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Ambition 2020: Technical Report

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UKCES
UK COMMISSION FOR EMPLOYMENT AND SKILLS

Foreword

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

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

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

Sharing the findings of our research and policy analysis and engaging with our audience is very important to the UK Commission.

All our outputs are accessible in the Research and Policy pages at www.ukces.org.uk

This technical report follows the publication of our first *Ambition 2020* report this May. The report presents the approach we took to forecasting progress towards the 'Leitch' 2020 skills targets, and the data considerations involved. The report also outlines our 2009/10 programme of development work, which will further build upon the models that report progress towards our 2020 Ambition for skills.

We hope you find the report useful and informative in building the evidence we need to achieve a more prosperous and inclusive society.

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1 Introduction

1.1 *AMBITION 2020* PROJECTIONS

Ambition 2020, published by the UK Commission for Employment and Skills in May of this year, formed its first annual assessment of the progress towards making the UK a world leader in employment and skills by 2020. This technical report details the sources and methods underpinning the forecasting models used to make this assessment. *Ambition 2020* monitors progress on our World Class Skills and Jobs Ambition and against our international competitors in the context of (i) the 'Leitch' Ambition for 2020; and (ii) the aims and priorities for the four nations of England, Scotland, Wales and Northern Ireland. It provides a sound evidence base for advice on strategies, policies and measures needed to increase skills, employment and productivity. The *Ambition 2020* report provides the baseline from which to assess future progress.

Specifically our models for the *Ambition 2020* report forecast:

- The 2020 qualifications profile for the UK and for individual UK nations;
- The UK 2020 basic skills position for literacy and numeracy;
- Our 2020 international ranking vis-à-vis OECD countries for (i) below upper secondary ('low skills'), (ii) upper secondary ('intermediate skills') and (iii) tertiary ('high skills') levels of education.

The results of the projections can be found in ***Ambition 2020: World Class Skills and Jobs for the UK***. This report details the agenda for prosperity, jobs and skills, and the 2020 ambition for skills and jobs. After summarising recent progress the report presents the results of the forecasts for 2020. Alternative measures of skills development, the jobs of today and tomorrow, raising employer ambition, and skills and employment policy are also discussed.

A second document ***Ambition 2020: Key findings and implications for action*** summarises the *Ambition 2020* key findings of the main report, including the headline results from the forecasting work. It then goes further to outline the UK Commission's view of the actions that are required for the employment and skills system to respond to our current difficult economic conditions and to lay the foundations for recovery.

In its first year of operation the UK Commission "inherited" skills forecasting models from the *Leitch Review* team. Work in this first year has been limited to understanding and updating these models, and making some (relatively minor) improvements. This enabled us to provide a report on progress since Leitch (on a common basis) and to review our anticipated skills attainment in 2020 (again on a common basis to Leitch).

However, we are not bound to the Leitch models. Where the models can be further enhanced to increase their robustness and coverage we will aim to develop them. We will continue for example to review the underpinning assumptions of the models and their data, and make improvements where needed. Whilst we're mindful of maintaining consistency of our approaches over time, developments may mean year-on-year that our forecasts change. However we will be clear in our approaches and aim to report comparable results had our methods remained unchanged.

We publish this technical report in the interests of transparency and debate. The 2020 targets are a shared ambition and the UK Commission has a responsibility to ensure that our reporting towards these targets is transparent. We also acknowledge when undertaking exercises such as this modelling work that there are data and definitional issues for consideration. We are therefore happy to engage in an open dialogue with experts who may have questions or ideas of how we might make our forecasting models even more robust in the future.

1.2 STRUCTURE OF THIS DOCUMENT

This document gives a detailed description of the forecasting models used within *Ambition 2020*. Chapter two gives a brief overview of the models that have been used, how they link back to the main *Ambition 2020* report, and the connections between the models.

From chapter three onwards each forecasting model is considered in more detail, the first discussed is the qualifications model, here the data issues and sources are considered as well as a step-by-step guide to the workings of the model, details for the 4-nations projections are also outlined. Chapter three concludes with details of future plans for the qualifications model. Chapter four takes a similar approach to chapter three, this time for the basic skills model, the development of the model for next year is considered. Chapter five details the method used for the international forecasts.

The final chapter, chapter six, takes a view on the next steps for these models and notes the work programme being implemented to feed into the UK Commission's second publication of *Ambition 2020* in May 2010.

2 The Ambition 2020 Models

2.1 OVERVIEW

The *Leitch Review* set out an ambition for the UK to become **a world leader in skills by 2020**, moving the UK into the top eight in the world, at every skills level, i.e. being in the top quartile of OECD countries.

To enable this ambition Leitch (2006, p. 137) identified a need to commit to four objectives:

- **95% of adults to have functional literacy and numeracy (basic skills)**, up from 85% literacy and 79% numeracy in 2005.
- **More than 90% of the adult population qualified to at least Level 2**, with a commitment to achieving World Class skills.
- **Shifting the balance of intermediate skills from Level 2 to Level 3.**
- **World Class high skills, exceeding 40% of the adult population qualified to Level 4 and above**, with an increased focus on Level 5 and above skills.

The UK Commission *Ambition 2020* report assesses our likely progress and prospects for achieving this World Class standing in skills. Underpinning this work three forecasting models were utilised by the UK Commission to project our skills profile to the year 2020:

- A **basic skills model** projecting the future stock of people of working age who lack functional literacy or numeracy skills.
- A **qualifications model** which charts progress towards low, intermediate, and high level skills (as measured by qualifications) for the UK and individual nations.
- An **international model** forecasting how our low, intermediate and high level skills mix will rank against OECD countries in 2020.

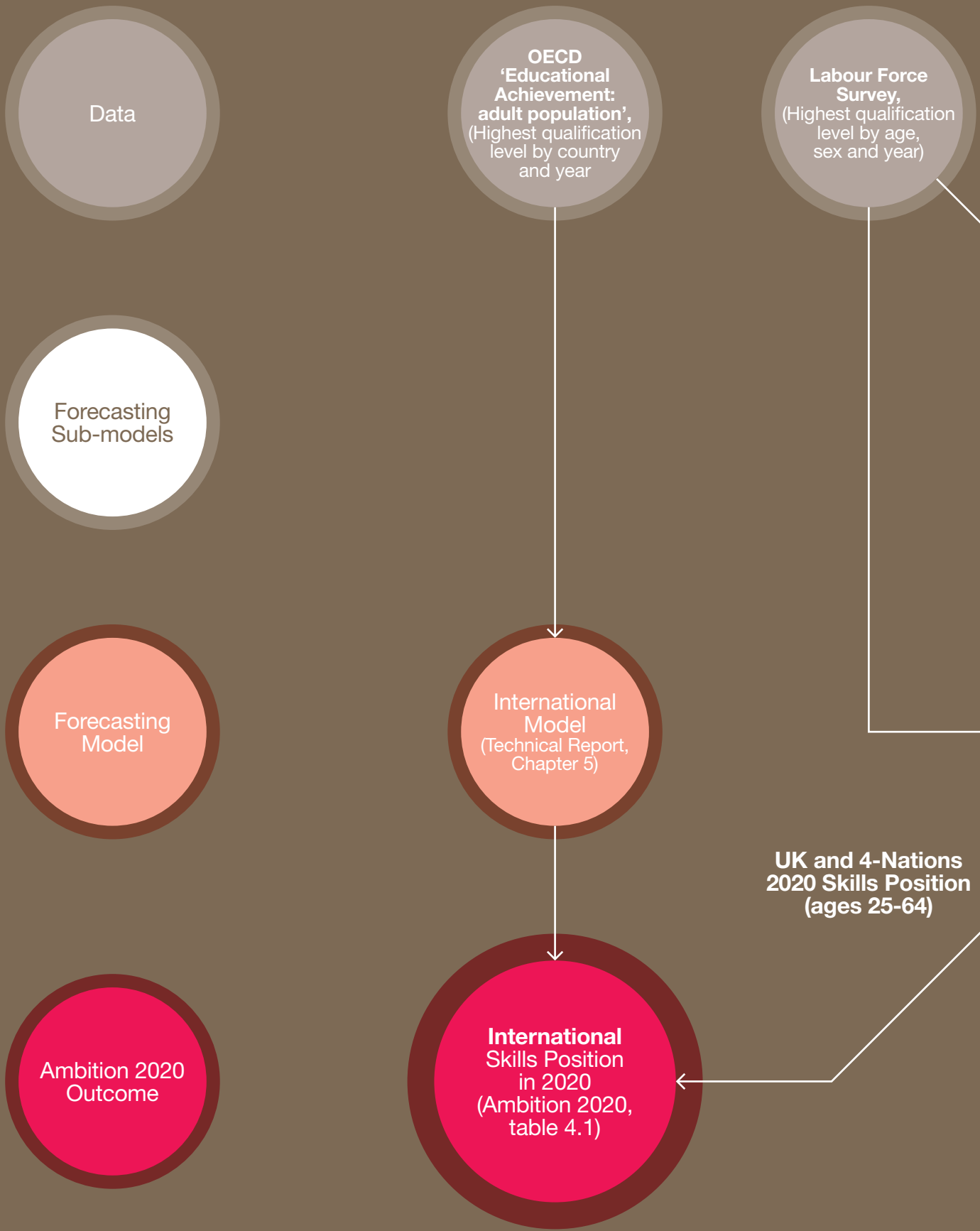
The models assume changes in qualification/skill levels are driven by three forces: **a qualifications effect**, as people who are already in the workforce increase their qualifications level; **a demographic effect**, whereby older individuals leave the working age population and are replaced by younger people who leave the education system and enter the labour market. Generally, this is a positive effect, as young people flowing into the workforce are (on average) more highly qualified than the average (though not necessarily more so than comparable groups in other countries) and significantly more highly qualified than those older people retiring from the active workforce; and **a migration effect**, reflecting the skills of the people who migrate into the UK and the skills of the people who migrate out of the UK. However whilst these effects underpin changes in qualifications/skill levels at present only the qualification model takes account of all three of these effects.

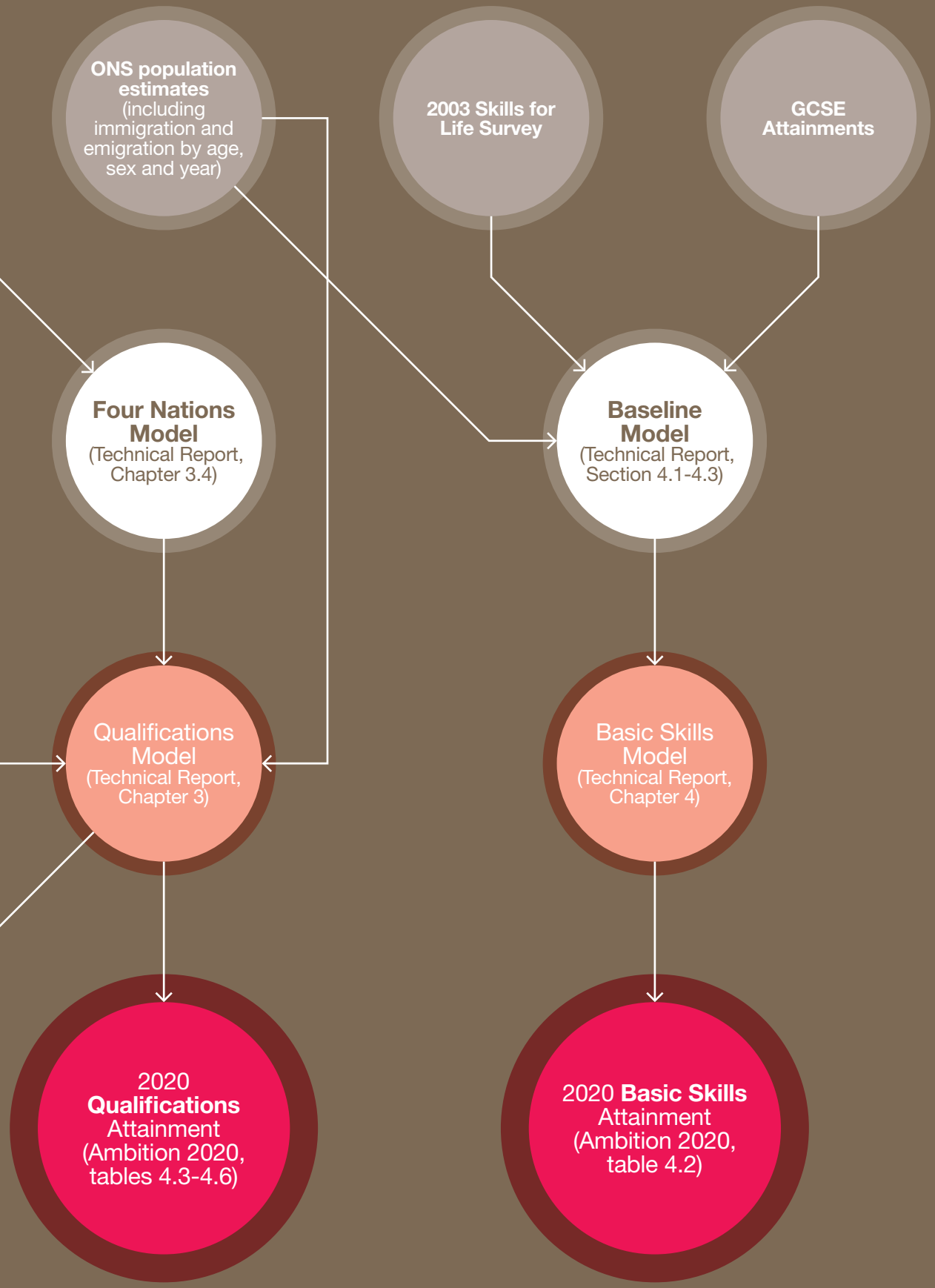
Figure 2.1 gives a brief overview of how each of the forecasting models flowed into the *Ambition 2020* report, summarises the data underlying each of the models, and highlights which forecasting models have underpinning 'sub-models'.

