We received evidence on **residential and day care managers**, SOC code 1185, from the Association of Camphill Communities, L’Arche, Skills for Care and Development, the Liverpool Social Care Partnership and a care home owned by Southern Cross in Glasgow. We met with representatives from major care organisations and we commissioned our own independent research (Moriarty *et al.*, 2008).
- 9.193 Our analysis of the top-down data indicated that residential and day care managers are skilled to level 3 or above and we received bottom-up evidence that corroborated this.
- 9.194 Our analysis of the top-down shortage data for residential and day care managers showed that this occupation passed on 3 out of 12 shortage indicators. We did not receive any bottom-up evidence to suggest that this occupation was in shortage and, indeed, we were told by representatives from the care sector that there were no shortages of managers.
- 9.195 The main problems in this sector relate to care assistants and home carers, which we have covered earlier in this chapter.
- 9.196 We received evidence on **social workers** (SOC 2442) from Skills for Care and Development, the relevant Sector Skills Council, including the third report of Skills for Care’s Skills Research and Intelligence Unit *The state of the adult social care workforce in England, 2008*, which looks

- at the workforce engaged in the social care of adults using the National Minimum Data Set for Social Care. We also received evidence from the NHS Workforce Review Team and commissioned our own research into the social care sector (Moriarty *et al.*, 2008).
- 9.197 Social workers passed as skilled from our top-down analysis. They are required to have relevant qualifications above level 3 – namely a degree or diploma in social work.
- 9.198 Social workers passed on only 1 out of 12 shortage indicators and we have had no compelling bottom-up evidence to contradict this top-down evidence.
- 9.199 The Workforce Review Team in England was commissioned by the Department of Health to undertake research and analysis of the UK labour markets relating to the health sector. NHS Workforce Review Team (2007) contains, in an appendix, a list of occupations recommended for the shortage occupation list. Social workers were included on that list. However, we have not received compelling bottom-up evidence to indicate that there is a UK-wide shortage of social workers.
- 9.200 We were asked to consider that **mechanical engineers** be included on the shortage list (SOC 2122). We received evidence from AMEC, Marshall Aerospace, the Association for Consultancy and Engineering, BP International Ltd, Energy & Utility Skills, Airbus UK, the Offshore Contractors Association, Rolls-Royce, Aeropeople and the Institution of Chemical Engineers.
- 9.201 We consider that the following job titles map across to the occupation of mechanical engineer: mechanical design engineer and aircraft structural engineer.
- 9.202 We were presented with evidence that mechanical engineers require a degree in mechanical engineering and are skilled. Our analysis of top-down data confirms this. However, they passed on only 3 of the 12 shortage indicators. This is a relatively low number and so the bottom-up evidence would have needed to be relatively compelling for us to include this occupation on our shortage list.
- 9.203 We received evidence from the Association for Consultancy and Engineering recording 980 vacancies for mechanical engineers. The Association predicted that this will rise to 1,400 in 2008. Its survey data also indicated that within mechanical engineering grades at least 40 per cent of all vacancies exist for more than three months, with this figure going up to over 60 per cent for engineer, senior professional and partner and director grades.
- 9.204 We had evidence from Rolls-Royce that it was finding it increasingly difficult to recruit engineers from within the EEA.
- 9.205 By contrast, the Institution of Chemical Engineers told us that while the categories of engineers in highest shortage were qualified automotive, electronic and electrical engineers, *“mechanical engineers have the best potential to be converted into the sorts of engineers in highest demand so are also very attractive”*. The Institution also cited statements by two recent chief executives of Jaguar Land Rover regarding the overall shortage of engineers. When we visited the West Midlands to see employers and other organisations, we were told that although chemical, biochemical, process, control and electrical engineering were all experiencing shortage, there was slightly less of an issue in mechanical engineering.

- 9.206 Overall, we did not receive clear and compelling evidence of shortage across this occupation such as to cause us to override the top-down data.
- 9.207 We also considered evidence asking that **electrical engineers** (SOC 2123) be included on the list. We received evidence from Energy & Utility Skills, the Association for Consultancy and Engineering, BP International Ltd, the Offshore Contractors Association, Peter M. Grant (Regius Professor of Engineering at the University of Edinburgh) and the Institution of Chemical Engineers.
- 9.208 We received a number of requests to include on the shortage list specific job titles relating to the electrical engineering occupation. Where possible we have mapped these across to the relevant SOC code. We regard the following job titles as included within the electrical engineers category: electrical design engineer, project electrical engineer, electricity generation engineer, plant process engineer, project control and instrumentation engineer and project control engineer.
- 9.209 Although there are some job titles in the electricity generation industry on the current UKBA shortage occupation list, and we are aware of media reports of shortages in this industry, we did not receive sufficient evidence in relation to most of these occupations to include them on our list. We did receive evidence indicating that any engineering discipline would suffice as a point of entry into these roles, and we are including both civil and chemical engineers on our list. However, we will be happy to discuss this further with the nuclear industry.
- 9.210 Bottom-up evidence told us that electrical engineers required a degree in electrical engineering and are skilled. Our analysis of top-down data confirms this.
- 9.211 Electrical engineers passed on only 3 of the 12 shortage indicators. As with mechanical engineers, this is a relatively low number and so the bottom-up evidence needed to be relatively compelling for us to include electrical engineers on our shortage list.
- 9.212 The Association for Consultancy and Engineering told us that its members reported 870 vacancies for electrical engineers and predicted 1,410 vacancies in 2008. Its survey data also indicated that within electrical engineering grades over 35 per cent of all vacancies exist for more than three months, with this figure going up to over 65 per cent for senior professional and partner and director grades.
- 9.213 Energy & Utility Skills told us that it surveyed four electricity generation companies who stated that they had in the region of 300 vacancies across 27 different occupations. However, not all these were electrical engineer occupations. In addition, Energy & Utility Skills reported that, in total, the gap between supply and demand across all these occupations is estimated to be in the tens at the moment and growing to around 500 by 2013.
- 9.214 The Institution of Chemical Engineers told us that electrical engineers are in the category of engineers in highest shortage.
- 9.215 Overall, as with mechanical engineers, we did not see clear and compelling evidence of shortage across this occupation such as to cause us to set aside the top-down

data and put the whole occupation on our recommended list. Nor did we receive sufficiently granular evidence to merit the inclusion of specific job titles within the occupations.

9.216 We also received evidence from DCSF and the relevant sector advisory panel on **primary and nursery education teaching professionals**, which fall under SOC code 2315. However, we saw no evidence of a national shortage to cause us to include this occupation on our recommended list. In particular, vacancy rates for this group were lower than the (apparently also relatively low) vacancy rates for secondary school teachers.

9.217 Turning to the **construction sector**, we received responses to our call for evidence from Construction Skills (the Sector Skills Council for construction) and the Recruitment and Employment Confederation. Chan *et al.* (2008) also carried out, on our behalf, independent research on staff shortages and immigration in the construction sector.

9.218 The evidence we received did not ask us to consider individual occupations for inclusion on the shortage occupation lists. Notwithstanding this, we did consider the construction sector as a whole and we make the following observations. We have also, separately within Section 9.2, recommended that the job title of 'project manager for property development and construction' be included on the shortage list.

9.219 Construction is a diverse sector and is affected by a number of factors, including economic conditions. We note that government policy and projects have an important impact on skills demand within the construction sector (e.g. housing, the Olympics and Crossrail).

9.220 In order to assess top-down, national-level data in relation to this sector, we looked at the following SOC codes:

- 5311 Steel erectors;
- 5312 Bricklayers, masons;
- 5313 Roofers, roof tilers and slaters;
- 5314 Plumbers, heating and ventilating engineers;
- 5315 Carpenters and joiners;
- 5316 Glaziers, window fabricators and fitters;
- 5319 Construction trades n.e.c. [not elsewhere classified];
- 5321 Plasterers;
- 5322 Floorers and wall tilers; and
- 5323 Painters and decorators.

9.221 Five of these occupations passed on our top-down skill indicators, namely 5311, 5312, 5314, 5315 and 5319.

9.222 We were told that about one-third of the construction workforce is qualified to level 3 equivalent or above, mainly in non-manual occupations. Manual occupations dominate the sector and these tend to be qualified at level 2 or equivalent.

9.223 We did receive evidence that qualification levels may not be sufficient indicators of skill and also that the SOC codes may no longer be reflective of the changes that have occurred in the industry over the past few years.

9.224 Looking at those occupations that passed on our skill indicators, only steel erectors (5311) show particular indications of shortage from our top-down analysis, passing on 6 out of our 12 shortage indicators. We intend to discuss with the relevant industry bodies whether this occupation should be included on any future shortage occupation list.

- 9.225 Chan *et al.* (2008) describes the sector as: *“an industry in need of change, being less productive and more labour intensive than those in other leading European countries, with a relatively stagnant and traditional division of labour, and often casual and informal employment”*.
- 9.226 The relative informality of construction sector employment makes it difficult to gain an accurate picture of the size of the labour market for the sector, where and how its staff are employed and the extent of available skills.
- 9.227 According to Chan *et al.* (2008): *“Years of under-investment in VET (Vocational Education and Training), itself fuelled by lack of labour market regulation, has left an ingrained legacy of a reliance on a contingent, self-employed, undeclared and often migrant labour.”*
- 9.228 Our research found that there was reluctance within parts of the construction sector to invest in training and development. It indicated that training provision within the UK is inadequate and may have contributed to a narrowing of skills and knowledge in construction in the UK.
- 9.229 We received evidence that the workforce within the construction sector is unrepresentative of wider society. For instance, only 2.8 per cent of those employed in the construction industry are from black and Asian minority ethnic groups, even though these constitute 8 per cent of the total economically active population (Chan *et al.*, 2008).
- 9.230 Despite the above, our top-down ‘sensible’ analysis also shows an above-average proportion of non-EEA immigrants in many construction occupations.
- 9.231 No evidence has been submitted that allows us to conclude that any construction occupations should be included on the shortage occupation list at this time. Evidence we received and independent research suggest that there is significant scope for increased training and up-skilling of significant potential labour pools both in the UK (including ethnic minorities and women) and the wider EEA. In parts of the sector, there may also be scope for adopting less labour-intensive methods. In addition, since our call for evidence closed, there have been increasing signs that the construction sector as a whole may be going through a period of reduced activity, for instance from the *Observer* (13 July 2008): *“In construction, there is likely to be a huge knock-on effect among the many thousands of contractors who are already feeling the impact from the precipitous fall in the number of new homes being built, bought and sold. Alan Ritchie, general secretary of construction union Ucat, says: ‘We’ve seen thousands of job losses among housebuilders but that’s just the tip of the iceberg because construction is the most casualised industry in the country. Most workers are forcibly self-employed. They don’t get redundancy.’”*
- 9.232 We received responses to our call for evidence from the Royal Institute of British Architects and the Association of Consultant Architects, asking for **architects**, which fall under SOC code 2431, to be included on our list. We also visited an architectural practice in Sheffield.
- 9.233 The evidence received on shortage was very brief. We were told that out of 100 firms sent a questionnaire on skills shortages, 25 responded. There were 225 vacancies over 18 practices (the practice with the smallest number had one vacancy and that with the largest had 80) and it took an average of almost

- three months to fill a post. It has been concluded that an estimated 1,888 personnel need to be recruited during three years by just 25 practices. But as 1,000 are qualifying each year, a shortage is not self-evident.
- 9.234 We also heard that UK architects are very export orientated, taking a particular interest in countries with high economic growth rates. These are mostly outside the EEA, and it is necessary to have staff from those countries to act as intermediaries and translators, and as local project or office leaders on their return to their own countries. We were presented with evidence that firms needed to draw on the international pool of talent in order to maintain standards and industry recognition. However, we note that only 8 per cent of those who responded to the questionnaire recruit from the rest of the world.
- 9.235 We were told that EEA immigrants meet some of the gaps created by a lack of UK architects, but the staff who would fit best into the UK construction sector come from countries with a historic link to the UK and that share a similar architectural education model and many construction industry practices: Commonwealth and Middle Eastern countries in particular. And, as such, this occupation needs to draw on the international pool of talent to maintain standards and industry recognition.
- 9.236 We believe that this argument on its own does not present a distinct criterion for whether it is sensible to bring in immigrants, and should have been balanced against other issues such as up-skilling the domestic workforce. While we accept that many sectors participate in global markets and may benefit from overseas expertise, we must ensure that, where possible, all alternatives to migration have been considered before resorting to the shortage route.
- 9.237 We therefore conclude that architects should not be included on the shortage occupation list. We also heard evidence of shortages of architectural technologists and technicians, but not enough to place those job titles on the list.
- 9.238 Turning to the **information and communication technology sector**, we heard evidence on jobs in the following SOC codes: information and communication technology managers (1136), IT strategy and planning professionals (2131) and software professionals (2132).
- 9.239 Evidence was presented at a meeting of the Information Technology, Communications and Electronics (ITCE) Sector Advisory Panel. e-skills UK, the Sector Skills Council for IT and telecoms, provided us with a paper entitled *Demand and supply in the ICT sector* listing employment levels and trends. The Professional Contractors Group responded to our call for evidence. In addition, we met with and took written evidence from Eurocom Developments Limited, a creative media company based in Derby.
- 9.240 Both the top-down and bottom-up evidence confirmed that these occupations are skilled. However, our analysis of the top-down evidence on shortage indicators showed that information and communication technology managers passed on just 1 out of 12 shortage indicators; IT strategy and planning professionals passed on just 2 out of 12; and software professionals passed on 3 out of 12 indicators. This does not constitute strong evidence of shortage.

- 9.241 The ITCE sector advisory panel advised us that none of these occupations was in shortage after considering a set of indicators based on changes in the demand for labour.
- 9.242 As a consequence of this and the corroborating top-down shortage data, we did not include these occupations on our shortage occupation list.
- 9.243 Eurocom provided evidence on shortages within the video games sector, but we did not receive sufficient evidence that the skills required for these posts were so distinct as to justify specific inclusion on the shortage occupation list. Nor did we receive evidence from any other game development companies.
- 9.244 We heard evidence about **boners and meat trimmers**, which fall under the SOC code 5431 – Butchers, meat cutters.
- 9.245 We met with representatives from Dunbia (Sawley), a beef abattoir and beef deboning plant, on a regional visit to the North West; and with a representative from Linden Foods Ltd on a visit to Northern Ireland. We also received a follow-up letter from Linden Foods and a letter from ABP Newry (a large beef processor in Northern Ireland). A letter of support was also received from the British Meat Processors Association.
- 9.246 The occupation is not skilled in our top-down analysis. But it covers a wide range of jobs and the top-down data relating to this occupation are therefore of limited relevance to these jobs. Therefore, we have concentrated on bottom-up evidence.
- 9.247 We heard evidence that there are no formal qualifications for boning and trimming. We were told that it takes at least one year of on-the-job training to start work as a boner but that it takes several more years of practice to become experienced and efficient at it. We considered that within this limited job title we saw sufficient evidence of skill.
- 9.248 This occupation passed on 3 out of 12 shortage indicators. However, as explained above, it was the bottom-up evidence that was of most relevance in this case.
- 9.249 We heard evidence that, due to shortages, less experienced staff were being prematurely promoted and this was resulting in reduced productivity. We were told that it was difficult to source anyone with the right skills and experience from within the EEA. We received evidence that salaries were competitive but that suitable applicants for vacancies were in single figures. We were also told that the most skilled at these jobs came from outside the EEA.
- 9.250 However, the evidence was not of sufficient depth for us to conclude that these job titles should be on the shortage occupation list at this time. We would be prepared to talk with representatives of the industry and in particular with the British Meat Processors Association, who we only heard from in July 2008, with a view to trying to access more relevant evidence.
- 9.251 We received evidence from the Childcare Recruitment Company Ltd about **housekeepers and childminders**, which fall under SOC codes 6231 and 6122 respectively.
- 9.252 Neither SOC code passes our top-down skill indicators. We received bottom-up evidence that soft skills are an important part of these roles. However, while recognising that there may be individuals in these occupations who are skilled at level 3, we did not see evidence that this

- was widespread. Nor did level 3 seem to be a requisite skill to carry out any of the tasks included within these occupations.
- 9.253 We received evidence from Lantra that **veterinary nurses and assistants**, who fall under SOC code 6131, are skilled and in shortage; this included evidence from a survey of practices about recruitment of qualified veterinary nurses. We accept that the occupation is skilled and that veterinary practices are finding it difficult to fill vacancies. However, the low earnings in the occupation are a concern, and survey evidence provided to us suggests that this is one of the reasons for recruitment and retention problems. We consider that there are alternatives for filling shortages other than by employing immigrants, such as improving advertising, increasing pay and addressing a mismatch in expectations between college-trained nurses and practices. On the basis of the evidence we have seen, we do not believe it would be sensible to fill vacancies in this occupation by immigration from outside the EEA.
- 9.254 We received responses to our call for evidence from the Chinese Immigration Concern Committee, the Chinese Takeaway Association and the Llandudno Hospitality Association in relation to **restaurant and catering managers** (1223), **kitchen and catering assistants** (9223), **waiters and waitresses** (9224) and **bar staff** (9225). None of these occupations passed our top-down analysis for skill. The main argument put forward in favour of considering these occupations as skilled was that those working 'front of house' in restaurants needed to have relevant knowledge of the cuisine being served and needed to be able to speak the language predominantly spoken in the kitchen. We do not accept that this is sufficient evidence of skill to level 3.
- 9.255 We also received a response to our call for evidence from GoSkills, the relevant Sector Skills Council, in respect of **traffic planners, transport planners and traffic engineers**. Transport planners and traffic planners are job titles within the SOC code 4134 – Transport and distribution clerks, which is unskilled. The Institute for Employment Research at Warwick University is currently reviewing the SOC classification for the Office for National Statistics and is considering reallocating these categories to SOC major group 2 in the 2010 version of SOC. We therefore did not regard the top-down data for SOC 4134 as relevant in this case.
- 9.256 We received evidence that transport planners, traffic planners and traffic engineers are skilled professionals, operating at NQF level 4 and above. Most have a first degree and a significant proportion a second, Master's, degree.
- 9.257 We also received evidence that research undertaken in 2002, as part of the Transport Planning Skills Initiative (TPSI), and repeated among larger employers in 2007, identified shortages of experienced professionals with at least five years' experience. We were told that the Universities' Transport Partnership (UTP) Employers' Forum repeated part of the TPSI survey in 2007 and this too showed continued shortage.
- 9.258 We were told that the fact that difficulties in recruiting experienced staff continue (as evidenced by the UTP and TPSI work) almost certainly reflects the growth in transport planning. We were told that the companies responding to the UTP research employed 24 per cent more transport planners in 2007 than in 2005, and they had plans to grow by another 24 per cent over the next two years.

- 9.259 We received some evidence that it may be sensible to address this shortage through non-EEA labour. For example, we were told that the nature of virtually all the work of transport and traffic planners and traffic engineers is such that it cannot be done offshore. This is because transport and traffic planners and traffic engineers need an intimate knowledge and understanding of the area for which they are planning or designing. We were also told that there is little opportunity for replacing skilled human resource and that there are a relatively small number of UK students studying full-time for a Master's degree in transport.
- 9.260 However, we noted that the Department for Transport is working with the London Development Agency, the Institution of Highways and Transportation and the Railway Industry Association on a national-level research project – Project Brunel – to identify engineering and planning skills gaps in the road and rail industries. They aim to define the shortage disciplines and level of skill within them, establish supply and demand factors, analyse gaps and identify actions. Project Brunel has not yet reported. We understand that this will happen very shortly – but not in time for the publication of this report. We therefore conclude that it is prudent to examine the findings of the Project Brunel report before fully considering further whether to include transport planners, traffic planners and traffic engineers on our list.
- 9.261 Skillfast-UK, the Sector Skills Council for fashion and textiles, responded to our call for evidence, asserting that various occupations within the **textiles industry** contained skilled jobs. It also argued that, based on its own survey evidence, a subset of these occupations were suffering from shortage. These included jobs in the top-down skilled occupations:
- product, clothing and related designers (SOC 3422) and tailors and dressmakers (SOC 5414). However, Skillfast-UK believed that the need could be met by up-skilling the UK workforce and recruiting within the EEA, so we will not place these occupations on the shortage occupation list at this time.
- 9.262 We received evidence from the Herbmedic Centre Ltd about various **traditional Chinese medicine** practitioner posts (doctor, acupuncturist, herbalist and masseur) which fall under the SOC code for therapists n.e.c. (3229) and also clinic manager, falling under the SOC code for healthcare practice managers (1183). However, we did not receive any evidence to suggest that there is a national shortage within these occupations as opposed to a local one.
- 9.263 A large number of other job titles and occupations were drawn to our attention in relation to the shortage occupation list. In a minority of cases it was put to us that these occupations should not be included. In the other cases we did not receive adequate evidence in support of these suggestions and so they have not been considered for inclusion. The job titles and occupations, together with their SOC codes included the following.
- 1112 Directors and chief executives of major organisations;
- Various job titles falling under 1121 production, works and maintenance managers;
- 1123 Managers in mining and energy;
- 1137 Research and development managers;
- 1135 Personnel, training and industrial relations managers;
- 1142 Customer care managers;

1212 Natural environment and conservation managers;

Textile chemist within 2111 Chemists;

2112 Biological scientists and biochemists;

General practitioners within 2211 Medical Practitioners;

2423 Management consultants, actuaries, economists and statisticians;

2422 Management accountants;

3531 Estimators, valuers and assessors;

3562 Personnel and industrial relations officers;

Instructor, technical within 3563 Vocational and industrial trainers and instructors;

5221 Metal machining setters and setter-operators;

5315 Carpenters and joiners;

5412 Upholsterers;

5419 Textiles, garments and related trades n.e.c.;

Various job titles within 5491 Glass and ceramics, makers, decorators and finishers;

5492 Furniture makers, other craft woodworkers;

Plant foreman within 8119 Process operatives n.e.c.;

Various job titles within 8114 Chemical and related process operatives;

8124 Energy plant operatives;

8136 Clothing cutters;

8137 Sewing machinists; and

8133 Routine inspectors and testers.

Chapter 10:



Results

10.1 Introduction

10.1 In this chapter we draw together the analysis of individual occupations covered in Chapters 6 to 9 to provide our first recommended shortage occupation list for the UK under Tier 2 of the Points Based System (PBS) for immigration. We also set out some occupations we plan to examine in further detail over the six months following the publication of this report.

10.2 The UK shortage occupation list

10.2 We listed some factors that are beyond our remit (for instance, national security considerations) in Chapter 8. Those specific issues aside, we believe this list represents the best and most comprehensive analysis to date of skilled occupations where shortages would sensibly be filled by immigrants in the UK.

10.3 **Our recommended shortage occupation list for the UK is set out in Table 10.1.** The Government will announce in due course whether it is going to accept our recommendations.

10.4 The number of occupations and jobs included on this list is larger than the last (July 2008) shortage occupation list produced by the UK Border Agency (UKBA). This is almost inevitable. The primary focus of that process was on a limited number of sectors – human and animal health, engineering, teaching, hospitality and information, technology

and electronics. We have examined the entire labour market. However, the occupations on our list account for approximately 700,000 UK-born and immigrant employees in the UK, well below the figure of over 1,000,000 employees covered by the July 2008 UKBA list (it should be noted that we are often dealing with specific job titles, making it difficult to calculate precise numbers).

10.5 The Scotland shortage occupation list is provided in Chapter 11.

Table 10.1: Recommended UK shortage occupation list for Tier 2 of the PBS, September 2008

Related occupation title and SOC code (see notes 1 and 2)	Job titles included on the shortage occupation list	Other information: skill levels and review timescales (see note 3)
Managers in construction (1122)	ONLY the following job title within this occupation: project manager for property development and construction (see 'Other information')	The individual must lead on a project or combination of projects that would amount to a large financial responsibility (at least several £million). See Chapter 9 for further details.
Civil engineers (2121)	ALL job titles within this occupation, including the following: public health engineer, rail engineer, drainage engineer, structural engineer, water engineer, geotechnical engineer, geotechnical design engineer, geotechnical specialist, tunnelling engineer, marine engineer, mining engineer, mining geotechnical engineer, petroleum engineer	
Physicists, geologists and meteorologists (2113)	ONLY the following job titles within this occupation: geologist, geological engineer, hydrogeologist, geophysical specialist, geological advisor, geological analyst, geological associate, geophysicist, geoscientist, geosupport engineer, contaminated land engineer, geoenvironmental engineer, reservoir panel engineer, rock mechanics engineer, soil mechanics engineer, geomechanics engineer, landfill engineer, contaminated land specialist, geoenvironmentalist	
Chemical engineers (2125)	ALL job titles within this occupation, including the following: chemical engineer, petrophysicist	

Table 10.1: Recommended UK shortage occupation list for Tier 2 of the PBS, September 2008 (*continued*)

Related occupation title and SOC code (see notes 1 and 2)	Job titles included on the shortage occupation list	Other information: skill levels and review timescales (see note 3)
Medical practitioners (2211) and Dental practitioners (2215)	ONLY the following job titles within these occupations: consultants in the field of psychiatry; consultants with the following job titles only: anaesthetics and intensive care, chemical pathology, clinical neurophysiology, clinical oncology, dermatology, genito-urinary medicine, haematology, immunology, neurology, occupational medicine, oral and maxillo-facial surgery, orthodontics, paediatrics, paediatric dentistry, plastic surgery, renal medicine	Review over the next six months.
Veterinarians (2216)	ONLY the following job title within this occupation: veterinary surgeon (see 'Other information')	The individual must be registered as a member of the Royal College of Veterinary Surgeons to work in the UK.
Biological scientists and biochemists (2112), Psychologists (2212), Pharmacists/ pharmacologists (2213), Medical radiographers (3214), Pharmaceutical dispensers (3217), Medical and dental technicians (3218), Occupational therapists (3222), Speech and language therapists (3223) and Therapists n.e.c. (3229)	ONLY the following job titles within these occupations: audiological scientist (within 2112); band 6 and above biomedical scientist (within 2112); state registered scientist in cytogenetics (within 2112); clinical psychologist (within 2212); pharmacist (within 2213); ultrasonographer (within 3214); HPC registered radiographer (within 3214); pharmacy technician (within 3217); audiologist (within 3218); occupational therapist engaged at band 7 or 8 of the Agenda for Change scale or their independent sector equivalents (within 3222); speech and language therapist employed or engaged at band 7 or 8 or their independent sector equivalents (within 3223); orthoptist (within 3229); and band 7 dietician (within 3229)	Review over the next six months.

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table 10.1: Recommended UK shortage occupation list for Tier 2 of the PBS, September 2008 (continued)

Related occupation title and SOC code (see notes 1 and 2)	Job titles included on the shortage occupation list	Other information: skill levels and review timescales (see note 3)
Secondary education teaching professionals (2314)	ONLY the following job title within this occupation: secondary education teacher within the subjects of maths and science	
Quantity surveyors (2433)	ALL job titles within this occupation	
Nurses (3211)	ONLY the following job titles within this occupation: registered nurse employed or engaged at band 7 or 8 of the Agenda for Change scale or their independent sector equivalents; registered nurse at band 5 or above employed or engaged in the following specialties: operating theatre nurse, anaesthetic nurse, operating department practitioner, scrub nurse, theatre nurse, critical care (nurses working in critical units with a level 2 or 3 classification)	Review over the next six months.
Engineering technicians (3113)	ONLY the following job title within this occupation: aircraft component manufacturing engineer	
Dancers and choreographers (3414)	ONLY the following job title within this occupation: skilled ballet dancer (see 'Other information')	For this job to be skilled, dancers must reach the standard required by internationally recognised UK ballet companies (e.g. Birmingham Royal Ballet, English National Ballet, Northern Ballet Theatre, the Royal Ballet and Scottish Ballet).

Table 10.1: Recommended UK shortage occupation list for Tier 2 of the PBS, September 2008 (*continued*)

Related occupation title and SOC code (see notes 1 and 2)	Job titles included on the shortage occupation list	Other information: skill levels and review timescales (see note 3)
Ship and hovercraft officers (3513)	ALL job titles within this occupation (see 'Other information')	The individual must hold a Certificate of Equivalent Competency from the Maritime and Coastguard Agency, indicating qualification to a level equivalent to Officer of the Watch certification or above.
Pipe fitters (5216)	ONLY the following job title within this occupation: high integrity pipe welder (see 'Other information')	The individual must have three or more years' documented evidence of related on-the-job experience.
Lines repairers and cable jointers (5243)	ONLY the following job title within this occupation: electricity transmission overhead linesworker	
Chefs, cooks (5434)	ONLY the following job title within this occupation: skilled chef (see 'Other information')	'Skilled' requires that the individual is earning at least £8.10 per hour after deductions for accommodation, meals, etc.
Care assistants and home carers (6115)	ONLY the following job title within this occupation: skilled senior care worker (see 'Other information')	'Skilled' requires that the individual is earning at least £8.80 per hour after deductions for accommodation, meals, etc. OR there is a requirement for senior care workers to be qualified at National Qualifications Framework level 3 or above (currently only the case in Scotland and Wales).

Table 10.1: Recommended UK shortage occupation list for Tier 2 of the PBS, September 2008 (continued)

Related occupation title and SOC code (see notes 1 and 2)	Job titles included on the shortage occupation list	Other information: skill levels and review timescales (see note 3)
Animal care occupations n.e.c. (6139)	ONLY the following job title within this occupation: skilled work rider (see 'Other information')	There must be documentary evidence that the individual has three or more years' paid experience in this job, at a level equivalent to NVQ level 3, for this job to be skilled. See Chapter 9 for further details of job responsibilities. The individual must also be licensed by the British Horseracing Authority.
Fishing and agriculture related occupations n.e.c. (9119)	ONLY the following job title within this occupation: skilled sheep shearer (see 'Other information')	The individual must hold the British Wool Marketing Board bronze medal (or equivalent) or above and there must be documentary evidence that the individual has worked at this level for three years for the job to be skilled.

Notes: (1) n.e.c. indicates an occupation that includes job titles not elsewhere classified in the SOC2000. (2) For official job descriptions relating to 4-digit occupations in the SOC2000, see www.statistics.gov.uk/methods_quality/ns_sec/downloads/SOC2000_Vol1_V5.pdf. (3) Timings are indicative. We may review any occupation at any time.

10.3 What next?

- 10.6 If the Government accepts our recommended list, we expect it to become operational when Tier 2 of the PBS is launched later this year. We also believe that the Government will ask us to keep the list under regular review.
- 10.7 We plan to partially review the list within the next six months, to carry out subsequent partial reviews, and to fully review the list, including new top-down data analysis, at least every two years.
- 10.8 However, our overriding intention is to be flexible to the changing needs of the economy and labour market, and responsive to the Government and other stakeholders. We may recommend more frequent changes to the list if appropriate. We will publish our recommendations.
- 10.9 We will review the healthcare-related occupations listed in Table 10.1 over the next six months. Over the same period, based on the top-down analysis of skill and shortage in Chapters 6 and 7, we plan to examine the following occupations in order to assess whether they have shortages of skilled labour that might sensibly be filled by immigrant labour. All these occupations were classed as skilled and passed on at least 50 per cent of the available shortage indicators:
- Moulders, core makers, die casters (SOC 5212);
 - Photographers and audio-visual equipment operators (3434);
 - Musicians (3415);
 - Welding trades (5215);
 - Dispensing opticians (3216);
 - Hairdressing and beauty salon managers and proprietors (1233);
 - Midwives (3212);
 - Metal machining setters and setter-operators (5221);
 - Computer engineers, installation and maintenance (5245); and
 - Steel erectors (5311).
- 10.10 The above list is not exhaustive. We may recommend inclusion, or removal, of any occupation from the list at any time if (a) we believe there is a robust case for doing this and (b) our work plan, as set by the Government, allows us to do this. We will maintain a list of occupations that we are reviewing at any given time and publish it on our website: www.ukba.homeoffice.gov.uk/mac.