Each of the three main models feeds directly into their respective reporting in *Ambition 2020*. The only exception to this are the UK results presented for the 2020 international skills position (*Ambition 2020*, table 4.1). As the qualifications model for the whole of the UK is more sophisticated than the international model (owing to the richer UK data available), the UK 2020 skills profile is imputed from the UK qualifications model into the international rankings. Similarly, both the current and projected international skills positions for the four UK nations are imported from the qualifications model (sub-national geographies are not available within the OECD data). In order to remain comparable with the OECD projections, and compare internationally, only the skills profiles for 25-64 year olds are used from the qualification model.

The forecasting models draw upon a variety of data sources, including ONS population projections, the Labour Force Survey, GCSE attainment data, the 2003 Skills for Life Survey, and data from OECD. Figure 2.1 summarises how the underlying data feeds into the three models.

Figure 2.1: *Ambition 2020*: linkages between forecasting models, data, and reporting




ONS population estimates (including immigration and emigration by age, sex and year)
2003 Skills for Life Survey
GCSE Attainments
Four Nations Model (Technical Report, Chapter 3.4)
Baseline Model (Technical Report, Section 4.1-4.3)
Qualifications Model (Technical Report, Chapter 3)
Basic Skills Model (Technical Report, Chapter 4)
2020 Qualifications Attainment (Ambition 2020, tables 4.3-4.6)
2020 Basic Skills Attainment (Ambition 2020, table 4.2)

Each of the forecasting models is discussed in detail in the subsequent chapters. The assessment of the UK's likely skills trajectory has involved extensive work to review, refine and update the models used by the *Leitch Review* team. This work is detailed within the report as well as avenues for further research and development required to improve the quality of these assessments in future years.

What we are assessing with these models is the likelihood of achieving the 2020 skills targets on the basis of recent trends. A different tool is used by BIS to examine progress to 2020. Their forecasts work as a planning tool, setting out the achievements that will be needed in the future to reach the 2020 targets. In this sense they, necessarily, show the 2020 targets being reached. Box 2.1 gives further details.

BOX 2.1 COMPARING APPROACHES TO SKILLS FORECASTING

There are varying forecasting methods that can be used with time-series data, and also differing approaches to skills forecasting more specifically.

The UK Commission's forecasting approach is based on taking past skills performance and projecting forward. Where possible the methodology explicitly takes account of population changes (including migration) as well as changes in the qualifications gained by the workforce as they progress through their working lives. The most robust and recent data currently available is used to undertake this exercise. There are known issues with some of these data sources such as comparability of OECD country data, and possible under-reporting of qualifications within the Labour Force Survey. The UK Commission's annual forecasts will, over time, benefit from the work of other departments and international partners as they work towards improving the accuracy of their data sources. However, as the UK Commission is not closely involved in such development work, and in order to maintain a transparency of approach over time, it only adjusts for obvious data anomalies. The UK Commission needs to maintain a consistency of approach: in the 2009 forecasting exercise for *Ambition 2020*, it chose to maintain consistency in its first year of reporting by keeping the forecasting approach broadly the same as that used in the *Leitch Review*.

The Department for Business, Innovation and Skills (BIS) also forecast the proportions of the workforce who attain basic skills, Level 2, Level 3 and Level 4 qualifications for future years up to 2020. BIS forecasting models use planned, future, publicly-funded achievements together with expected population flows, death and migration effects, and private upskilling to predict the skills position (of England) up to 2020 assuming that planned levels of investment are implemented.

In this respect then the BIS and the UK Commission's models whilst both projecting forward to 2020 do two quite different things – as well as being useful for BIS internal business planning, the BIS models give us an indication of just how much investment will be needed to get us where we want to be in 2020. In contrast the UK Commission forecasting takes the current trends and forecasts these forward, showing at the current rate of progress where we expect to be in 2020. In this respect the two approaches can be seen as complementary rather than contradictory and strengthen the argument that continued and increasing investment in skills should be sustained over future years if we are to reach our 2020 Ambition. We would expect that over time the BIS planned achievements and recent years' increases in skills investment will feed positively into the UK Commission's forecasts in future years (as these begin to be reflected in the data on achievements). Indeed, if BIS planned achievements are actualised and realised in the data, we would expect that the two forecasts converge as we move closer to 2020.

3 UK Qualification Projections

3.1 INTRODUCTION

As part of its annual reporting, the *Ambition 2020* report published progress towards the Leitch qualification ambitions for 2020.

In particular progress was assessed towards the targets of:

- 90% Low level skills – adults qualified to at least Level 2
- 68% Intermediate level skills – adults qualified to at least Level 3
- 40% High level skills – adults qualified to at least Level 4.

The UK qualification model undertakes this assessment by projecting to 2020 the mix of qualifications the UK adult population will hold.

The qualification model developed for this year's *Ambition 2020* forecasting exercise uses the same basic approach as the HM Treasury model used by the Leitch Review. That is, it uses linear time series forecasts of qualifications proportions over the period to 2020 and pins these to the Centre for Demography (ONS) projections of the future population over the same period. Box 3.1 highlights the key differences between the Leitch and *Ambition 2020* qualifications model.

BOX 3.1 KEY DIFFERENCES IN THE APPLICATION OF THE LEITCH AND *AMBITION 2020* QUALIFICATIONS MODELS

The *Ambition 2020* projections are carried out using broadly the same approach as the Leitch projections, however important differences include:

- The period used in making the projections has changed; the Leitch series from 1997 to 2003 has been extended to 2007.
- Differences are caused by the changes in population forecasts by the ONS Centre for Demography and, in particular, the revisions made to projections of migratory flows. This is potentially important if there are differences between the qualification mix of emigrants and immigrants.
- The *Ambition 2020* models have more detailed items relating to qualifications by age. Individual years of age between 16 and 64 are used (there are problems with the LFS qualifications data for those above State pensionable age in the historical data), while the earlier Leitch model used individual years of age only up to age 30 and then all individuals aged over 30. Thus, the *Ambition 2020* model allows the exploration of the effects of policy initiatives on the qualifications held by older individuals.
- No attempt is made to model the implications of the changes to female pensionable age (as in the original Treasury model). This is problematic anyway because of missing qualifications information for females above 59. In the present model all females aged 16 to 64 are included, and the missing data on qualification proportions for the 60-64 year old females is estimated by simple regressions using the changing qualification proportions for slightly younger females.
- The *Ambition 2020* qualifications model has the ability to look at both the qualifications of the population as a whole and the qualifications of the economically active (although the latter has not been used in the 2009 edition of *Ambition 2020*).

The remaining sections in this chapter explore the qualification classifications underlying the model, how the qualifications model works, the rationale behind various aspects and choices made with the modelling work are discussed, and any key data issues or considerations highlighted. The chapter concludes by discussing areas for future development.

3.2 USING QUALIFICATIONS AS A MEASURE OF SKILL

An important consideration in projecting progress of skill levels to 2020 is the way in which these skill levels are defined and derived. *Ambition 2020* (UKCES, 2009, p.46) acknowledges in practice there are a range of definitions and meanings of skills. There is a body of literature that looks in depth at the issues related to the measurement of skills (usefully summarised in LSC, 2002, p.5-10.), and the *Ambition 2020* report extends as far as possible to include a range of measures of skills. Traditionally however skills have been measured by qualifications, despite their shortcomings as a proxy for skills; qualifications allow relatively simple and straightforward comparisons over time, between sub-groups, and internationally (LSC, 2002, p.6).

The *Ambition 2020* qualifications model classifies qualifications into the six levels set out in table 3.1 below (see "UK Equivalent Levels"). These six national qualification framework (NQF) levels are a common and accepted standard in the UK for classifying UK qualifications.[1] More recently these UK qualification levels have been expanded to eight levels, with the previous levels four and five expanded, this new mapping is also noted in table 3.1.

These UK qualifications levels can be grouped into low skills (no qualifications and Level 1); intermediate skills (Level 2 and 3) and high skills (Level 4 and above). This 'common currency' allows comparisons across sub-groups of the population, time and, to a certain extent, between countries. Table 3.1 shows how UK qualifications map onto international classifications (specifically, the International Standard Classification of Education 1997 (ISCED) and the groupings and descriptions used by OECD in *Education at a Glance*).

In the past there has been some debate about the classification of qualifications at an international level. Prior to the introduction of ISCED 1997, the international standard was ISCED 1976. The ISCED 1976 standard was implemented differently by Eurostat and OECD, which has caused some confusion in the past. Under ISCED 1976 Eurostat coded GCSE's for example to ISCED level 2, whereas OECD coded GCSE's to ISCED level 3. This has subsequently caused confusion when for example the Eurostat ISCED 1976 coding was used by the International Adult Literacy Surveys (IALS), and published as *Adult Literacy in Britain* in 1997 (Carey et al. 1997, p.162-163). This survey was undertaken prior to ISCED 1997 being implemented, however the coding has since (on occasion) been incorrectly replicated by other surveys.

Eurostat and OECD are now in alignment with each other in their assignment of qualifications to ISCED 1997. ONS have recently updated volume five of their LFS user guide (ONS, 2009, p.105-108) which shows the ISCED 1997 mapping to UK qualifications. Importantly, UK Level 2 qualifications are mapped to ISCED 3C (Long programme), which is classified as "Intermediate Level Skills" or "Upper Secondary Education".

1 The manner in which specific qualifications are allocated to the appropriate NQF level is set out in detail in Appendix B.

3

Table 3.1: Comparing qualifications by level: ISCED, OECD, and UK equivalents

UK NQF Equivalent	Typical UK Qualifications	UK Skill Level
No qualifications	No or very low qualifications	Low Skills
Level 1	GCSEs, O-Levels or equivalent at grades D-G; National Vocational Qualification (NVQ) Level 1; Business Training and Education Council (BTEC) first or general certificate; General National Vocational Qualification (GNVQ) foundation level; Royal Society of Arts (RSA); and SCOTVEC modules	
Level 2	Five or more GCSEs, O-Levels or equivalent at grades A*-C; NVQ Level 2; BTEC first or general diploma; GNVQ intermediate level; City and Guilds Craft; RSA diploma; and SCOTVEC first or general	Intermediate Skills
Level 3	Two or more A-Levels or equivalent; NVQ Level 3; BTEC National; Ordinary National Diploma (OND); Ordinary National Certificate (ONC); City and Guilds Advanced Craft	
n/a	n/a	
Level 4-6 (Formerly level 4)	First or other degree; NVQ Level 4; Higher National Diploma (HND); Higher National Certificate (HNC); and higher education diploma; nursing; teaching (including further education, secondary, primary and others)	High Level Skills
Level 7-8 (Formerly level 5)	Higher degree; Doctor of Philosophy (Ph.D.); and NVQ Level 5	

Source(s): Adapted from *Leitch Interim Report* (Leitch, 2005, Box 2.1), OECD (2008) *Education at a Glance*, UNESCO (1997) *International Standard Classification of Education*, and ONS (2009) *Labour Force Survey User Guide – Volume 5: LFS Classifications* (2009, p.105-108).

ISCED Level	ISCED Description	OECD Description	OECD Skill Level
Level 0	Pre-Primary Education	Pre-primary and primary education	Below Upper Secondary
Level 1	Primary Education or First Stage of Basic Education		
Level 2	Lower Secondary or Second Stage of Basic Education	Lower secondary education	
Level 3		ISCED 3C (short programme)	
	(Upper) Secondary Education	ISCED 3C (long programme)	Upper Secondary Education
		ISCED 3A/3B	
Level 4	Post-Secondary Non-Tertiary Education	Post-secondary non-tertiary education	
Level 5	First Stage of Tertiary Education (Not leading directly to an advanced research qualification)	Tertiary Education: Type A	Tertiary
		Tertiary Education: Type B	
Level 6	Second Stage of Tertiary Education (Leading to an advanced research qualification)	Advanced research programmes	

3

To assess the stock of skills as measured by qualification levels the Labour Force Survey (LFS) is the most commonly used source of data, owing to its large sample size, comprehensive UK coverage, regularity of data collection, and robustness. The LFS also provides data to the European Union Labour Force Survey (EU LFS), and is used for international comparisons by the OECD.

However there are a number of data issues for consideration when using the LFS data for overall qualification levels. Estimating the proportion of the population qualified at different levels using LFS data is not a straightforward task. Results can differ depending on a number of factors, including:[2]

1 The vintage of the data set (ONS release different versions, incorporating corrections and adjustments based on other data to benchmark the numbers more robustly).

2 There are also different versions of the LFS available at the same time which can contain different information (e.g. Government Departments get uncensored access to the data while public versions of the data set have various information suppressed because of concerns about confidentiality and data protection issues).

3 The coverage over time. The LFS is conducted quarterly, using an overlapping sample (i.e. individuals appear for five consecutive quarters and are then replaced). There are some differences in the information collected in each quarter. Quarters can be combined together to create an annual average but this requires careful treatment to avoid double counting of some individuals due to the same individual being questioned in subsequent quarters.

4 There are a number of slightly different questions relating to qualifications resulting in a choice of possible variables in the final survey results.

5 The allocation of individual qualifications to NQF levels is not straightforward. The mapping is complicated by the need to recognise that in some cases some proportion of individuals have achieved the threshold levels to move them up from one NQF level to the next (this will depend on the grades achieved and the number of qualifications obtained).[3] This information is not always available in the LFS and an apportionment based on other information is needed. This requires a procedure to randomly select and allocate individual cases which can lead to sampling variation of estimates taken from the LFS, separate from the normal statistical variation. This approach is necessary in a number of situations, as described in more detail in appendix A.