The Scotland list

11.1 Background

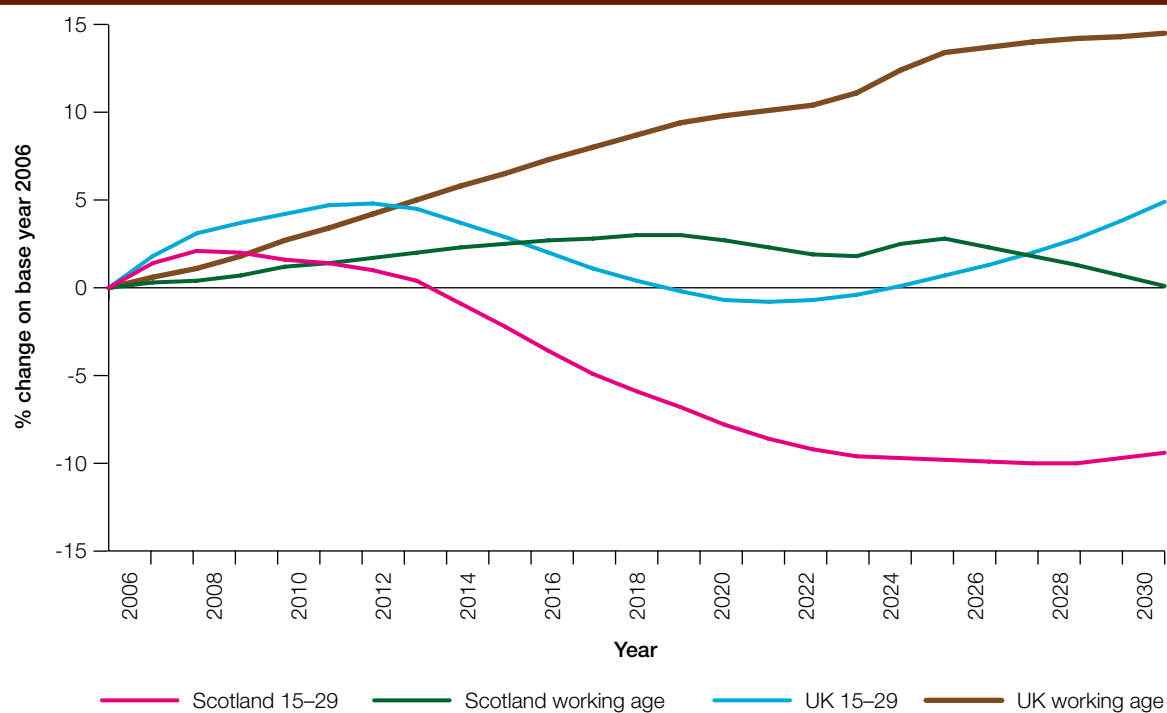
- 11.1 The Government asked us to produce a separate shortage occupation list for Scotland, in addition to the list covering the whole of the UK.
- 11.2 The UK Border Agency's (UKBA's) consultation document on the development of the Points Based System (PBS) – UKBA, 2005 – set out Scotland's specific need for managed migration:

“Scotland, for reasons both of economic growth and social development, needs to address its predicted population decline and changing demographic profile... There will be fewer people of working age to contribute to the economy, and an increase in the number of older people. This population change will affect the supply and demand for public services and economic development in Scotland. Scotland therefore wants managed migration. In particular Scotland wants to attract the skills and talent to ensure the long-term sustainability of its economy.”

Demography and labour market

- 11.3 As of mid-2006, official estimates put Scotland's population at around 5.1 million people, compared with a UK total population of 60.6 million (Government Actuary's Department (GAD), 2008). The population of Scotland decreased by 1.6 per cent between 1981 and 2005 and projections in 2003 estimated Scotland's population to fall below 5 million by 2017.
- 11.4 However, official projections for 2006 estimate Scotland's population to increase less rapidly than the population of the UK as a whole (GAD, 2008):
- 2006–11: Scotland's population projected to increase by 1.6 per cent compared with 3.7 per cent in the UK; and
 - 2006–16: Scotland's population projected to increase by 2.8 per cent compared with 7.3 per cent in the UK.

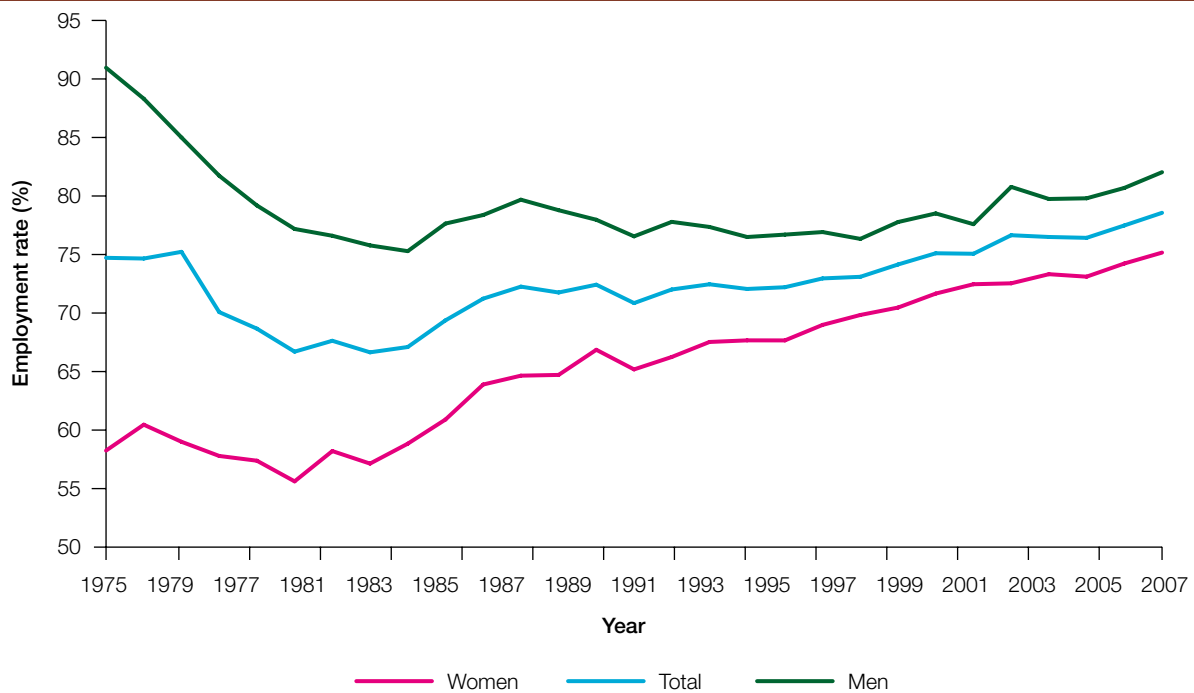
Figure 11.1: Projected population change for Scotland and the UK, 2006–2030



Note: Principal projections from base year 2006; working-age population 16–64 (males), 16–59 (females).
Source: GAD (2008).

- 11.5 The working-age population as a proportion of the total population in Scotland is very similar to the UK as a whole. In 2006, 62.8 per cent of the population were aged 16–64 (males) and 16–59 (females) compared with 62.1 per cent in the UK as a whole (GAD, 2008). But in Scotland, the working-age population is projected to rise less rapidly than in the UK, including among the 15–29 age group, as shown in Figure 11.1.

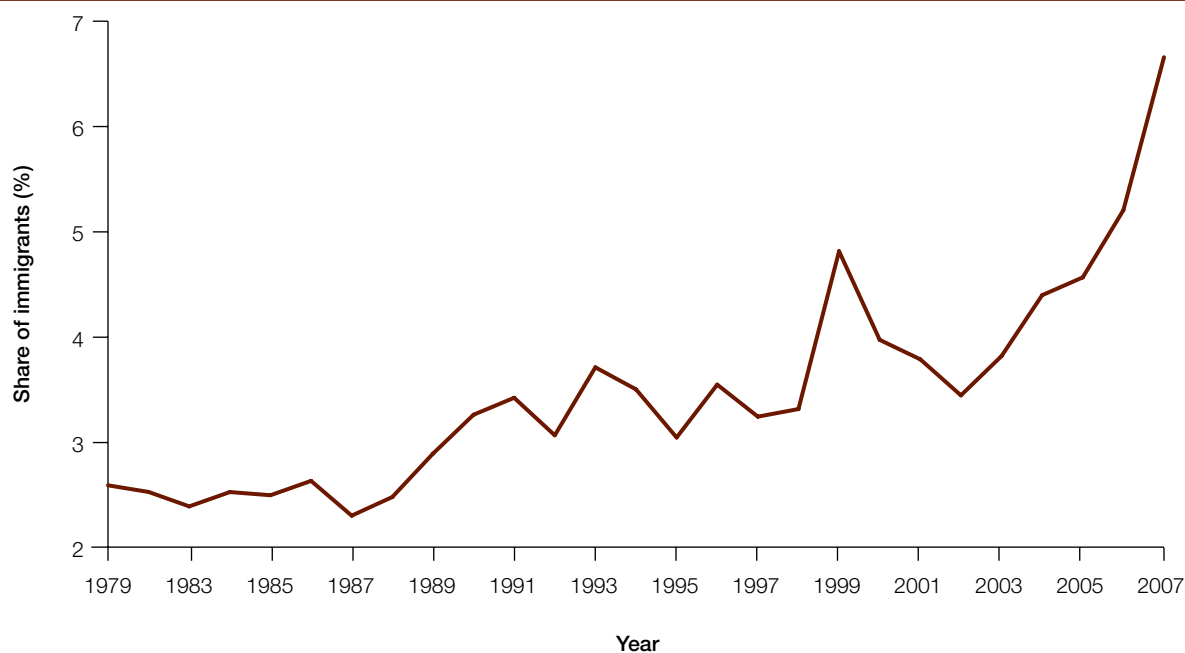
Figure 11.2: Employment rate in Scotland, 1975–2007



Note: Employment rate among population of working age (16–64 males, 16–59 females), excluding students. Based on 2003 Labour Force Survey (LFS) population weights. Data for men and women are not available for 1979.
 Source: (LFS) (1975–2007).

11.6 Figure 11.2 shows the evolution of the aggregate employment rate, alongside that for men and women for Scotland, from 1975 to 2007. Since the end of the last recession, there has been a steady rise in employment. Currently, the total employment rate is slightly higher than that for the UK taken as a whole (see Chapter 1 for corresponding charts for the UK).

Figure 11.3: Share of immigrants (working-age population) in Scotland, 1979–2007



Note: Share of immigrants among population of working age (16–64 males, 16–59 females), excluding students. Based on 2003 LFS population weights. Source: LFS (1979–2007).

- 11.7 As in the rest of the UK, immigration to Scotland has risen strongly since the mid-1990s. While immigrants still account for less than 7 per cent of the working-age population in Scotland, compared with 13 per cent in the UK as a whole, this is three times higher than the level observed 20 years ago (see Figure 11.3).

Box 11.1: Fresh Talent: Working in Scotland Scheme

The Fresh Talent: Working in Scotland Scheme (FT:WiSS) was launched in June 2005 to enable non-EEA graduates from a Scottish higher or further education institution to stay and work in Scotland for up to two years after completing their studies. The scheme was subsumed within the post-study category within Tier 1 of the new PBS in June 2008.

The aims of the initiative are to:

- address the projected falling population by encouraging and enabling people to relocate to Scotland, allowing international students to remain in Scotland for two years after graduation, and other measures;
- boost the international element of Scottish life and the economy; and
- promote Scotland as an ideal place to live, study, work and do business.

Through the scheme, over 8,000 international graduates from Scottish universities and colleges have taken the opportunity to apply to stay in Scotland at the end of their studies. The scheme is part of wider efforts to attract workers to Scotland from around the world. Work is under way to promote Scotland in a number of key markets, including in the European accession states. For instance, Scotland is the Place maintains a Polish version of its website at www.szkocja.eu.

Source: FT:WiSS web pages at www.scotlandistheplace.com.

11.8 Scotland does not have a separate migration policy from the UK as a whole. It does, however, have a specific initiative to enable graduates from outside the European Economic Area (EEA) to stay and work in Scotland: the Fresh Talent scheme described in Box 11.1.

Employers' survey for Scotland

11.9 Employer-survey information specific to Scotland is available from the Skills in Scotland survey (Futureskills Scotland, 2007). The latest survey interviewed around 6,300 Scottish employers in summer 2006. The questionnaire differs from the English equivalent, the National Employers Skills Survey (NESS), but they share some key questions, including the definitions of a 'hard-to-fill vacancy' and a 'skill-shortage vacancy'. There are some slight differences between the two surveys, for example the NESS interviews

establishments with two or more employees, while the Skills in Scotland survey interviews those with one or more employees. However, the methodologies are sufficiently similar to allow comparison.

11.10 The sample size is not sufficient to report occupations at the 4-digit level; however, we can examine aggregate results in comparison with the NESS. The most recent Scottish survey was in 2006, whereas the most recent NESS is for 2007. The Skills in Scotland survey indicated that around 20 per cent of all workplaces carry at least one vacancy and 5 per cent report skill shortages (Futureskills Scotland, 2007). Table 11.1 shows the results for Scotland and England by major occupational groups within the Standard Occupational Classification (SOC).

Table 11.1: Employers' surveys for Scotland and England

Occupations (major groups)	Scotland (Skills for Scotland survey)			England (NESS)		
	SSVs per 1,000 employees	% SSVs of all vacancies	% SSVs of HTFVs	SSVs per 1,000 employees	% SSVs of all vacancies	% SSVs of HTFVs
Managers and senior officials	11	59	90	6	21	73
Professionals	13	34	60	2	28	78
Associate professionals	19	40	73	7	22	81
Administrative staff	8	28	73	14	12	67
Skilled tradespeople	17	45	63	3	37	77
Personal service staff	8	14	44	14	21	61
Sales and customer service staff	9	25	64	8	15	65
Machine operatives	7	23	50	4	24	71
Elementary staff	8	20	50	7	15	56
All occupations	11	30	63	4	21	71

Note: SSVs are skill-shortage vacancies; HTFVs are hard-to-fill vacancies. Data for Scotland relate to 2006, whereas data for England are for 2007.

Source: Futureskills Scotland survey (2006); NESS (2007).

11.11 The highest numbers of skill-shortage vacancies (SSVs) reported in Scotland per thousand employees are for associate professionals, skilled trades and professionals. Across all occupations, Scottish firms report almost three times as many skill-shortage vacancies per thousand employees as employers in England. The number of skill-shortage vacancies as a proportion of employment is particularly high for associate professionals, skilled trades and professionals, both relative to other occupations in Scotland and relative to

England. The differential between Scotland and England is smaller when looking at the number of skill-shortage vacancies as a percentage of all vacancies. When we look at the number of skill-shortage vacancies as a proportion of the number of hard-to-fill vacancies, the UK actually has a higher proportion than Scotland. Scottish employers clearly report more vacancies than their English counterparts, but it is less clear whether skill shortages are a more significant reason for vacancies in Scotland than in England.

11.2 Process for producing the Scotland list

11.12 By definition, a UK list includes Scotland, meaning that the UK shortage occupation list will apply to Scotland as well as to the rest of the UK. Our work plan requires us to produce a separate shortage occupation list for Scotland. This list will consist of occupations where a convincing case that a shortage of skilled labour that can sensibly be filled by immigrants exists in Scotland, but where a convincing case has not been made for the UK as a whole.

11.13 In addition to the questions we asked UK employers about skilled, shortage and sensible, we asked Scottish employers what efforts were being made to recruit people from elsewhere in the UK and the reasons why those efforts were not proving successful.

11.14 We relied heavily on bottom-up evidence, because our ability to carry out top-down analysis at a detailed occupational level was extremely limited. Insufficient sample sizes for Scotland meant that we could not replicate the analysis of the LFS, the Annual Survey of Hours and Earnings and skill survey data we conducted at the UK level. Administrative data on Jobcentre Plus unfilled vacancies and claimant counts are available at the 4-digit level, but these indicators would fulfill only one of our four groups of shortage indicators. Although not sample survey statistics, reliability is still a concern for these indicators because of small numbers at the 4-digit level.

11.15 We sought evidence specific to Scotland through visits and meetings with employers and other organisations in Scotland, in addition to the evidence submitted to us following our call for evidence. Evidence received from stakeholders in Scotland also played a role in helping us to assess whether shortages exist at the UK level.

11.16 We met with officials from the Scottish Executive and Futureskills Scotland early on in our work and have continued to work with them since. We had constructive exchanges with Futureskills Scotland, which is part of Scottish Enterprise and Highlands and Islands Enterprise (Scotland's main economic development agency, funded by the Scottish Government) and responsible for carrying out the Skills in Scotland survey. Futureskills Scotland aims to:

- analyse the Scottish labour market to inform policymaking in Scotland and further afield;
- improve the availability, quality and consistency of labour market information and intelligence across Scotland; and
- work closely with Careers Scotland to provide the organisation and its clients with labour market information.

Stakeholder meetings

11.17 We held the fourth meeting of the Migration Advisory Committee (MAC) in Glasgow on 28 March 2008. We visited a number of employers around Glasgow and Aberdeen the day before:

- First Group plc, Aberdeen;
- Offshore Contractors Association, Aberdeen;
- Freshcatch Ltd, Aberdeen;
- Harlequin Leisure, Glasgow;
- Southern Cross, Glasgow; and
- Golden Jubilee, Glasgow.

11.18 In addition, we hosted a lunch event for Scottish employers and other organisations to gather further evidence. Attendees at this lunch are listed in Annex D.

11.19 We also received responses from individuals, employers and other bodies in Scotland to our call for evidence. Among the organisations and individuals that presented written evidence to the Committee specifically about Scotland were:

- the Scottish Government Health Workforce Directorate;
- NHS Grampian;
- NHS Education for Scotland;
- the North Scotland Industries Group;
- Scottish Enterprise; and
- the Scottish Fishermen's Federation.

11.20 We also received other responses to our call for evidence which, while not exclusively focused on Scotland, had relevance to Scotland, for example in relation to the offshore oil and gas industry.

11.21 We also sought Scottish perspectives through the Stakeholder Forum that we set up to facilitate direct contact between ourselves and stakeholders. The forum held its first meeting on 9 May 2008, to which we invited the Confederation of British Industry Scotland, the Scottish Chamber of Commerce, the Scottish Trades Union Congress, the Scottish Executive and Futureskills Scotland.

11.3 Stakeholder evidence

11.22 As noted earlier, we were extremely limited in our ability to conduct top-down analysis at the necessary level of detail. We also encountered some scepticism over the value and reliability of aggregate skill survey data, with some participants reporting a far higher level of shortages than those reflected in national-level data.

“A bottom-up approach must be given a higher degree of importance as broad-based statistics do not give an accurate picture of what is happening in a particular skills area at a particular time.”

Response to the MAC's call for evidence from Internationally Trained Nurses, North of Scotland

11.23 In this section we discuss some specific issues that were raised with us in relation to Scotland. First, however, it is important to note that some of the evidence we received mirrored what we were told about occupations in the rest of the UK. This is reflected in those occupations included on the UK shortage occupation list. For instance, many of the specialist shortages reported to us in the health sector in Scotland were replicated across those same specialisms in the rest of the UK. However, we have considered additional specialisms for inclusion on the Scotland shortage occupation list. We also received Scotland-specific evidence for engineering and catering sectors that featured in our considerations for the UK.

11.24 We received a range of responses addressing a number of different issues. Some of the issues that struck us with particular force or were raised on a number of occasions by different stakeholders are outlined in more detail below. These form part of the backdrop to our consideration of the occupations for the Scotland list.

Impact of the offshore oil and gas industry

11.25 In the north of Scotland some employers reported problems with recruiting and retaining local labour when the nearby offshore oil and gas industry is able to offer more competitive wages. In some cases, this also impacts on firms' ability

to train up local workers, as the demand for suitable candidates from the oil and gas industry is high. This was an issue for Fresh Catch, who employ fish filleters, discussed in Section 11.4. The high demand for skilled workers by the oil and gas industry in Scotland, and the resulting increases in wages, was corroborated by discussions with the UK Oil and Gas Forum.

Pay and conditions

11.26 Some stakeholders expressed concern that the factors influencing policy decisions do not always hold true for Scotland. It was felt that pay differentials between Scotland and the rest of the UK were not accounted for in the new PBS for immigration, which made recruiting and retaining immigrants more difficult. Even when they could be recruited, immigrant workers often headed south or joined the offshore oil and gas industry quite soon thereafter. A number of stakeholders reported that they could not offer higher wages without having to pass on these increased costs to their customers, resulting in a loss of business. There were also problems with recruiting staff to jobs with long hours or difficult working conditions.

Rural and remote areas

11.27 We were told of particular problems in recruiting staff, particularly experienced staff, for employers located in rural and remote areas across all sectors and occupations. There were also problems in settling the families of staff in these locations.

11.28 Naturally, some of the above factors will work in combination with each other. For instance, in its report for Scottish Enterprise Grampian on the skill needs in the Peterhead energy project, Ekos (2007) found that:

“There was no unanimity on the main reasons for recruitment difficulties. There was a degree of consensus around:

- *the lack of skill/experience/qualifications of applicants;*
- *higher wages available elsewhere – specifically Aberdeen or offshore;*
- *the remoteness of Peterhead and the travel difficulties this entails.”*

11.4 Occupational evidence

11.29 In this section we discuss those occupations where we have received evidence pertaining to skilled, shortage and sensible that is specific to Scotland. For these occupations a convincing case was not made that these occupations ought to be included on the shortage occupation list for the UK.

Food, drink and tobacco process operatives (SOC 8111)

11.30 We are including the job titles manual fish filleters and machine trained operatives and quality controllers on the shortage occupation list for Scotland.

11.31 We visited Fresh Catch, a pelagic fish (mackerel and herring) processing plant in Aberdeen and later received a response to our call for evidence. Two specific jobs were identified as being in shortage: manual filleters of frozen fish and machine trained operatives and quality controllers.

11.32 This occupation does not score as skilled on our top-down evidence. However, we received evidence that an assessment by Improve (the Sector Skills Council for the food and drink sector) carried out on the above job titles at Fresh Catch rated them all at level 3. We were told that Improve stated that these jobs required *“individuals who have been at least three years in training and probably many more years*

- of experience in order to conduct these operations with the skills, attention to detail and ability to work at a considerable throughput i.e. highly productive.”*
- 11.33 We received evidence that the Scottish Seafood Training Association also assessed the pelagic fish operatives at level 3. Ninety per cent of Fresh Catch’s sales are for export (mainly to Japan) and its customers have very exacting specifications requiring specialist processing skills. For instance, due to the properties of pelagic fish, spoilage will occur very quickly if the fish are improperly handled. The job requires frozen fish to be filleted with great care at temperatures of minus 24 degrees. Pin-boning of defrosted fish using tweezers requires an extremely keen eye and attention to detail.
- 11.34 Fresh Catch told us that it has had huge difficulties in sourcing the highly skilled workers it needs from the local area or wider EEA. Previously it employed skilled immigrants from outside the EEA using a UKBA Sectors Based Scheme but since this scheme was closed to all but Bulgarian and Romanian nationals, it has been unable to recruit the required number of workers. The company told us that as a result of this it was only able to get enough skilled workers to operate a day shift during the 2007 herring season, resulting in an extreme drop in production capacity.
- 11.35 Fresh Catch told us that, as with other employers in the area, the demand for offshore workers by the oil and gas industry restricts the availability of skilled staff who can be trained for these jobs. The salaries offered by the oil and gas industry to similarly skilled workers are almost double what Fresh Catch can offer.
- 11.36 Fresh Catch told us that it is losing business due to a shortage of skilled staff. It is one of the largest processors of pelagic fish in Europe but may have to cease production during the coming season if it cannot source the necessary staff.
- 11.37 Improve commissioned research which found that *“there is a shortage of traditional craft skills i.e. butchery, baking and fish processing across the sector as a whole. The sector also struggles to attract new recruits at all levels from elementary, craft skilled, professional and graduate levels due to poor image as a low skilled, poor working condition and low wage industry.”*
- 11.38 We were told that Improve is working with the Sea Fish Industry Authority and employers to make a fish sector pathway available within the suite of food manufacturing qualifications, to help address the domestic skill shortage.
- Nurses (SOC 3211)**
- 11.39 We are including the job title ‘nurses in care of the elderly units at bands 5 and above’ on the shortage occupation list for Scotland.
- 11.40 We received evidence that nurses working within care of the elderly units should be included on the Scotland list. We had evidence in the form of correspondence from, and also discussions with, Internationally Trained Nurses, NHS Grampian, NHS Education for Scotland and the Scottish Government Health Workforce Directorate.
- 11.41 As set out in Chapter 9, nurses at bands 5 and above are skilled.
- 11.42 Internationally Trained Nurses, North of Scotland told us that the shortage of nurses in care of the elderly units was a longstanding problem, with a shortage of registered nurses applying for posts

in this specialty combined with a lack of experienced nurses in this job sector. They said that the Grampian region, for example, currently has a 40 per cent shortage of experienced nurses in care of the elderly units. They reported that wards had been closed and staff redeployed as a result of this shortage.

11.43 We received evidence that health authorities are putting in place improved and targeted training to allow nurses to progress more quickly into specialist areas. We were told that a staff nurse development programme placed newly qualified nurses in wards for one year to gain greater experience. However, we were told that these nurses required more supervision from experienced nurses, thus exacerbating immediate resourcing problems.

11.44 We also received evidence relating to shortages of nurses working in operating theatres and critical care. These occupations have been placed on the UK shortage occupation list.

Speech and language therapists (SOC 3223)

11.45 We received evidence relating to speech and language therapists from the Scottish Government Health Workforce Directorate. It told us that this occupation is skilled above level 3, which is corroborated by our top-down analysis.

11.46 Table 11.2 shows the NHS Information Services Division Scotland's workforce data for this occupation, which show reasonably high levels of vacancies in comparison with staff in post, corroborating what we were told about difficulties recruiting speech and language therapists.

Table 11.2: NHS Information Services Division Scotland's vacancy data for speech and language therapists, 2007

Occupation	Staff in post	Total vacancies	Vacancies as % of staff in post	Vacancies vacant for 3+ months
All allied health professional staff	8,951.5	453.4	5.1	180.8
Speech and language therapists	941.8	48.4	5.1	16.7

Note: Data as at 30 September 2007.

Source: NHS Information Services Division Scotland's Scottish Workforce Information Standard System workforce data, published at: www.isdscotland.org/isd/796.html

- 11.47 New workforce planning arrangements have been established in Scotland to help match the supply of staff to workforce demand. These arrangements will also be used to consider the training numbers required at national level. However, we were told that identified training schemes and other initiatives to increase the flow of staff into these areas would take a while to have an impact and that the current shortage needed to be met in the short term through immigration.
- 11.48 We are aware that speech and language therapists at Agenda for Change bands 5 and 6 were recommended by the NHS Workforce Review Team for deletion from the UKBA UK shortage occupation list in the most recent round of evidence. We did, however, receive evidence that convinced us to include bands 7 and 8 on the UK list (see Chapter 9). We consider the evidence sufficient to include bands 5 and above (which are skilled to level 3 and above) on the Scotland list.
- 11.49 We also received evidence from the Scottish Government Health Workforce Directorate on medical radiographers, which are included on the UK list.
- 11.50 We also received evidence on nurses in assessment and rehabilitation units and midwives. The evidence received was not sufficient to include these occupations on our shortage occupation list for Scotland at this time, but we will look at these occupations as part of our review of healthcare occupations over the next six months.
- 11.51 For some occupations on the UK list (skilled chefs and skilled senior care workers), we defined skilled jobs within an occupation using an earnings threshold. We examined whether a significant pay differential existed between Scotland and the UK as a whole for these occupations. Using the Annual Survey of Hours and Earnings at the 3-digit level, the differences observed were small. For healthcare and related personal service occupations, earnings were actually slightly higher in Scotland. We therefore decided not to apply different thresholds to Scotland.

11.5 The Scotland shortage occupation list

- 11.52 Our recommended shortage occupation list for Scotland is set out in Table 11.3. As with the UK list, the UK Government will announce in due course whether it wishes to accept our recommendations.
- 11.53 Most of the occupations where a convincing case was made for shortage specifically in Scotland fall under the ‘associate professionals’ category, which is the major group occupation where skill-shortage vacancies accounted for the highest proportion of employment in the Skills in Scotland survey (Futureskills Scotland, 2007).

Table 11.3: Recommended Scotland shortage occupation list for Tier 2 of the PBS, September 2008

Related occupation title and SOC code	Job titles included on the Scotland shortage occupation list	Other information: skill levels and review timescales (see note)
N/A	ALL job titles and occupations on the UK shortage occupation list	See Table 10.1 for more details.
Food, drink and tobacco process operatives (8111)	ONLY the following job title within this occupation: manual filleters of frozen fish; machine trained operatives and quality controllers in the fish processing industry IN SCOTLAND	Individual must have three or more years paid experience in this job for this job to be skilled.
Nurse (3211)	ONLY the following job title within this occupation: nurses in care of the elderly units at bands 5 and above IN SCOTLAND	Review over the next six months.
Speech and language therapists (3223)	ALL jobs within this occupation IN SCOTLAND	

Note: These timings are indicative. We may review any occupation at any time.

11.6 Next steps

- 11.54 The shortage occupation list for Scotland presented in this chapter assumes that immigrants coming through this route into these occupations will be employed only in Scotland. We will remain alert to any practical issues arising from the arrangements for the Scotland list, for example where employers are based both in Scotland and in the rest of the UK.
- 11.55 Futureskills Scotland is in the process of conducting a new employers' survey and we hope to be able to access more up-to-date national-level data about skills and shortages in Scotland in the near future.
- 11.56 As we review particular occupations for the UK, we will continue to review the position in Scotland.

Chapter 12:



Next steps

12.1 Updating and reviewing the list

- 12.1 Assuming that the Government asks us to keep the shortage occupation lists under review, we plan to partially review the shortage occupation lists for Scotland and the UK within the next six months. We will also fully review the lists at least every two years. We may recommend more frequent changes. We will publish our recommendations.
- 12.2 Specific occupations that we plan to review over the next six months were listed in Chapters 10 and 11. We will keep an up-to-date list of occupations that we are reviewing at any time on our website: www.ukba.homeoffice.gov.uk/mac

12.2 Stakeholder input

- 12.3 Stakeholder input is essential to the evidence base on which we are working to advise the Government. We will continue to hold periodic meetings of our Stakeholder Panel and Forum, to visit employers and other stakeholders, and hold other events.
- 12.4 We may issue further formal calls for evidence in the future. However, evidence may be submitted to us at any time. Our contact details are provided on the inside front cover of this report. But before submitting evidence, please see our comments below.

- 12.5 Some excellent written evidence was submitted to us for this report, and we are grateful for this, especially given that the timescales for our call for evidence were tight and this first iteration of the shortage occupation list has been a learning process for all involved. In recognition of the difficulties, in this report we have sometimes drawn on evidence that was not submitted strictly within our desired format, but where relevant information could be extracted. Future written evidence submitted should meet our criteria as set out below.

- 12.6 If you are submitting evidence, please could you:

- provide details of your name, address, contact details and (where applicable) the organisation you are representing; and
- provide full and specific evidence to support any claims, but also an easily digestible summary.

- 12.7 If you are submitting evidence that a job title or occupation should be considered for inclusion on (or non-inclusion on or removal from) the shortage occupation lists for the UK or Scotland, please could you also:

- specify which specific occupations⁵ and job titles,⁶ according to the Standard

⁵ For a list and description of occupations at the 1- to 4-digit level, see Office for National Statistics (ONS) (2000a): www.statistics.gov.uk/methods_quality/ns_sec/downloads/SOC2000_Vol1_V5.pdf

⁶ For a complete list of job titles, see ONS (2000b): www.statistics.gov.uk/methods_quality/ns_sec/downloads/SOC2000_Vol2_V6.pdf

Occupational Classification 2000 (SOC2000) at the 4-digit level your evidence relates to. If you believe that the area of skilled shortage does not neatly map onto the SOC2000, please make this clear, but also state what you believe the closest match within the SOC2000 to be; and

- set out explicitly how the occupation or job title satisfies *each* of our criteria in relation to ‘skilled’, ‘shortage’ and ‘sensible’ as described in this or subsequent Migration Advisory Committee publications.

12.3 Future research

12.8 We set out some of our potential future research plans in Chapters 6, 7 and 8. These included:

- looking in more detail at how skill might be defined and measured at the occupational level, and whether any improvements can be made to our methodology for identifying skilled occupations;
- informing our approach to shortage through research into the weighting and selection of indicators, the supply of skilled labour within the European Economic Area (EEA), regional shortages within the UK, and the relationship between shortage and the economic cycle at the occupational level;
- exploring in more detail when and where non-EEA immigrants may sensibly fill gaps in the labour market, including how employing non-EEA immigrants impacts on (a) employers’ incentives to find alternative solutions to skill shortages, (b) the productivity of resident workers, and (c) employment, the economy and the public finances; and

- ‘inside the firm’ research into how employers used the work permit system, possibly as part of a ‘before and after’ study and also examining how and why employer and employee behaviour has evolved following the introduction of the Points Based System.

12.4 Evaluation

12.9 Our research programme will allow us to evaluate, and thus potentially improve, our approach to identifying skilled occupations where shortages might sensibly be filled by migration. We will use the data available to us to assess the impact that the shortage occupation list is having on migration flows, and believe that high-quality management information should be collected for this purpose. We also believe that the Points Based System should be evaluated rigorously and we would be happy to be involved in this process.

12.5 Other MAC work

12.10 Finally, this report is focused on our work to develop the shortage occupation lists. However, the Government has indicated that it may, from time to time, ask us to advise on other matters in relation to migration. We will publish reports on other issues that the Government asks for our independent view on as required.

- A.1 Since there is no pre-existing classification of occupations that are skilled to National Qualifications Framework (NQF) level 3⁷ (or equivalent) or above, we need to develop our own. This annex supplements Chapter 6 of this report by describing in further detail the method used to identify occupations that are skilled to level 3 and above (or equivalent) using top-down indicators.
- A.2 The top-down indicators are derived from national-level data sources. The broad framework for the top-down approach to identifying skilled occupations was described in the February report of the Migration Advisory Committee (MAC, 2008b). We have, however, developed and refined our approach with input from a number of colleagues and organisations, particularly those who were present at a workshop we held in April. We are grateful for all the feedback and advice we received.
- A.3 This annex is structured as follows:
- Section A.1 describes the approach used in more detail;
 - Section A.2 contains information on the indicators and classifications for ‘skilled’;
 - Section A.3 presents results for the first stage of the analysis;
 - Section A.4 present results for the second stage of the analysis;

- Section A.5 presents the initial list of skilled occupations; and
- Section A.6 lists all the 353 occupations at 4-digit level, showing the occupations identified as ‘skilled’ and our top-down indicators.

A.1 Approach

- A.4 In our February report, we outlined a number of indicators which we would use to identify a skilled occupation. These were:

- the link between the Office for National Statistics’ Standard Occupational Classification (SOC2000) and skills;
- qualifications; and
- earnings.

With the addition of the following indicators, primarily available through bottom-up evidence:

- on-the-job training or experience; and
- innate ability.

- A.5 These remain our key indicators. However, we confirm our initial view that the final two cannot be assessed through available national data sources. We must rely on bottom-up evidence about on-the-job training and innate ability to supplement this initial list with further occupations and job titles that we can regard as skilled.

⁷ The skill level required by Tier 2 of the Points Based System is NVQ level 3 or equivalent. The NQF matches equivalent qualifications. We are therefore interested in skill level 3 in the NQF.

- A.6 In the February report we also discussed some research by Peter Elias and Kate Purcell (2004) of the Institute for Employment Research at Warwick University on the link between the SOC2000 and skills. Although they were interested in graduate-level occupations, their work provided a pre-existing classification of skilled occupations: a benchmark against which we could calibrate our own analysis.
- A.7 Our starting points were therefore the three top-down indicators of qualifications, earnings and the SOC skill level, together with the research by Elias and Purcell into classifying graduate occupations. The 'top-down' analysis was split into two distinct stages:
- stage one – this stage tested the validity of the starting points against each other. The question asked is: How good are our indicators at replicating a pre-existing classification of 'skilled'? It also confirmed Elias and Purcell's list of graduate occupations against our indicators; and
 - stage two – the three indicators were used to add occupations that are skilled to level 3 or above to the Elias and Purcell 'graduate' list. A decision rule was devised for combining indicators, and a number of iterations were tested and resulting classifications assessed.

Box A.1: Elias and Purcell (2004) 'graduate' classification

This box gives a brief overview of the research by Elias and Purcell (2004) to classify graduate occupations at the SOC2000 4-digit level. This research looked at changing levels of qualifications in the workforce for occupations, together with survey evidence to create a classification of graduate occupations at the 4-digit level, which they term SOC(HE). The classification also used fine-grained evidence acquired in the course of work to develop the SOC2000 for the Office for National Statistics.

They identified 148 of the 353 4-digit occupations as graduate level and classified those graduate occupations into four groups, described in Table A.1.

The authors undertook criterion validation of the classification against a survey of employees about the appropriateness of their occupations for someone with a degree. The classification was also validated against earnings and job satisfaction, on the basis that, on average, graduates in graduate jobs will earn more and report more positive aspects about their jobs than graduates in non-graduate jobs. On both assessments of validity, the SOC(HE) classification showed a clear distinction between graduate and non-graduate jobs, though less so for the 'niche' graduate occupations.

This validation is important, as it provides a classification that is calibrated against employees' actual experiences.

Table A.1: Description of Elias and Purcell ‘graduate’ classifications

Classification	Description	Examples	No.
<i>Traditional</i>	The established professions, where entry is traditionally via undergraduate degree	Solicitors; medical practitioners; biological scientists	25
<i>Modern</i>	Newer professions where graduates have been entering since educational expansion in the 1960s	Directors, chief executives (major organisations); software professionals; computer programmers; authors/writers/journalists	29
<i>New</i>	New or expanding occupations where the entry route recently changed to be via undergraduate degree programmes	Marketing and sales managers; management accountants; countryside/ park rangers	34
<i>Niche</i>	The majority of incumbents are not graduates; however, there are stable or specialist niches within the occupation which require higher education, skills and knowledge	Leisure and sports managers; nurses and midwives; retail managers	60
Total			148

Note: The number of occupations falling into each graduate classification is shown in the final column.
Source: Elias and Purcell (2004).

A.2 Indicators and classifications

A.8 This section gives more detailed background information on the indicators and classifications used.

The link between SOC and skills

A.9 The UK SOC2000, in line with international standards (ISOC-88), is based on two elements. The first is the job: the kind of work performed, defined as a set of tasks or duties to be carried out by one person. The second element is skill, which is the ability to carry out the tasks and duties in a competent manner. Skill, in turn, depends on two factors. First, it depends on skill level, the complexity of the tasks and duties performed. Second, it depends on the skill specialisation in the field of knowledge required for competent conduct of sets of tasks.

A.10 The SOC2000 has four skill levels based on the time required to become fully competent, the time taken to gain the necessary formal or work-based training, and the experience required. The SOC2000 includes an assessment of the level of skill required by each of the 353 4-digit occupations. According to the SOC2000 manual:

“Skill levels are approximated by the length of time deemed necessary for a person to become fully competent in the performance of the tasks associated with a job. This, in turn, is a function of the time taken to gain necessary formal qualifications or the required amount of work-based training. Apart from formal training and qualifications, some tasks require varying types of experience, possibly in other tasks, for competence to be acquired” (ONS, 2000a).

A.11 These four skill levels are described in Table A.2. The SOC is structured in terms of skill, so it is possible to allocate occupations at the 2-digit level to each skill level.

Table A.2: SOC skill level classifications

Level	Description	SOC 2-digit occupations	No.
4	‘Professional’ occupations and managerial positions in corporate enterprises or national/local government. Occupations at this level normally require a degree or equivalent period of relevant work experience	11 – Corporate managers 21 – Science and technology professionals 22 – Health professionals 23 – Teaching and research professionals 24 – Business and public service professionals	76
3	Require a body of knowledge associated with a period of post-compulsory education, but not to degree level	12 – Managers and proprietors in agriculture and services 31 – Science and technology associate professionals 32 – Health and social welfare associate professionals 33 – Protective service occupations 34 – Culture, media and sports occupations 35 – Business and public service associate professionals 51 – Skilled agricultural trades 52 – Skilled metal and electrical trades 53 – Skilled construction and building trades 54 – Textiles, printing and other skilled trades	142
2	Require knowledge provided via a good general education, but typically have a longer period of work-related training or work experience	41 – Administrative occupations 42 – Secretarial and related occupations 61 – Caring personal service occupations 62 – Leisure and other personal service occupations 71 – Sales occupations 72 – Customer service occupations 81 – Process, plant and machine operatives 82 – Transport and mobile machine drivers and operatives	100
1	Require competence associated with a general education, usually acquired by the time a person completes his/her compulsory education	91 – Elementary trades, plant and storage-related occupations 92 – Elementary administration and service occupations	35

Note: The number of occupations falling into each skill level is shown in the final column.
Source: ONS (2000a).

Qualifications

- A.12 This indicator, based on data from the Labour Force Survey (LFS), describes the percentage of all employees in an occupation that are qualified to level 3 or above. As a validity check in stage one of the analysis, we also considered employees qualified at degree level or equivalent.
- A.13 The indicator was drawn from a pooled data set for the LFS covering the eight quarters of 2006 and 2007. This pooling increases the number of observations, improving the accuracy of estimates, as we are interested in occupations at the 4-digit level. Owing to the semi-panel design of the LFS, individuals are in a data set for five consecutive quarters. As this indicator is derived from a sample survey, it is subject to sampling error. This is taken into account in the analysis. Because of the panel design of the LFS, the sampling error is increased, in comparison with a simple random sample, by the presence of individuals surveyed more than once.
- A.14 In terms of the working population at present, approximately 45 per cent are qualified to NQF level 3 or above.

Earnings

- A.15 This indicator is based on data from the Annual Survey of Hours and Earnings (ASHE). It describes the median hourly wage (or equivalent, where a salary is paid) for all employees in an occupation.
- A.16 Data were drawn from the 2007 ASHE survey. This is also a sample survey, and the indicator is therefore subject to sampling error. We were not able to obtain the data necessary to calculate confidence intervals. For some occupations, figures were unavailable owing to large sampling errors. If the mean was available, this was used. In the remaining cases, we decided to give an occupation the ‘benefit of the

doubt’ on this indicator, and assume it passed the required threshold.

- A.17 We estimated that the median hourly earnings for all employees is £10.14 per hour. This indicator is not normally distributed. It is truncated at the lower end by the minimum wage (currently set at £5.52 for 22-year-olds and over and £4.60 for 18–21-year-olds), and there is a ‘tail’ at the upper end of very high-earning occupations. We therefore looked at the distribution of earnings in terms of rank of occupations by earnings.

A.3 Graduate-level occupations

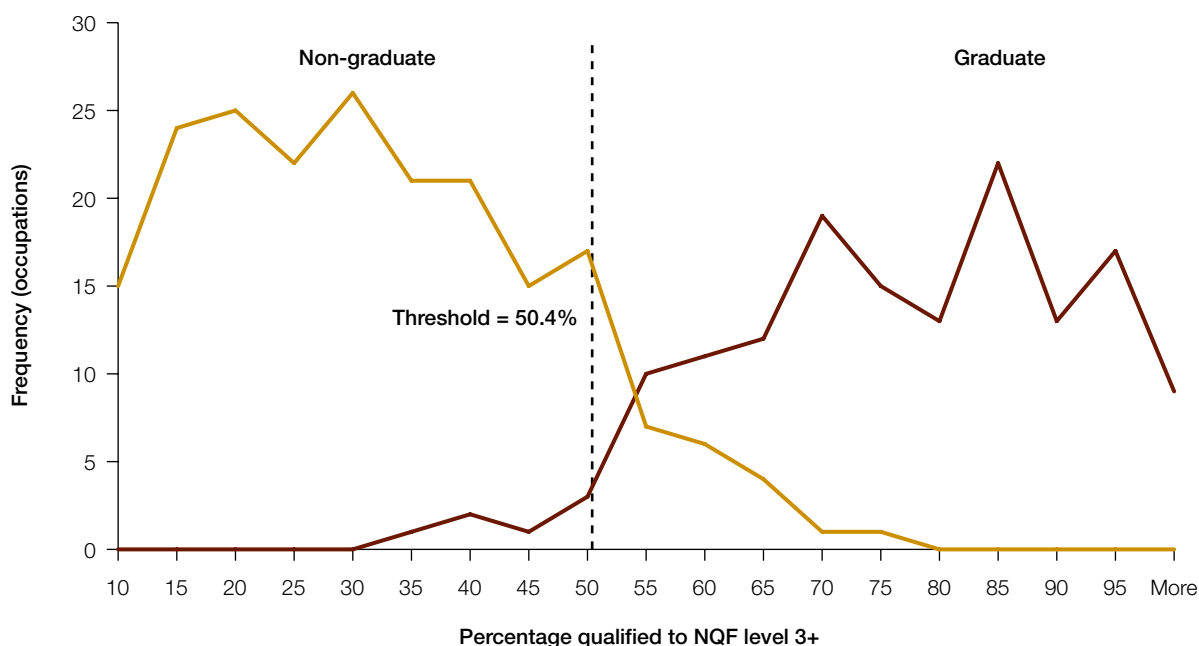
- A.18 This section describes the methodology for validating our starting points and presents results on the degree of corroboration between our indicators and the Elias and Purcell (2004) classification.
- A.19 The main aim of this stage was to understand the properties of the indicators we chose and how we might combine them to identify which of the 353 SOC 4-digit occupations could be regarded as skilled to level 3 or above (or equivalent). This was done by corroborating each indicator against a pre-existing classification for ‘skilled’ occupations – the ‘graduate’ occupations identified by Elias and Purcell (2004). Taking a well researched pre-existing classification which had involved primary or ‘bottom-up’ evidence in addition to ‘top-down’ indicators had two advantages. First, we had an existing list of skilled occupations to work from, albeit defined at graduate level rather than level 3+. Second, it provided a test of our indicators: if they were good at predicting the ‘graduate’ occupations, we could be reasonably confident that they would be good indicators with which to extend the list of graduate occupations to include those skilled to level 3+.

A.20 The validation exercise looked at the distributions of the graduate occupations on each indicator. If an indicator was a perfect predictor of graduate occupations, the distribution of graduate occupations would be completely separate from that of non-graduate occupations. To put it another way, there would be a threshold above which all occupations were graduate, and below which all occupations were non-graduate. In practice, single

indicators are not likely to be perfect predictors, and we would expect 'errors' on each side of the threshold where occupations are misclassified on that indicator.

A.21 Figure A.1 gives an example of how the distributions can be analysed in this way and highlights where the errors occur. This figure shows the distribution of 'graduate' and 'non-graduate' occupations for our qualifications indicator.

Figure A.1: Distribution of 'graduate' occupations according to the qualifications indicator



Note: 'Graduate' and 'non-graduate' as defined by Elias and Purcell (2004).
 Source: Migration Advisory Committee (MAC) calculations based on the LFS (2006 and 2007).

A.22 For each indicator, a threshold was identified so that the majority of occupations above the threshold were classified as 'graduate', and the majority below as 'non-graduate'. As the indicators are not normally distributed, we used a non-parametric approach⁸ to identify the optimum thresholds on each indicator. This basically amounts to counting the errors on each side of a proposed threshold. The analysis tested three possible thresholds according to the distribution of errors on each side of the threshold:

- 'equal' – a threshold with approximately equal numbers of errors on each side;
- 'best' – a threshold with the lowest number of errors overall; and
- 'low' – a threshold where lower numbers of graduate occupations are misclassified than non-graduate.

Table A.3: Obtaining thresholds for classifying graduate occupations

Threshold option	Threshold for graduate	Misclassified graduate occupations No. (per cent)	Misclassified non-graduate occupations No. (per cent)	Total misclassified occupations No. (per cent)
SOC skill level				
Best*	SOC levels 3 and 4	3 (2)	73 (35.6)	76 (22)
Median hourly earnings for all employees				
Low	Above £10.83	17 (11.5)	48 (23.4)	65 (18.4)
Best	Above £11.41	24 (16.2)	31 (15.1)	55 (15.6)
Equal	Above £11.74	29 (19.6)	29 (14.1)	58 (16.4)
Percentage qualified to NQF level 4 or above				
Low	Above 27.5%	4 (2.7)	18 (8.7)	22 (6.5)
Best	Above 29.1%	9 (6.1)	13 (6.3)	22 (6.2)
Equal	Above 30%	12 (8.1)	12 (5.9)	24 (6.8)
Percentage qualified to NQF level 3 or above				
Low	Above 50.4%	9 (6.1)	20 (9.8)	29 (8.2)
Best	Above 57.8%	19 (12.8)	7 (3.4)	26 (7.3)
Equal	Above 54.8%	14 (9.5)	14 (6.8)	28 (7.9)

*Since it is a categorical indicator, only one threshold for SOC skill level can sensibly be defined.

⁸ Logit and probit functions were also tested, with similar results to the 'best' option, although for qualifications it is clear that the differing shapes of distributions have an impact upon the thresholds obtained and therefore a non-parametric approach was considered more robust.

A.23 Results for each possible threshold are presented in Table A.3. It is clear that the qualifications indicator is a good predictor of graduate occupations, with a small number of occupations misclassified using that indicator alone. The earnings indicator is less accurate, but nevertheless correctly classifies over 80 per cent of occupations. As a categorical variable, the SOC skill level is a fairly blunt instrument. Nevertheless, it classifies just under 80 per cent of occupations correctly.

A.24 To decide which threshold to use, we took into account the fact that we would lower the thresholds in stage two to add occupations that were skilled to level 3+. Therefore, it seemed sensible to reduce the number of errors on the graduate side of the distribution, thereby including as many of the graduate occupations as possible. The 'low' threshold was therefore chosen.

A.25 The main conclusion we drew at this stage was that all three of our indicators are reasonably good at classifying 'skilled' occupations, with the qualifications indicator being the most accurate. In using the indicators for stage two, we implicitly took forward most of the occupations that Elias and Purcell (2004) classified as 'graduate'. The thresholds obtained in this stage were lowered and, together with a decision rule to combine indicators, used to add occupations that are skilled to level 3+ to the graduate occupations.

A.4 Identifying occupations at level 3 and above

A.26 The corroboration exercise in stage one satisfied us that the indicators we have chosen are good enough proxies for 'skilled' to develop an initial list of skilled occupations.

A.27 The purpose of stage two was to use the indicators to extend the list of graduate

occupations to those that are skilled to level 3+ or equivalent. This was done by lowering the thresholds for each indicator and applying a decision rule for combining the indicators.

A.28 The thresholds obtained in stage one can sensibly be interpreted as upper limits to the range we might consider in choosing thresholds for indicators. We would expect that the threshold for the level 3+ qualifications indicator should be below 50.4 per cent, the threshold for pay should be below £10.83 per hour (at 2007 prices), and the threshold for SOC skill level should be at level 3 or below.

Selecting a decision rule for combining indicators

A.29 In choosing a decision rule for combining indicators, it is necessary to take into account:

- the theoretical basis for combining indicators; and
- the correlation (or otherwise) between the indicators.

A.30 The relative importance of indicators could also be accounted for in the decision rule; however, any weighting of indicators would also be affected by the stringency of thresholds defined. We have not, therefore, explicitly weighted the indicators in addition to setting thresholds.

A.31 We discussed some of the theoretical issues in our February report (MAC, 2008b). Earnings, for example, are not necessarily a premium for skills alone – other factors such as dangerous work or unsocial hours can attract a premium wage in an otherwise less skilled job. Similarly, some jobs may attract people who are 'over-qualified' for the job. Temporary jobs undertaken by students, such as bar work or shelf stacking, can account for some of these. In others, where

labour supply outstrips demand, employers may discriminate between applicants on the basis of qualifications, even if they are not required to do the job. It is therefore clear that classifying an occupation as skilled on the basis of one indicator would not be sound.

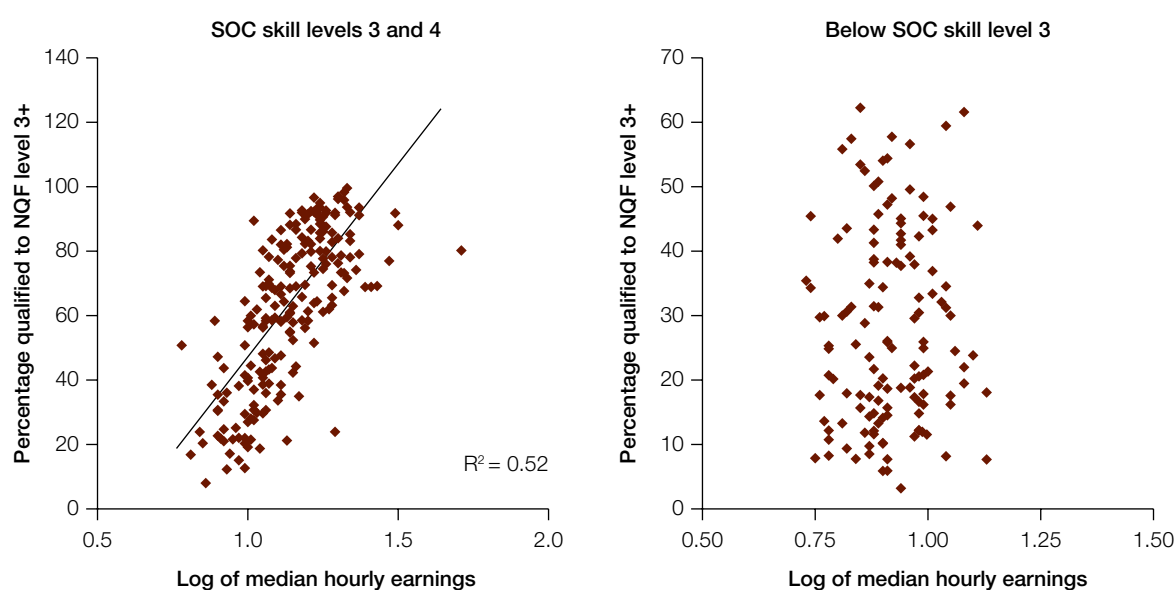
A.32 Could we say that an occupation must pass both qualifications and earnings thresholds to be classified as skilled? It is unlikely that an unskilled job will attract both a premium wage and qualifications. However, there are examples of skilled jobs where we might anticipate either qualifications to be lower than expected (for example, owing to innate ability being the main requirement) or wages to be lower than expected (for example, owing to an occupation being primarily in the public sector).

A.33 The SOC skill level is useful to corroborate these indicators, to act as a backstop for a limited number of outlying occupations that for some reason fail either qualifications

or pay indicators. Although it does not explicitly relate to level 3+, it is a classification that has been developed with fine-grained bottom-up data and may indicate some of the inconsistencies in the other top-down indicators for particular occupations. It should act in this way if there is a good correlation between qualifications and earnings.

A.34 We would expect a good correlation between the indicators of skill, and this is indeed the case (Figure A.2). There is a correlation between qualifications and earnings at SOC skill levels 3 and 4. Employers are willing to pay a premium for well-qualified employees for jobs that require those qualifications. There is some evidence that employers will pay a premium for skills, even if they are not required for the job (Elias and Purcell, 2004). It is interesting to note that the link between qualifications and earnings is not found for the lower skill levels 1 and 2.

Figure A.2: Correlation between earnings and qualifications at SOC skill levels 3 and 4 and levels 1 and 2



Note: The percentage qualified in each occupation is shown against log of earnings. Because of the distribution of the earnings indicator, the log of earnings better illustrates the correspondence with qualifications. Charts are divided between occupations at SOC skill level 3 and above, and those below skill level 3.

Source: Qualifications from LFS (2006 and 2007); log of earnings from ASHE (2007).

A.35 Given that we have no theoretical basis for weighting indicators, and given a good correlation between the two interval indicators at the skill levels we are interested in, we have chosen a default decision rule: **if an occupation passes two or more of our three indicators, we define it as skilled.**

A.36 As a check, let us apply this to the thresholds obtained in stage one for graduate occupations.⁹ These thresholds predict graduate occupations very accurately and, crucially, far better than an individual indicator alone: five graduate occupations are misclassified and 30 non-graduate occupations are misclassified, giving an overall accuracy of 90 per cent. The decision rule is clearly more

lenient than an individual indicator as it misclassifies more non-graduates, so we need to bear this in mind when setting thresholds. The five graduate occupations failing the indicators using the decision rule are shown in Table A.4. Most of these fall into the ‘niche’ graduate classification, which includes occupations where niches of skilled jobs exist within an occupation that is not wholly skilled. It is likely that these niches are not necessarily reflected in national-level indicators at the 4-digit level. We did not choose to assume that these occupations are skilled because they are in the SOC(HE) graduate classification, as niche job titles within otherwise less skilled occupations can be added through bottom-up evidence.

Table A.4: Graduate occupations failing two or more thresholds at the graduate level

			% qualified to...			
SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC)	Degree level or above	NQF level 3 or above	Median hourly earnings (£)
5414	Tailors and dressmakers	Niche	3	29.21	43.70	8.37
3414	Dancers and choreographers	New	3	28.76	35.96	.
1163	Retail and wholesale managers	Niche	4	22.03	40.67	10.10
1224	Publicans and managers of licensed premises	Niche	3	16.66	35.46	8.00
4137	Market research interviewers	Niche	2	35.78	54.04	7.90

Note: Median hourly earnings figures for dancers and choreographers are unavailable for reasons noted in paragraph A.16 (i.e. large sampling errors).

Source: LFS (2006 and 2007); ASHE (2007); ONS (2000); Elias and Purcell (2004).

⁹ For consistency with the main stage two results, this is applied using the same robustness principles used in the analyses for stage two, discussed in Section A.5.

Defining thresholds for each indicator

A.37 Corroborating our indicators against the Elias and Purcell SOC(HE) classification provided an external reference point on which to calibrate our indicators. However, this was at the graduate level, so the thresholds obtained can provide an upper limit to thresholds we can consider for level 3+.

A.38 We do not have any existing reference point for level 3 or equivalent. This skill level covers both academic and vocational qualifications and is not as commonly understood as the notion of graduate. It was not possible to undertake a comparable validation exercise to that for graduate occupations, which would be more complicated and perhaps less reliable for level 3. We must therefore recognise that, without an external reference point, a degree of judgement is required. However, a key test of our approach is the sensitivity of the analysis to different thresholds.

A.39 To define thresholds we also took into account the distributions of the three indicators across all occupations, and for the workforce. Specifically:

- approximately 45 per cent of the working-age population, and 50 per cent of the working-age population in employment, have level 3+ qualifications;

- the median pay per hour for all employees is £10.14; and
- SOC skill level 3, although not directly associated with NQF level 3, relates to occupations normally requiring a period of post-compulsory education, either formally or through significant work experience on the job.

A.40 A number of options for thresholds were identified which, together with the decision rule, resulted in differing numbers of graduate occupations. In working through iterations it became clear that, once the decision rule is applied, the list of occupations is not overly sensitive to small changes in the thresholds.

A.41 The limited sensitivity of the approach to different thresholds reflects the correlation of our indicators of skill.

Combining indicators

A.42 For simplicity and because of the limited sensitivity to differing thresholds, we preferred to select nearest round numbers. The thresholds we finally selected are shown in Box A.2.

Box A.2: Thresholds for defining a skilled occupation

An occupation is defined as skilled at the 4-digit level if it satisfies *two or more* of the following:

- **50 per cent** or more of the workforce are qualified to NQF level 3 (or equivalent) or above;
- median hourly earnings for all employees are **£10** or more; and
- the occupation is defined as **skill level 3 or 4** in the SOC2000. In practice this means that it belongs to the following '1-digit' occupational groups: managers and senior officials; professional occupations; and associate professional and technical occupations.

A.43 Without taking account of any robustness measures, the result of applying the thresholds and the decision rule is that 182 occupations are classified as skilled to NQF level 3 and above. Table A.5 shows the number of 4-digit occupations passing the thresholds for the indicators.

Table A.5: Number of indicators of ‘skilled’ passed by SOC(HE)

Number of indicators passed	SOC(HE) classification		Total
	Non-graduate	Graduate	
0	103	0	103
1	64	4	68
2	30	15	45
3	8	129	137
Total	205	148	353

Source: MAC analysis.

A.44 However, as noted in Section A.1, the qualification and earnings indicators are based, respectively, on the LFS and ASHE surveys and are therefore subject to sampling error. Pooled extracts from these surveys have been used, which reduces errors for the majority of occupations. But some occupations have low numbers of employees and therefore standard errors are substantially higher.

A.45 We decided to account for these errors in making the final classification. On balance, we felt that for these occupations, the risk of exclusion from the ‘skilled’ list was greater than the risk of inclusion of unskilled occupations. We did not want to exclude an occupation on the basis of small numbers in that occupation. Therefore,

in addition to the 182 occupations that passed without the robustness checks, we added ten on the following basis:

A.46 That **two or more** of the following indicators are met:

- the upper 95 per cent confidence interval for the qualifications indicator passes the 50 per cent threshold;¹⁰
- median hourly earnings for all employees are £10 or more. Where ASHE data were omitted because they were unreliable, the mean hourly earnings were used. Where the mean was also not available, the earnings indicator was assumed to pass the threshold;¹¹ and
- the occupation is SOC skill level 3 or 4.

¹⁰ The cross-correlation between quarters of the LFS has not been accounted for in the standard errors; however, analysis of this showed low variation between occupations for this indicator. Including this in the calculation could reduce slightly the number of occupations that pass on the confidence interval.

¹¹ Full ASHE data were not available to us in time to calculate the standard errors by occupation. The table at occupational level omitted figures for those occupations where small numbers meant that data were unreliable.

A.47 These occupations are listed in Table A.6 below.

Table A.6: Graduate occupations excluded from skilled occupations list

SOC2000 4-digit Identifier		SOC(HE)	Skill level (SOC)	Percentage qualified to NQF level 3 or above	Median hourly earnings (£)
1233	Hairdressing and beauty salon managers and proprietors	Non-graduate	3	48.68	.
3217	Pharmaceutical dispensers	Non-graduate	3	47.21	7.99
3311	Non-commissioned officers (NCOs) and other ranks	Non-graduate	3	42.22	.
3414	Dancers and choreographers	New	3	35.96	.
3441	Sports players	Non-graduate	3	31.64	.
3513	Ship and hovercraft officers	Non-graduate	3	49.26	.
4142	Communication operators	Non-graduate	2	46.90	11.35
5414	Tailors and dressmakers	Niche	3	43.70	8.37
5495	Goldsmiths, silversmiths, precious stone workers	Non-graduate	3	42.95	.
8124	Energy plant operatives	Non-graduate	2	43.96	12.99

Note: Earnings data are missing for some occupations for reasons noted in paragraph A.16.
Source: LFS (2006 and 2007); ASHE (2007); ONS (2000a); Elias and Purcell (2004).

A.5 The initial list of skilled occupations

- A.48 This section presents some descriptive analysis of the initial list of skilled occupations against the top-down indicators used to identify them. It concludes by highlighting some potential issues.
- A.49 The final list of 192 occupations accounts for approximately 52 per cent of all 4-digit occupations and contains approximately 49 per cent of the UK workforce. We have, therefore, classified about half of the occupations and half the workforce as skilled to NQF level 3 or above.