6 The LFS is a complex survey and routing through the questionnaire can affect the number of missing cases. The proportions with different qualifications can be affected by this. Unless this routing is dealt with in precisely the same way when interrogating the survey slightly different results can be obtained.

7 Variations can also arise because of the use of a different population (for example excluding all above the official retirement age).

8 Differences can also arise because the focus is sometimes only on the highest qualification held as opposed to all qualifications held. Only taking the highest qualification may mean individuals are allocated to a lower qualification level than using 'all qualifications' (also known as an 'additive approach'). The sum of all the qualifications held by an individual may move them into a higher qualifications level.

2 Details of the specific procedures, assumptions, and choices adopted for the 2009 Ambition 2020 UK qualification forecasting exercise are given in appendix A.

3 For example an individual with five GCSE's comprising four grade C's and one grade D would be allocated to Level 1, however if the individuals held five grade C's they would move up a qualifications level to Level 2.

Unless all of these factors are harmonised, two independent interrogations of the LFS can lead to very different outcomes. Without very detailed documentation on how data were extracted and estimates made it is often not possible to exactly replicate results.

Our approach to using the LFS for this work is outlined in more detail in appendices A and B. However to summarise, we used LFS datasets based on the 2004 weighting exercise, the fourth quarter of each year's data were used, those above official retirement age were excluded, and an 'additive approach' to deriving qualifications levels utilised.

In addition to the discussions and literature around qualifications being an imperfect proxy for skills and not fully reflecting the stock of skills held by the population, there are also concerns that when we do measure skills via qualifications levels that the LFS may not be fully capturing the stock of qualifications held by the population. As indicated earlier, there are always a number of cases missing in the LFS and in addition there are significant numbers of cases where individuals respond that they "Don't know" the qualifications they hold.

This has led to worries that the LFS may be under-reporting qualification levels in the UK, particularly with regard to trade apprenticeships, vocational qualifications, and the qualifications of migrants. As such BIS are working with the Office for National Statistics to review the education and training section of the LFS. BIS have been undertaking analysis, research, and consultation around these issues, with the aim of introducing an improved education and training section on the LFS in 2011. The hope is that the new section will be more effective at getting the correct information whilst at the same time reducing the burden on respondents' time. The changes that will be introduced in the LFS may produce a discontinuity to the statistics after that date.

In the meantime these types of problems (missing cases, and the treatment of "Don't Knows") can be dealt with in various different ways. One possibility is to assume that such cases all have the same probabilities of holding qualifications as the population as a whole. Another is to assume that those who don't know have no qualifications. A third possibility is to allocate them all to a residual category. These different approaches can lead to quite different outcomes and, as with the other data issues highlighted above, detailed documentation on the approach used is the only way to ensure results can be replicated with two separate interrogations of the LFS.[4] In the present work, where the response was 'don't know', the individuals are allocated as 'other qualified', while those with no response were excluded. There is, however, no current evidence of which method of dealing with this problem is the most appropriate.

In the longer term it is anticipated that the UK Commission's forecasts will benefit from any LFS development work undertaken by other government departments that improves the quality of responses to questions on qualifications.

4 Further details on our approach can be found in Appendix A and B.

3.3 QUALIFICATIONS MODEL OVERVIEW AND APPROACH

The previous sections in this chapter have outlined what we are measuring progress towards (i.e. Leitch Skills targets) in the qualifications modelling work, why qualifications are used as a proxy for measuring these skills ambitions, which qualification levels are used in the work, and issues around measuring qualifications levels using the LFS. This section now moves on to look in more detail at the approach used to achieve our *Ambition 2020* qualification forecasts.

Our UK qualifications model is constructed using the average annual rate of change in the qualifications held, by age, for the previous ten years and then rolls this forward to 2020. The approach explicitly allows for demographic changes such as an ageing population, changing retirement patterns and pension age changes and migration patterns. It should be noted that it is not designed to give a precise forecast of qualifications in 2020, but to give indicative projections of the UK's likely skill profile if recent/current trends continue. It is also capable of testing the impact of different scenarios.

The sub-model used to derive the 2020 forecasts for the four individual UK nations is a simpler iteration of the UK qualifications model.

The qualifications projections are based on a series of linear extrapolations of changes in qualification levels and participation rates. This follows the methodology used by HM Treasury for the *Leitch Review* (although the model is organised in a somewhat different way for *Ambition 2020*).

Two sets of extrapolations are provided within the qualifications model:

- **Long term trends**, based upon historical, fourth quarter LFS qualifications data from 1998 to 2007 inclusive;
- **Short term trends**, based on historical, fourth quarter LFS qualifications data from 2002 to 2007 inclusive.

Both sets of projections (based on long and short term trends) were derived using exactly the same method; the only difference is the length of the time series upon which the forecasts are based. Both the long and short term extrapolations were produced in the same workbooks, however for brevity only the forecasts based on the long term trends are discussed in any depth in this chapter.

The use of both short and long term trends is rooted in the earlier Treasury work which suggested that, at that time, the more recent trends gave a more pessimistic picture than the longer term trends. This study found relatively little difference between the two sets of projections and the projected 2020 attainment presented in *Ambition 2020* is based on the long term trends.The emerging differences between the short and long term trend projections is something the UK Commission will continue to monitor, however, it is expected that recent investments in education and training should begin to show through as an upturn in the short term trends.[5]

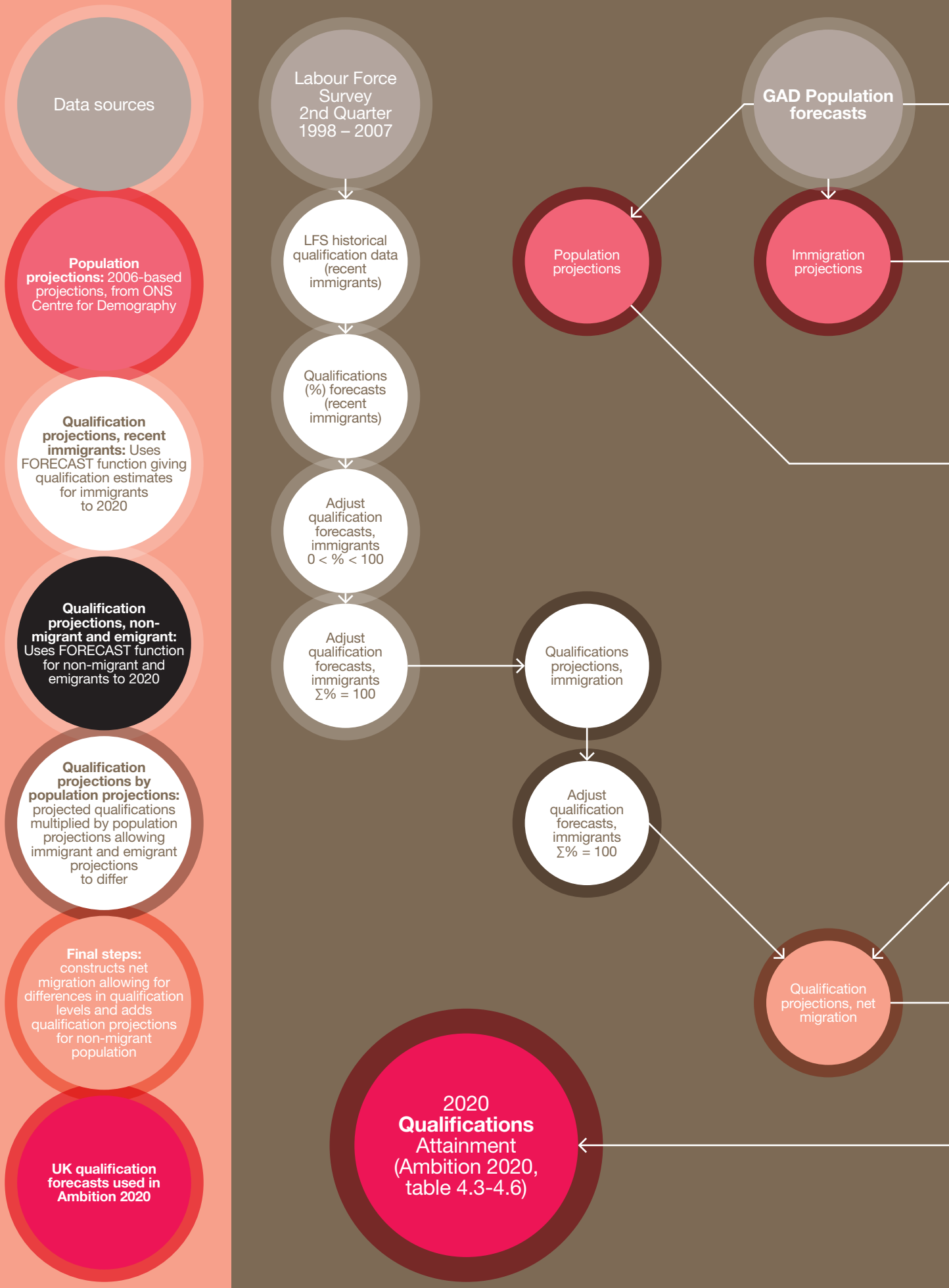
5 Also note that there will always be time lags between data and publication, and this may mean that any recent improvements (i.e. in Level 2 & Level 3 for example) will not be reflected in the data until future years.

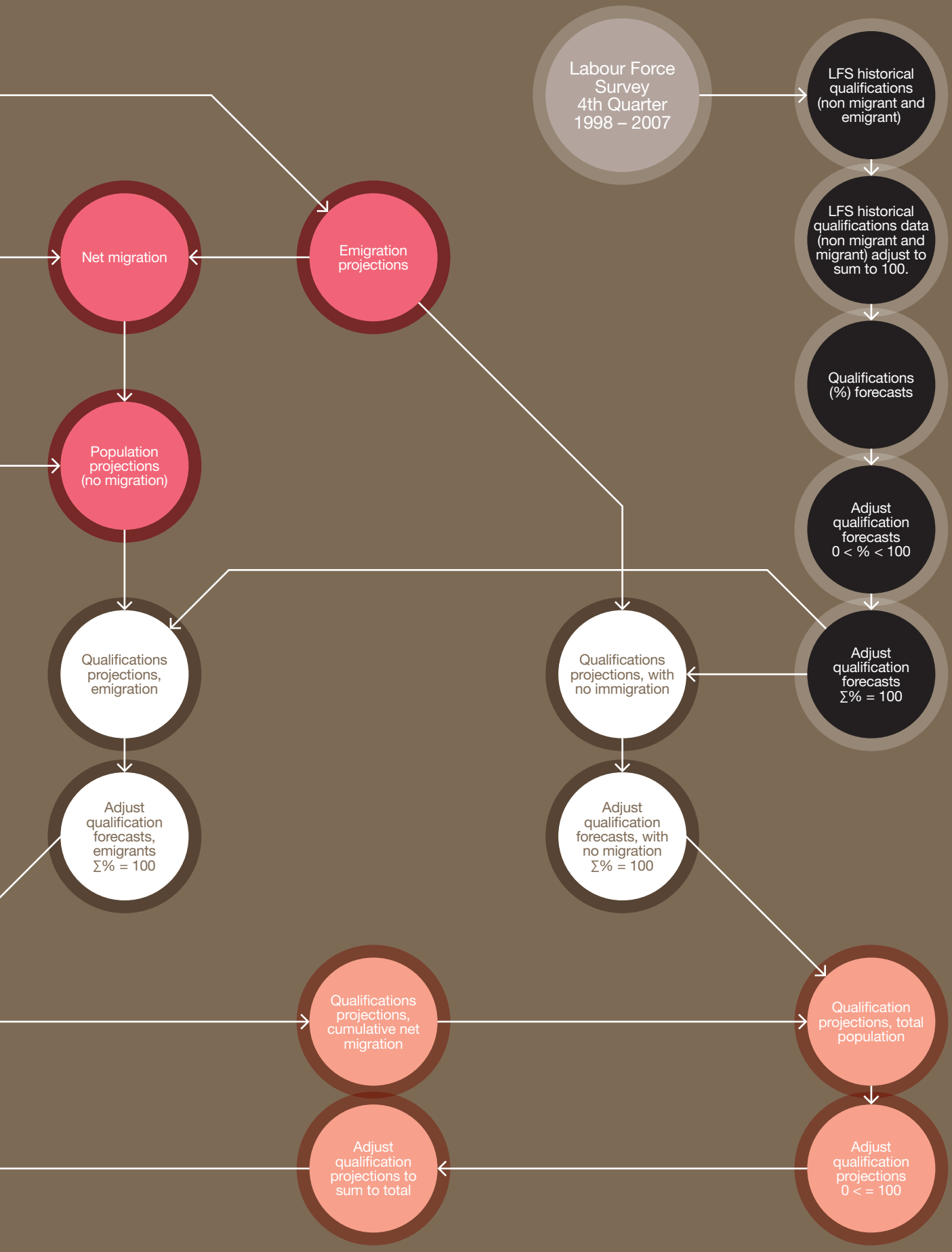
Figure 3.1 below summarises the data flowing into the UK qualifications model, and the relationships between the different worksheets used to derive the forecasts used in *Ambition 2020*.

The starting point for the qualifications model is the 2006-based population projections by the Centre for Demography at ONS. These were the latest available when undertaking the forecasting work, ONS will be releasing 2008-based population projections in October 2009, which will be used in our 2010 version of *Ambition 2020*.

The population projections feed into assessing the **demographic effect** and the **migration effect** on qualifications. The qualification model uses overall population, immigration and emigration projections.