Graduate occupations – SOC(HE)

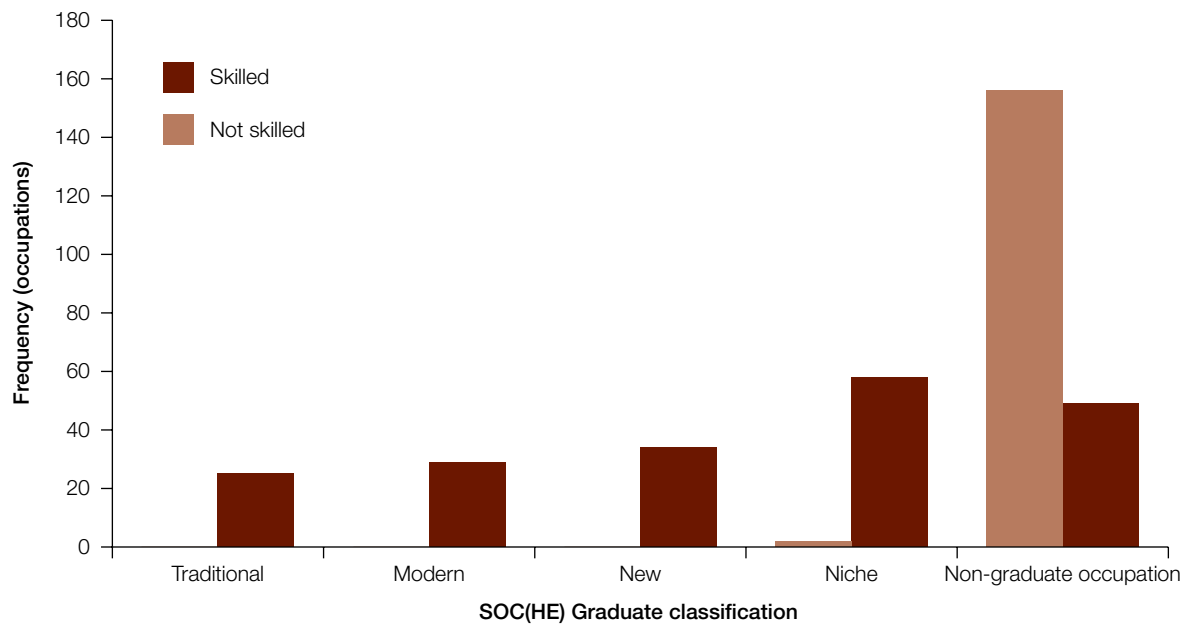
A.50 Table A.7 shows the two graduate occupations excluded from the ‘skilled’ list by this analysis. Forty-six of the non-graduate occupations have been classified as skilled, which amounts to approximately 22 per cent of all the non-graduate occupations. Figure A.3 presents the distribution of skilled occupations by the SOC(HE) classification.

Table A.7: Graduate occupations excluded from skilled occupations list before robustness checks

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC)	Percentage qualified to NQF level 3 or above	Median hourly pay (£)
1224	Publicans and managers of licensed premises	Niche	3	35.46	8.00
4137	Market research interviewers	Niche	2	54.04	7.90

Source: LFS (2006 and 2007); ASHE (2007); ONS (2000a); Elias and Purcell (2004).

Figure A.3: Distribution of skilled occupations by SOC(HE)

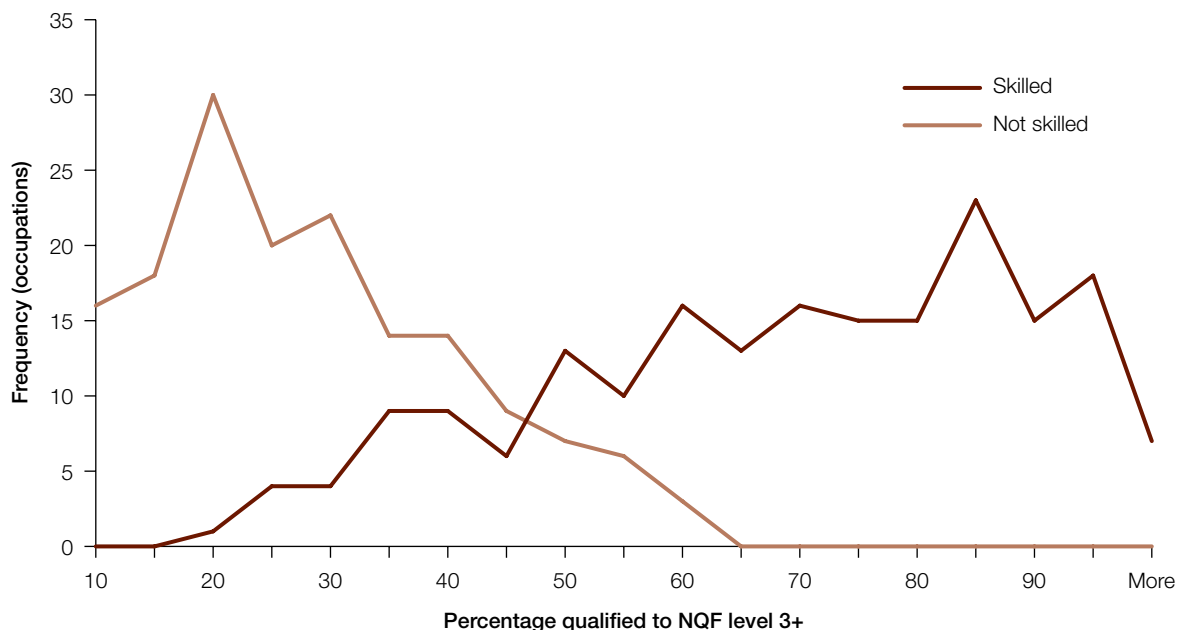


Source: MAC analysis; Elias and Purcell (2004).

Skilled occupations against our indicators

- A.51 The following figures show the distribution of occupations we have preliminarily defined as skilled to level 3+ according to each of the three indicators.
- A.52 The qualifications indicator (Figure A.4) shows more overlap between 'skilled' and 'not skilled' occupations than between 'graduate' and 'non-graduate' discussed earlier. The qualifications indicator is not weighted as much in this skilled analysis, reflecting the fact that at NQF level 3, formal qualifications are perhaps less crucial in determining a skilled occupation than they are at degree level.

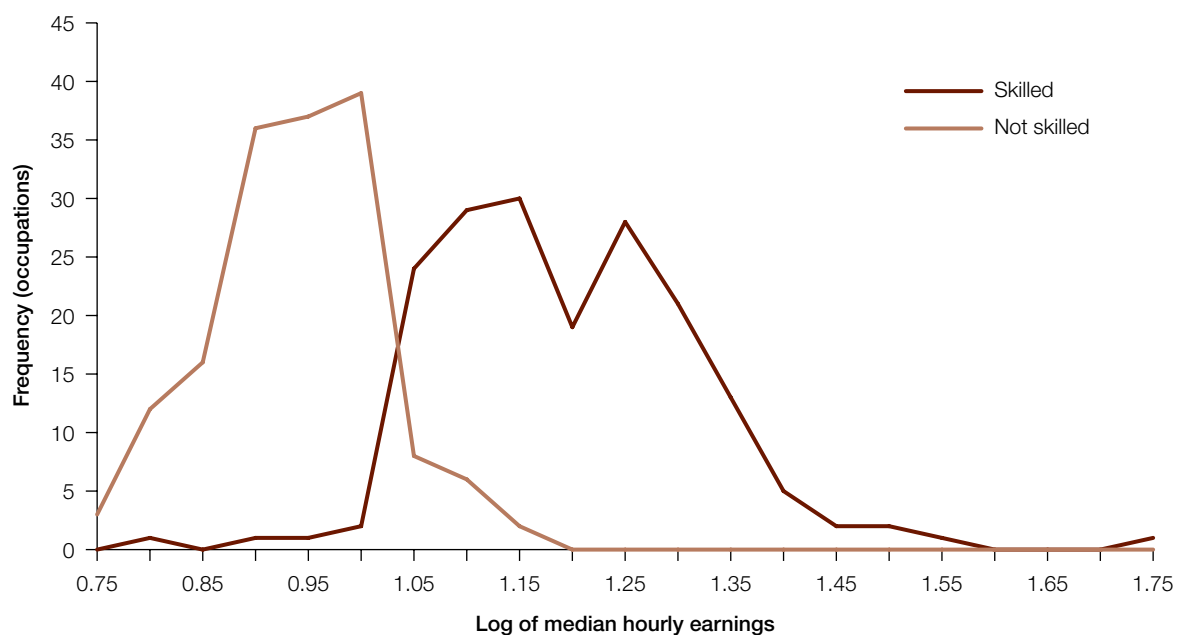
Figure A.4: Distribution of skilled occupations by qualifications



Source: MAC analysis; LFS (2006 and 2007).

A.53 The earnings indicator (Figure A.5) shows a more distinct separation between 'skilled' and 'not skilled' than between 'graduate' and 'non-graduate' discussed earlier.

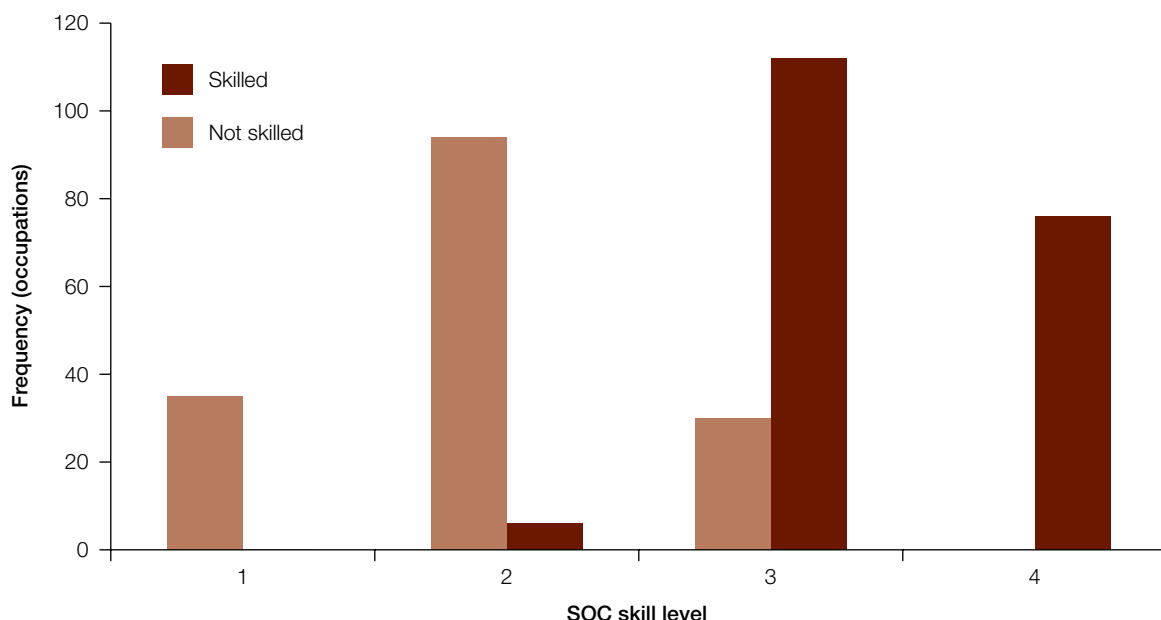
Figure A.5: Distribution of skilled occupations by earnings



Source: MAC analysis; ASHE (2007).

A.54 Finally, we have classified as skilled to level 3+ all the occupations in SOC skill level 4, and over three-quarters of the occupations in SOC skill level 3. In addition, six occupations in SOC skill level 2 have been classified as skilled. We would not expect the skill level structure to exactly match our definition of skilled; however, there may be good arguments for defining as skilled some job titles within the 4-digit occupations at skill level 3 that have not been included in this list.

Figure A.6: Distribution of skilled occupations by SOC skill level



Source: MAC analysis; ONS (2000).

Methodological issues

- A.55 There are a number of potential issues with the indicators we have chosen and some improvements to the methodology that could be made in future.
- A.56 The indicators we have used relate to both full-time and part-time employees. It has been found elsewhere that the earning premium for skilled jobs may be less for part-time workers. Conversely, it has also been found that employers tend to be more

selective in terms of qualifications for part-time workers. It is worth considering in the long term the implications of different levels of full-time and part-time work in an occupation, and particularly the corresponding gender bias towards women in part-time work in some occupations, which may affect the analysis to a small extent.

- A.57 Another issue is that immigrants' qualifications may be underestimated in the qualifications indicators. This would occur because it may be difficult to align foreign qualifications with the equivalent UK qualifications, particularly at sub-graduate level. Thus, some immigrants' level 3 qualifications may be in the 'other qualifications' data, which have not been considered in our analysis.
- A.58 We would like to have taken account of standard errors for ASHE data by using the upper confidence interval in the analysis. Unfortunately, respondent-level data were not made available to us in time to take this into account. Therefore, where data were deemed to be unreliable, they were marked as missing in our data set; this occurred for 14 occupations.
- A.59 Thinking about the definition of 'skilled' occupations in the long term, there are a number of issues that we need to bear in mind. First, our definition of skilled is calibrated against current conditions for both earnings and qualifications. If, for example, we were to repeat the analysis in 10 years' time using the same thresholds, it is likely that more occupations would pass the 'skilled' test owing to inflation in wages and the increasing proportion of the workforce with qualifications at level 3 and above.

- A.60 Second, the SOC2000 is currently being revised for SOC2010, and we will need to monitor how skill levels are dealt with in the new classification. We understand that Elias and Purcell are also improving upon their method of obtaining the SOC(HE) classification, and the implications of any changes to that will also need to be considered.
- A.61 The 'skilled' analysis is not set in stone, but we would expect the skill required for occupations to remain stable in the short and medium term. Therefore, although we will consider refinements to the methodology, and the addition of bottom-up evidence, the skilled list will not be reanalysed in the way in which we expect to do for shortages.

A.6 Table of results

- A.62 Table A.8 presents the indicators of skill for the occupations identified as skilled. Table A.9 presents the indicators of skill for the occupations not identified as skilled. Both tables are sorted by SOC 4-digit codes.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
Corporate managers					
1111	Senior officials in national government	Modern	4	88.0	31.8
1112	Directors and chief executives of major organisations	Modern	4	80.2	50.8
1113	Senior officials in local government	Modern	4	85.3	22.1
1114	Senior officials of special interest organisations	Modern	4	83.9	17.3
1121	Production, works and maintenance managers	Niche	4	62.0	18.6
1122	Managers in construction	Niche	4	61.2	17.8
1123	Managers in mining and energy	New	4	71.7	21.4
1131	Financial managers and chartered secretaries	New	4	69.2	27.0
1132	Marketing and sales managers	New	4	67.6	21.1
1133	Purchasing managers	Niche	4	73.4	20.2
1134	Advertising and public relations managers	Modern	4	78.1	19.2
1135	Personnel, training and industrial relations managers	New	4	78.7	20.5
1136	Information and communication technology managers	Modern	4	78.1	22.0
1137	Research and development managers	Traditional	4	92.1	21.8
1141	Quality assurance managers	Niche	4	74.5	18.0
1142	Customer care managers	Niche	4	61.3	15.8
1151	Financial institution managers	Niche	4	63.2	19.2
1152	Office managers	Niche	4	52.4	14.2
1161	Transport and distribution managers	Non-graduate	4	35.0	14.8
1162	Storage and warehouse managers	Niche	4	35.5	13.0

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
1163	Retail and wholesale managers	Niche	4	40.7	10.1
1171	Officers in armed forces	New	4	74.5	*
1172	Police officers (inspectors and above)	Niche	4	68.9	24.3
1173	Senior officers in fire, ambulance, prison and related services	Niche	4	69.4	19.1
1174	Security managers	Non-graduate	4	55.0	13.7
1181	Hospital and health service managers	Modern	4	91.2	19.5
1182	Pharmacy managers	Traditional	4	89.7	17.6
1183	Healthcare practice managers	Niche	4	59.5	13.6
1184	Social services managers	Modern	4	85.7	19.1
1185	Residential and day care managers	Niche	4	81.2	13.5
Managers and proprietors in agriculture and services					
1211	Farm managers	Niche	3	43.7*	12.0
1212	Natural environment and conservation managers	Modern	3	92.1	17.2
1219	Managers in animal husbandry, forestry and fishing n.e.c.	Non-graduate	3	56.9	*
1221	Hotel and accommodation managers	Niche	3	58.4	10.0
1222	Conference and exhibition managers	New	3	75.5	13.7
1225	Leisure and sports managers	Niche	3	58.4	11.6
1226	Travel agency managers	Niche	3	56.4	10.1
1231	Property, housing and land managers	Niche	3	63.9	16.7
1232	Garage managers and proprietors	Non-graduate	3	33.7	12.5

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
1233	Hairdressing and beauty salon managers and proprietors	Non-graduate	3	48.7*	*
1234	Shopkeepers and wholesale/retail dealers	Non-graduate	3	36.0	11.4
1235	Recycling and refuse disposal managers	New	3	44.2*	14.4
1239	Managers and proprietors in other services n.e.c.	Niche	3	56.2	15.5
Science and technology professionals					
2111	Chemists	Traditional	4	92.4	16.3
2112	Biological scientists and biochemists	Traditional	4	92.2	16.5
2113	Physicists, geologists and meteorologists	Traditional	4	91.8	18.2
2121	Civil engineers	Modern	4	82.2	16.1
2122	Mechanical engineers	New	4	77.7	17.7
2123	Electrical engineers	Niche	4	76.0	18.3
2124	Electronics engineers	New	4	82.8	19.1
2125	Chemical engineers	Modern	4	87.9	*
2126	Design and development engineers	Modern	4	86.1	17.6
2127	Production and process engineers	New	4	69.5	15.6
2128	Planning and quality control engineers	Niche	4	69.1	14.4
2129	Engineering professionals n.e.c.	New	4	73.4	16.4
2131	IT strategy and planning professionals	Modern	4	79.1	23.2
2132	Software professionals	Modern	4	80.1	17.4

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
Health professionals					
2211	Medical practitioners	Traditional	4	93.1	30.8
2212	Psychologists	Traditional	4	99.6	21.4
2213	Pharmacists/pharmacologists	Traditional	4	92.6	18.0
2214	Ophthalmic opticians	Traditional	4	96.2	19.9
2215	Dental practitioners	Traditional	4	91.2	23.6
2216	Veterinarians	Traditional	4	91.3	16.9
Teaching and research professionals					
2311	Higher education teaching professionals	Traditional	4	95.9	20.9
2312	Further education teaching professionals	Traditional	4	95.0	17.2
2313	Education officers, school inspectors	Traditional	4	91.9	19.7
2314	Secondary education teaching professionals	Traditional	4	98.3	20.9
2315	Primary and nursery education teaching professionals	Modern	4	97.0	19.9
2316	Special needs education teaching professionals	Modern	4	93.7	21.5
2317	Registrars and senior administrators of educational establishments	Niche	4	75.3	16.2
2319	Teaching professionals n.e.c.	Modern	4	86.7	16.4
2321	Scientific researchers	Traditional	4	88.4	17.3
2322	Social science researchers	Traditional	4	89.4	10.5
2329	Researchers n.e.c.	Traditional	4	88.4	14.6
Business and public service professionals					
2411	Solicitors and lawyers, judges and coroners	Traditional	4	93.5	23.4
2419	Legal professionals n.e.c.	Modern	4	83.2	21.8

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
2421	Chartered and certified accountants	New	4	87.6	18.3
2422	Management accountants	New	4	79.9	18.2
2423	Management consultants, actuaries, economists and statisticians	Traditional	4	84.0	19.9
2431	Architects	Traditional	4	93.2	16.9
2432	Town planners	Traditional	4	90.7	17.8
2433	Quantity surveyors	New	4	88.0	17.7
2434	Chartered surveyors (not quantity surveyors)	New	4	85.7	17.6
2441	Public service administrative professionals	Niche	4	73.2	20.7
2442	Social workers	Modern	4	84.3	15.3
2443	Probation officers	New	4	91.5	15.9
2444	Clergy	Traditional	4	80.2	11.1
2451	Librarians	Traditional	4	83.6	12.0
2452	Archivists and curators	Modern	4	86.5	12.9
Science and technology associate professionals					
3111	Laboratory technicians	New	3	64.5	9.9
3112	Electrical/electronics technicians	Non-graduate	3	59.4	12.3
3113	Engineering technicians	Niche	3	60.6	13.9
3114	Building and civil engineering technicians	Niche	3	65.5	11.5
3115	Quality assurance technicians	Niche	3	56.7	11.3
3119	Science and engineering technicians n.e.c.	Niche	3	59.2	11.4
3121	Architectural technologists and town planning technicians	New	3	82.0	12.9
3122	Draughtspersons	Non-graduate	3	71.1	11.9

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
3123	Building inspectors	Niche	3	83.2	16.0
3131	IT operations technicians	Non-graduate	3	62.9	14.1
3132	IT user support technicians	Niche	3	58.6	12.2
Health and social welfare associate professionals					
3211	Nurses	Niche	3	91.7	13.9
3212	Midwives	Niche	3	96.6	16.6
3213	Paramedics	Non-graduate	3	58.4	15.9
3214	Medical radiographers	New	3	93.6	17.5
3215	Chiropodists	Modern	3	79.3	15.1
3216	Dispensing opticians	Non-graduate	3	57.3	10.4
3217	Pharmaceutical dispensers	Non-graduate	3	47.2*	8.0
3218	Medical and dental technicians	Niche	3	63.0	12.4
3221	Physiotherapists	New	3	92.6	15.2
3222	Occupational therapists	New	3	89.9	15.4
3223	Speech and language therapists	Modern	3	92.0	15.1
3229	Therapists n.e.c.	Modern	3	79.8	16.3
3231	Youth and community workers	Niche	3	73.4	11.0
3232	Housing and welfare officers	New	3	69.1	11.4
Protective service occupations					
3311	NCOs and other ranks	Non-graduate	3	42.2	*
3312	Police officers (sergeant and below)	Niche	3	51.5	16.5
3313	Fire service officers (leading fire officer and below)	Non-graduate	3	38.5	13.0
3314	Prison service officers (below principal officer)	Non-graduate	3	38.6	11.3
3319	Protective service associate professionals n.e.c.	Niche	3	57.9	14.1

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
Culture, media and sports occupations					
3411	Artists	Modern	3	86.0	*
3412	Authors, writers	Modern	3	80.4	13.1
3413	Actors, entertainers	Niche	3	56.7	*
3414	Dancers and choreographers	New	3	36.0	*
3415	Musicians	New	3	68.5	14.0
3416	Arts officers, producers and directors	Modern	3	77.9	14.4
3421	Graphic designers	Niche	3	78.2	11.7
3422	Product, clothing and related designers	New	3	75.4	13.2
3431	Journalists, newspaper and periodical editors	Modern	3	86.6	14.6
3432	Broadcasting associate professionals	Modern	3	76.3	19.8
3433	Public relations officers	New	3	77.3	12.7
3434	Photographers and audio-visual equipment operators	Niche	3	68.6	12.2
3441	Sports players	Non-graduate	3	31.6	*
3442	Sports coaches, instructors and officials	Niche	3	61.9	10.8
3443	Fitness instructors	Non-graduate	3	58.4	7.8
3449	Sports and fitness occupations n.e.c.	New	3	59.4	*
Business and public service professionals					
3511	Air traffic controllers	Non-graduate	3	74.2	22.7
3512	Aircraft pilots and flight engineers	New	3	77.0	29.6
3513	Ship and hovercraft officers	Non-graduate	3	49.3*	*
3514	Train drivers	Non-graduate	3	23.9	19.4
3520	Legal associate professionals	Niche	3	66.6	12.8

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
3531	Estimators, valuers and assessors	Niche	3	64.4	13.2
3532	Brokers	Niche	3	68.9	25.5
3533	Insurance underwriters	Niche	3	54.7	13.7
3534	Finance and investment analysts/advisers	Niche	3	64.4	16.9
3535	Taxation experts	Niche	3	82.3	15.6
3536	Importers, exporters	Niche	3	42.6*	11.0
3537	Financial and accounting technicians	Niche	3	65.5	19.2
3539	Business and related associate professionals n.e.c.	New	3	69.0	13.0
3541	Buyers and purchasing officers	Niche	3	61.0	13.7
3542	Sales representatives	Niche	3	48.6*	11.8
3543	Marketing associate professionals	New	3	67.9	12.3
3544	Estate agents, auctioneers	Niche	3	50.8	9.8
3551	Conservation and environmental protection officers	Traditional	3	88.2	13.8
3552	Countryside and park rangers	New	3	60.0	10.3
3561	Public service associate professionals	New	3	65.8	15.2
3562	Personnel and industrial relations officers	Niche	3	69.2	11.5
3563	Vocational and industrial trainers and instructors	Niche	3	69.8	11.8
3564	Careers advisers and vocational guidance specialists	Modern	3	82.2	13.5
3565	Inspectors of factories, utilities and trading standards	Niche	3	73.7	13.9
3566	Statutory examiners	Niche	3	58.1	12.9

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
3567	Occupational hygienists and safety officers (health and safety)	New	3	58.5	15.0
3568	Environmental health officers	New	3	73.2	14.0
Administrative occupations					
4111	Civil Service executive officers	Niche	2	61.6	12.0
4114	Officers of non-governmental organisations	Niche	2	59.4	10.9
4142	Communication operators	Non-graduate	2	46.9*	11.4
Skilled metal and electrical trades					
5211	Smiths and forge workers	Non-graduate	3	40.7*	11.2
5212	Moulders, core makers, die casters	Non-graduate	3	18.7	11.1
5214	Metal plate workers, shipwrights, riveters	Non-graduate	3	32.2	10.5
5215	Welding trades	Non-graduate	3	28.0	10.2
5216	Pipe fitters	Non-graduate	3	42.3*	14.3
5221	Metal machining setters and setter-operators	Non-graduate	3	27.6	10.6
5222	Tool makers, tool fitters and markers-out	Non-graduate	3	42.7	11.4
5223	Metal working production and maintenance fitters	Non-graduate	3	43.3	11.9
5224	Precision instrument makers and repairers	Non-graduate	3	48.1*	11.2
5233	Auto electricians	Non-graduate	3	44.5*	10.3
5241	Electricians, electrical fitters	Non-graduate	3	46.8	12.2
5242	Telecommunications engineers	Non-graduate	3	47.6	12.8
5243	Lines repairers and cable jointers	Non-graduate	3	21.2	13.6

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.8: Indicators of skill for occupations identified as skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level in (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
5245	Computer engineers, installation and maintenance	Niche	3	58.3	12.9
5249	Electrical/electronics engineers n.e.c.	Non-graduate	3	46.2	11.4
Skilled construction and building trades					
5311	Steel erectors	Non-graduate	3	21.5	10.2
5312	Bricklayers, masons	Non-graduate	3	30.7	10.4
5314	Plumbers, heating and ventilating engineers	Non-graduate	3	38.9	11.9
5315	Carpenters and joiners	Non-graduate	3	37.0	10.4
5319	Construction trades n.e.c.	Non-graduate	3	29.8	10.8
Textiles, printing and other skilled trades					
5414	Tailors and dressmakers	Niche	3	43.7*	8.4
5421	Originators, compositors and print preparers	Non-graduate	3	29.7	11.3
5422	Printers	Non-graduate	3	30.7	11.4
5493	Pattern makers (moulds)	Non-graduate	3	55.0	11.1
5495	Goldsmiths, silversmiths, precious stone workers	Non-graduate	3	42.9*	*
5496	Floral arrangers, florists	Non-graduate	3	50.8	6.0
Process, plant and machine operatives					
8124	Energy plant operatives	Non-graduate	2	44.0*	13.0

Notes: *Indicator assumed to have passed threshold on the basis of indicator reliability checks.
 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.
 Source: LFS (2006 and 2007); ASHE (2007); ONS (2000a); Elias and Purcell (2004).

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
Managers and proprietors in agriculture and services					
1223	Restaurant and catering managers	Non-graduate	3	38.2	9.3
1224	Publicans and managers of licensed premises	Niche	3	35.5	8.0
Administrative occupations					
4112	Civil Service administrative officers and assistants	Non-graduate	2	44.3	8.7
4113	Local government clerical officers and assistants	Non-graduate	2	48.4	9.7
4121	Credit controllers	Non-graduate	2	42.3	9.6
4122	Accounts and wages clerks, book-keepers, other financial clerks	Non-graduate	2	45.5	9.7
4123	Counter clerks	Non-graduate	2	39.2	9.1
4131	Filing and other records assistants/clerks	Non-graduate	2	41.7	8.8
4132	Pensions and insurance clerks	Non-graduate	2	49.6	9.1
4133	Stock control clerks	Non-graduate	2	25.9	8.2
4134	Transport and distribution clerks	Non-graduate	2	33.4	10.2
4135	Library assistants/clerks	Non-graduate	2	57.8	8.3
4136	Database assistants/clerks	Non-graduate	2	47.2	8.2
4137	Market research interviewers	Niche	2	54.0	7.9
4141	Telephonists	Non-graduate	2	26.1	8.1
4150	General office assistants/clerks	Non-graduate	2	38.2	8.4
Secretarial and related occupations					
4211	Medical secretaries	Non-graduate	2	37.9	9.3
4212	Legal secretaries	Non-graduate	2	29.6	9.3
4213	School secretaries	Non-graduate	2	34.4	7.9
4214	Company secretaries	Non-graduate	2	43.3	10.2

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
4215	Personal assistants and other secretaries	Non-graduate	2	36.9	10.3
4216	Receptionists	Non-graduate	2	28.8	7.2
4217	Typists	Non-graduate	2	25.0	8.3
Skilled agricultural trades					
5111	Farmers	Non-graduate	3	30.7	8.0
5112	Horticultural trades	Non-graduate	3	38.5	7.5
5113	Gardeners and groundsman/groundswomen	Non-graduate	3	30.4	7.9
5119	Agricultural and fishing trades n.e.c.	Non-graduate	3	33.4	8.4
Skilled metal and electrical trades					
5213	Sheet metal workers	Non-graduate	3	29.5	9.8
5231	Motor mechanics, auto engineers	Non-graduate	3	39.7	10.0
5232	Vehicle body builders and repairers	Non-graduate	3	27.0	10.0
5234	Vehicle spray painters	Non-graduate	3	20.3	9.8
5244	TV, video and audio engineers	Non-graduate	3	41.5	9.9
Skilled construction and building trades					
5313	Roofers, roof tilers and slaters	Non-graduate	3	12.7	9.7
5316	Glaziers, window fabricators and fitters	Non-graduate	3	17.1	8.8
5321	Plasterers	Non-graduate	3	19.2	10.0
5322	Floorers and wall tilers	Non-graduate	3	12.3	8.5
5323	Painters and decorators	Non-graduate	3	22.0	9.8
Textiles, printing and other skilled trades					
5411	Weavers and knitters	Non-graduate	3	21.8	8.1
5412	Upholsterers	Non-graduate	3	22.1	9.3

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
5413	Leather and related trades	Non-graduate	3	21.0	8.4
5419	Textiles, garments and related trades n.e.c.	Non-graduate	3	15.1	9.3
5423	Bookbinders and print finishers	Non-graduate	3	25.2	9.1
5424	Screen printers	Non-graduate	3	22.7	8.0
5431	Butchers, meat cutters	Non-graduate	3	8.0	7.3
5432	Bakers, flour confectioners	Non-graduate	3	20.4	7.1
5433	Fishmongers, poultry dressers	Non-graduate	3	18.1	6.4
5434	Chefs, cooks	Non-graduate	3	23.9	7.0
5491	Glass and ceramics makers, decorators and finishers	Non-graduate	3	21.6	8.9
5492	Furniture makers, other craft woodworkers	Non-graduate	3	36.1	8.5
5494	Musical instrument makers and tuners	Non-graduate	3	45.9	**
5499	Hand craft occupations n.e.c.	Non-graduate	3	24.7	8.3
Caring personal service occupations					
6111	Nursing auxiliaries and assistants	Non-graduate	2	48.2	8.2
6112	Ambulance staff (excluding paramedics)	Non-graduate	2	25.9	9.7
6113	Dental nurses	Non-graduate	2	54.4	8.1
6114	Houseparents and residential wardens	Non-graduate	2	56.6	9.0
6115	Care assistants and home carers	Non-graduate	2	31.5	7.5
6121	Nursery nurses	Non-graduate	2	53.4	7.1
6122	Childminders and related occupations	Non-graduate	2	38.3	7.5
6123	Playgroup leaders/assistants	Non-graduate	2	55.8	6.4

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
6124	Educational assistants	Non-graduate	2	52.5	7.3
6131	Veterinary nurses and assistants	Non-graduate	2	62.3	7.1
6139	Animal care occupations n.e.c.	Non-graduate	2	31.4	6.7
Leisure and other personal service occupations					
6211	Sports and leisure assistants	Non-graduate	2	43.5	6.6
6212	Travel agents	Non-graduate	2	50.8	7.7
6213	Travel and tour guides	Non-graduate	2	41.9	6.3
6214	Air travel assistants	Non-graduate	2	45.0	10.2
6215	Rail travel assistants	Non-graduate	2	31.2	11.0
6219	Leisure and travel service occupations n.e.c.	Non-graduate	2	40.0	*
6221	Hairdressers, barbers	Non-graduate	2	24.9	6.0
6222	Beauticians and related occupations	Non-graduate	2	57.4	6.8
6231	Housekeepers and related occupations	Non-graduate	2	13.3	6.5
6232	Caretakers	Non-graduate	2	20.3	7.9
6291	Undertakers and mortuary assistants	Non-graduate	2	37.7	8.7
6292	Pest control officers	Non-graduate	2	20.6	9.6
Sales occupations					
7111	Sales and retail assistants	Non-graduate	2	29.9	5.9
7112	Retail cashiers and check-out operators	Non-graduate	2	25.3	6.0
7113	Telephone salespersons	Non-graduate	2	38.3	8.1
7121	Collector salespersons and credit agents	Non-graduate	2	45.1	8.8
7122	Debt, rent and other cash collectors	Non-graduate	2	35.0	7.5

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
7123	Roundsmen/women and van salespersons	Non-graduate	2	18.7	8.1
7124	Market and street traders and assistants	Non-graduate	2	17.9	6.6
7125	Merchandisers and window dressers	Non-graduate	2	50.1	7.5
7129	Sales related occupations n.e.c.	Non-graduate	2	41.0	8.8
Customer service occupations					
7211	Call centre agents/operators	Non-graduate	2	43.3	7.7
7212	Customer care occupations	Non-graduate	2	41.3	7.6
Process, plant and machine operatives					
8111	Food, drink and tobacco process operatives	Non-graduate	2	11.6	7.5
8112	Glass and ceramics process operatives	Non-graduate	2	20.2	9.4
8113	Textile process operatives	Non-graduate	2	8.5	7.5
8114	Chemical and related process operatives	Non-graduate	2	23.3	11.9
8115	Rubber process operatives	Non-graduate	2	12.2	9.5
8116	Plastics process operatives	Non-graduate	2	14.5	8.1
8117	Metal making and treating process operatives	Non-graduate	2	17.6	11.3
8118	Electroplaters	Non-graduate	2	3.2	8.8
8119	Process operatives n.e.c.	Non-graduate	2	16.2	9.7
8121	Paper and wood machine operatives	Non-graduate	2	17.3	9.4
8122	Coal mine operatives	Non-graduate	2	7.7	13.5
8123	Quarry workers and related operatives	Non-graduate	2	16.6	9.7

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
8125	Metal working machine operatives	Non-graduate	2	20.8	9.8
8126	Water and sewerage plant operatives	Non-graduate	2	30.0	11.3
8129	Plant and machine operatives n.e.c.	Non-graduate	2	14.8	9.6
8131	Assemblers (electrical products)	Non-graduate	2	16.8	7.7
8132	Assemblers (vehicles and metal goods)	Non-graduate	2	16.2	11.2
8133	Routine inspectors and testers	Non-graduate	2	30.5	9.6
8134	Weighers, graders, sorters	Non-graduate	2	17.8	7.7
8135	Tyre, exhaust and windscreen fitters	Non-graduate	2	11.8	7.3
8136	Clothing cutters	Non-graduate	2	38.8	7.5
8137	Sewing machinists	Non-graduate	2	9.4	6.6
8138	Routine laboratory testers	Non-graduate	2	45.8	7.7
8139	Assemblers and routine operatives n.e.c.	Non-graduate	2	13.3	7.8
8141	Scaffolders, staggers, riggers	Non-graduate	2	18.1	13.4
8142	Road construction operatives	Non-graduate	2	12.1	9.5
8143	Rail construction and maintenance operatives	Non-graduate	2	19.5	12.1
8149	Construction operatives n.e.c.	Non-graduate	2	24.5	11.6
Transport and mobile machine drivers and operatives					
8211	Heavy goods vehicle drivers	Non-graduate	2	11.5	9.1
8212	Van drivers	Non-graduate	2	17.4	7.5
8213	Bus and coach drivers	Non-graduate	2	18.8	8.7
8214	Taxi, cab drivers and chauffeurs	Non-graduate	2	15.7	7.0
8215	Driving instructors	Non-graduate	2	34.5	10.9
8216	Rail transport operatives	Non-graduate	2	23.8	12.5

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
8217	Seafarers (merchant navy); barge, lighter and boat operatives	Non-graduate	2	32.1	10.8
8218	Air transport operatives	Non-graduate	2	17.8	9.8
8219	Transport operatives n.e.c.	Non-graduate	2	22.2	9.4
8221	Crane drivers	Non-graduate	2	8.2	11.1
8222	Fork-lift truck drivers	Non-graduate	2	5.9	7.9
8223	Agricultural machinery drivers	Non-graduate	2	10.2	8.0
8229	Mobile machine drivers and operatives n.e.c.	Non-graduate	2	11.2	9.4
Elementary trades, plant and storage related occupations					
9111	Farm workers	Non-graduate	1	17.7	7.0
9112	Forestry workers	Non-graduate	1	42.7	8.8
9119	Fishing and agriculture related occupations n.e.c.	Non-graduate	1	30.6	6.6
9121	Labourers in building and woodworking trades	Non-graduate	1	14.1	8.0
9129	Labourers in other construction trades n.e.c.	Non-graduate	1	15.7	8.2
9131	Labourers in foundries	Non-graduate	1	12.0	8.9
9132	Industrial cleaning process occupations	Non-graduate	1	9.8	7.4
9133	Printing machine minders and assistants	Non-graduate	1	25.0	9.7
9134	Packers, bottlers, canners, fillers	Non-graduate	1	7.8	6.9
9139	Labourers in process and plant operations n.e.c.	Non-graduate	1	14.3	7.4
9141	Stevedores, dockers and slingers	Non-graduate	1	21.3	9.9

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
9149	Other goods handling and storage occupations n.e.c.	Non-graduate	1	14.8	7.5
Elementary administration and service occupations					
9211	Postal workers, mail sorters, messengers, couriers	Non-graduate	1	18.8	9.1
9219	Elementary office occupations n.e.c.	Non-graduate	1	30.0	6.4
9221	Hospital porters	Non-graduate	1	10.1	7.9
9222	Hotel porters	Non-graduate	1	20.7	6.0
9223	Kitchen and catering assistants	Non-graduate	1	17.7	5.8
9224	Waiters, waitresses	Non-graduate	1	35.4	5.4
9225	Bar staff	Non-graduate	1	45.4	5.5
9226	Leisure and theme park attendants	Non-graduate	1	34.3	5.5
9229	Elementary personal services occupations n.e.c.	Non-graduate	1	29.7	5.7
9231	Window cleaners	Non-graduate	1	10.7	6.0
9232	Road sweepers	Non-graduate	1	5.9	8.1
9233	Cleaners, domestics	Non-graduate	1	8.3	6.0
9234	Launderers, dry cleaners, pressers	Non-graduate	1	7.9	5.7
9235	Refuse and salvage occupations	Non-graduate	1	7.7	8.2
9239	Elementary cleaning occupations n.e.c.	Non-graduate	1	12.1	7.7
9241	Security guards and related occupations	Non-graduate	1	21.7	7.6
9242	Traffic wardens	Non-graduate	1	32.8	9.6
9243	School crossing patrol attendants	Non-graduate	1	12.2	6.0

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table A.9: Indicators of skill for occupations identified as not skilled to NQF level 3+ (continued)

SOC2000 4-digit occupation		Elias and Purcell (2004) graduate classification	Skill level (SOC 2000)	Per cent of employees qualified to NQF level 3+	Median hourly pay, all employees (£)
9244	School mid-day assistants	Non-graduate	1	13.6	6.0
9245	Car park attendants	Non-graduate	1	23.6	7.4
9249	Elementary security occupations n.e.c.	Non-graduate	1	31.3	7.7
9251	Shelf fillers	Non-graduate	1	25.5	6.9
9259	Elementary sales occupations n.e.c.	Non-graduate	1	20.2	6.1

Notes: *Indicator assumed to have passed threshold on the basis of indicator reliability checks; ** indicator did not pass earnings indicator when mean substituted for median in reliability checks.

'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Source: LFS (2006 and 2007); ASHE (2007); ONS (2000); Elias and Purcell (2004).

- B.1 The purpose of this annex is to supplement Chapter 7 by giving additional information on the top-down analysis of occupational shortages.
- B.2 The annex starts with a discussion of the types of indicators that we considered and gives more detail about the process we went through to narrow these down to 12 shortage indicators. The annex then gives further information on the correlation, thresholds chosen and distributions of these 12 indicators. The results of the analysis are displayed in Table B.4. At the end of the annex is a glossary of some of the key statistical terms referred to in Chapter 7 and Annex B.
- B.1 Initial look at potential indicators**
- B.3 We started by identifying potential shortage indicators. We then had an initial look at relevant data and assessed their suitability as an indicator.
- B.4 There were many different types of indicators and data sources that we considered. However, we had to dismiss using many of these owing to a lack of data. For example, we could not access any top-down data available on outsourcing.
- B.5 In the situations where we did find some data that could potentially measure a shortage indicator, the key criteria we looked for at first were as follows:
- Could it be broken down to 4-digit Standard Occupational Classification (SOC) codes?
 - Would it be a valid measure, i.e. would it pick up shortages rather than some other change?
 - Would it be a reliable measure, i.e. was the sample size large enough to give us reliable estimates when broken down to the 4-digit SOC code level?
- B.6 In several cases, potential top-down indicators failed on one or more of our three key criteria. For example, we could not find any suitable top-down data for an indicator that measured changes in the overall employment packages offered by employers. The British Household Panel Survey (BHPS) provides information on pensions, which may have been a valid measure of overall employment packages offered. However, the BHPS has a much smaller sample size than larger surveys such as the Labour Force Survey (LFS) or the Annual Survey of Hours and Earnings (ASHE), and therefore this indicator would not be reliable at the 4-digit SOC level.
- B.7 We concluded that the data sources suitable for our shortage indicators were:
- National Employers Skills Survey (NESS);
 - Labour Force Survey (LFS);
 - Annual Survey of Hours and Earnings (ASHE);

- Jobcentre Plus (JCP) vacancy data; and
- the JCP claimant count.

B.2 Background information on our key data sources

Employer Skill Surveys

- B.8 The National Employers Skills Survey (NESS) is a biannual survey produced by the Learning and Skills Council (LSC) in partnership with the Department for Innovation, Universities and Skills (DIUS) and the UK Commission for Employment and Skills (UKCES). A large-scale survey of employers in England, it provides information on skill-shortage vacancies, skills gaps and workforce development activity. In order to obtain information at regional and local levels, ‘employers’ are defined as establishments rather than enterprises; therefore some enterprises may be represented by more than one of their sites. NESS was last carried out in 2007 and covered 79,000 employers.
- B.9 The NESS also offers a definition of hard-to-fill vacancies (HTFVs) and skill-shortage vacancies (SSVs). It is the only survey in England that attempts to comprehensively identify vacancies that employers feel are hard to fill because of skill shortage in the labour market. Skills are interpreted in the survey as a mix of soft and hard skills that employers believe are necessary to carry out the required work.
- B.10 The occupation breakdown is mostly limited to the minor group (3-digit) level. However, we commissioned IFF Research (2008) to recode and analyse the 2007 survey data for us at the 4-digit SOC code level. They also provided a technical assessment of the statistical robustness of the different indicators of skills shortage provided by NESS. They concluded that we could use the skill-shortage vacancy, hard-to-fill vacancy, and all vacancy data in our analysis at the 4-digit level.
- B.11 The ‘Skills in Scotland 2006’ report, published by Futureskills Scotland (2007), may be a useful source of information on the Scottish labour market. Published last year, it is based on a survey of more than 6,000 Scottish employers and provides a comprehensive analysis of Scottish employers’ views on skills, training and recruitment issues.
- B.12 In Northern Ireland, the Skills Unit for the Department for Employment and Learning carry out a similar survey called the Skills Monitoring Survey (Department for Employment and Learning (2006a)). This is a survey based on over 4,000 employers and is carried out every few years.
- B.13 Similarly, Futureskills Wales (2005) carries out the Sector Skills Survey of over 6,000 employers approximately every two years.
- B.14 The four skill surveys discussed above are comparable in some ways, as the questions they ask and the definitions they use are very similar. However, their methodologies differ and the timing of the surveys is not the same. Therefore, we are unable to put them together to create a UK data source (see Department for Employment and Learning (2006b)). This is why we only use the NESS, which has the largest sample size of the four surveys.

Labour Force Survey

- B.15 The Labour Force Survey is the main source of information on the labour market in the UK. It is a quarterly household survey (of approximately 53,000 households) conducted by the Office for National Statistics (ONS). As well as households, it includes some people living in student halls of residence and National Health Service accommodation but excludes some other communal residences. The sample is a semi-panel design, structured in such a way that a single respondent is in the survey for five successive quarters. Groups

of respondents are staggered in waves so that between any two quarters, there is an approximate 80 per cent overlap.

- B.16 It is the main source for information on employment and unemployment status for the UK population. It can be broken down by characteristics such as current occupation, sector, employment status and qualifications in addition to demographic characteristics such as age, sex and nationality. This can be done for both the private and the public sectors in addition to providing information on duration in the current job, hours worked and overtime. Earnings data are also collected for a random subset of the LFS sample, and it is a valuable source of earnings information for individuals.
- B.17 LFS estimates have recently been updated to take account of the new population estimates (published in late 2007) using an interim re-weighting adjustment methodology.
- B.18 Although the LFS overall has a large sample size, some questions are only asked in certain waves and some questions are not asked of everyone. Therefore, given the need to break down the data to 4-digit SOC codes, to increase the cell sizes in each occupation we appended four quarters together to create annual data sets.

Annual Survey of Hours and Earnings (ASHE)

- B.19 The Annual Survey of Hours and Earnings provides information about the levels, distribution and make-up of earnings and paid hours for employees within specific industries, occupations and regions. ASHE was developed to replace the New Earnings Survey (NES) in 2004. This included improvements to the coverage of employees, imputation for item non-response, and the weighting of earnings

estimates. ASHE is approximately a one per cent random sample of British workers, covering all employees whose National Insurance number ends in two specific (confidential) digits.

- B.20 The ASHE tables contain UK data on earnings for employees by gender and full-time/part-time employee breakdown. Further breakdowns include by region, occupation, industry and age group. These are available for the following variables: gross weekly pay, weekly pay excluding overtime, basic pay including other pay, overtime pay, gross hourly pay, hourly pay excluding overtime, gross annual pay, annual incentive pay, total paid hours, basic paid hours and paid overtime hours. This is a very good source for identifying trends in relative earnings growth by occupation that may indicate that demand for labour for a specific occupation is not fully met.
- B.21 As set out in Office for National Statistics (2007c), the ASHE sample size was reduced by 20 per cent in March 2007. It has been reduced for 2007 based on approximately 142,000 returns, down from 175,000 in 2006. Reductions were targeted at those industries that exhibit the least variation in their earnings patterns. It appears that this sample reduction will not affect the aggregated data. However, it may lead to some problems when analysing data at the 4-digit SOC code level.

Jobcentre Plus (JCP) vacancy data

- B.22 Statistics of Jobcentre vacancies, i.e. job openings notified by employers to Jobcentre Plus, are collected from the JCP administrative system. These, therefore, are not a sample estimate of the number of vacancies but represent the actual number of vacancies advertised on the Jobcentre network. As not all firms advertise through JCP, its vacancy measures represent only

around 35–40 per cent of all vacancies. Indicators derived from this data may underestimate vacancies for certain occupations, if an employer with a given occupation prefers to advertise elsewhere.

B.23 These data provide a breakdown of vacancies in more detail than is possible using the ONS Vacancy Survey, e.g. data by local area, 4-digit SOC code occupations, duration of vacancies, and by industry. However, these vacancy data are only available for Great Britain rather than the UK as a whole.

B.24 The JCP figures can be expressed in terms of the inflow of newly notified vacancies over a period or the number (or stock) of unfilled vacancies on a specified date each month. A variety of data are made available on Nomis®, including vacancy data. Nomis is a database where the ONS collates up-to-date UK labour market statistics and allows users to pick from a variety of variables to cross-tabulate. For example, it is possible to create a table for vacancies by duration, Government Office region and occupation. Seasonally adjusted national and regional data go back as far as 1980 (for more information, see: www.nomisweb.co.uk).

JCP claimant count

B.25 This measures the number of people who are claiming unemployment benefits but who are actively seeking work. Like the JCP vacancy data, this is not a sample but the actual number of claimants. The main issue with this is that it tends to report lower figures than the LFS (suggesting an underestimation of unemployment) because some unemployed people either choose not to claim benefits or are not entitled to claim.

B.26 The data are compiled by the ONS and include details of the claimant regarding age, date of birth, sex, 4-digit SOC code occupation, postcode, and the start and end dates of their claim. The details are based on the inflows (how many have started a new claim during the month) and outflows (how many have terminated their claim during the month). The claimant count data are seasonally adjusted so that analysis of data month to month is not heavily influenced by seasonal shifts.

B.27 Jobseeker's Allowance (JSA) is administered on either a contributory or income basis. The level of National Insurance contributions made during the two years prior to the claim determines the eligibility for contributory JSA. Income-based JSA is determined by a means test. Both types of benefit require the following criteria to be met. The claimant must:

- be available, i.e. 'willing and able' to take up work immediately;
- prove to be actively seeking work;
- have entered into a Jobseeker's Agreement;
- be capable of work;
- be under the state pension age; and
- normally reside within the UK.

B.28 In addition, there are some extra requirements. For example, to claim income-based JSA you must have below a certain threshold of savings. For example, a recent graduate who has not made sufficient National Insurance contributions while studying, but has savings, may not be able to claim this benefit. Therefore, some individuals may be unemployed and looking for a job but are not counted as unemployed by the claimant count measure.

B.29 The claimant count is clearly dependent on any adjustments in the procedures governing the eligibility for benefits. Therefore, when looking at changes in claimant count data, for our indicators, we must be aware of any recent changes in the eligibility criteria that may affect the data.

B.3 Choosing the indicators

B.30 After our initial assessment of the available data and their suitability, we decided which types of indicator we wanted to use to measure shortages. We decided it was important to look at:

- employer-based indicators:
 - skill-shortage vacancies (normalised);
- price-based indicators:
 - pay
 - relative premium to working in a certain occupation, given that the individual has NQF level 3;
- volume-based indicators:
 - unemployment levels
 - employment levels
 - hours worked
 - proportion of new hires; and
- other indicators of imbalance based on administrative data:
 - vacancy duration
 - unfilled and notified vacancies
 - vacancy rates.

B.31 After choosing to use these indicators, we then had to investigate the different ways of measuring each indicator.

B.32 For some indicators the decision as to exactly what measure and data source to use was quite obvious, whereas for others there were many potential indicators to consider. Table B.1 summarises all the indicators for which we collected and examined data.

Table B.1: Measures considered for each indicator

Indicator	Measures collected	Data sources	Frequency available
Employer-based indicators			
Employer-reported skill-shortage vacancies	Skill-shortage vacancies (level)	NESS	Biannual
	Hard-to-fill vacancies (level)	NESS	Biannual
	All vacancies (level)	NESS	Biannual
	Percentage of skill-shortage vacancies/employment by occupation	NESS and LFS	Biannual
	Percentage of skill-shortage vacancies/unemployment (sought) by occupation	NESS and JCP	Biannual
	Percentage of skill-shortage vacancies/unemployment (usual) by occupation	NESS and JCP	Biannual
	Percentage of skill-shortage vacancies/all vacancies	NESS	Biannual
	Percentage of skill-shortage vacancies/hard-to-fill vacancies	NESS	Biannual
Price-based indicators			
Pay	Annual percentage change of median hourly pay for all employees	ASHE	Annual
	Annual percentage change of mean hourly pay for all employees	ASHE	Annual
	Annual percentage change of median hourly pay for full-time employees	ASHE	Annual
	Annual percentage change of mean hourly pay for full-time employees	ASHE	Annual
	Annual percentage change of median weekly pay for full-time employees	ASHE	Annual
	Annual percentage change of mean weekly pay for full-time employees	ASHE	Annual
	Levels of all the above	ASHE	Annual
	Absolute changes of all the above (rather than percentage change)	ASHE	Annual

Table B.1: Measures considered for each indicator (*continued*)

Indicator	Measures collected	Data sources	Frequency available
Relative premium to working in a certain occupation, given that an individual is at NQF level 3	Annual percentage change in log hourly wage regressed on occupation, for the subset of the sample who have NQF level 3	LFS	Quarterly (but very small sample size unless annual data are used)
	Annual percentage change in log hourly wage regressed on occupation with controls (such as age and region), for the subset of the sample who have NQF level 3	LFS	Quarterly (but very small sample size unless annual data are used)
	Levels of the above available		
Volume-based indicators			
Unemployment	Percentage change of claimant count by sought occupation	JCP	Monthly
	Percentage change of claimant count by usual occupation	JCP	Monthly
	Percentage change in unemployed	LFS	Quarterly
	Percentage change in unemployed + inactive	LFS	Quarterly
	Levels of the above	LFS	Quarterly
Employment	Change in employment estimates	LFS	Quarterly
Hours worked Could also look at hours for all employers or hours for part-time workers.	Percentage change in median of total paid hours worked for full-time workers	ASHE	Annual
	Percentage change in mean of total paid hours worked for full-time workers	ASHE	Annual
	Percentage change in median of basic paid hours worked for full-time workers	ASHE	Annual
	Percentage change in mean of basic paid hours worked for full-time workers	ASHE	Annual
	Levels of the above	ASHE	Annual
Overtime data are not robust enough to use.			

Table B.1: Measures considered for each indicator (*continued*)

Indicator	Measures collected	Data sources	Frequency available
Proportion of new hires	Percentage change in proportion of workers in job less than a year	LFS	Quarterly
	Proportion of workers in job less than a year	LFS	Quarterly
	Absolute change in proportion of workers in job less than a year	LFS	Quarterly
Indicators of imbalance based on administrative data			
Vacancy duration	Percentage change of median duration	JCP	Monthly
	Percentage change of mean duration	JCP	Monthly
	Levels and absolute changes of the above	JCP	Monthly
Unfilled and notified vacancies	Percentage change of total live unfilled vacancies	JCP	Monthly
	Percentage change of notified vacancies	JCP	Monthly
	Levels and absolute change of all the above	JCP	Monthly
Vacancy rates Note that if we use inactive there are different definitions of 'inactive' we could use.	Live unfilled vacancies/unemployed by sought occupation	JCP	Every month
	Live unfilled vacancies/unemployed by usual occupation	JCP	Every month
	Live unfilled data/Unemployed (U)	JCP and LFS	Quarterly
	Live unfilled data/U+ inactive (I)	JCP and LFS	Quarterly
	Live unfilled data/U+ employed (E)	JCP and LFS	Quarterly
	Live unfilled data/U+I+ E	JCP and LFS	Quarterly
	Percentage changes of all the above		

B.33 As Table B.1 shows, in total we collected data for just over 70 possible indicators. We then used and assessed the possible indicators, using criteria stated in Chapter 7. Subsequently, from these many indicators we chose our key 12 indicators (see Table 7.2).

B.4 Correlation of the indicators

B.34 In Chapter 7 we discuss each of our 12 indicators and why we chose them. We also briefly discuss the correlation between the 12 indicators in that chapter. However, here we present the results of the correlation in Table B.2 and discuss the results further.

Table B.2: Shortage indicator pairwise correlations

	SSVs/ employment	SSVs/all vacancies	SSVs/HTFV	% change in median pay	% change in mean pay	return to occupation	% change in unemployment	% change in hours worked	% change in employment	absolute change in median vacancy duration	vacancies/ unemployment
SSVs/all vacancies	0.386*										
SSVs/HTFV	0.299*	0.573*									
% change in median pay	0.092*	0.060*	-0.012								
% change in mean pay	0.019	0.064*	0.053*	0.536*							
return to occupation	-0.059*	0.025	0.088*	-0.077*	-0.053*						
% change in unemployment	0.066*	-0.052*	0.155*	-0.045	-0.007	0.212*					
% change in hours worked	-0.012	0.158*	0.199*	-0.108*	0.053*	-0.056*	0.093*				
% change in employment	-0.073*	-0.015	-0.132*	-0.291*	0.044	-0.010	-0.042	-0.142*			
absolute change in median vacancy duration	0.135*	0.03	0.078*	-0.127*	-0.014	0.008	0.029	-0.126*	0.134*		
vacancies/unemployment	0.192*	-0.015	0.068*	-0.023	0.037	0.049	0.060*	0.088*	-0.043	0.594*	
absolute change in new hires	0.080*	-0.002*	0.030	-0.060*	-0.027	0.025	0.160*	0.034	-0.182*	0.121*	0.018

Sources: NESS, Annual Survey of Hours and Earnings, LFS, claimant count, JCP

*indicates statistical significance at the 95 per cent level.

- B.35 We would expect the correlations to be positive among all indicators, if they were influenced by similar aspects of labour market performance (or employer demands for labour), apart from the change in the unemployment indicator, which we would expect to be negatively correlated with the other indicators. An asterisk symbol (*) next to the correlation indicates that the correlation is significant at the 95 per cent level.
- B.36 Overall, we found that the majority of the correlations are in the direction we would expect, and many of these are significant.
- B.37 In future analysis we hope to study the correlations further as part of additional robustness checks.
- B.5 Distributions of the indicators and determination of thresholds**
- B.38 After choosing the indicators, we chose the thresholds. As explained in Chapter 7, we chose to use the median plus 50 per cent of the median as our first choice of threshold. As our second choice of threshold, we used the top quartile. Table B.3 summarises the threshold used for each indicator.

Table B.3: Indicator thresholds

Indicator	Figure number	Threshold used
Employer-based indicators		
Percentage of skill-shortage vacancies/employment by occupation	B1	Median plus 50% of the median
Percentage of skill-shortage vacancies/all vacancies	B2	Median plus 50% of the median
Percentage of skill-shortage vacancies/hard-to-fill vacancies	B8	Top quartile
Price-based indicators		
Percentage change in median hourly pay for all employees	B3	Median plus 50% of the median
Percentage change in mean hourly pay for all employees	B4	Median plus 50% of the median
Relative premium to an occupation, given NQF3, controlling for region and age	B5	Median plus 50% of the median
Volume-based indicators		
Percentage change in unemployed by sought occupation	B6	Median plus 50% of the median
Percentage change in hours worked for full-time employees	B9	Top quartile
Percentage change in employment	B10	Top quartile
Absolute change in proportion of workers in occupation less than one year	B7	Median plus 50% of the median
Indicators of imbalance based on administrative data		
Absolute change in median vacancy duration	B11	Top quartile
Stock of vacancies/claimant count by sought occupation	B12	Top quartile

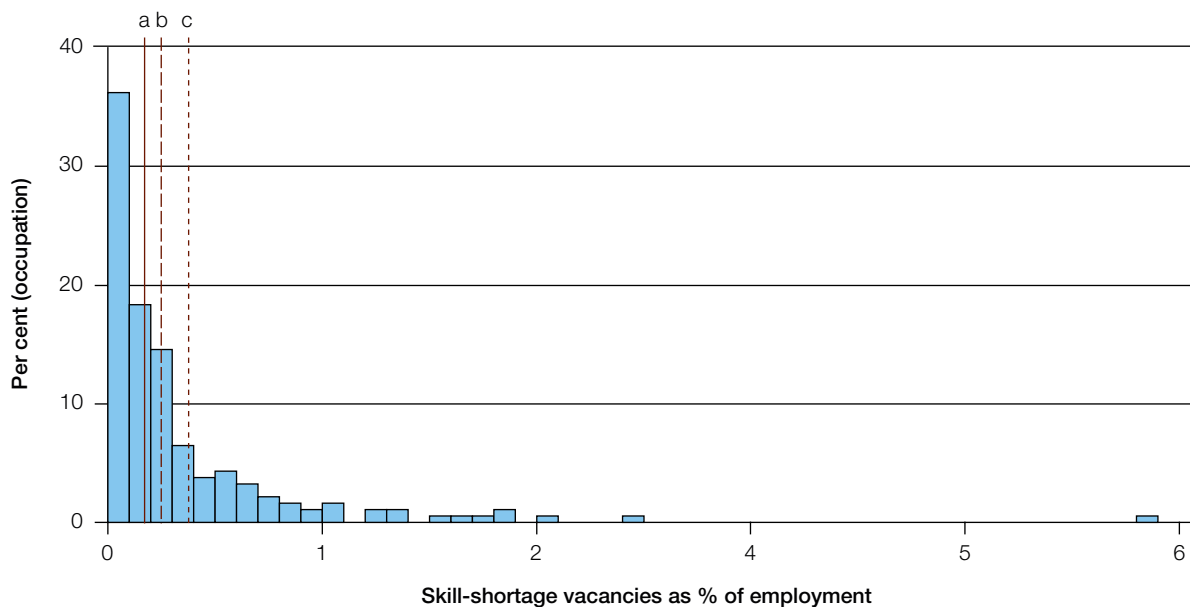
B.39 In order to help determine our choice of threshold we examined the distributions of the indicators. Figures B.1 to B.12 show the distribution of each of the 12 shortage indicators used in Chapter 7.

B.40 The indicators where the threshold chosen is the median plus 50 per cent of the median are presented first (Figures B.1 to B.7), followed by those where we have chosen the top quartile as the threshold (Figures B.8 to B.12). Indicators are presented in bands along the x axes of the histograms. On the y axis is the percentage of occupations, so the height of the bars is the percentage of occupations at this level. The sum of the heights equals 100. The vertical lines in the figures represent:

- a – the median;
- b – the median plus 50 per cent of the median; and
- c – the top quartile.