Figure 3.1: The *Ambition 2020* UK qualifications model (based on long term trends)





Note: short-term based projections use the same approach as that used for long term trends outlined in this figure.

3

Considering the **migration effect** in more detail, the qualifications of emigrants and immigrants may not be the same. As such, two separate projections giving the future qualifications profiles of each group are derived. It follows therefore that the immigrant population projections flow as an input into the qualifications projections for immigrants, and similarly the emigration estimates flow into subsequent qualifications forecasts for emigrants.

Net migration is also derived from the population projections (by subtracting emigration from immigration), this then feeds into a set of qualifications forecasts that model the qualifications profile in 2020 assuming no migration. This step is utilised later in the model to help adjust for the rationale that there may be differences in the qualifications levels of immigrants and emigrants.

The qualifications forecasts are sensitive to the underlying population forecasts, and the impact of the assumptions about migration is subject to some uncertainty for a number of reasons. The migration data are very volatile. Predicting future migration levels and qualification attainment using past trends may be a key element to consider in the achievement of the various targets. Each wave of inward migration in recent years has been characterised by different qualifications profiles. Although recent changes to the rules and regulations for inward migration will make it more difficult for unqualified and poorly qualified people to enter the UK from outside the EU, the impact of such changes remains to be seen. Also for those entering from European Union Member States, no constraints can be placed on their entry (SSDA, 2008).

To improve the migration element of the qualification forecasting work, we will be working with the updated population projections in the 2010 version of *Ambition 2020*. The UK Commission will also look in more detail at the sensitivity of the forecasts to migration assumptions, and consider whether there is any supplementary information about migration flows that might be used to augment the qualifications model.

The LFS is the key source of information used for the qualifications data that are allied to the population projections in order to achieve the 2020 qualifications forecast. A historical series of fourth quarter LFS data is constructed for the period 1998 to 2007 containing the proportion of individuals at each qualification level (using the National Qualifications Framework as set out earlier) by age and sex.[6] With the exception of immigrants (which have a separate time series constructed), fourth quarter LFS data is used to cover the population on the basis that most qualifications are awarded during the summer quarter.

The historical qualification information for immigrants (1998-2007) is also taken from the LFS, however this group's data is taken from the second quarter of the LFS as this is the only quarter in which it is available. The results are based on those not resident in the UK one year prior to the survey; the data for the relevant year are used (e.g. immigrant qualification data for the second quarter of 2002 is used alongside UK population data from the final quarter of 2002).[7] Even this is problematic as it is difficult, if not impossible, for the interviewers to code all types of foreign qualifications. Hence, a number of assumptions and approximations are made in coding the immigration qualification data.

6 The 60+ data for females and the 65+ group for males are not used because of the problems with the LFS routing for the qualifications question above State pension age. In practice, to allow for the change in State pension age for females, qualification proportions have been projected in a separate workbook for ages 60-64. These projections are based on the changing patterns of qualification proportions with age over ages 50-59 for females.

7 A development for future years work may be to match the spring immigrant data with the fourth quarter population data from the year before (e.g. immigrant qualification data for the second quarter of 2001 to be used alongside UK population data from the final quarter of 2000).

The historical qualifications data for immigrants also exhibit problems because of small sample sizes. A series of interpolations and extrapolations were undertaken to overcome these issues. Details of precisely how this was done can be obtained from the authors on request.

Once the qualifications time series data have been constructed, the model first checks the historical qualifications proportions sum to 100 per cent to eliminate any rounding errors in the data. The (Excel-based) model then uses the FORECAST function with the data to carry out linear extrapolations of the historical trends over the period 2006-2020.[8] This is done separately for non-migrant and immigrant groups, emigrant groups are assumed to have the same qualification profile as the UK population as a whole (therefore the 'non-migrant' qualifications proportions are used for emigrants in later calculations).

Where projections of qualification proportions are undertaken as part of the model these are constrained to lie in the range 0 to 100 per cent (i.e. any negative proportion is set equal to zero and any projected proportion over 100 is set to 100). In addition, where the qualifications proportions with different attributes should sum to 100 per cent, they are constrained to do so (e.g. the percentage with no qualifications through to the percentage of those with NQF5 sum to 100).

The forecasted qualifications proportions for each of the non-migrant, emigrant, and immigrant groups are then multiplied by their corresponding population forecasts. By subtracting the estimates for immigrants and emigrants (broken down by level of qualification) cumulative net migration forecasts are achieved. These are then added back with the forecast qualification figures for the population without migration.

In the final stage of the forecasts the model checks that there are no negative estimates for qualifications amongst the population, and ensures that the estimates of the numbers of individuals with different levels of qualifications sum to the population as a whole.

The resulting forecasts are those used for the UK's 2020 anticipated qualification mix in the *Ambition 2020* report (*Ambition 2020*, tables 4.3-4.6) for 19-64 year olds. As the model is disaggregated by age, the qualifications for adults aged 25-64 were also extracted and used in *Ambition 2020* to rank the UK position against other OECD countries (*Ambition 2020*, table 4.1). The 2020 qualifications mix for the individual UK nations were derived using a simpler method, described briefly below in section 3.4.

8 Predicted values for 2006 and 2007 have been included in the model even though fourth quarter data are available for both those years; they enable a comparison between the predicted and actual values. These projections are based on the trends over the period 1998 to 2007.

3.4 FOUR NATION FORECASTS

As noted earlier the four nation forecasts for qualifications used within *Ambition 2020* are derived on a simpler basis compared to the UK qualifications model. The basics however are the same as the UK-wide model, including:

- Qualifications levels are used as a proxy for skills levels.
- The same six qualifications levels are used (see table 3.1).
- LFS quarter four data is used to construct the historical time series.
- Qualifications levels are derived from the LFS using the same method as the UK-wide model.
- The historical time period covered by the LFS data in the model is 1998 to 2007.

The projections are based on a continuation of the long-term qualifications trend (1998–2007) within each UK nation. The time series information relates to the share of each qualification level held by each nation state (e.g. the share of those with no qualifications located in England, the share located in Wales, etc.). Thus, the shares always sum to 100 per cent for the UK for each level of qualification. These shares are very stable over time, although there are some marginal changes over the ten year historical period as a whole.

These shares by qualifications level for individuals aged 19–64 are then projected forward to 2020. The model is based within Excel as with the qualifications model, and the FORECAST function used to achieve the linear extrapolations. The forecasts are repeated for individuals aged 25-64, this gives 2020 projections for a comparable age range to the OECD international forecasts. As with the UK-wide qualification model the 4-nation results for 25-64 year olds were used to compare against the 2020 skills mix of OECD countries (*Ambition 2020*, table 4.1).

The development work for the 2010 work will look at the feasibility of extending this model to make the 4-nation forecasts more sophisticated, and in-line with the UK-wide approach described earlier in this chapter.

3.5 FUTURE WORK

This chapter has outlined the background to the qualifications model, underlying assumptions, data considerations, and the approach used. Various areas for future development have been highlighted within this chapter to help mitigate some of the data issues with the qualification model and generally improve its functioning. Further developments we are looking to implement, not mentioned previously, include examining future economic activity rates by level of qualification, forecasts for males and females separately, and a regional disaggregation. The UK Commission hopes to implement developments as far as possible in time for the 2010 publication of *Ambition 2020*, the areas for progress are summarised below:

- **Labour Force Survey Update:** The re-weighted LFS data will be used for forecasts derived for the 2010 *Ambition 2020* report.
- **Population forecasts:** The model will be updated to use the 2008-based ONS population projections.
- **Scenarios:** The models could be extended to be used for scenario testing, for example exploring the sensitivity of the forecasts to alternative migration scenarios, and looking at what the impact would be if the assumptions about LFS under-reporting were realised.
- **Migration:** Work to consider whether the models can be extended and improved with supplementary information on migration flows. And investigating whether it is more robust to match the second quarter LFS data with the previous year's fourth quarter population data.

- **UK Nations:** the development work for 2009–10 will explore whether a more in-depth approach could be taken to achieve the 4-nation 2020 qualification forecasts.
- **Regional disaggregation:** resources permitting we hope in 2010 to develop 2020 qualification forecasts for the English regions.
- **Male and female qualification estimates:** The workbook has the potential to provide different estimates for males and females to 2020, this element may be further developed for the 2010 *Ambition 2020* report.
- **Future economic activity rates** of individuals, by level of qualification. The workbook could, in the future, be used to derive numbers and proportions of the economically active by qualification level. It could also be used to estimate what the effect of the changing qualification mix of the population has on economic activity rates (as the more highly qualified tend to have higher economic activity rates than the less highly qualified, except at the beginning and end of their working lives).

4 The Basic Skills Model

4.1 INTRODUCTION

Basic skills such as literacy and numeracy are particularly important as prerequisites to the acquisition of other skills. As such, a key ambition set out in the *Leitch Review* was for 95% of adults to have functional literacy and numeracy (basic skills) by 2020.

Functional literacy and numeracy are defined within the literature as:

- Functional literacy is defined as Level 1 English; this is equivalent to GCSE English at Grade G. It represents the level of literacy needed to function in everyday life.
- Functional numeracy is defined as Entry Level 3 Mathematics; this is less demanding than GCSE Mathematics at Grade G.

The level of literacy skills required to be "functional" is higher than that for numeracy, Moser (1999, p103-104) notes that higher levels of literacy are required more often than higher numeracy, both in everyday life and in the workplace. Those with low levels of literacy are less likely to be in full-time employment than those with higher levels, whilst only those with very low numeracy skills are thought to have difficulty maintaining employment. Box 4.1 notes how basic skills are measured.

BOX 4.1 DEFINING AND MEASURING BASIC SKILLS

The UK uses five levels to measure literacy and numeracy skills: Entry Levels 1, 2 and 3, Level 1 and Level 2. The *Moser Report* (1999) identified Level 1 literacy and Entry Level 3 numeracy as the standards necessary to function at work and in society in general. An example of an Entry Level 3 numeracy skill is being able to add or subtract money using decimal notation, or being able to work with fractions.

Surveys, like the Skills for Life Survey conducted in 2003, assess people's basic skill levels using a variety of literacy and numeracy problems corresponding to the five levels described above. In 2003, 16% of the working-age population in England, over five million people, lacked Level 1 literacy skills and 21% (6.8 million) lacked Entry Level 3 numeracy skills. More than 15 million people in England lacked Level 1 numeracy skills, equivalent to a GCSE Maths pass at grades D–G.

International surveys, such as the OECD's International Adult Literacy Survey and the more recent Adult Literacy and Life Skills Survey, use similar techniques to the Skills for Life Survey. They show that, while many other countries have a large number of adults with low basic skills, the UK lies in the bottom half of the OECD. Sweden had the lowest proportion of adults who had less than the equivalent of UK Level 1 literacy at just 7.5% in 1994, (compared with 21.8% in the UK in 1996) and just 5% of 26 to 35 year olds.

Source(s): Leitch (2006, Box 2.1, p.43)

The qualifications model was based on the qualification framework and as such cannot easily incorporate changes in attainment of basic skills, therefore the modelling work for future basic skills attainment is done separately. The basic skills model projects trends in the proportions of working-age population without functional literacy (Level 1) and numeracy (Entry Level 3) in the UK by 2020. The model is designed to illustrate and compare different trajectories, given current trends and alternative policies, of the proportion of working-age people with poor literacy and numeracy skills.

There are two principal data sources available for measuring post-15 literacy and numeracy – GCSE Maths and English acquisition and the Skills for Life survey. However there are issues with these:

- These two measures do not agree with each other on the level of basic skills.
- The Skills for Life survey has not been updated since 2003, which limits the extent to which the projections can be updated to those used in Leitch.

To lessen the impact of these issues, two variants of the model have been run giving the worst- and best-case scenarios.

The Basic Skills Model makes projections of the future stock of people of working age who lack functional literacy or numeracy skills (Level 1 English, and Entry Level 3 Mathematics), the model used for the results published in the 2009 *Ambition 2020* report is based upon the earlier version used by the Leitch Review.

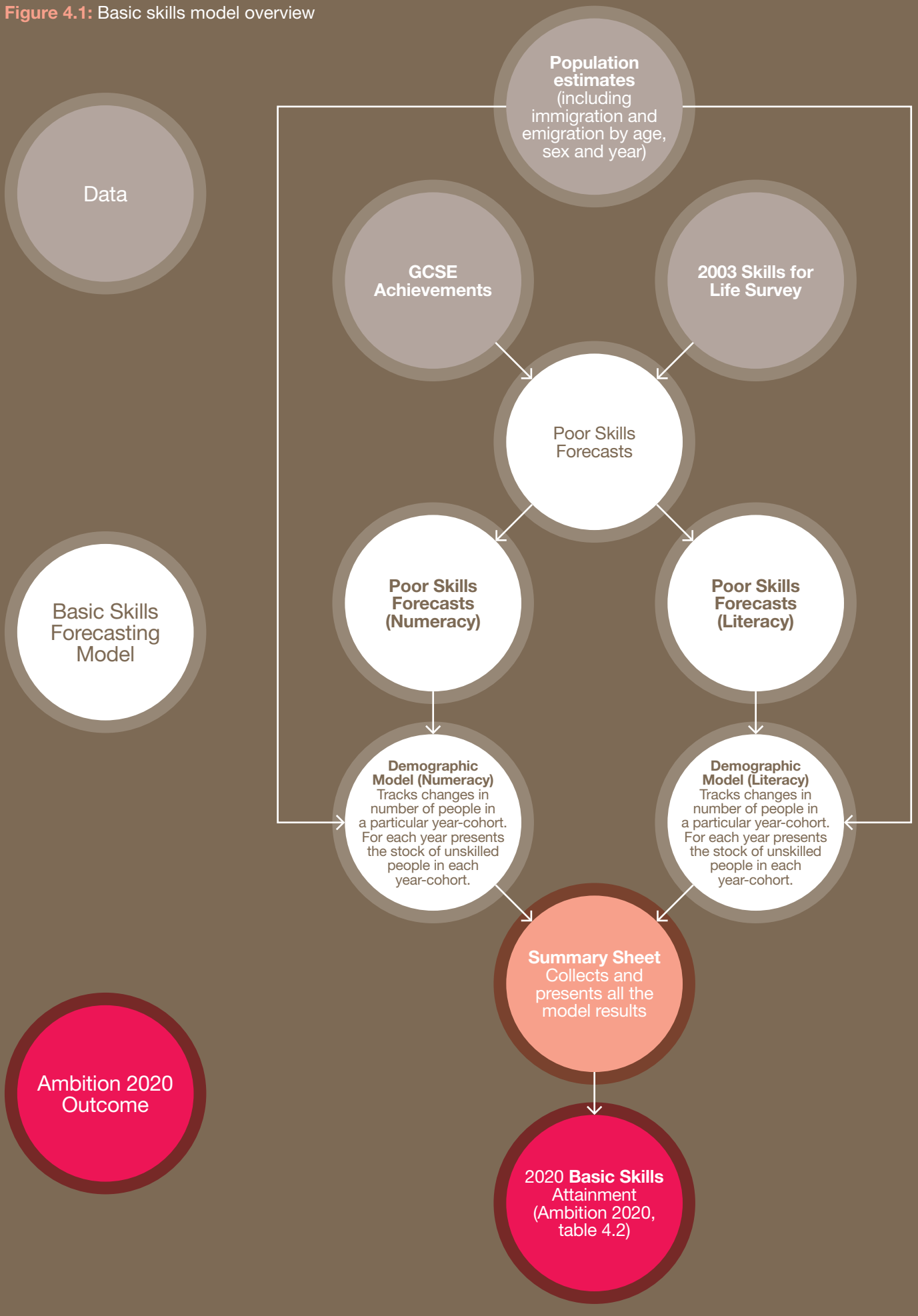
4.2 BASIC SKILLS MODEL OVERVIEW

Figure 4.1 below gives an overview of the current basic skills modelling work (the 'baseline model'), The pictorial representation shows how the model and data used for the basic skills model link together to produce the basic skills forecast for this year's *Ambition 2020* report.

The basic skills model starts by providing a breakdown of numeracy and literacy by age for the UK population based on the 2003 Skills for Life Survey. This stock/flow model then builds in the inflow of 16 year olds each year and removes those who will retire, GCSE English and Mathematics trends are then used to model the achievements of 15 year olds. **Therefore this part of the model accounts for changes to the stock (i.e. flows) of people without basic skills being driven only by differences between the skill level of people leaving the workforce (due to demographic factors), and school leavers entering at age 15**.

The remainder of the chapter looks at the data sources used in the basic skills model, and discusses each component of the model in more depth. The chapter concludes by discussing future developments to the model including the incorporation of 'upskilling scenario' next year.

Figure 4.1: Basic skills model overview



4.3 DATA SOURCES: BASIC SKILLS BASELINE MODEL

The current baseline model for projecting basic skills uses three main data sources:

- ONS population projections;
- 2003 Skills for life survey data;
- GCSE attainments.

As with the qualifications model the basic skills model uses ONS 2006-based population projections. The projections are stratified by age at last birthday at mid-year for the working-age population (ages 16-64) and are inclusive of net migration. Further discussion relating to the population projections can be found in the qualifications model chapter.

The results of the Skills for Life Survey are also used as a data source in the basic skills modelling exercise to estimate the level of poor skills within the working-age population (DfES, 2003). These provide a breakdown of the proportion of functionally numerate and literate individuals in the UK population broken down by year of age in 2003. This survey took an empirical approach to assessing the skill set of the English population: a sample of the public was assessed using specially-designed tests for literacy and numeracy. These results were then mapped onto qualification levels (critically, for this purpose, Level 1 and Entry Level 3, respectively). This can be contrasted to an approach based on the use of qualifications data where possession of a particular qualification is assumed to equate to possession of a particular skill level. In a minority of cases, the Skills for Life Survey noted a mismatch between assessed skill levels and qualifications actually possessed by respondents (DfES, 2003, p.21). It was not possible to assess whether this was due to deskilling or to other factors[9].

The level set for non-literacy is below Level 1 and for non-numeracy is below Entry Level 3, which correspond to the way in which the targets are set for 2020.[10] It can be seen in figure 4.2 that, despite setting a lower level for numeracy the proportion of non-numerate exceeds that of non-literate for every year of age from 16 to 64.

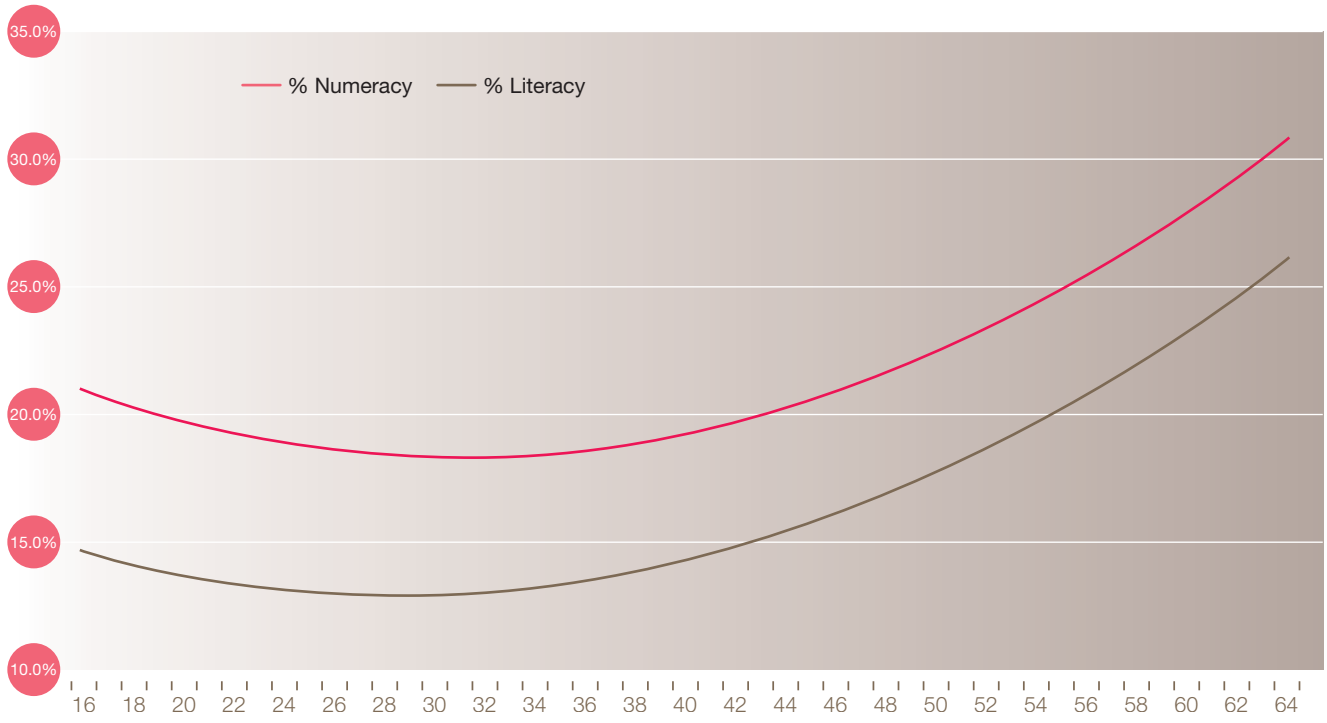
It is also worth noting that the Skills for Life Survey only covers England, and results are scaled up to give UK estimates. In 2004, the Welsh Assembly Government conducted a similar survey to Skills for Life in Wales (Williams and Kinnaird, 2005). It was not possible to use these data to improve the estimates for 2003 because the published data were not available in sufficient detail. However, a key conclusion of the study was that skills levels in Wales were poorer than those in England (Williams and Kinnaird, 2005, p.19-20). This suggests that it is not entirely appropriate to apply English data (from the Skills for Life Survey) to the UK.

We acknowledge that this approach to the data is a limitation of the current model but note also that: England makes up more than 80% of the UK population and, therefore, for the Welsh data to impact the English data significantly would require the level of poor skills to be very much higher than for England; and data for Scotland and Northern Ireland, were it available, may offset the Welsh data.

9 The survey's conclusions for literacy have since been the subject of a critique prepared for the Basic Skills Agency by Thomas Sticht (Sticht, 2003) which argued that it does not have construct validity because there was 'considerable ambiguity about what skills and knowledge are actually being assessed'.

10 Details of the equivalence levels can be found in the Skills for Life: Quick Reference Guide (LSC, 2003, p.14)

Figure 4.2: Proportion of population below functional literacy and numeracy levels, 2003



Source: Based upon data from the *Skills for Life Survey* (DfES, 2003)

In addition to the Skills for Life Survey, GCSE attainments are also used within the basic skills model. Having constructed data for the proportions with poor skills for each of the age cohorts that were working in 2003 using the Skills for Life Survey, it is then necessary to make estimates for cohorts that joined the working-age population between 2004 and 2008. This is done through the use of GCSE data for England.

GCSE achievement is used because it is a measure of the achievement of *school leavers* which is the cohort of interest. The disadvantage of this measure is that GCSE data does not formally measure functional numeracy and literacy on the same basis that Skills for Life did[11]; further, for numeracy GCSE is a measure at a higher level than functional numeracy.

11 As reflected in the fact that the proportion failing to achieve a GCSE is much lower than the proportion of poor skilled derived from the Skills for Life Survey.

Other data sources were reviewed and assessed in earlier development work on the forecasting models undertaken by Cambridge Econometrics (SSDA, 2008). This work identified that one possible data source covering the GCSE attainment would have been data published by the Joint Council for Qualifications (JCQ) – a body which consists of the examining authorities from all parts of the UK[12]. It publishes GCSE pass rates by subject and grade for England, Wales and Northern Ireland[13]. The work identified the key problem with using these data is that they only provide information only for candidates who have sat the exam. A sizeable component of the proportion of the unskilled population is those who do not sit the exam. Improvements in skills levels will be captured in part by more students sitting the exam. Another problem is that the results are for students sitting the exam at any age (including, for example, young people retaking the exam in their late teens and early 20s). This will also tend to mask the true trend of interest: in the years for which JCQ data have been examined (2001-2007) there was no discernable trend in the success rate at Grade G in Mathematics and English.

Thus the data used for the modelling exercise for the 2009 *Ambition 2020* report are the GCSE results over the period 1994 to 2008, broken down by proportion of 15 year olds taking the examinations and their level of performance (i.e. A-C grade, D-G grade and below G) in the examination. It is assumed that those who do not take the exam would fail it and, thus, the number of individuals below Level 1 is the number who do not take the exam plus those who achieve below grade G. This is converted into a proportion of the whole 15 year old cohort.

4.4 THE BASIC SKILLS MODEL IN-DEPTH

4.4.1 DEMOGRAPHIC SUB-MODEL

The baseline scenario for both numeracy and literacy is driven by a demographic sub-model, which tracks changes in the number of people in a particular year-cohort. The key assumption in the basic skills model is that a fixed proportion of each cohort lacks basic skills for the entire working life of the cohort. Changes in the total stock of those with basic skills can only arise therefore from the entry or exit of a cohort from the working population or a change in the size of a cohort.

The demographic sub-model uses the ONS population projections. It is possible using such projections to follow the projected size of a year-cohort through time. A year-cohort, for this purpose, is defined as a group of people in the population who were all 15 at last birthday at mid-year in the same year. For example, everyone born between mid-year 2007 and mid-year 2008 will be in the same age cohort as they will all be 15 at last birthday at mid-year in 2022. Changes in the size of a year-cohort can only arise due to the following factors: death of members of the cohort before age 65; or net migration into or out of the cohort.

Over time some year-cohorts will leave the working-age population (as they reach age 65) and new cohorts will enter (as they reach age 15).

Each year-cohort has a proportion of innumeracy or illiteracy associated with it. In this year's basic skills model this proportion remains the same throughout the working life of the cohort. This approach assumes therefore that inflows and outflows from a cohort (due to death or migration) do not affect the unskilled proportion.

12 The Scottish Qualifications Authority (SQA) is a member of the JCQ but Scotland is the only part of the UK where GCSEs are not a part of the secondary education system (the equivalent qualification is Standard Grade).

13 Published under the title GCSE, Entry Level and GNVQ Results. See for example JCQ (2007).

Sufficient conditions for this to be the case are: people are equally likely to die whether or not they are unskilled; people are equally likely to emigrate whether or not they are unskilled; and the inflow of migrants to a particular age cohort has the same proportion of unskilled as the year-cohort had on its entry to the working age population. An equally sufficient condition is that changes in the proportion from one of the three causes above are offset by one another (for example, the immigration of skilled migrants may be offset by the emigration of skilled residents).

Table 4.1 shows a sample of the demographic model for numeracy. For each year, the worksheet presents the stock of unskilled people in each year-cohort, the population and the unskilled proportion.

The unskilled proportions (%) are derived separately (see section 4.4.2 on "Poor skills"). The stock is equal to the unskilled proportion multiplied by the population. At the bottom of the worksheet (not shown), stock and proportions figures are presented for each year; these results feed into the model results ('summary' worksheet).