Distributions of the indicators where we used median plus 50 per cent of the median as the threshold

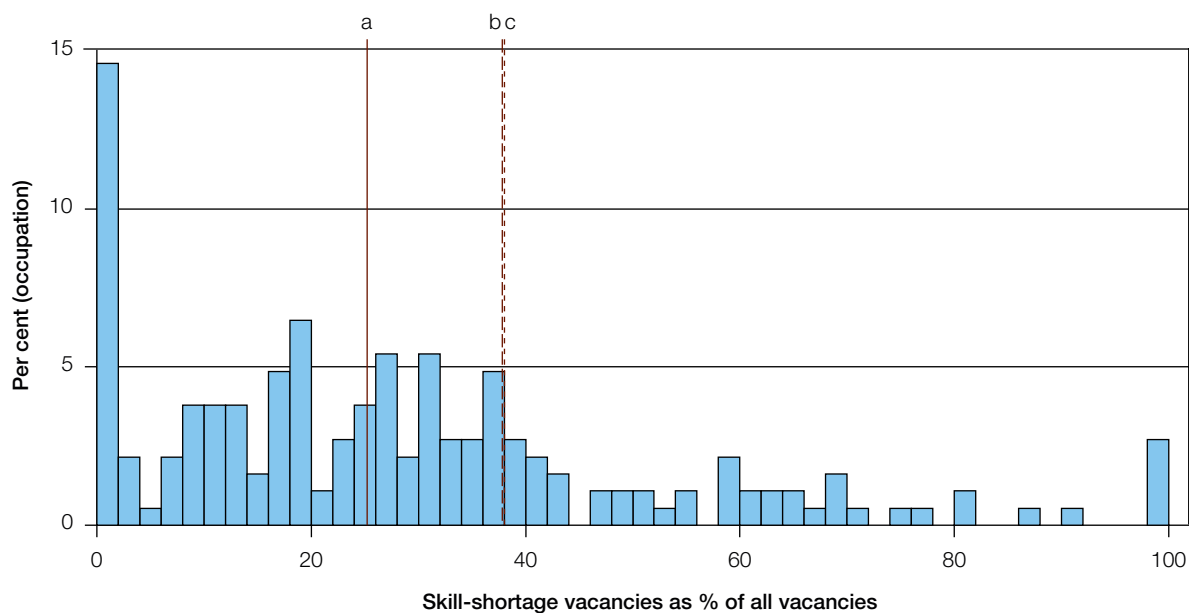
Figure B.1: Percentage of skill-shortage vacancies/employment by occupation



Source: MAC analysis; National Employers Skills Survey and Labour Force Survey 2007

The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

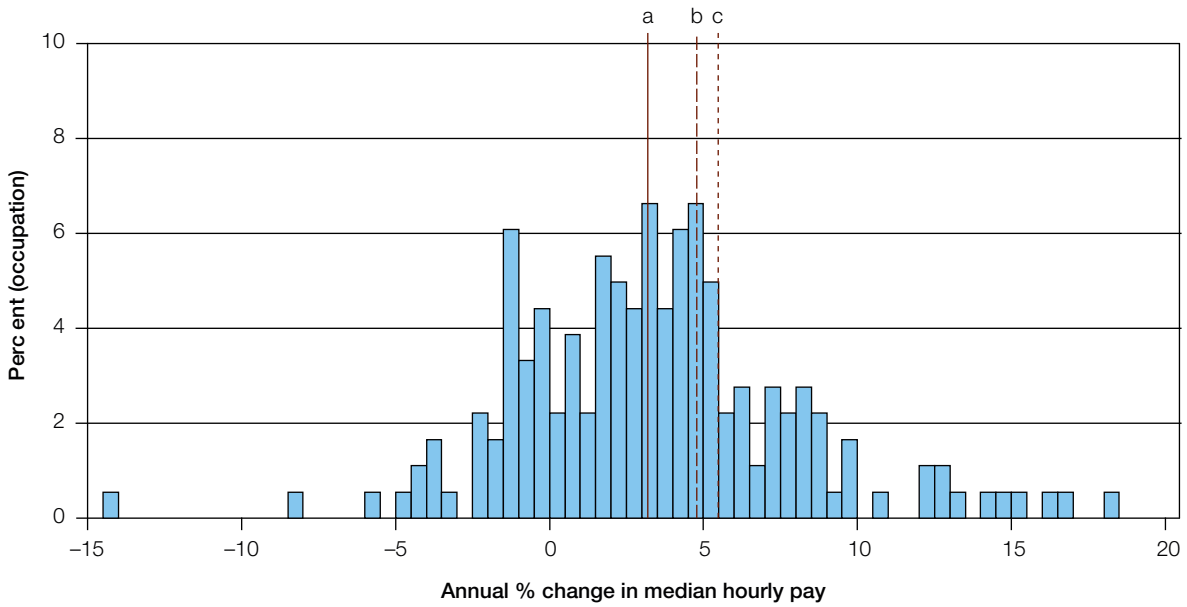
Figure B.2: Percentage of skill-shortage vacancies/all vacancies



Source: MAC analysis; National Employers Skills Survey 2007

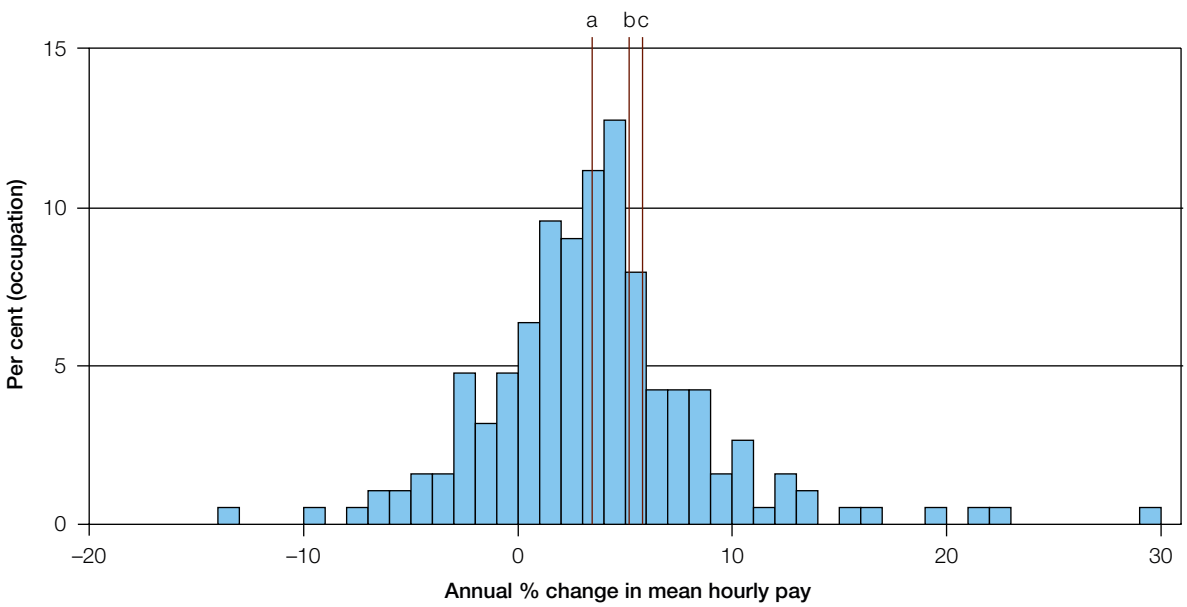
The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

Figure B.3: Percentage change in median hourly pay for all employees



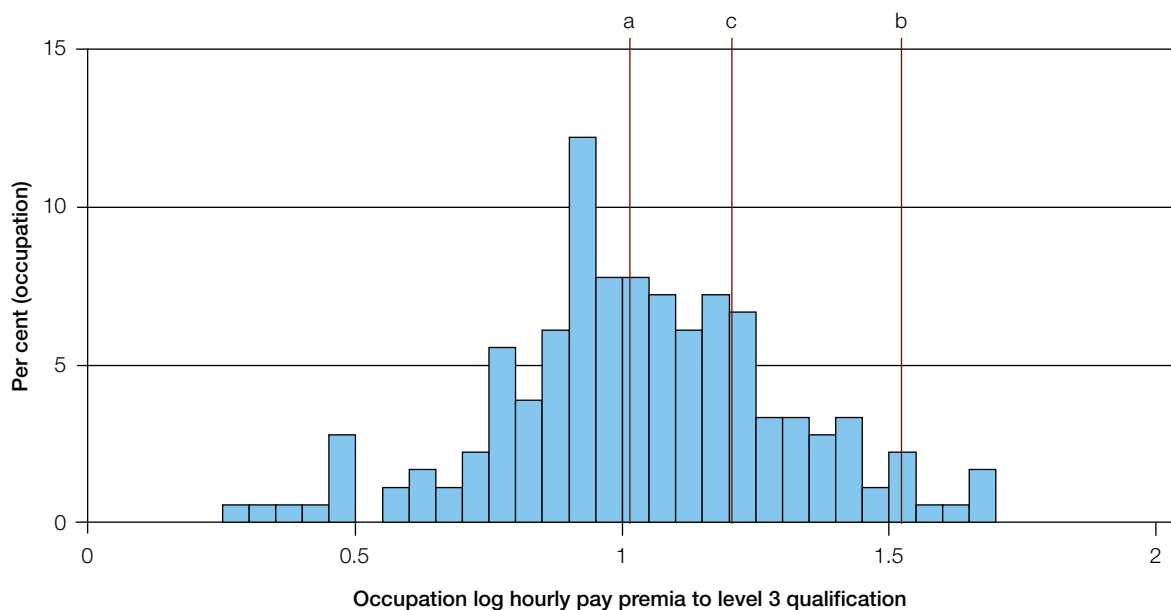
Source: MAC analysis; Annual Survey of Hours and Earnings 2006 and 2007
 The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

Figure B.4: Percentage change in mean hourly pay for all employees



Source: MAC analysis; Annual Survey of Hours and Earnings 2006 and 2007
 The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

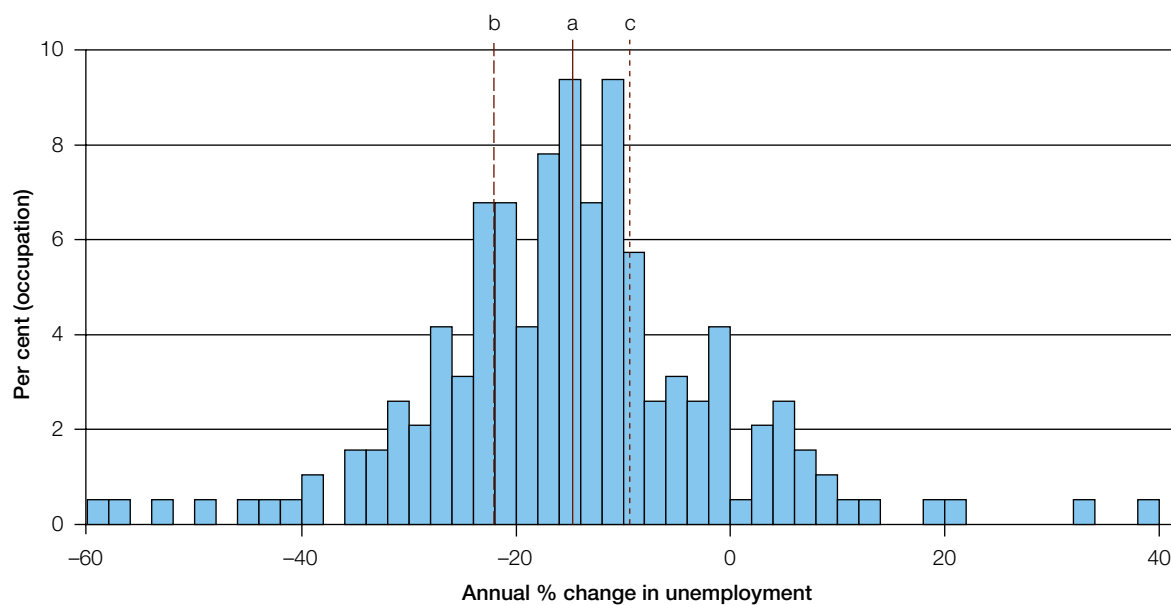
Figure B.5: Relative premium to an occupation, given NQF3



Source: MAC analysis; Labour Force Survey 2007

The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

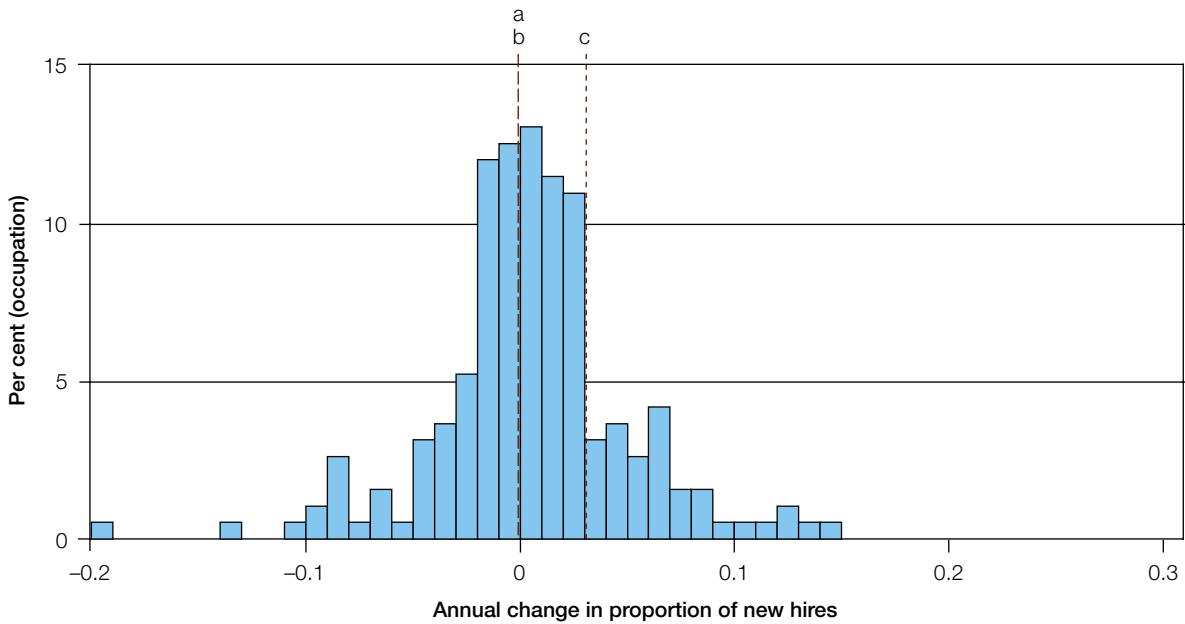
Figure B.6: Percentage change in unemployed by sought occupation



Source: MAC analysis; Jobcentre Plus March 2007–March 2008

The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

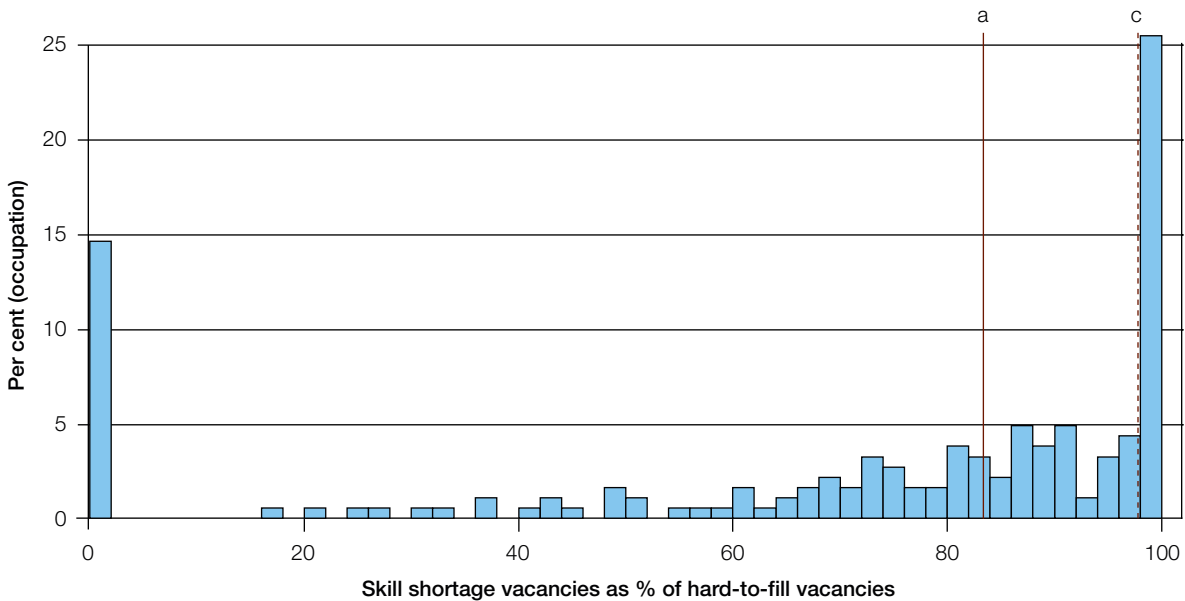
Figure B.7: Absolute change in proportion of workers in occupation less than one year



Source: MAC analysis; Labour Force Survey 2007
 The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.
 Line 'b' does not show up on the scale as 'b' takes the value 0.007425

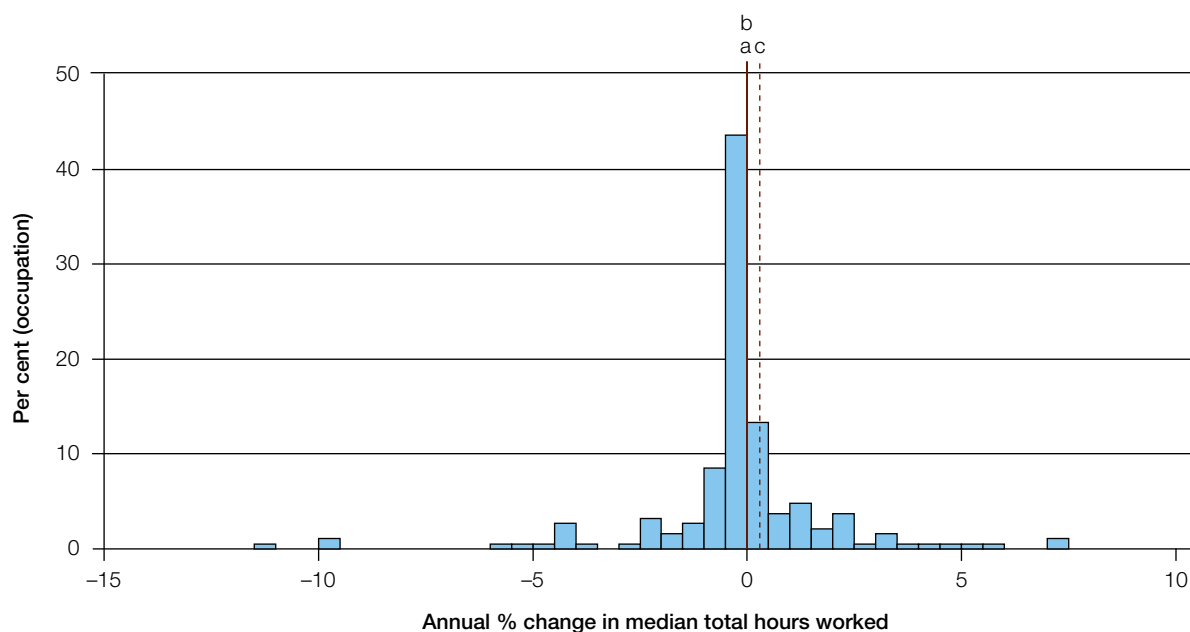
Distributions of the indicators where we used top quartile as the threshold

Figure B.8: Percentage of skill-shortage vacancies/hard-to-fill vacancies



Source: MAC analysis; National Employers Skills Survey 2007
 The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.
 Line 'b' does not show up on the scale as 'b' takes the value 125.5

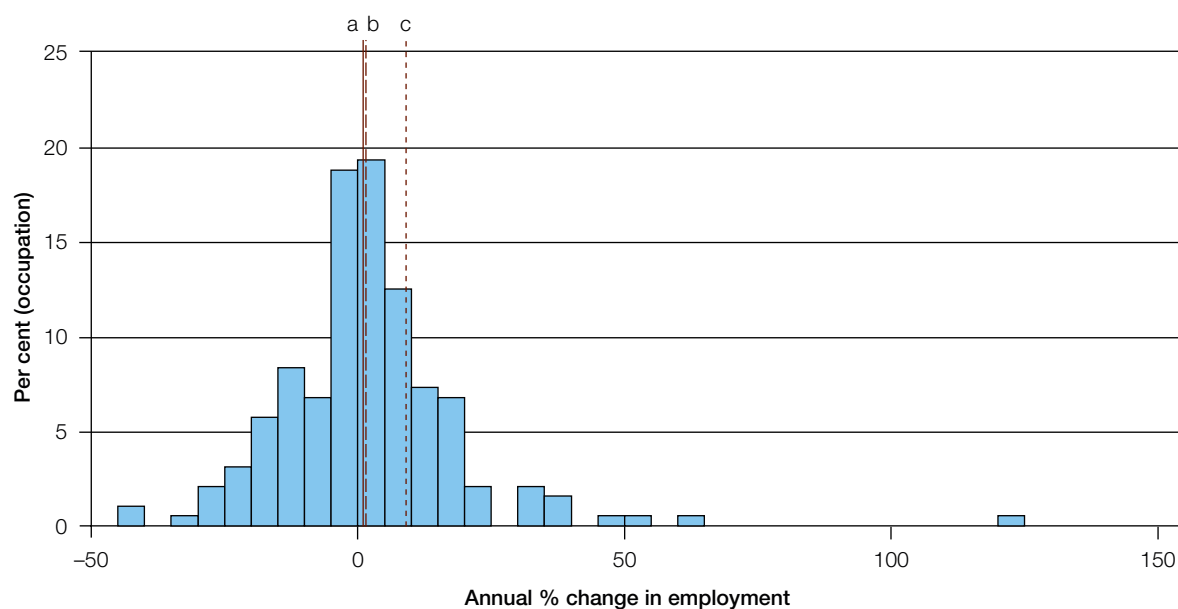
Figure B.9: Percentage change in hours worked for full-time employees



Source: MAC analysis; Annual Survey of Hours and Earnings 2006 and 2007

The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

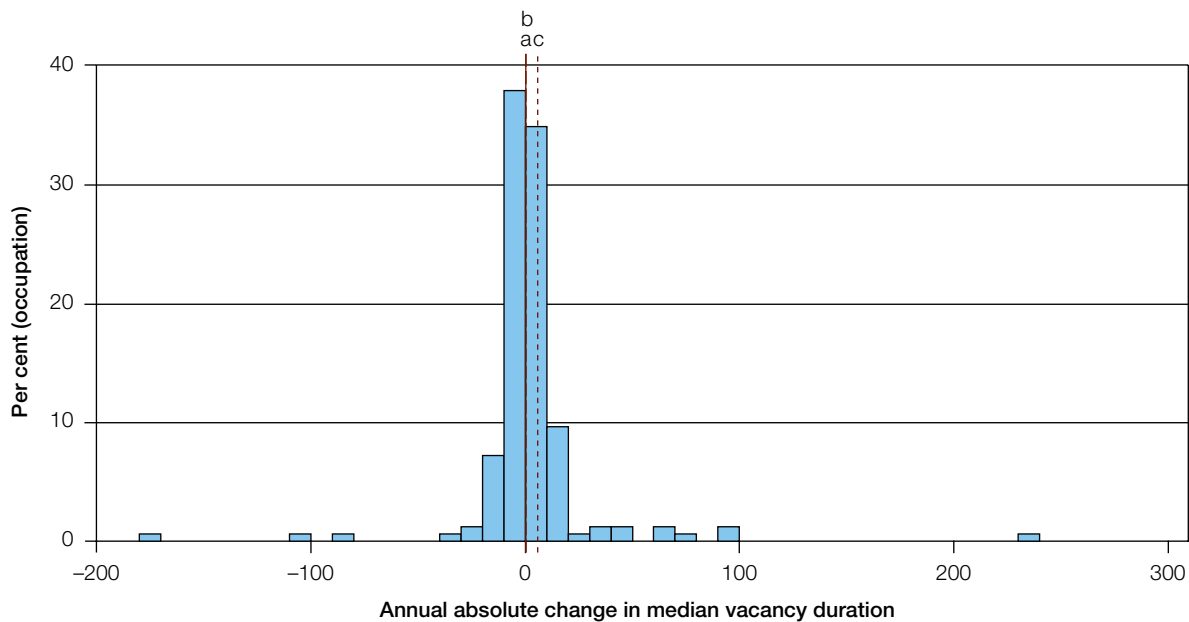
Figure B.10: Percentage change in employment



Source: MAC analysis; Labour Force Survey 2007

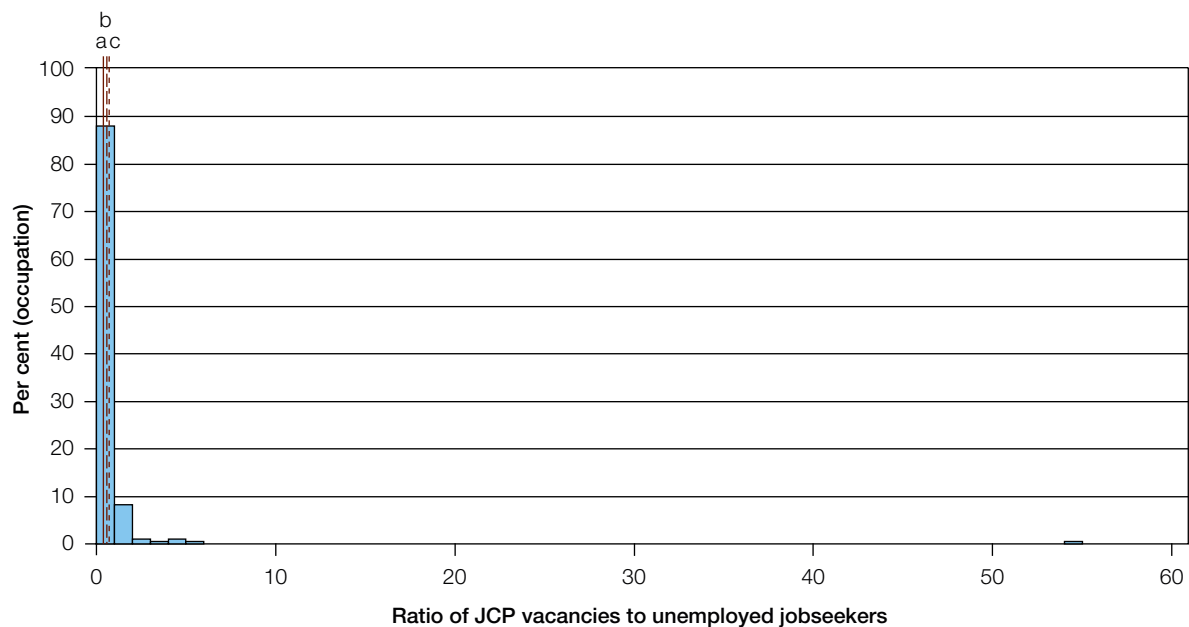
The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

Figure B.11: Absolute change in median vacancy duration



Source: MAC analysis; Jobcentre Plus March 2007–March 2008
 The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

Figure B.12: Stock of vacancies/claimant count by sought occupation



Source: MAC analysis; Jobcentre Plus March 2007–March 2008
 The vertical lines in the figures represent: • a – the median; • b – the median plus 50 per cent of the median; and • c – the top quartile.

- B.41 Figures B.8 to B.12 show the indicators that we decided were not suitable to use median plus 50 per cent of the median as the threshold. For example, Figure B.8 shows that for the indicator percentage of skill-shortage vacancies/hard-to-fill vacancies the threshold ‘median plus 50 per cent of the median’ takes a value that is impossible for any occupation to pass on, as it is above 100 per cent. For these indicators we revert to using the top quartile as the threshold.
- B.42 In Chapter 7 we discuss how we considered using the median plus standard deviation as a possible threshold but had to reject using this approach. We now discuss in further detail our reasons for this.
- B.43 If the indicator were normally distributed, then around 67 per cent of observations would lie within one standard deviation of the mean (or median). Since a normal distribution is symmetric, then around 16.5 per cent of observations would be greater than the mean (or median) plus one standard deviation and 16.5 per cent less than the mean minus one standard deviation. Moreover, some 2.5 per cent of observations would lie above mean/median plus two standard deviations.
- B.44 As the histograms above suggest, however, many of the distributions for the selected indicators outlined above do not approximate to a normal distribution. Chebyshev’s inequality does give an upper bound above which a given proportion of observations will be expected to lie for any distribution, not just a normal distribution. This states that no more than $1/k^2$ of the values will be k standard deviations away from the mean (where $k > 1$). However, these are upper bounds and in practice much less than $1/k^2$ of the values for each indicator lie more than k standard deviations away from the mean. Moreover for $K \leq 1$, Chebyshev’s inequality is not helpful.
- B.45 In essence, the reason why we do not use the ‘median plus one standard deviation’ threshold is that in practice, for most of the indicator variables we use, far fewer observations are greater than one standard deviation from the median, than the 16.5 per cent expected if the distribution were normal. This threshold resulted in so few occupations passing the shortage threshold that it would not be meaningful.

B.6 Results

- B.46 Table B.4 presents the indicators of shortage by occupation, showing whether they pass the relevant threshold for shortage. A dark brown coloured cell signifies that an occupation is above or equal to the indicator threshold. A light yellow coloured cell signifies that the occupation indicator value is below the threshold. A cell displaying ‘x’ signifies missing data, or data which are too unreliable to report. The summary statistics in the last few columns on pages 268–281 summarise, for each occupation: the total number of indicators that lie above the threshold; the number of indicators there were data available for; and from this, the percentage of indicators that an occupation passes. This chapter concludes in Box B.1 with a glossary of statistical terms used in the report.
- B.47 We deem there to be good top-down evidence if an occupation exceeds the shortage threshold in at least 50 per cent of the indicators. However, when considering the evidence, it is also useful to take into account the number of available indicators.

Table B.4: Indicators of shortage

Key to indicators, sources and notes

Indicator	Description of indicator	Date	Data source	Threshold calculation	Threshold
Price-based indicators	P1 Annual percentage change of median hourly pay for all employees	2006–2007	ASHE	median + 50% median	4.8
	P2 Annual percentage change of mean hourly pay for all employees	2006–2007	ASHE	median + 50% median	5.175
	P3 Return to occupation, given NQF 3, with age and region controls	2007	LFS	median + 50% median	1.5207015
Indicators of imbalance	I1 Absolute change in median vacancy duration	March 2007– March 2008	JCP	top quartile	5.7
	I2 Live unfilled vacancies/unemployed by sought occupation	2007	JCP	top quartile	0.7134615
Volume-based indicators	V1 Annual percentage change in unemployment by sought occupation	March 2007– March 2008	JCP	median + 50% median	-22.05
	V2 Annual percentage change in employment estimates	2006–2007	LFS*	top quartile	9.0495024
	V3 Annual percentage change of median total paid hours, for full-time employees	2007	ASHE	top quartile	0.3
	V4 Absolute change in proportion working with employer for less than one year	2006–2007	LFS*	median + 50%	0.0074921

Table B.4: Indicators of shortage (continued)

Key to indicators, sources and notes

Indicator	Description of indicator	Date	Data source	Threshold calculation	Threshold
Employer-based perceptions	E1	2007	NESS	median + 50% median	37.835456
	E2	2007	NESS	top quartile	98.197998
	E3	2007	NESS and LFS*	median + 50% median	0.3000731
Summary statistics	Number of indicators passed		MAC analysis		
	Total indicators there are data for		MAC analysis		
	Percentage of indicators passed		MAC analysis		
	Estimated employed in occupation (thousands)	2007	LFS*		

Data sources: ASHE = Annual Survey of Hours and Earnings; JCP = Jobcentre Plus; LFS = Labour Force Survey; NESS = National Employers Skills Survey.

*The LFS estimates are for working-age population (males aged 16–64, females aged 16–59) for four quarters of aggregated data. The weighting applied was calculated by dividing the updated 2007 quarter weights by 4, rounding them and then applying them to the aggregated data. This may mean that the estimates vary slightly compared to if the weighting was applied fully at the initial stage and then the estimates obtained were divided by 4.

'x' denotes missing data, or data that are too unreliable to be reported.