Table 4.1: Extract from the demographic model (numeracy)

	2003			2004		
Age Cohort	Number of Unskilled	Population	Unskilled %	Number of Unskilled	Population	Unskilled %
16	166,497	791,348	21%	164,457	802,399	20%
17	163,817	791,162	21%	167,751	797,309	21%
18	165,034	809,190	20%	166,090	802,140	21%
19	161,804	804,712	20%	168,114	824,288	20%
20	160,692	809,858	20%	165,068	820,946	20%
21	161,745	825,235	20%	163,990	826,478	20%
22	156,608	808,066	19%	165,219	842,960	20%

Source: GAD Population estimates, and *Ambition 2020* poor skills forecasts (using the 2003 *Skills for Life Survey* and GCSE attainment data).

4.4.2 POOR SKILLS

As indicated above, the calculation of poor skills flows into the demographic model providing the proportion of each age cohort over time expected to have poor skills (i.e. unskilled % in table 4.1). These proportions are derived using results from the 2003 Skills for Life survey which give a baseline poor skills level for numeracy and literacy in each year-cohort for 2003.

An example of how the poor skills forecasts operate in practice is given in table 4.2. Each row in table 4.2 represents a different year-cohort, columns represent different years. The growing white triangle in the top right hand corner above represents the retirement of earlier cohorts over time. Cells in red are calculated automatically and are not updated, whereas cells in orange can be manually updated with poor skills proportions for a year-cohort. The figures in column B are the proportion with poor skills for each year-cohort (each row) for the starting year of estimates (2003) based on the last Skills for Life Survey undertaken.

Table 4.2: Extract from poor skills forecasts (numeracy)

	% Unskilled (Numeracy)					
Year Cohort A	2003 B	2001 C	2005 D	2006 E	2007 F	2008 G
	Extract from top of worksheet ↓					
1955	31%					
1956	30%	30%				
1957	29%	29%	29%			
1958	29%	29%	29%	29%		
1959	28%	28%	28%	28%	28%	
1960	27%	27%	27%	27%	27%	27%
	Extract from bottom of worksheet ↓					
2003	21%	21%	21%	21%	21%	21%
2004		20%	20%	20%	20%	20%
2005			20%	20%	20%	20%
2006				19%	19%	19%
2007					19%	19%
2008						18%
2009						

Source: Forecasts based upon 2003 baseline data from 2003 *Skills for Life Survey*, and DCSF GCSE attainment data.

At the bottom of the poor skills forecast table 4.2, new cohorts entering the working age population enter into the model. The orange cells need to be populated with the expected levels of innumeracy (or illiteracy). These cells can be based on projected GCSE attainment, or 2003 levels carried forward (see discussion in section 4.4.3).

The brown-shaded cells represent combinations of year-cohorts and years which are not valid as the cohort is not in the working-age population yet.

The red cells are automatically populated by the worksheet from the orange cells. The manner in which they are populated depends on 'switches' at the top of the poor skills worksheet. In the present work, these 'switches' are set to 0, which means that, in the absence of further information about achievements or upskilling, a year-cohort will be projected to have the same baseline poor skills proportion in all years.[14]

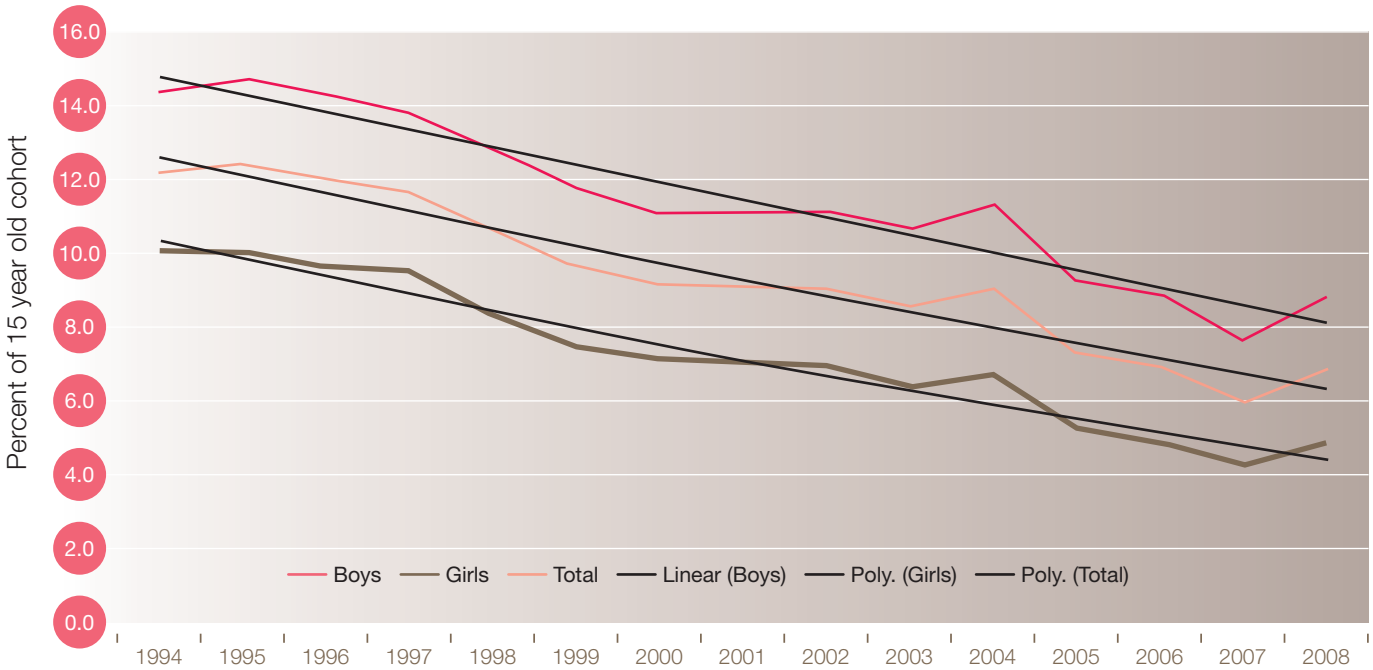
14 If Appreciating Skills is set to 1, the following rule is applied: If the immediately older year-cohort has a lower proportion of unskilled in its white cell, that proportion is used; otherwise the 'starting' proportion entered for the year-cohort (in its white cell) is used. If Depreciating Skills is set to 1 (and Appreciating Skills is set to 0), the following rule is applied: If the immediately older year-cohort has a higher proportion of unskilled, that proportion is used; otherwise the 'starting' proportion for the year-cohort (in its white cell) is used.

4.4.3 WORST AND BEST CASE SCENARIOS: USING GCSE DATA

GCSE data can be used to populate the proportion of new year-cohorts expected to have below functional numeracy/literacy (inserted into the 'poor skills' worksheet demonstrated in table 4.2). However an important assumption in the current basic skills model is whether or not the literacy and numeracy levels of the new flow of individuals at age 16 will improve over the period to 2020. Recent trends in GCSE attainment do cast some doubt on this assumption as demonstrated in figures 4.3 and 4.4. As a result of these trends best and worst case scenarios were developed within the basic skills model.

Data for the proportion of the 15-year old cohort with below level 1 GCSE English (in England) between 1994 and 2008 are presented in figure 4.3. Quadratic trend lines have been fitted to the data. For literacy (GCSE English) the quadratic trend is very close to being linear, however at the end of the period (between 2007 and 2008) there is a slight increase in the proportions attaining below level 1 GCSE English. It is difficult to establish at this stage whether this is a "blip" in the data or the start of a new trend of increasing proportions attaining below Level 1 GCSE English (or in other words *decreasing* proportions achieving *above* Level 1 GCSE English/functional literacy).

Figure 4.3: Trends in below Level 1 GCSE English, England



Source: The data were compiled from a series of GCSE result tables published by DCFS.
The latest is: www.dcsf.gov.uk/rsgateway/DB/SFR/s000768/revisedGCSE2008additionaltablesv2-2.xls

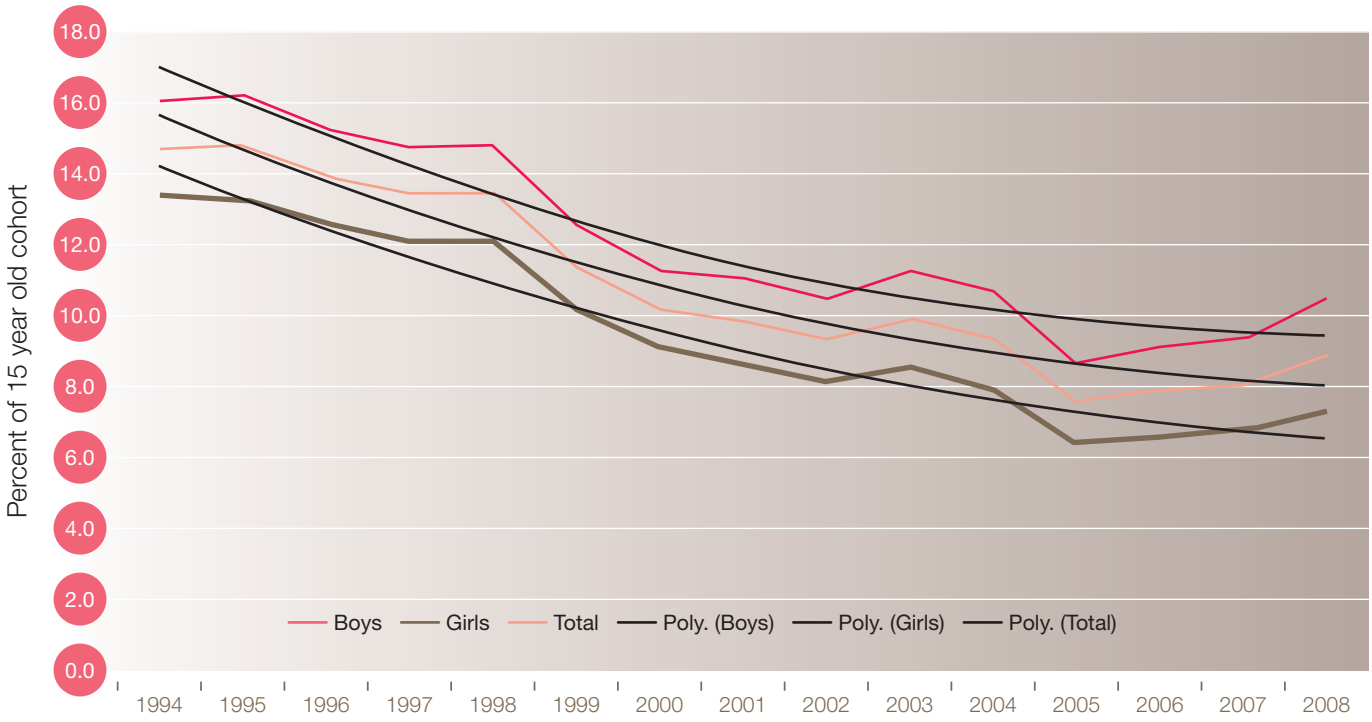
Note: Data relates only to those who have sat the GCSE English exam.

A similar exercise for numeracy gives GCSE trends for below level 1 GCSE attainment in Mathematics between 1994 and 2008, fitting a quadratic trend line (figure 4.4). For Mathematics the upturn in the proportion with below level 1 attainment is more distinct, running from 2005 to 2008.[15] That is, between 2003 and 2008 there were increasing proportions achieving GCSE Mathematics below level 1 (this can also be viewed as increasing proportions of students achieving GCSE Mathematics at a level considered below "functional").

Whilst this slight curve upwards in the quadratic trend fitted to the historical GCSE Mathematics data can just be observed in figure 4.4. If this quadratic trend is projected forward eleven years to 2020 (figure 4.5), the proportion of the 15-year old cohort having below Level 1 Mathematics (or below functional numeracy) rises to 23.4 per cent. This proportion can be contrasted with a linear trend which forecasts only 11.8 per cent innumeracy in 2020.

15 This upturn is reflected in all polynomials, quadratic and higher.

Figure 4.4: Trends in below level 1 GCSE Mathematics, England



Source: The data were compiled from a series of GCSE result tables published by DCFS.
The latest is: www.dcsf.gov.uk/rsgateway/DB/SFR/s000768/revisedGCSE2008additionaltablesv2-2.xls

Note: Data relates only to those who have sat the GCSE Mathematics exam.

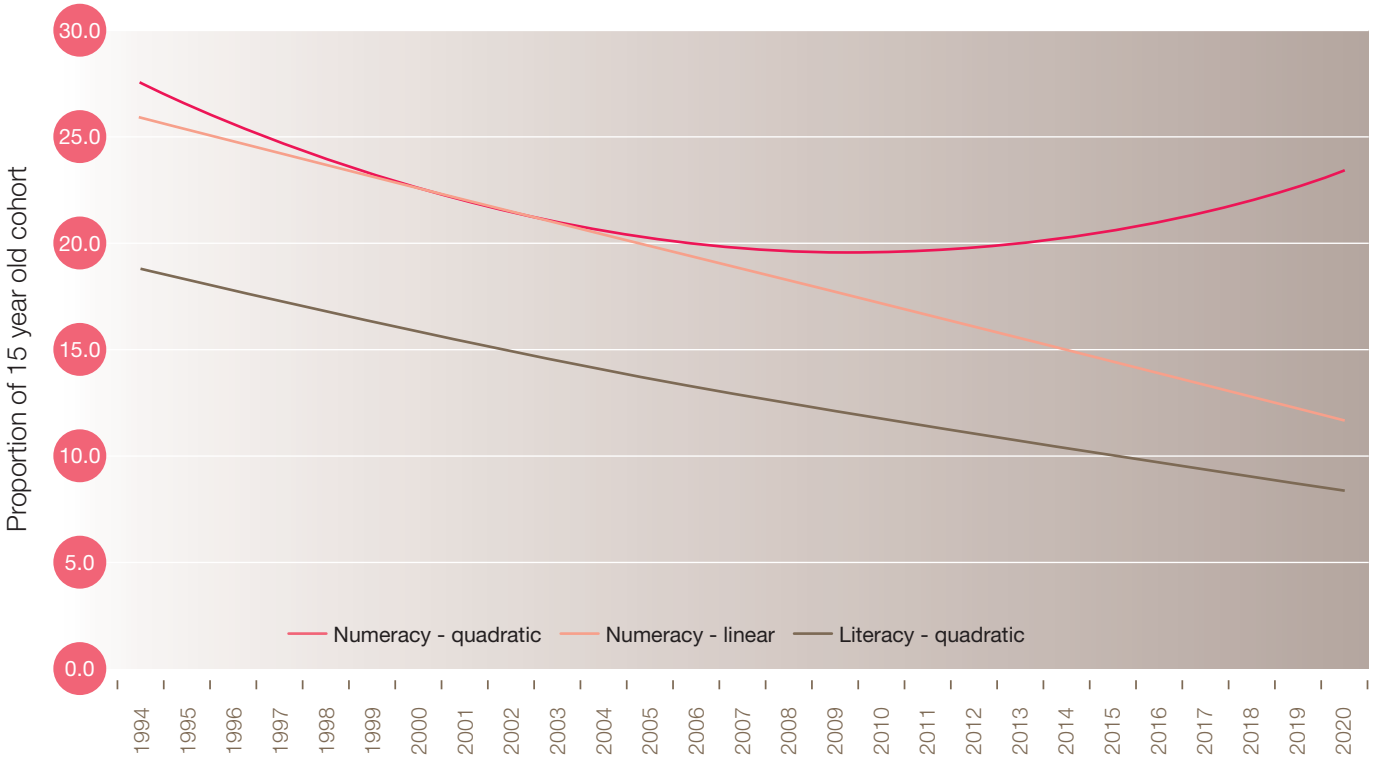
Examining figure 4.5 for literacy, the quadratic function projected forward for illiteracy on the other hand for the 15-year old cohort (via GCSE attainment below Level 1) is much clearer, still continuing to be an almost linear and downward trend to 2020. This suggests the proportion of the 15-year old cohort achieving below Level 1 GCSE English will fall to a level of around 8.5 per cent by 2020.

The impact of these trends for basic skills projections is we have to be careful when we assume that improvements (particularly for numeracy) will come through demographic change. A considerable question mark remains over what the literacy and numeracy levels of the new flow of individuals will be at the age of 16 over the period to 2020.

In light of this evidence best and worst case scenarios have been developed within the basic skills model and were presented in the *Ambition 2020* report.

- The worst case scenario is that literacy and numeracy will be fixed at their 2003 Skills for Life levels.
- The best case scenario is that literacy and numeracy will follow the quadratic (English) and linear (Mathematics) trends shown in figure 4.5.

Figure 4.5: Linear and quadratic trends and projections for GCSE Mathematics and English attainment below Level 1 to 2020



Source: Author projections based upon 1994 to 2008 GCSE data presented in figures 4.3 and 4.4

Note: data includes both those who don't sit the GCSE exam (assumed not to meet literacy or numeracy targets) and those who do sit the exam (hence the higher proportion of those not meeting the literacy/numeracy levels compared to figures 4.3 and 4.4)

4.5 FUTURE WORK

There will be some improvements to basic skills over time through demographic changes, as less numerate and literate older individuals reach retirement age. Though there is some doubt as to the contribution incoming younger cohorts may make to our future stock of basic skills, it is clear that, if the overall targets of 95% numeracy and literacy rates are to be met by 2020, then a considerable amount of work needs to be done amongst older adults, not just those passing through formal education.

Clearly then basic skills improvements will not only come from demographic change, but also as a result of upskilling of the existing workforce. Representing upskilling in the basic skills model will strengthen the robustness of the basic skills forecasting work. However, taking such an approach is not without its challenges, the complexity of the FE and adult education system makes incorporating an upskilling scenario a complex task (and one that was not completed for the 2009 *Ambition 2020* report).

In 2010 our approach to basic skills modelling will be developed to include the basic skills achievements of the post-15 group via approved Skills for Life qualifications.[16] **As such this new part of the model will allow for the remaining stock of people without basic skills to be reduced by upskilling the workforce**.[17]

Our initial scoping work has shown that the implementation of the upskilling scenario will be possible for England using Individual Learner Record (ILR), and these results could be scaled up to cover the whole of the UK. However we are keen to extend the model to fully cover Scotland, Northern Ireland, and Wales, and hope to research whether appropriate data sources are available for capturing post-15 basic skill upskilling for incorporation in the basic skills model.

The 2003 Skills for Life Survey still offers the best estimate of poor skills in the working-age population as no additional data have been produced which would offer a superior estimate. There are plans however for BIS to update the Skills for Life Survey in 2010; once the survey results are available these will feed into the basic skills modelling work. However these will not be available before the 2010 *Ambition 2020* report.

Finally as with the qualifications model, ONS population projections currently underpin the basic skills model. As such we will be updating the basic skills model with the new 2008-based projections once they are released in October 2009.

16 In the first stage of development the upskilling scenario will be developed using English data, projections will be scaled up to UK population estimates, and constrained for remaining 'hard to reach' groups. The second stage of development will then explore whether basic skills achievements within Wales, Northern Ireland, and Scotland can be captured and incorporated into the model.

17 The modelling work on these upskilling flows will be undertaken in a separate workbook, then forming an input into the main model.

5 International Modelling

5.1 INTRODUCTION

Ambition 2020 reiterated the Leitch ambition for the UK to be in the top 8 OECD countries across all levels of skills (low, intermediate, and high) by 2020. In order to measure the UK's progress towards this ambition of being in the top quarter of OECD countries for skills, we also need some measure of where we anticipate individual OECD countries will be in 2020 with regard to skills.

The international model helps us assess the likely trajectory of individual OECD countries to 2020 across the three levels of skill; the UK's 2020 skill mix (taken from the qualifications model) can then be compared internationally.

As with the UK qualifications model the international model uses qualifications as a measure of skill levels within individual countries. The OECD uses the international standard classification of education (ISCED) to classify individual countries' qualifications. These qualification classifications are then further grouped to give high, intermediate, and low skills levels (equivalent to Tertiary, Upper Secondary, and Below Upper Secondary).[18]

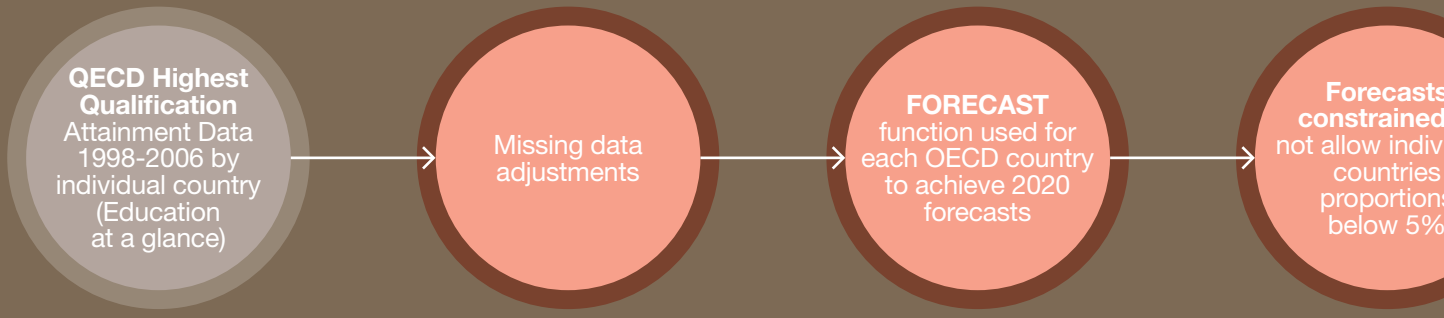
18 Table 3.1 presented earlier in the chapter presented how UK qualifications levels equate to the OECD equivalents.

As with all comparisons between countries, there are limitations to the comparability of education systems and qualifications. The complexity of the factors which influence the future trajectory also mean that any attempt to project trends into the future will, necessarily, be very 'broad brush'. However, in the absence of more accurate projections, it is valuable to consider the results of such an exercise.

5.2 INTERNATIONAL MODEL

Figure 5.1 gives a diagrammatic overview of how the international skills model works. It follows the same logic as the forecasting model used by the *Leitch Review* team, using simple linear extrapolations of international qualifications data to achieve the forecasts. Figure 5.1 reiterates that in the international skills model, the UK projections are based upon those from the qualifications model for the UK (adjusted to cover a comparable age range to the international data).

Figure 5.1: *Ambition 2020* international skills model overview



The international skills model comprises a simple spreadsheet that projects the educational attainment of the adult working-age population in OECD countries. Although the projections are based on recent trends in skills supply across the OECD, the forecasts have limitations. First, demographic trends outside the UK are not taken into account. It may be that improvements in other countries' skills profiles will be slower or faster than their historic performance depending on their age profile. Second, any recent trends may not be replicable into the future. Recent trends may be, for example, driven by one-off expansions of an HE system, that are subsequently constrained by population size or by economic trends. Finally, OECD member states may pursue alternative skills policies in the future, the international projections do not make a systematic assessment of these, and thus do not reflect possible alternatives in the direction they take.

The starting point for the international model is OECD data for 1998 to 2006, to identify trends in changes in educational attainment. The source for the data is the OECD's annual "Education at a Glance" publication series[19], from the table "Educational attainment: adult population" contained in this publication. The table presents the distribution of the 25 to 64 year old population, by highest level of education attainment. The latest data available at the time the modelling was undertaken was 2006, enabling a reasonably consistent data base to be compiled for most years from 1998 to 2006.[20]

Earlier in chapter 3, table 3.1 noted how the OECD qualification data categories relate to the OECD low, intermediate, and high level skills groupings for each country within the model. Table 3.1 also noted how these levels relate to the ISCED system, and how the UK qualification levels map on to this schema.

19 www.oecd.org/education/database.

20 It is worth noting that this time series is therefore one year shorter than the time series used for the UK qualifications model, however it was practicable to use the most up to date data available for the UK model.

It is important to note, as was also highlighted in chapter 3, there has been in the past some debate over whether UK Level 2 qualifications are classified as low or intermediate skills. This debate has now been resolved and UK Level 2 qualifications are firmly positioned as 'upper secondary' (i.e. intermediate level skills). As such the UK qualification model results reported in *Ambition 2020* this year classify UK Level 2 qualifications as 'upper-secondary' (intermediate skills), in line with BIS's methodology, the Leitch Review, and OECD/Eurostat consensus. The results from the UK qualifications model derived on this basis are used are used alongside the international forecasts (table 4.1 presented in *Ambition 2020*). The international model results for other OECD countries also follow the standard OECD/ISCED qualification level mappings (noted in table 3.1).

A difference between the OECD data used for the international modelling work and the UK qualification model is that the OECD uses the qualification variable 'highest level of achievement'. In contrast the UK qualification model uses a more sophisticated 'additive approach', which is noted in more detail within the qualifications model chapter and appendix B.

Turning back to the international model, once the time series by attainment level has been assembled for each country, a series of adjustments and extrapolations are made for missing data within the model. For example some of the footnotes to the original data indicate that the figures that appear in a particular year may actually be for another year, which is the closest data available for that country at that point in time. Thus, some data have to be reallocated to their correct years.

The "raw" OECD data have some missing observations for certain countries in particular years. Data are missing for most countries for the year 2000 and, while there are one or two other missing cells, the data for 2001 to 2006 are largely complete. The relatively small numbers of missing cells are interpolated and, only in three instances, was it necessary to interpolate to fill in data for two consecutive years (Slovak Republic, Ireland, and Poland). In a small number of instances there were "ad hoc" jumps in the data or a failure to give the full breakdown of all three levels of education, which were again removed by interpolation. Box 5.1 gives further details and examples of data adjustments.

The adjusted data is then checked to ensure that the qualifications proportions in the historical data sum to 100 per cent and then the FORECAST function is used to linearly project the trends observed from 1998 to 2006 through to 2020.

Prior to using the forecasts to give the international rankings at each skill level the model ensures that no projected percentage falls below a value of 5 (there were no projected values that were above 100 and, hence, no constraint with regard to exceeding "100 per cent" had to be imposed).[21] The only level of education that this value of 5 per cent is relevant to is the "below upper secondary" level, where significant declines over the period in question meant that nine countries become constrained at this lower 5 per cent limit during the forecast period and a further two countries reach this lower limit in 2020.[22]

After these adjustments the forecasts are re-checked to ensure proportions sum to 100 per cent and do not fall below the value of 5 per cent, and then finally each education level is ranked. The resulting 2020 qualification projections for the OECD countries (with the exception of the UK and 4-nation data) are those used in table 4.1 in *Ambition 2020*.

21 *Analysis of the way in which reductions in the proportion of "below secondary level" slow as countries approach a level of 3-5%, suggest that 5 is a good choice of limit.*

22 *Canada, the Czech Republic, Hungary, Korea, Norway, the Slovak Republic, and Sweden reach the 5% limit prior to 2020, while Finland and the Netherlands reach it at 2020.*

BOX 5.1 EXAMPLES OF INTERNATIONAL MODEL DATA ADJUSTMENTS

Japan is one of the countries that requires most modification in order for the data to be usable. The data prior to and post adjustment are shown in Tables 5.1 and 5.2. As with most of the countries, data for 2000 are missing and so these figures are interpolated. In addition, not only are the data for 2004 missing, but the below upper secondary and upper secondary are aggregated for 2005 and 2006.

There are several ways in which the missing data can be estimated. The way chosen was to apply the relative sizes of below upper secondary and upper secondary from 2003 to the 2005 and 2006 figures for the combined categories. After doing this, the figures for 2004 were interpolated from the results for 2003 and 2005.