'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

If a cell is coloured dark brown then this signifies that an occupation is above or equal to the indicator threshold. If it is light yellow, then this signifies that it is below the threshold.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	I3	V1	V2	V3	V4	E1	E2	E3				
Corporate managers																	
1111	7.5	6.8	1.44	x	0.01	-57.9	-17.3	-0.60	0.06	x	x	x	x	4	8	50	12
1112	9.3	9.9	1.69	0.9	0.03	3.1	1.7	-0.30	0.04	99.9	99.9	0.14	0.14	6	12	50	48
1113	-2.1	-1.2	1.11	4.7	0.28	0.0	1.4	0.00	-0.01	0.0	0.0	0.00	0.00	0	12	0	25
1114	1.6	4.2	1.56	14.0	0.10	-20.3	-24.1	-1.40	0.04	0.0	0.0	0.00	0.00	3	12	25	21
1121	4.8	5.7	1.28	2.3	0.27	-17.3	5.4	0.60	-0.02	19.0	64.8	0.13	0.13	3	12	25	382
1122	7.4	6.0	1.13	-1.0	1.10	0.5	7.2	0.00	-0.01	39.2	95.0	0.26	0.26	4	12	33	244
1123	-4.4	-2.1	1.04	5.8	0.20	-13.4	31.7	0.20	0.03	0.0	0.0	0.00	0.00	3	12	25	15
1131	5.5	7.9	1.54	-3.7	0.26	-0.7	6.7	0.00	0.00	26.9	92.5	0.10	0.10	3	12	25	224
1132	3.1	3.1	1.38	-3.9	0.56	-7.3	-0.9	0.00	0.01	27.7	88.0	0.22	0.22	1	12	8	505
1133	1.4	4.8	1.25	10.0	0.14	-13.9	6.4	0.00	-0.06	26.0	99.5	0.07	0.07	2	12	17	38
1134	2.5	4.2	1.46	-4.5	0.19	-19.4	17.5	0.40	0.04	28.2	88.7	0.25	0.25	3	12	25	54
1135	5.1	4.6	1.31	8.3	0.23	-9.8	-6.4	-0.60	-0.01	25.2	74.2	0.10	0.10	2	12	17	142
1136	2.2	2.9	1.46	0.1	0.05	-14.3	1.2	-0.80	0.02	17.5	85.3	0.03	0.03	1	12	8	295
1137	5.0	2.0	1.16	-3.3	0.39	-2.5	2.0	0.30	0.02	17.6	57.6	0.25	0.25	3	12	25	60
1141	3.4	-2.3	1.20	5.1	0.24	-16.7	10.5	-0.10	0.00	19.4	98.9	0.03	0.03	2	12	17	49
1142	2.7	5.2	1.19	7.6	0.54	-6.8	-3.3	0.30	0.02	19.4	100.0	0.05	0.05	5	12	42	85

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3					
1151	4.5	4.7	1.39	5.8	0.53	2.7	1.5	0.00	0.01	37.8	100.1	0.23	2	12	17	162	
1152	3.1	3.6	1.06	-5.8	0.25	-11.7	2.1	-0.30	0.01	31.5	72.8	0.31	2	12	17	258	
1161	3.7	3.5	1.37	0.8	0.25	-15.8	-7.6	-2.00	0.00	9.1	37.9	0.04	0	12	0	82	
1162	8.2	6.6	0.88	-10.5	0.18	-17.4	-0.8	-0.20	0.02	21.9	73.1	0.09	3	12	25	76	
1163	4.9	6.8	0.86	-1.5	1.00	-9.6	-0.9	0.30	-0.01	17.4	73.4	0.13	4	12	33	396	
1171	x	x	1.42	7.3	5.86	-34.9	10.5	x	0.02	x	x	x	5	6	83	28	
1172	-0.3	0.8	1.54	x	0.07	-26.7	17.5	0.00	0.01	x	x	x	3	8	38	15	
1173	8.6	14.0	1.33	x	0.30	33.3	7.2	0.00	0.00	9.8	100.0	0.06	3	11	27	16	
1174	-0.1	-4.2	1.29	-1.6	0.34	-7.8	-12.2	0.00	0.11	54.0	54.0	0.06	2	12	17	15	
1181	6.1	4.7	1.01	-8.6	0.41	-11.7	-3.3	0.00	0.02	31.5	51.0	0.12	2	12	17	68	
1182	7.5	-9.5	1.23	x	0.40	-11.8	-15.7	-4.50	0.07	100.0	100.0	0.19	4	11	36	6	
1183	1.7	2.0	0.95	60.5	0.56	-12.2	1.9	0.90	-0.03	24.1	99.1	0.26	3	12	25	19	
1184	13.0	7.7	0.90	-11.6	0.93	0.0	-6.7	0.00	-0.04	3.5	98.2	0.01	4	12	33	43	
1185	4.5	6.3	0.75	0.3	2.64	3.1	-13.0	0.10	0.03	37.5	87.3	0.21	3	12	25	47	
Managers and proprietors in agriculture and services																	
1211	5.0	1.9	0.80	x	0.13	-60.3	2.7	0.20	-0.01	70.3	99.3	0.39	5	11	45	18	
1212	7.8	3.5	1.23	11.0	0.03	8.5	-21.2	0.30	0.14	28.9	99.7	0.20	5	12	42	5	
1219	x	-13.5	0.85	x	0.13	0.0	-0.2	-5.90	0.08	0.0	0.0	0.00	1	10	10	12	

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3					
1221	4.4	10.7	1.08	1.9	0.46	-17.4	18.7	0.00	-0.02	64.9	100.4	0.24	4	12	33	48	
1222	5.8	4.9	1.21	8.9	0.32	6.3	-4.2	-0.20	0.00	36.4	99.7	0.77	4	12	33	14	
1225	0.4	-6.7	1.00	0.6	0.33	-15.8	18.8	-0.50	0.01	10.2	25.1	0.12	2	12	17	49	
1226	3.1	13.9	1.14	48.1	0.65	5.3	-25.6	0.10	0.13	0.0	0.0	0.00	3	12	25	8	
1231	1.7	4.0	1.19	14.4	0.43	-5.0	0.8	0.40	0.00	20.7	72.9	0.20	2	12	17	98	
1232	-1.3	-1.7	1.11	0.8	0.40	-12.0	-16.7	0.00	0.00	0.0	0.0	0.00	0	12	0	35	
1233	x	x	0.85	-6.8	0.32	-31.0	-12.9	4.40	-0.01	60.3	100.1	0.84	5	10	50	22	
1234	5.9	1.7	0.74	-2.7	0.10	-49.9	-1.3	1.30	0.02	0.0	0.0	0.00	4	12	33	131	
1235	0.7	4.2	1.19	3.9	0.79	-17.2	19.2	-1.60	0.08	36.1	100.0	0.12	4	12	33	11	
1239	3.4	0.8	0.86	0.0	0.67	-14.6	3.5	-1.40	-0.01	12.6	37.9	0.08	0	12	0	180	
Science and technology professionals																	
2111	8.8	8.0	0.96	0.1	0.23	-26.5	0.5	0.60	0.06	35.2	71.8	0.27	5	12	42	22	
2112	3.2	5.8	1.12	0.6	0.09	-17.8	10.6	0.00	-0.04	58.5	97.7	0.61	4	12	33	88	
2113	-1.4	-0.8	0.77	x	0.05	-32.2	-11.6	0.70	0.03	42.1	95.2	1.61	5	11	45	17	
2121	5.1	3.4	1.08	-11.3	1.35	-9.2	0.8	2.40	0.00	59.5	88.2	2.10	5	12	42	78	
2122	2.2	4.9	1.07	0.6	0.74	-21.7	11.6	0.00	-0.01	32.0	91.8	0.41	3	12	25	79	
2123	0.9	1.1	1.06	-8.9	1.52	-21.4	-1.2	-0.60	-0.01	39.1	86.1	0.46	3	12	25	53	

See 'Key to indicators, sources and notes' on pages 268-269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2		V1	V2	V3	V4	E1	E2	E3				
2124 Electronics engineers	4.3	2.3	1.10	-0.9	0.16		-20.6	1.8	-0.50	-0.03	36.7	61.1	0.05	0	12	0	34
2125 Chemical engineers	x	22.4	x	x	0.20		-5.3	49.4	1.90	-0.09	6.2	45.2	0.08	3	9	33	10
2126 Design and development engineers	6.1	5.0	1.07	-0.2	0.56		-30.9	0.3	0.00	0.00	37.9	68.9	0.75	4	12	33	69
2127 Production and process engineers	-5.7	-2.6	1.13	-1.0	0.83		-25.0	-4.3	0.30	0.03	18.8	91.7	0.14	4	12	33	32
2128 Planning and quality control engineers	-0.6	-1.3	1.22	3.5	0.75		-22.3	1.9	0.00	0.01	27.3	97.5	0.28	3	12	25	32
2129 Engineering professionals n.e.c.	1.9	5.6	1.19	-6.5	0.68		-20.6	4.0	0.00	0.02	23.6	82.1	0.42	3	12	25	83
2131 IT strategy and planning professionals	4.7	1.6	1.43	1.5	0.06		-10.7	9.4	0.00	0.01	31.8	88.3	0.15	2	12	17	144
2132 Software professionals	2.4	2.4	1.30	-1.6	0.13		-23.4	0.8	0.00	-0.01	40.9	90.8	1.14	3	12	25	316
Health professionals																	
2211 Medical practitioners	-1.6	-0.8	1.51	-9.7	0.31		-28.2	-5.2	0.00	-0.04	10.7	87.5	0.03	1	12	8	190
2212 Psychologists	8.5	4.7	1.29	-0.7	0.09		-22.2	-5.1	-0.10	-0.09	6.4	21.7	0.11	2	12	17	24
2213 Pharmacists/pharmacologists	-1.3	-5.1	0.92	-6.6	0.47		-15.1	2.2	0.00	0.03	17.6	100.0	0.09	2	12	17	41
2214 Ophthalmic opticians	-2.2	-0.7	x	x	0.88		-19.2	5.9	0.00	0.01	10.0	30.5	0.16	2	10	20	13
2215 Dental practitioners	2.1	-6.9	x	-16.1	0.76		-8.0	0.1	0.10	-0.01	0.0	0.0	0.00	1	11	9	28
2216 Veterinarians	13.2	31.4	x	x	0.17		-45.8	-16.7	-5.00	0.10	33.7	72.1	0.66	5	10	50	15
Teaching and research professionals																	
2311 Higher education teaching professionals	-0.5	0.8	0.90	-1.6	0.21		-26.0	1.4	-0.90	0.02	12.5	85.8	0.43	3	12	25	117

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3					
	2312	2.1	6.0	0.83	-8.9	0.23	-22.5	-4.6	0.00	-0.04	8.2	49.7	0.12				
2313	11.0	10.9	0.75	-4.0	0.39	-22.8	3.3	0.40	0.01	12.3	100.0	0.07	5	12	42	25	
2314	4.6	4.7	1.10	-3.1	0.79	-22.0	-4.0	0.00	0.01	9.8	68.7	0.33	3	12	25	386	
2315	3.4	3.6	0.50	-1.9	0.49	-24.8	-0.7	0.00	0.01	15.4	67.6	0.16	2	12	17	363	
2316	3.1	1.4	0.59	18.7	0.28	-26.0	-4.8	0.10	0.00	0.0	0.0	0.00	2	12	17	65	
2317																	
2319	-8.1	-3.7	1.00	13.6	0.31	-23.7	3.3	0.00	-0.01	68.5	100.0	0.18	4	12	33	34	
2321	-0.6	3.4	1.18	10.2	0.26	-19.8	6.8	0.00	-0.02	40.1	80.3	0.41	3	12	25	140	
2322	8.0	4.8	x	5.7	0.06	-18.9	-12.3	0.00	0.03	2.7	100.0	0.06	4	11	36	14	
2329	x	1.9	0.81	x	0.03	-1.8	-5.4	0.50	-0.05	51.2	100.0	0.74	4	10	40	15	
	4.7	5.1	0.92	2.7	0.18	-10.7	-2.5	-1.60	0.01	14.3	100.0	0.35	3	12	25	50	
Business and public service professionals																	
2411	1.7	2.9	1.53	-5.5	0.56	5.0	10.5	0.00	0.01	30.4	85.6	0.55	3	12	25	161	
2419	12.9	-2.7	1.27	16.8	0.36	-12.1	-22.3	2.50	-0.05	34.6	100.0	0.34	5	12	42	15	
2421	-1.3	0.3	1.36	-1.3	0.34	-15.6	1.6	0.00	0.02	52.5	94.7	0.29	2	12	17	153	
2422	3.8	8.5	1.17	-2.7	0.41	-6.9	-1.0	-1.00	-0.03	0.0	0.0	0.00	1	12	8	77	
2423	-0.8	-4.2	1.31	-9.9	0.09	2.9	11.2	0.00	0.03	22.4	43.3	0.26	2	12	17	177	

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	I3	V1	V2	V3	V4	E1	E2	E3				
2431 Architects	1.4	3.3	1.23	-4.0	1.05	-14.7	7.4	0.00	0.01	0.01	47.6	80.9	2.22	4	12	33	52
2432 Town planners	-0.1	-1.0	1.40	0.4	0.58	-10.4	-4.6	0.00	0.00	0.00	76.8	78.6	1.01	2	12	17	22
2433 Quantity surveyors	4.9	1.6	1.45	3.2	4.13	11.3	-15.8	0.00	0.06	0.06	67.1	87.0	2.94	5	12	42	34
2434 Chartered surveyors (not quantity surveyors)	6.9	3.9	1.17	-13.2	0.69	-0.9	-7.0	0.10	0.05	0.05	30.3	68.4	1.58	3	12	25	53
2441 Public service administrative professionals	5.5	3.0	1.16	-0.9	0.24	-9.4	12.2	-9.70	0.01	0.01	0.0	0.0	0.00	3	12	25	34
2442 Social workers	3.0	3.1	0.81	-0.4	1.34	-15.5	-11.3	0.00	-0.02	0.00	28.8	79.5	0.27	1	12	8	92
2443 Probation officers	16.7	7.6	0.70	15.9	0.26	-20.2	-12.4	0.00	-0.01	0.00	x	x	x	3	9	33	11
2444 Clergy	3.3	5.6	0.46	x	0.03	-24.1	-4.4	0.00	0.00	0.00	0.0	0.0	0.00	2	11	18	39
2451 Librarians	-0.5	4.9	0.75	-4.4	0.07	-11.6	6.8	-0.20	0.00	0.00	9.0	100.0	0.06	1	12	8	32
2452 Archivists and curators	7.5	3.2	0.81	-2.8	0.05	-17.3	-18.9	0.10	0.03	0.03	17.2	100.0	0.24	3	12	25	8
Science and technology associate professionals																	
3111 Laboratory technicians	0.0	0.8	0.78	-0.7	0.22	-11.5	4.4	0.10	-0.03	-0.03	18.2	99.9	0.14	1	12	8	62
3112 Electrical/electronics technicians	-2.2	1.8	0.92	-2.3	0.50	-17.2	34.1	-2.70	-0.06	-0.06	13.0	100.0	0.10	2	12	17	34
3113 Engineering technicians	2.5	2.9	0.94	0.5	1.29	-13.5	10.5	3.90	0.02	0.02	36.4	99.9	0.37	6	12	50	70
3114 Building and civil engineering technicians	6.5	5.1	0.97	7.0	0.86	-20.1	-17.2	3.40	0.01	0.01	7.2	91.7	0.20	5	12	42	25
3115 Quality assurance technicians	5.2	5.3	0.89	-2.3	0.88	-14.7	3.3	0.00	-0.02	-0.02	33.2	100.1	0.23	4	12	33	23
3119 Science and engineering technicians n.e.c.	9.8	8.6	0.92	-1.7	0.45	-11.4	5.8	-0.60	0.06	0.06	33.2	79.7	1.49	4	12	33	44
3121 Architectural technologists and town planning technicians	-2.2	2.0	0.90	-1.8	0.98	-17.6	35.6	0.00	0.08	0.08	55.8	88.7	1.22	5	12	42	29
3122 Draughtspersons	1.8	10.7	0.99	2.3	0.65	-16.2	-0.9	-1.50	0.02	0.02	48.2	74.3	1.02	4	12	33	43

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance		Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3				
3123 Building inspectors	15.5	12.3	1.17	-19.1	0.43	-33.7	-30.2	0.00	-0.13	100.0	100.0	0.11	5	12	42	5
3131 IT operations technicians	2.8	0.6	0.99	-1.9	0.08	-11.6	-4.6	0.30	0.02	23.9	83.7	0.23	2	12	17	118
3132 IT user support technicians	1.6	2.9	0.93	-4.3	0.12	-3.8	-7.7	0.10	0.04	2.1	76.5	0.04	1	12	8	54
Health and social welfare associate professionals																
3211 Nurses	4.7	5.1	0.77	5.3	3.00	-21.1	0.5	0.00	-0.01	9.7	58.2	0.15	1	12	8	508
3212 Midwives	7.9	8.4	x	x	0.10	-29.2	15.2	-0.10	-0.02	17.3	100.0	0.05	5	10	50	37
3213 Paramedics	14.9	10.8	1.29	-2.9	0.71	-5.4	-26.2	-2.10	0.02	0.0	0.0	0.00	4	12	33	17
3214 Medical radiographers	0.3	-3.4	1.19	x	0.40	-30.2	17.8	1.10	0.02	0.0	0.0	0.00	4	11	36	25
3215 Chiroprodists	6.5	4.1	x	x	0.28	-22.6	2.5	0.00	-0.08	0.0	0.0	0.00	2	10	20	10
3216 Dispensing opticians	5.2	9.8	1.61	17.0	1.75	-21.1	-44.8	-1.40	-0.02	x	x	x	5	9	56	5
3217 Pharmaceutical dispensers	9.0	6.8	0.75	2.3	1.49	4.1	-8.7	0.10	0.04	42.4	74.3	0.51	6	12	50	31
3218 Medical and dental technicians	8.5	-0.5	0.96	-6.7	0.29	-10.2	-21.5	1.30	-0.01	35.1	91.5	0.17	2	12	17	30
3221 Physiotherapists	3.8	4.9	1.31	0.2	0.17	-24.0	-1.6	1.40	0.01	18.0	72.8	0.10	3	12	25	33
3222 Occupational therapists	4.0	4.0	0.74	1.4	0.53	-32.3	1.8	0.20	-0.01	0.0	0.0	0.00	1	12	8	31
3223 Speech and language therapists	-1.3	4.8	0.59	99.5	0.44	-31.7	15.9	0.00	-0.03	27.0	60.1	0.16	3	12	25	14
3229 Therapists n.e.c.	5.6	8.8	1.01	-172.4	0.17	-22.0	-10.4	1.60	-0.04	0.0	0.0	0.00	3	12	25	52
3231 Youth and community workers	4.4	3.2	0.76	-11.9	0.28	-9.9	-0.7	0.00	0.00	38.0	70.4	0.65	2	12	17	89
3232 Housing and welfare officers	4.8	2.4	0.91	-2.3	0.33	-15.5	-12.5	0.00	-0.01	11.8	61.9	0.38	2	12	17	149
Protective service occupations																
3311 NCOs and other ranks	x	x	1.20	234.6	54.7	-9.5	-9.8	x	0.01	20.0	100.0	1.85	5	9	56	53

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance		Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3				
3312 Police officers (sergeant and below)	3.1	3.1	1.19	-34.3	0.37	-34.1	7.4	-0.30	0.00	0.0	0.0	0.00	1	12	8	174
3313 Fire service officers (leading fire officer and below)	0.5	1.9	1.01	45.4	0.71	-18.0	2.6	0.50	-0.01	8.8	18.0	0.07	2	12	17	39
3314 Prison service officers (below principal officer)	-14.3	-2.7	1.02	7.7	1.48	8.0	-1.8	2.50	0.05	31.0	99.7	0.07	5	12	42	40
3319 Protective service associate professionals n.e.c.	16.2	7.1	1.08	x	0.28	-27.8	1.5	-9.80	0.00	0.0	0.0	0.00	3	11	27	29
Culture, media and sports occupations																
3411 Artists	x	4.5	0.39	x	0.01	-27.0	9.1	x	0.09	25.3	100.1	0.13	4	9	44	29
3412 Authors, writers	-1.0	0.6	0.60	92.7	0.54	-14.2	10.8	-0.60	0.02	12.1	86.1	0.25	3	12	25	51
3413 Actors, entertainers	x	x	0.62	-81.3	0.33	-23.6	-16.0	-4.30	-0.07	11.0	68.8	0.15	1	10	10	28
3414 Dancers and choreographers	x	10.3	x	0.3	1.01	-14.2	62.0	5.10	0.13	0.0	0.0	0.00	5	10	50	6
3415 Musicians	5.9	5.4	1.08	61.2	0.04	-23.8	9.0	0.90	0.06	74.5	100.4	0.27	8	12	67	32
3416 Arts officers, producers and directors	-4.3	2.3	1.34	7.4	0.03	-12.6	14.1	-2.00	0.02	28.2	86.0	0.18	3	12	25	31
3421 Graphic designers	-1.7	-1.5	0.97	4.5	0.05	-13.8	4.1	0.00	0.01	26.0	82.9	0.76	2	12	17	95
3422 Product, clothing and related designers	1.8	2.9	0.90	-11.8	0.19	-18.3	22.4	0.00	0.00	58.6	94.1	1.47	3	12	25	53
3431 Journalists, newspaper and periodical editors	1.0	2.2	1.69	-2.8	0.02	-15.9	-21.5	1.30	0.03	4.0	98.5	0.05	4	12	33	55
3432 Broadcasting associate professionals	5.4	-4.7	1.39	x	0.01	-10.8	-3.1	-0.80	-0.02	18.7	97.6	0.34	2	11	18	41
3433 Public relations officers	1.0	1.6	0.96	-4.3	0.14	-6.6	2.6	0.00	-0.05	27.2	96.9	0.57	1	12	8	32

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3					
3434 Photographers and audio-visual equipment operators	12.4	7.2	1.13	16.0	0.06	-22.4	9.4	-4.00	0.01	63.2	98.8	2.48	9	12	75	61	
3441 Sports players	x	x	0.27	x	0.02	-52.7	5.7	-0.50	0.01	91.0	91.0	0.03	3	9	33	14	
3442 Sports coaches, instructors and officials	5.4	-2.3	0.49	2.3	0.39	-12.0	12.3	0.00	0.01	30.1	89.3	0.62	3	12	25	50	
3443 Fitness instructors	2.1	2.2	0.50	-10.5	0.27	-11.2	-5.8	-0.50	0.00	10.2	51.9	0.38	1	12	8	27	
3449 Sports and fitness occupations n.e.c.	x	-0.6	x	-24.6	0.29	-14.0	30.6	1.00	-0.19	0.0	0.0	0.00	2	10	20	11	
Business and public service associate professionals																	
3511 Air traffic controllers	-1.0	2.5	1.68	x	0.08	-12.5	-7.9	0.00	0.12	x	x	x	2	8	25	8	
3512 Aircraft pilots and flight engineers	-3.8	3.2	2.01	x	0.09	-9.9	-10.6	5.00	-0.03	62.8	94.8	0.42	4	11	36	19	
3513 Ship and hovercraft officers	x	7.7	0.68	x	0.25	-28.6	11.4	0.60	-0.01	100.0	100.0	0.20	6	10	60	17	
3514 Train drivers	8.1	8.0	1.25	x	0.05	-5.1	-18.1	-0.80	0.01	16.9	100.0	0.06	4	11	36	16	
3520 Legal associate professionals	-3.5	3.7	1.07	-4.7	0.54	-2.0	9.1	0.40	0.07	16.7	76.2	0.28	3	12	25	50	
3531 Estimators, valuers and assessors	-1.3	1.6	1.00	5.7	2.34	9.4	6.9	-0.30	0.05	34.2	89.1	0.33	4	12	33	65	
3532 Brokers	-0.4	12.7	1.41	-7.7	0.72	12.4	20.8	2.40	-0.02	3.1	100.0	0.07	5	12	42	60	
3533 Insurance underwriters	1.0	0.1	1.11	32.5	1.38	39.8	-0.8	0.00	-0.02	27.9	80.9	0.57	3	12	25	27	
3534 Finance and investment analysts/advisers	3.8	6.7	1.23	0.0	1.56	21.6	21.8	-0.70	-0.02	37.3	86.0	0.57	4	12	33	182	
3535 Taxation experts	0.4	-5.1	1.20	5.7	0.75	-43.9	-14.3	-2.40	-0.04	48.8	64.1	0.15	4	12	33	26	
3536 Importers, exporters	7.6	19.3	0.90	0.6	0.73	-30.1	-12.1	0.00	-0.09	0.0	0.0	0.00	4	12	33	7	
3537 Financial and accounting technicians	6.8	5.4	1.06	-1.4	0.49	-3.7	-15.5	-0.70	-0.03	50.2	100.0	0.32	5	12	42	27	

See 'Key to indicators, sources and notes' on pages 268-269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2		V1	V2	V3	V4	E1	E2	E3				
3539 Business and related associate professionals n.e.c.	4.1	4.2	1.03	14.0	0.82	-1.7	12.3	0.00	0.03	0.03	24.9	67.2	0.13	4	12	33	129
3541 Buyers and purchasing officers	0.8	1.9	0.93	-4.3	0.45	-10.6	2.7	0.00	0.00	0.00	10.5	90.1	0.12	0	12	0	60
3542 Sales representatives	5.2	6.2	0.98	-8.6	4.86	-5.5	-3.5	0.00	-0.01	0.00	30.2	80.6	1.16	4	12	33	211
3543 Marketing associate professionals	3.2	6.6	0.91	-7.7	1.19	6.1	-1.8	0.00	0.07	0.00	17.8	82.3	0.72	4	12	33	129
3544 Estate agents, auctioneers	1.6	12.2	0.98	6.9	0.67	19.9	-1.6	1.80	0.07	0.00	36.0	95.0	0.93	5	12	42	31
3551 Conservation and environmental protection officers	4.5	1.7	1.01	4.6	0.05	-22.7	-25.3	0.00	0.02	0.00	19.4	99.6	0.55	4	12	33	20
3552 Countryside and park rangers	9.8	4.8	0.46	3.5	0.09	-11.4	-41.5	0.00	0.11	0.00	0.0	0.0	0.00	2	12	17	5
3561 Public service associate professionals	4.2	1.1	1.01	2.3	0.78	-9.2	-4.5	0.00	0.03	0.00	12.1	97.0	0.02	2	12	17	74
3562 Personnel and industrial relations officers	-3.4	-2.0	0.96	7.6	0.95	-1.0	9.1	0.20	0.05	0.00	27.4	81.6	2.00	5	12	42	150
3563 Vocational and industrial trainers and instructors	4.0	2.4	0.92	2.8	0.90	-18.2	7.5	0.00	-0.01	0.00	22.2	75.7	0.53	2	12	17	140
3564 Careers advisers and vocational guidance specialists	4.0	8.7	0.93	-6.1	0.40	4.6	1.8	0.00	0.04	0.00	87.7	100.0	0.26	4	12	33	27
3565 Inspectors of factories, utilities and trading standards	-3.8	-3.2	1.02	1.2	0.69	-12.9	35.6	0.00	0.06	0.00	0.0	0.0	0.00	2	12	17	13
3566 Statutory examiners	3.0	0.3	0.91	x	0.48	-39.6	9.8	-4.30	-0.01	0.00	0.0	0.0	0.00	2	11	18	15
3567 Occupational hygienists and safety officers (health and safety)	6.4	4.0	1.15	12.8	0.44	-15.8	15.8	0.00	0.00	0.00	37.9	92.0	0.31	5	12	42	41
3568 Environmental health officers	-1.4	2.2	0.96	2.2	0.42	-29.1	2.3	0.00	0.09	0.00	13.0	48.1	0.11	2	12	17	12

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance		Volume-based indicators				Employer-based indicators			Total number of indicators	Number of indicators passed	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2	V1	V2	V3	V4	E1	E2	E3				
	Administrative occupations															
4111	2.8	2.9	0.83		x	0.02	-41.0	0.00	-0.01	6.8	97.2	0.02	11	1	9	70
4114	2.7	0.5	0.73	-4.8	0.61	-26.5	17.6	-0.70	0.03	0.0	0.0	0.00	12	3	25	50
4142	1.4	-2.3	0.94	15.4	1.02	-5.2	19.6	1.40	0.00	18.2	26.8	0.30	12	4	33	33
Skilled metal and electrical trades																
5211	-1.0	-0.9	1.14	-7.7	0.23	-21.6	30.5	0.00	-0.07	81.0	100.0	0.86	12	4	33	6
5212	12.2	12.0	x	21.0	0.39	-35.1	53.2	3.30	-0.03	99.3	99.3	1.04	11	9	82	4
5214	2.6	-0.2	1.08	6.8	0.80	-14.4	-3.9	-4.30	0.01	23.7	74.3	0.28	12	3	25	10
5215	8.9	9.7	0.86	0.5	0.80	-14.4	11.0	2.40	0.05	43.5	82.1	0.92	12	8	67	87
5216	18.4	16.9	0.65	-7.4	1.13	-11.9	-14.2	5.70	0.06	30.4	48.1	0.37	12	6	50	11
5221	1.9	3.3	0.90	-1.7	1.74	-24.2	-0.3	3.50	0.07	68.3	80.2	0.67	12	6	50	66
5222	4.1	-1.3	0.87	1.5	0.47	-27.2	-22.7	7.40	-0.05	24.1	33.7	0.04	12	2	17	19
5223	3.3	3.5	0.93	0.6	0.50	-21.3	-3.2	1.10	-0.01	27.2	80.6	0.71	12	2	17	228
5224	4.6	8.8	1.12	-109.2	0.36	-20.6	-7.1	1.10	-0.04	15.7	97.4	0.04	12	2	17	18
5233	-1.3	4.6	0.80	0.2	0.35	-25.2	-11.2	1.60	-0.08	80.3	99.5	0.76	12	5	42	8
5241	4.5	5.0	1.00	-0.8	0.94	-16.8	16.2	-1.20	0.00	46.9	85.6	0.67	12	4	33	254

See 'Key to indicators, sources and notes' on pages 268–269.

Table B.4: Indicators of shortage (continued)

SOC2000 4-digit occupation	Price-based indicators			Indicators of imbalance			Volume-based indicators				Employer-based indicators			Number of indicators passed	Total number of indicators	Percentage of indicators passed	Employment estimates (thousands)
	P1	P2	P3	I1	I2		V1	V2	V3	V4	E1	E2	E3				
5242	1.4	1.8	0.95	17.1	0.71	-8.6	-2.5	3.00	0.01	0.01	38.2	88.1	0.13	4	12	33	47
5243	-1.7	-0.7	1.25	-12.7	0.55	-17.6	36.5	2.50	-0.09	18.2	40.9	0.04	2	12	17	17	
5245	5.0	5.4	0.88	13.5	0.13	-19.0	-2.7	0.00	0.02	24.4	99.9	0.39	6	12	50	39	
5249	2.1	0.6	0.94	-5.8	0.88	-16.4	-11.3	0.00	0.03	65.7	93.9	0.81	4	12	33	91	
Skilled construction and building trades																	
5311	7.2	8.2	0.77	-18.3	0.68	-9.4	-1.3	7.10	0.01	60.9	83.4	1.26	6	12	50	14	
5312	1.0	2.3	0.90	3.8	0.38	-3.8	6.4	0.00	-0.02	19.6	62.0	0.30	0	12	0	101	
5314	2.9	4.3	1.02	-10.9	0.63	-14.3	5.3	0.00	-0.02	41.3	91.0	0.35	2	12	17	197	
5315	4.2	4.6	0.91	4.7	0.53	-11.7	-2.1	2.50	-0.01	32.7	67.2	0.33	2	12	17	281	
5319	9.7	5.8	0.94	4.9	0.32	-11.6	4.8	0.00	-0.01	26.5	78.0	0.18	2	12	17	222	
Textiles, printing and other skilled trades																	
5414	x	22.0	0.34	-0.5	0.22	-16.3	5.3	x	0.00	68.5	100.0	2.24	4	10	40	6	
5421	8.3	-2.8	0.90	x	0.06	-20.7	-26.3	-3.80	0.01	39.5	97.7	5.80	4	11	36	6	
5422	-4.6	-7.7	0.97	-6.6	0.11	-13.0	-12.2	1.20	0.03	40.1	87.6	0.27	3	12	25	35	
5493	-0.7	8.8	1.23	74.6	0.93	-39.4	120.1	-11.20	-0.10	0.0	0.0	0.00	5	12	42	2	
5495	x	15.7	1.02	35.0	0.08	-12.9	23.0	-2.30	0.01	30.1	43.4	0.11	3	11	27	10	
5496	3.9	0.5	0.44	11.8	0.30	-16.8	18.5	-2.20	-0.10	58.6	71.3	1.29	4	12	33	15	
Process, plant and machine operatives																	
8124	14.2	3.8	1.24	-26.3	0.56	6.0	2.5	-4.00	-0.04	x	x	x	1	9	11	8	

See 'Key to indicators, sources and notes' on pages 268–269.

B.7 Glossary of basic statistical terms used in this report

Box B.1: Glossary of statistical terms

Correlation coefficient: a correlation coefficient is a number between -1 and 1 , which measures the degree to which two variables are linearly related. If there is perfect linear relationship with positive slope between the two variables, we have a correlation coefficient of 1 ; if there is a positive correlation, whenever one variable has a high (low) value, so does the other. If there is perfect linear relationship with negative slope between the two variables, we have a correlation coefficient of -1 ; if there is negative correlation, whenever one variable has a high (low) value, the other has a low (high) value. A correlation coefficient of 0 means that there is no linear relationship between the variables.

Measures of central tendency:

- **Median:** the median is the value halfway through the ordered data set, below and above which there lies an equal number of data values.
- **Mode:** the mode is the most frequently occurring value in a set of discrete data. There can be more than one mode if two or more values are equally common.
- **Mean:** the sample mean is an estimator available for estimating the population mean. It is a measure of location, commonly called the average.

Normal distribution: normal distributions are thought to underlie many continuous random variables (such as the distribution of age or height in a population). Normal distributions follow a regular 'bell-shaped' pattern and are symmetric (50 per cent of observations lie to the right of the mean and 50 per cent above), with the mean, median and mode all equal.

Outliers: an outlier is an observation in a data set, which is far removed in value from the others in the data set. It is an unusually large or an unusually small value compared to the others.

Percentile: percentiles are values that divide a sample of data into 100 groups containing (as far as possible) equal numbers of observations.

Skewness: skewness is defined as asymmetry in the distribution of the sample data values. Values on one side of the distribution tend to be further from the 'middle' than values on the other side.

Variance: the (population) variance of a random variable is a non-negative number, which gives an idea of how widely spread the values of the random variable are likely to be; the larger the variance, the more scattered the observations on average. Stating the variance gives an impression of how closely concentrated around the expected value the distribution is; it is a measure of the 'spread' of a distribution about its average value.

Standard deviation: standard deviation is a measure of the spread or dispersion of a set of data. It is calculated by taking the square root of the variance and is symbolised by 's.d.' or 's'. The more widely the values are spread out, the larger the standard deviation.

Standard error: standard error is the standard deviation of the values of a given function of the data (parameter), over all possible samples of the same size.

Source: www.stats.gla.ac.uk/steps/glossary/alphabet.html

- C.1 This annex presents the available quantitative data relevant to our indicators of whether it is sensible to fill shortages in skilled occupations with immigrants from outside the European Economic Area (EEA). These indicators are:
- the shares of non-EEA immigrants and non-British EEA immigrants already employed in an occupation; and
 - the percentage of the workforce in receipt of training.
- C.2 Estimates presented are taken from the Labour Force Survey. These were not used in a top-down analysis of sensible, but were used alongside the bottom-up evidence as appropriate.
- C.3 Table C.1 presents these data for the 192 occupations identified as skilled to level 3 and above. Table C.2 presents these data for occupations not identified as skilled to level 3. We also present, at the top of each table, the median for the skilled, less skilled and all occupations.
- C.4 The relevant shortage indicators that also aided our analysis of sensible were listed in Annex B and are not repeated here.

Table C.1: Quantitative indicators of sensible for skilled occupations

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
Median for skilled occupations		7	3	33
Median for all occupations		6	3	26
Corporate managers				
1111	Senior officials in national government	14	4	38
1112	Directors and chief executives of major organisations	15	5	24
1113	Senior officials in local government	8	2	40
1114	Senior officials of special interest organisations	10	3	31

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
1121	Production, works and maintenance managers	5	2	21
1122	Managers in construction	3	3	25
1123	Managers in mining and energy	8	0	29
1131	Financial managers and chartered secretaries	9	5	26
1132	Marketing and sales managers	7	4	24
1133	Purchasing managers	7	2	30
1134	Advertising and public relations managers	13	4	27
1135	Personnel, training and industrial relations managers	7	3	37
1136	Information and communication technology managers	11	3	29
1137	Research and development managers	9	3	29
1141	Quality assurance managers	6	5	24
1142	Customer care managers	5	2	35
1151	Financial institution managers	12	3	34
1152	Office managers	6	3	26
1161	Transport and distribution managers	5	1	20
1162	Storage and warehouse managers	2	1	21
1163	Retail and wholesale managers	9	3	18
1171	Officers in armed forces	10	3	47
1172	Police officers (inspectors and above)	6	0	48
1173	Senior officers in fire, ambulance, prison and related services	1	7	60
1174	Security managers	12	2	38
1181	Hospital and health service managers	9	3	50
1182	Pharmacy managers	*	0	59

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
1183	Healthcare practice managers	5	5	34
1184	Social services managers	6	3	53
1185	Residential and day care managers	9	0	55
Managers and proprietors in agriculture and services				
1211	Farm managers	0	5	12
1212	Natural environment and conservation managers	0	3	36
1219	Managers in animal husbandry, forestry and fishing n.e.c.	0	4	4
1221	Hotel and accommodation managers	9	4	21
1222	Conference and exhibition managers	15	3	24
1225	Leisure and sports managers	3	6	38
1226	Travel agency managers	8	0	22
1231	Property, housing and land managers	8	3	29
1232	Garage managers and proprietors	4	1	18
1233	Hairdressing and beauty salon managers and proprietors	5	3	19
1234	Shopkeepers and wholesale/retail dealers	19	2	7
1235	Recycling and refuse disposal managers	3	5	27
1239	Managers and proprietors in other services n.e.c.	7	4	24
Science and technology professionals				
2111	Chemists	11	9	32
2112	Biological scientists and biochemists	12	6	42
2113	Physicists, geologists and meteorologists	22	10	42
2121	Civil engineers	10	4	31
2122	Mechanical engineers	5	2	28

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
2123	Electrical engineers	7	1	27
2124	Electronics engineers	11	3	26
2125	Chemical engineers	13	8	26
2126	Design and development engineers	9	2	30
2127	Production and process engineers	6	0	29
2128	Planning and quality control engineers	5	6	24
2129	Engineering professionals n.e.c.	7	2	28
2131	IT strategy and planning professionals	15	4	27
2132	Software professionals	14	4	26
Health professionals				
2211	Medical practitioners	32	5	64
2212	Psychologists	19	4	62
2213	Pharmacists/pharmacologists	21	5	54
2214	Ophthalmic opticians	4	1	64
2215	Dental practitioners	20	8	68
2216	Veterinarians	4	14	60
Teaching and research professionals				
2311	Higher education teaching professionals	15	9	34
2312	Further education teaching professionals	8	3	51
2313	Education officers, school inspectors	0	1	52
2314	Secondary education teaching professionals	6	3	49
2315	Primary and nursery education teaching professionals	4	2	55
2316	Special needs education teaching professionals	2	0	59
2317	Registrars and senior administrators of educational establishments	11	1	41

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
2319	Teaching professionals n.e.c.	8	5	36
2321	Scientific researchers	12	13	27
2322	Social science researchers	12	7	32
2329	Researchers n.e.c.	17	12	31
Business and public service professionals				
2411	Solicitors and lawyers, judges and coroners	12	4	55
2419	Legal professionals n.e.c.	20	2	43
2421	Chartered and certified accountants	13	3	42
2422	Management accountants	16	4	35
2423	Management consultants, actuaries, economists and statisticians	10	4	32
2431	Architects	14	5	34
2432	Town planners	6	3	42
2433	Quantity surveyors	4	2	37
2434	Chartered surveyors (not quantity surveyors)	2	2	35
2441	Public service administrative professionals	4	8	36
2442	Social workers	9	3	65
2443	Probation officers	11	0	69
2444	Clergy	15	3	36
2451	Librarians	7	3	48
2452	Archivists and curators	5	0	36
Science and technology associate professionals				
3111	Laboratory technicians	9	4	38
3112	Electrical/electronics technicians	8	1	22
3113	Engineering technicians	6	1	36
3114	Building and civil engineering technicians	6	9	28

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
3115	Quality assurance technicians	9	4	40
3119	Science and engineering technicians n.e.c.	8	6	31
3121	Architectural technologists and town planning technicians	6	10	37
3122	Draughtspersons	4	1	20
3123	Building inspectors	0	0	49
3131	IT operations technicians	8	6	32
3132	IT user support technicians	8	3	32
Health and social welfare associate professionals				
3211	Nurses	19	3	62
3212	Midwives	12	9	68
3213	Paramedics	8	2	53
3214	Medical radiographers	8	4	39
3215	Chiropodists	9	0	49
3216	Dispensing opticians	5	8	51
3217	Pharmaceutical dispensers	8	1	51
3218	Medical and dental technicians	10	3	40
3221	Physiotherapists	9	4	64
3222	Occupational therapists	5	6	52
3223	Speech and language therapists	4	0	63
3229	Therapists n.e.c.	6	5	50
3231	Youth and community workers	5	3	50
3232	Housing and welfare officers	9	2	53
Protective service occupations				
3311	NCOs and other ranks	11	3	54
3312	Police officers (sergeant and below)	3	1	48

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
3313	Fire service officers (leading fire officer and below)	2	4	61
3314	Prison service officers (below principal officer)	3	2	44
3319	Protective service associate professionals n.e.c.	5	1	38
Culture, media and sports occupations				
3411	Artists	8	4	18
3412	Authors, writers	12	8	15
3413	Actors, entertainers	9	3	15
3414	Dancers and choreographers	*	0	41
3415	Musicians	13	2	8
3416	Arts officers, producers and directors	8	7	16
3421	Graphic designers	9	5	13
3422	Product, clothing and related designers	11	6	14
3431	Journalists, newspaper and periodical editors	9	5	17
3432	Broadcasting associate professionals	10	4	22
3433	Public relations officers	7	7	29
3434	Photographers and audio-visual equipment operators	5	3	16
3441	Sports players	10	5	31
3442	Sports coaches, instructors and officials	4	1	45
3443	Fitness instructors	12	4	45
3449	Sports and fitness occupations n.e.c.	1	5	36
Business and public service associate professionals				
3511	Air traffic controllers	5	0	47
3512	Aircraft pilots and flight engineers	14	5	50

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
3513	Ship and hovercraft officers	3	1	44
3514	Train drivers	7	6	33
3520	Legal associate professionals	7	1	42
3531	Estimators, valuers and assessors	3	1	31
3532	Brokers	13	5	24
3533	Insurance underwriters	1	3	40
3534	Finance and investment analysts/advisers	12	5	40
3535	Taxation experts	7	2	48
3536	Importers, exporters	*	5	16
3537	Financial and accounting technicians	10	6	45
3539	Business and related associate professionals n.e.c.	6	3	29
3541	Buyers and purchasing officers	6	3	20
3542	Sales representatives	6	3	23
3543	Marketing associate professionals	10	5	28
3544	Estate agents, auctioneers	6	2	23
3551	Conservation and environmental protection officers	5	7	41
3552	Countryside and park rangers	0	0	30
3561	Public service associate professionals	7	3	36
3562	Personnel and industrial relations officers	6	5	34
3563	Vocational and industrial trainers and instructors	5	2	46
3564	Careers advisers and vocational guidance specialists	4	1	49
3565	Inspectors of factories, utilities and trading standards	0	0	33

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
3566	Statutory examiners	9	3	38
3567	Occupational hygienists and safety officers (health and safety)	3	3	41
3568	Environmental health officers	4	13	51
Administrative occupations				
4111	Civil Service executive officers	5	2	36
4114	Officers of non-governmental organisations	6	3	27
4142	Communication operators	4	0	38
Skilled metal and electrical trades				
5211	Smiths and forge workers	2	3	42
5212	Moulders, core makers, die casters	*	*	15
5214	Metal plate workers, shipwrights, riveters	2	0	17
5215	Welding trades	3	5	15
5216	Pipe fitters	0	3	32
5221	Metal machining setters and setter-operators	6	4	12
5222	Tool makers, tool fitters and markers-out	2	0	12
5223	Metal working production and maintenance fitters	4	2	27
5224	Precision instrument makers and repairers	2	3	24
5233	Auto electricians	0	0	22
5241	Electricians, electrical fitters	4	2	25
5242	Telecommunications engineers	7	3	31
5243	Lines repairers and cable jointers	1	6	28
5245	Computer engineers, installation and maintenance	7	2	32
5249	Electrical/electronics engineers n.e.c.	5	3	31

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.1: Quantitative indicators of sensible for skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
Skilled construction and building trades				
5311	Steel erectors	3	0	13
5312	Bricklayers, masons	2	4	14
5314	Plumbers, heating and ventilating engineers	3	2	30
5315	Carpenters and joiners	4	6	13
5319	Construction trades n.e.c.	6	7	10
Textiles, printing and other skilled trades				
5414	Tailors and dressmakers	*	11	2
5421	Originators, compositors and print preparers	0	12	9
5422	Printers	6	2	13
5493	Pattern makers (moulds)	0	0	14
5495	Goldsmiths, silversmiths, precious stone workers	9	0	5
5496	Floral arrangers, florists	9	3	16
Process, plant and machine operatives				
8124	Energy plant operatives	2	2	46

*No estimate available due to small sample in occupation. Estimates are based on data for the working-age population. 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.
Source: Labour Force Survey (2007)

Table C.2: Quantitative indicators of sensible for less skilled occupations

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
Median for less skilled		5	4	18
Median for all occupations		6	3	26
Managers and proprietors in agriculture and services				
1223	Restaurant and catering managers	24	8	20
1224	Publicans and managers of licensed premises	7	3	18
Administrative occupations				
4112	Civil Service administrative officers and assistants	5	1	30
4113	Local government clerical officers and assistants	5	2	32
4121	Credit controllers	7	4	22
4122	Accounts and wages clerks, book-keepers, other financial clerks	9	3	26
4123	Counter clerks	5	2	30
4131	Filing and other records assistants/clerks	5	2	23
4132	Pensions and insurance clerks	5	2	36
4133	Stock control clerks	6	3	18
4134	Transport and distribution clerks	6	2	21
4135	Library assistants/clerks	3	2	32
4136	Database assistants/clerks	6	4	23
4137	Market research interviewers	7	0	25
4141	Telephonists	6	1	27
4150	General office assistants/clerks	6	3	21
Secretarial and related occupations				
4211	Medical secretaries	8	2	24
4212	Legal secretaries	7	1	19
4213	School secretaries	5	1	32

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
4214	Company secretaries	7	1	10
4215	Personal assistants and other secretaries	7	3	18
4216	Receptionists	5	2	24
4217	Typists	0	2	23
Skilled agricultural trades				
5111	Farmers	0	1	6
5112	Horticultural trades	1	4	18
5113	Gardeners and groundsmen/ groundswomen	2	2	12
5119	Agricultural and fishing trades n.e.c.	3	1	17
Skilled metal and electrical trades				
5213	Sheet metal workers	2	1	13
5231	Motor mechanics, auto engineers	3	2	25
5232	Vehicle body builders and repairers	2	1	13
5234	Vehicle spray painters	2	8	15
5244	TV, video and audio engineers	4	2	15
Skilled construction and building trades				
5313	Roofers, roof tilers and slaters	1	3	14
5316	Glaziers, window fabricators and fitters	1	5	7
5321	Plasterers	5	4	12
5322	Floorers and wall tilers	2	6	9
5323	Painters and decorators	4	8	8
Textiles, printing and other skilled trades				
5411	Weavers and knitters	0	0	3
5412	Upholsterers	6	4	8
5413	Leather and related trades	0	*	13

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
5419	Textiles, garments and related trades n.e.c.	4	0	9
5423	Bookbinders and print finishers	4	6	11
5424	Screen printers	2	0	0
5431	Butchers, meat cutters	4	4	7
5432	Bakers, flour confectioners	11	10	13
5433	Fishmongers, poultry dressers	9	14	16
5434	Chefs, cooks	22	6	20
5491	Glass and ceramics makers, decorators and finishers	7	4	4
5492	Furniture makers, other craft woodworkers	6	6	13
5494	Musical instrument makers and tuners	*	0	0
5499	Hand craft occupations n.e.c.	5	1	12
Caring personal service occupations				
6111	Nursing auxiliaries and assistants	10	4	50
6112	Ambulance staff (excluding paramedics)	0	0	38
6113	Dental nurses	5	5	35
6114	Houseparents and residential wardens	5	4	50
6115	Care assistants and home carers	12	4	49
6121	Nursery nurses	3	2	45
6122	Childminders and related occupations	10	7	27
6123	Playgroup leaders/assistants	4	3	45
6124	Educational assistants	6	3	46
6131	Veterinary nurses and assistants	4	2	45
6139	Animal care occupations n.e.c.	6	4	28
Leisure and other personal service occupations				
6211	Sports and leisure assistants	4	5	45

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
6212	Travel agents	10	6	25
6213	Travel and tour guides	5	4	31
6214	Air travel assistants	7	7	35
6215	Rail travel assistants	11	2	28
6219	Leisure and travel service occupations n.e.c.	8	5	21
6221	Hairdressers, barbers	5	3	32
6222	Beauticians and related occupations	7	3	27
6231	Housekeepers and related occupations	6	13	20
6232	Caretakers	4	4	15
6291	Undertakers and mortuary assistants	0	0	15
6292	Pest control officers	0	0	18
Sales occupations				
7111	Sales and retail assistants	7	2	22
7112	Retail cashiers and check-out operators	9	1	20
7113	Telephone salespersons	4	4	28
7121	Collector salespersons and credit agents	4	0	23
7122	Debt, rent and other cash collectors	6	2	19
7123	Roundsmen/women and van salespersons	6	1	6
7124	Market and street traders and assistants	16	1	6
7125	Merchandisers and window dressers	5	2	18
7129	Sales related occupations n.e.c.	6	2	26
Customer service occupations				
7211	Call centre agents/operators	5	2	36
7212	Customer care occupations	8	3	29

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
Process, plant and machine operatives				
8111	Food, drink and tobacco process operatives	17	19	18
8112	Glass and ceramics process operatives	3	9	16
8113	Textile process operatives	15	4	11
8114	Chemical and related process operatives	8	3	22
8115	Rubber process operatives	8	10	22
8116	Plastics process operatives	9	9	17
8117	Metal making and treating process operatives	2	5	14
8118	Electroplaters	*	3	3
8119	Process operatives n.e.c.	5	11	16
8121	Paper and wood machine operatives	3	8	12
8122	Coal mine operatives	*	0	17
8123	Quarry workers and related operatives	0	4	30
8125	Metal working machine operatives	6	8	15
8126	Water and sewerage plant operatives	0	0	34
8129	Plant and machine operatives n.e.c.	5	5	13
8131	Assemblers (electrical products)	7	6	14
8132	Assemblers (vehicles and metal goods)	11	9	18
8133	Routine inspectors and testers	4	8	19
8134	Weighers, graders, sorters	14	7	14
8135	Tyre, exhaust and windscreen fitters	8	0	18
8136	Clothing cutters	0	0	15
8137	Sewing machinists	26	5	5
8138	Routine laboratory testers	3	3	21

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
8139	Assemblers and routine operatives n.e.c.	14	6	13
8141	Scaffolders, staggers, riggers	3	3	15
8142	Road construction operatives	3	1	17
8143	Rail construction and maintenance operatives	0	4	40
8149	Construction operatives n.e.c.	3	8	25
Transport and mobile machine drivers and operatives				
8211	Heavy goods vehicle drivers	2	5	11
8212	Van drivers	5	3	7
8213	Bus and coach drivers	14	5	14
8214	Taxi, cab drivers and chauffeurs	25	2	5
8215	Driving instructors	6	1	19
8216	Rail transport operatives	2	4	34
8217	Seafarers (merchant navy); barge, lighter and boat operatives	0	0	20
8218	Air transport operatives	14	4	26
8219	Transport operatives n.e.c.	3	5	22
8221	Crane drivers	2	3	17
8222	Fork-lift truck drivers	7	6	14
8223	Agricultural machinery drivers	5	11	23
8229	Mobile machine drivers and operatives n.e.c.	1	5	16
Elementary trades, plant and storage related occupations				
9111	Farm workers	1	5	12
9112	Forestry workers	0	0	28
9119	Fishing and agriculture related occupations n.e.c.	2	8	19

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
9121	Labourers in building and woodworking trades	5	6	17
9129	Labourers in other construction trades n.e.c.	1	4	21
9131	Labourers in foundries	*	3	8
9132	Industrial cleaning process occupations	17	13	19
9133	Printing machine minders and assistants	6	5	16
9134	Packers, bottlers, canners, fillers	17	30	11
9139	Labourers in process and plant operations n.e.c.	4	6	13
9141	Stevedores, dockers and slingers	0	5	16
9149	Other goods handling and storage occupations n.e.c.	8	9	15
Elementary administration and service occupations				
9211	Postal workers, mail sorters, messengers, couriers	9	2	8
9219	Elementary office occupations n.e.c.	5	2	20
9221	Hospital porters	6	5	28
9222	Hotel porters	*	13	18
9223	Kitchen and catering assistants	14	6	21
9224	Waiters, waitresses	12	9	26
9225	Bar staff	5	5	27
9226	Leisure and theme park attendants	6	0	23
9229	Elementary personal services occupations n.e.c.	17	6	22
9231	Window cleaners	2	5	4
9232	Road sweepers	5	8	12
9233	Cleaners, domestics	11	8	10

Note: 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.

Table C.2: Quantitative indicators of sensible for less skilled occupations (cont.)

SOC2000 4-digit occupation		% employees born non-EEA	% employees born EEA, excl. UK	% employees received training in last 13 weeks
9234	Launderers, dry cleaners, pressers	16	17	9
9235	Refuse and salvage occupations	0	7	15
9239	Elementary cleaning occupations n.e.c.	4	6	15
9241	Security guards and related occupations	22	2	24
9242	Traffic wardens	*	0	22
9243	School crossing patrol attendants	7	0	6
9244	School mid-day assistants	7	1	14
9245	Car park attendants	*	0	27
9249	Elementary security occupations n.e.c.	5	2	20
9251	Shelf fillers	8	1	21
9259	Elementary sales occupations n.e.c.	7	8	19

*No estimate available due to small sample in occupation. Estimates are based on data for the working-age population. 'n.e.c.' indicates an occupation that includes job titles not elsewhere classified in the SOC2000.
Source: Labour Force Survey (2007)

Annex D: Consultation

D.1 Respondents to the call for evidence

ABP Newry	Fresh Catch
Aim Aviation (Henshalls) Ltd	GAAPs Actuarial
AMEC	General Medical Council
Association for Consultancy and Engineering	GoSkills (SSC)
Association of Camphill Communities	Grant, Peter M. (University of Edinburgh)
Association of Consultant Architects	Greater London Authority (GLA Economics)
Bangladesh Caterers Association UK Ltd	Ground Forum
Birmingham Chamber of Commerce and Industry	Harlequin Leisure
Birmingham Royal Ballet	Herbmedic Centre Ltd
BP International Ltd	HM Government (cross-departmental response)
British Horseracing Authority	Hurlingham Polo Association
British Meat Processors Association	Immigration Law Practitioners Forum
Chamber of Shipping	Independent Theatre Council
Chinese Immigration Concern Committee	Institution of Chemical Engineers
Christine Lee & Co (Solicitors) Ltd (Chinese community)	Internationally Trained Nurses
Confederation of British Industry	Itihaas – Bangladeshi and Indian Restaurant
Confederation of Chinese Association of Scotland	Jaipur Restaurant Ltd
Construction Skills (SSC)	Jalori – Indian Cuisine
Department for Children, Schools and Families	Lantra (SSC)
Department for Culture, Media and Sport	L'Arche
Duthie, Charles (civil engineer)	Linda Gilroy MP
Energy & Utility Skills (SSC)	Liverpool Chinese Business Association
English Community Care Association	London Development Agency
Ethnic Minority Citizens Forum	London First
Eurocom Developments Limited	Marshall Aerospace
	Matchworkers International
	National Association of Agricultural Contractors

National Farmers' Union
National Trainers Federation
NHS Employers
NHS Workforce Review Team
North Scotland Industries Group
People First (SSC)
Professional Contractors Group
Proskills (SSC)
Recruitment and Employment Confederation
Royal College of Veterinary Surgeons
Royal Institute of British Architects
Royal Institution of Chartered Surveyors
Royal Opera House
Royal Town Planning Institute
Scottish Enterprise
Scottish Fishermen's Federation
Scottish Government Health Workforce Directorate
Semta (SSC)
Skillfast-UK (SSC)
Skills for Care and Development (SSC)
Skills for Health (SSC)
Skillset (SSC)
South West Regional Development Agency
The Childcare Recruitment Company Ltd
The Chinese Takeaway Association
The Society of London Theatre and the Theatrical Management Association (jointly)
Trades Union Congress
Training and Development Agency for Schools
United Kingdom Homecare Association Ltd
West Midlands Strategic Migration Partnership
Wirral Chinese Association
Some respondents wished to remain anonymous and are therefore not included in the list above.

D.2 List of organisations met with

Academy of Oriental Cuisine
Advantage West Midlands
Aeropeople
Aim Aviation (Henshalls) Ltd
Airbus UK
Amie Tsang & Co (Solicitors)
Association for Consultancy and Engineering
Association of Camphill Communities
Bangladesh Caterers Association UK Ltd
Bank of England
Birmingham Royal Ballet
Bond Architects
British Chambers of Commerce
Buro Happold
Capital Properties
Cardiff and Vale NHS Trust
China City Restaurant
Chinese Immigration Concern Committee
Chinese restaurant community in Chinatown
Confederation of British Industry
Credit Suisse
CTC Marine Projects Ltd
David Simcock Racing Limited
Davis Langdon LLP
Department for Business, Enterprise and Regulatory Reform
Department for Innovation, Universities and Skills
Department for Work and Pensions
Dunbia (Sawley)
e-skills UK (SSC)
Engineering Sector Advisory Panel
English Community Care Association
Ethnic Minority Citizens Forum

Eurocom Developments Limited	Northern Ireland Food and Drink Association
Federation of Small Businesses	Office for National Statistics
First Group plc	Offshore Contractors Association
Freshcatch Ltd	Oriental Chinese Takeaway
Guild of Bangladeshi Restaurateurs	Recruitment and Employment Confederation
Harlequin Leisure	Registered Nursing Home Association
Healthcare Sector Advisory Panel	Rolls-Royce
HM Treasury	Sector Skills Development Agency
Home Office	Semta (SSC)
Hospitality Sector Advisory Panel	Sheffield Teaching Hospitals NHS Foundation Trust
Immigration Advisory Service	Skills for Health
Information Technology, Communications and Electronics Sector Advisory Panel	Southern Cross
Institute of Directors	SRK Consulting (UK) Ltd
Institute of Public Policy Research	Teaching Sector Advisory Panel
Jubilee National Hospital, Glasgow	The Childcare Recruitment Company Ltd
Jumbo City Restaurant	The Red Fort
KPMG	Trades Union Congress
Lantra (SSC)	UK Border Agency
L'Arche	UK Commission for Employment and Skills
Las Iguanas	University College London
Linden Foods Ltd	Veeraswamy
Linklaters	Wrightbus Ltd
Liverpool Social Care Partnership	D.3 Stakeholder Forum attendees
Llandudno Hospitality Association	(9 May 2008)
London First	Academy of Oriental Cuisine
Low Pay Commission	Association for Consultancy and Engineering
Mark Johnston Racing Ltd	Bangladesh Caterers Association UK Ltd
Marshall Aerospace	British Chambers of Commerce
Matchworkers International	British Hospitality Association
Michelin	Chartered Institute of Personnel and Development
National Care Association	Chinese Immigration Concern Committee
NHS Employers	CITB Construction Skills
NHS Workforce Review Team	

Cogent
Confederation of British Industry
Energy & Utility Skills (SSC)
Engineering and Technology Board
Engineering Construction Industry Training Board
Engineering Council UK
English Community Care Association
Federation of Small Businesses
Futureskills Scotland
General Teaching Council
GoSkills
Greater London Authority
Guild of Bangladeshi Restaurateurs
Immigration Advisory Service
Institution of Civil Engineers
Institution of Railway Signal Engineers
Intellect UK
Jarvis Hotels
Lantra (SSC)
London First
Low Pay Commission
National Care Association
People First (SSC)
Registered Nursing Home Association
Semta (SSC)
Skills for Care and Development
Skillsmart Retail Limited
Trades Union Congress
UK Commission for Employment and Skills
Union Network International
Unite
Welcome Skills

D.4 Scotland stakeholder meeting attendees (Glasgow, 28 March 2008)

Britannia Spice
Confederation of British Industry
Convention of Scottish Local Authorities
Four Seasons Health Care
Futureskills Scotland
Harlequin Leisure
Highlands and Islands Enterprise
Institute of Directors
Itihaas – Bangladeshi and Indian Restaurant
Laing O'Rourke
NHS Education for Scotland
NHS Grampian
NHS Greater Glasgow and Clyde
Platinum Recruitment
Scotland Office
Scottish Chambers of Commerce
Scottish Development International
Scottish Enterprise
Scottish Executive
UK Border Agency

D.5 Presentations by the MAC

Government Economic Service conference
Migration Impacts Forum
Oil and Gas Forum
Seminar at Department for Business, Enterprise and Regulatory Reform
Workshop with government and academic economists at London School of Economics

Abbreviations

Abbreviation	Full Title
A8	The eight Eastern European countries that joined the European Union in 2004
AS	Advanced Subsidiary
ASHE	Annual Survey of Hours and Earnings
BCC	British Chambers of Commerce
BHPS	British Household Panel Survey
CBI	Confederation of British Industry
DCSF	Department for Children, Schools and Families
DWP	Department for Work and Pensions
EEA	European Economic Area
EU	European Union
FT:WiSS	Fresh Talent: Working in Scotland Scheme
GAD	Government Actuary's Department
GDP	Gross Domestic Product
GNVQ/GSVQ	General National Vocational Qualification/General Scottish Vocational Qualification
HNC/HND/BTEC	Higher National Certificate/Higher National Diploma/Business and Technician Council
HTFV	hard-to-fill vacancy
IEPUK	International Exchange Program UK
ITCE	Information Technology, Communications and Electronics
JCP	Jobcentre Plus
JSA	Jobseeker's Allowance
LFS	Labour Force Survey
MAC	Migration Advisory Committee
MIF	Migration Impacts Forum
NAAC	National Association of Agricultural Contractors
NESS	National Employers Skills Survey
NHS	National Health Service
NQF	National Qualifications Framework
NVQ	National Vocational Qualification
OECD	Organisation for Economic Co-operation and Development

ONS	Office for National Statistics
PBS	Points Based System
PSA	Public Service Agreement
RICS	Royal Institution of Chartered Surveyors
RLMT	resident labour market test
RSA	Royal Society for the Encouragement of the Arts
SOC	Standard Occupational Classification
SOC2000	Standard Occupational Classification 2000
SSC	Sector Skills Council
SSV	skill-shortage vacancy
STCW	Standards of Training, Certification and Watchkeeping
TDA	Training and Development Agency for Schools
TIM	Total International Migration
TPSI	Transport Planning Skills Initiative
TUC	Trades Union Congress
UKBA	United Kingdom Border Agency
UTP	Universities' Transport Partnership Employers' Forum
VET	vocational education and training
WRS	Worker Registration Scheme

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