Table 5.1: Japan international model data *prior* to adjustment

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below Upper Secondary	20.1	19.1		16.9	16.3	16.1		0.0	0.0
Upper Secondary	49.5	49.3		49.3	47.4	46.5		60.1	59.5
Tertiary	30.4	31.6		33.8	36.3	37.4		39.9	40.5
Total	**100**	**100**		**100**	**100**	**100**		**100**	**100**

Source: OECD, *Education at a Glance* series

Table 5.2: Japan international model data *post* adjustment

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below Upper Secondary	20.1	19.1	18.0	16.9	16.3	16.1	15.7	15.4	15.3
Upper Secondary	49.5	49.3	49.3	49.3	47.4	46.5	45.6	44.7	44.2
Tertiary	30.4	31.6	32.7	33.8	36.3	37.4	38.7	39.9	40.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Author-adjusted data series based on data from OECD, *Education at a Glance*.

The following two tables (5.3 and 5.4) show the ad hoc adjustments made for New Zealand. As for most of the countries, data are not available for 2000, so the figures are interpolated from the 1999 and 2001 values. The data for 2006 are clearly out of line from the earlier years. It is not clear whether the new or the older figures are incorrect, or whether some form of redefinition or reclassification has taken place. In the absence of any other information an adjustment is made to bring the single figure for 2006 into line. This is carried out by extrapolating from 2004 and 2005.

Table 5.3: New Zealand international model data *prior* to adjustment

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below Upper Secondary	27.3	26.4		24.3	23.8	22.5	22.4	21.3	30.6
Upper Secondary	46.1	46.6		46.4	46.3	46.6	52.4	51.6	31.1
Tertiary	26.6	27.0		29.2	29.8	30.9	25.3	27.1	38.3
Total	**100**	**100**		**100**	**100**	**100**	**100**	**100**	**100**

Source: OECD, *Education at a Glance* series

Table 5.4: New Zealand international model data *post* adjustment

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below Upper Secondary	27.3	26.4	25.4	24.3	23.8	22.5	22.4	21.3	20.2
Upper Secondary	46.1	46.6	46.5	46.4	46.3	46.6	52.4	51.6	50.8
Tertiary	26.6	27.0	28.1	29.2	29.8	30.9	25.3	27.1	29.0
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Author-adjusted data series based on data from OECD, *Education at a Glance*.

A range of other adjustments have been made for other countries, but the vast majority only required simple interpolations of figures for one and, at the most, two years.

5.3 FUTURE WORK

This chapter has outlined the approach taken to forecasting international skill levels to 2020 used for the 2009 edition of the *Ambition 2020* report. The discussion has covered the data sources used and noted data considerations.

There are areas in which the model could be further developed however. The international model currently uses only a limited range of data, not taking account of individual countries' demographic trends, education investment patterns, or economic trends for example. There will always be more detailed data available for the *Ambition 2020* forecasting work available within the UK compared with the international data available via the OECD. However, the OECD does publish a large amount of international data with regard to education and training other than levels of attainment. This data may warrant further consideration for the international modelling work in the future.

A final area for research with the international model is the choice of function fitted to the data to undertake the forecasts. A simple linear trend line is used at the moment; however there may be a more robust function that better fits the data, which could be an area for development. A more general functional form may allow the lower limit of under upper secondary level individuals to be estimated rather than imposed.

6 Next Steps

The previous chapters have re-stated the Leitch targets that each of our forecasting models is measuring progress towards, noted how the models function, their assumptions, data sources, and data issues. Each of the chapters discussing the *Ambition 2020* forecasting models has indicated where further development is required. In this final chapter we bring these discussions together and identify four broad areas of development for our models – inclusion of **data developments**, investigating and improving model **robustness**, improving **model coverage**, and **new reporting** based upon extending the existing methods.

Whilst we would hope that all of these areas are developed in the future, it is important to prioritise which of these will be ready in time for our 2010 round of *Ambition 2020* reporting. Development work can be unpredictable and, as such, difficult to estimate the amount of resource needed to realise these changes. Therefore our primary aim will be to first implement any **data developments**, as well as improving the **robustness** of the current models in time for our 2010 publication of *Ambition 2020*. In summary therefore, our key priority is to make sure that our 2010 reporting of progress towards our 2020 skills targets at the **UK-level** is of the highest order.

Data developments to be included in the 2010 version of the forecasting models include updating the basic skills and qualifications model to use the 2008-based population estimates (released October 2009). All underpinning LFS data will be replaced with re-weighted data in the qualifications model, and updated to cover the time series 1999 to 2008. Data underpinning the basic skills model and international model will also be updated by a year.

We will be prioritising improving the **robustness** of our models through a number of avenues. The basic skills model will implement the upskilling scenario to better account for the post-15 population improving their basic skills levels. Work on our qualifications model will consider whether improvements can be made with additional information on migration flows. We will explore whether the approach to international modelling can be improved and augmented with additional data, and investigate whether a more appropriate forecasting function is available to use with the data.

Following successful implementation of these two development areas, we will then move to improving **model coverage** and extending the models to include **new areas of reporting**.

Model coverage will be extended in the future by considering whether a more in-depth approach can be taken to the forecasting of qualifications levels in each of the four UK nations to 2020. We will also consider the feasibility of developing regional qualifications forecasts (given sample sizes, this would most likely be based upon simple linear extrapolations, similar to the method used for the 4-nations this year). Further, we plan to investigate whether the upskilling scenario we have scoped for the 2010 version of the basic skills model can be updated to accommodate basic skills information from Northern Ireland, Scotland, and Wales.

There is also scope for the current suite of forecasting models to be extended to cover **new areas of 2020 reporting**. The qualifications model for example could be utilised to develop scenario testing, this could help us unpick issues such as the sensitivity of the forecasts to migration flows and possible impact of LFS under-reporting. The qualifications model also has potential to be extended to give future economic activity rates of individuals by qualification level, and separate male/female qualifications estimates for 2020. Finally, the HM Treasury *Leitch Review* team utilised a cost-benefit analysis model to assess the impact of various skills scenarios on a range of economic and social outcomes. There may be value in re-visiting and further developing this cost-benefit model to complement our other suite of skills forecasting models.

In publishing this *Ambition 2020* technical report which documents our approach taken to forecasting skill levels to 2020, we endeavour to maintain transparency in our methods. We hope via this technical report to keep an open dialogue with interested parties to further progress the robustness of our skills reporting in future years.

Appendix A

Labour Force Survey: specific procedures, assumptions and choices adopted for the 2008/9 *Ambition 2020* forecasting.

1. The data used currently were re-weighted in April/May 2004. A new rebasing is now available and will be used in future work.

2. Allocation to NQF level:

There are four qualifications where the allocation to NQF level depends on the number of qualifications held by the individual (LFS variable name given in parenthesis):

A-Level (LFS variable numal) – available from 1993 to date

SCE higher or equivalent (numsce) – 1997 to 2005

A, S level or equivalent (numas) – 1995 to date

GCSE level, GCSE grade A-C or equivalent (numol, numol4, numol5) – 1994 to date

Where this information is not available an apportionment is done (see below).

Many people when surveyed report that they do not know precisely how many qualifications they hold. These cases are split in the same proportion as those who do know. This can produce different results depending on which other variables are included in the process.

There are three cases where the allocation to NQF splits a qualification category. These are allocated by a fixed proportion (based on information supplied by DfES):

Scottish CSYS	2/3 NQF3	1/3 NQF2	
Trade apprenticeship	1/2 NQF3	1/2 NQF2	
Other quals and Don't know	10% NQF3	35% NQF2	45% NQF1

In addition the qualifications such as A-level above are split on fixed proportions in the years where information on the number of qualifications held is not available.

3. "Don't know" is now treated as "Other qualifications".

4. There is currently no qualification information (i.e. it is missing) for anyone over retirement age (59/64) unless they are in employment. It is understood this may change.

If other variables are used this can restrict things. For example, the 'where resident one year ago' variable (gorone) is available for the 1st quarter only.

5. IER normally use the 'Highest qualification' held variable, although not in the qualification forecasts for the UK Commission.

6. SCOTVEC modules are less than 'NQF1' and are included in 'NQF1 or less'. In some cases these may be treated as no qualifications.

Appendix B

Detailed allocation of individual qualifications to NQF level[23]

Level 1 is described by DIUS as 'Below Level 2'; SCOTVEC modules are below Level 1 but more than No qualification.
Four or fewer 'GCSEs,O-Level or equivalent at grades A-C' is in the Below Level 2 category.
One A-Level or equivalent is in Level 2.

AS levels:
One AS level = Level 1
Two or three AS levels = Level 2
Four or more AS levels = Level 3

SCE:
Three or more = Level 3
One or two = Level 2

Advanced Scottish highers:
Two or more = Level 3
One = Level 2

Scottish highers:
Three or more = Level 3
One or two = Level 2

In terms of LFS categories:

Level 4 includes:
RSA higher diploma
Other higher education below degree

Level 3 includes:
RSA Advanced diploma or advanced certificate
Advanced Welsh Bac'te
International Bac'te
GNVQ/GSVQ advanced
Scottish CSYS (two thirds)
Access qualifications
SCE Three or more
Four or more AS levels
Trade apprenticeship (half) *
Scotvec Full National Certificate
Two or more Advanced Scottish highers
Three or more Scottish highers

Level 2 includes:
One A-Level
Intermediate Welsh Bac'te
Trade apprenticeship (half) *
Scottish CSYS (one third)
SCE One or two
Two or three AS levels
One Advanced Scottish highers
One or two Scottish highers

Below Level 2 includes:
Four or fewer 'GCSEs,O-Level or equivalent at grades A-C'
SCOTVEC first/general
Some other RSA (including Stage I, II and III)
One AS level
City & Guilds Foundation/Part 1
YT,YTP certificate
Key Skills Qualification
Basic Skills Qualification
Entry Level qualification

23 Source: Peter Millar (IER, Warwick University)

Treatment of missing cases and don't knows
Highest qualification, hiqual, **missing** codes (Does not apply, No answer) are allocated to all other codes in proportion, including the No qualification code. Previously these were allocated to a category, *missing*.

Highest qualification, hiqual, **don't know** code is allocated to **all** other codes in proportion, excluding the No qualification code. Previously these were allocated to *Other qualifications*, and divided 10:35:55 %, NQF 3:2:1

In both these cases the proportions used are those before either adjustment has been applied.

* For people whose highest qualification is one **A-level** the DIUS syntax looks at whether they have **other qualifications** that would put them in Level 3. For example, in the case of Apprenticeship, they are allocated 50:50 to NQF levels 3:2. Previously those with one A-level were simply allocated to NQF 2.

AS levels are treated similarly to A-Levels Previously people were simply allocated to NQF 3, 2 or 1 depending on how many AS levels they had.

Scottish CE higher – treated similarly to A-Levels. Previously people were simply allocated to NQF 3 or 2 depending on how many SCE highers levels they had.

Alternative simpler allocation base just on single highest qualification held
Using the rules above requires information not just on the highest qualification held but also about all others, including the number of some qualifications held. In some cases the method of allocation to NQF levels is done using a simpler allocation based just on the highest single qualification held. This includes the qualification by industry and qualification by occupation charts as well as some others.

The simpler SPSS syntax uses just the 'Highest qualification' variable.

In cases where the highest qualification is A-Level and the number of qualifications held is not known then the lower NQF level is assumed (i.e. it is assumed that the person has just one A-Level and is allocated to NQF 2). This issue also affects the treatment of those with GCSE (A-C)/O-Levels, AS-Levels and Scottish Highers.)

In these results the allocation to NQF category is therefore carried out according to a simple rule based on using the Labour Force Survey to rank the 'Highest Qualification' held. For example, someone with One A-Level would be allocated to Level 2 even if they also had 'Three or more SCEs' which, had the SCEs been their 'Highest Qualification', would put them into Level 3 according to the DIUS rules. This is because SCE is below A-Level in the LFS ranking. In contrast if they had One A-Level and qualifications at 'GNVQ/GSVQ advanced', that would put them into Level 3 as 'GNVQ/GSVQ advanced' is "above" A-Level in the LFS's simple rankings of 'Highest Qualification'.

Where the response was 'Don't Know', the individuals are allocated as 'Other qualified'.

No answers were excluded.

Glossary

BIS	Department for Business, Innovation and Skills
CfD	Centre for Demography
DCSF	Department for Children, Schools and Families
DfES	(former) Department for Education and Skills
DIUS	(former) Department for Innovation, Universities and Skills
EU	European Union
GAD	Government Actuary Department
HM Treasury	Her Majesty's Treasury
ILR	Individualised Learner Records
ISCED	International Standard Classification of Education
JCQ	Joint Council for Qualifications
LFS	Labour Force Survey
LSC	Learning and Skills Council
NQF	National Qualification Framework
OECD	Organisation for Economic Cooperation and Development
ONS	Office for National Statistics
PSA	Public Sector Agreement
SQA	Scottish Qualifications Authority
UKCES	UK Commission for Employment and Skills

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Notes

The UK Commission aims to raise UK prosperity and opportunity by improving employment and skills. Our ambition is to benefit employers, individuals and government by advising how improved employment and skills systems can help the UK become a world-class leader in productivity, in employment and in having a fair and inclusive society: all this in the context of a fast-changing global economy.

Because employers, whether in private business or the public sector, have prime responsibility for the achievement of greater productivity, the UK Commission will strengthen the employer voice and provide greater employer influence over the employment and skills systems.

Having developed a view of what's needed, the UK Commission will provide independent advice to the highest levels in government to help achieve those improvements through strategic policy development, evidence-based analysis and the exchange of good practice.

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