

**The Home
Office
Migration
Advisory
Committee**

**A Review of
Labour
Shortages,
Skills
Shortages
and Skill
Gaps**

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Migration Advisory Committee
Review of Labour Shortages, Skill Shortages and Skill Gaps

Author & Contact Details

Date: 28 April 2008

Authors: Malcolm Greig
Keith Glancey
Philip Wilson

Quality Assured by: Philip Wilson

York Consulting LLP
The Canon Mill
1-3 Canon Street
EDINBURGH
EH3 5HE

Tel: 0131 2706066
Fax: 0131 2706069

Email: malcolm.greig@yorkconsulting.co.uk



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1 INTRODUCTION

Purpose and Aims of the Research

- 1.1 The Migration Advisory Committee (MAC), a body set up to provide independent evidence-based advice to the Government, commissioned this research to provide an overview of theoretical and practical issues in the conceptualisation and measurement of labour shortages, skills shortages and skills gaps in the context of its terms of reference.
- 1.2 The research evidence is aimed at assisting the MAC with its aim of compiling clearly specified lists of occupations that can sensibly be filled by allowing employers to recruit migrants.
- 1.3 In providing evidence to support this decision making, the study conducted a review of existing literature:
 - to identify issues and thinking around the concept and definition of “*skill shortages*”;
 - to assess the different measures of skill shortages that have already been developed;
 - to assess the use of potential indicators from currently available national data to identify labour shortages;
 - to evaluate other countries’ experience in measuring labour and skills shortages for the purpose of managing migration.
- 1.4 This report presents evidence from the literature review and outlines key findings from the analysis.

Report Structure

- 1.5 Following the introduction, the report is structured as follows:
- **chapter 2:** contains details of the methodology employed;
 - **chapter 3:** provides a summary comparative analysis of literature relating to definitions of skills shortages;
 - **chapter 4:** provides a summary comparative analysis of literature relating to measures of skills shortages and use of existing indicators;
 - **chapter 5:** provides a summary comparative analysis of literature relating to international applications of skills shortage indicators to migration issues and policy;
 - **chapter 6:** provides conclusions on the key messages and implications for the MAC
 - **appendix 1:** provides detailed reviews for selected literature, given paper-by paper in alphabetical order by first named author;
 - **appendix 2:** contains corresponding Harvard-style list of references used in the report..
- 1.6 The report therefore provides both a summary analysis of literature against key aspects of interest, and detailed reviews of key individual papers for further reference.
- 1.7 A spreadsheet containing all literature identified from the study has been provided separately. This contains summary reviews of papers not selected for detailed review and further details of the scoring system used to underpin the review process.

2 METHODOLOGY

2.1 This section describes our methodology, which was based on a **Rapid Evidence Assessment (REA)**, which is described below.

Rapid Evidence Assessment

2.2 Rapid Evidence Assessments (REA) are commonly used as a basis to identify relevant evidence where time constraints may limit a more detailed review. A recent review of an REA undertaken by the National Educational Research Forum (NERF) provides useful information on how this approach can be applied to a range of evidence¹. The key element that can be taken from this is to use a scoring system to quickly analyse a paper to see whether it should be included in the review.

2.3 Our REA focused on the following key stages:

- developing a search strategy;
- searching databases;
- determining inclusion criteria;
- synthesising the evidence;
- producing a summary comparative analysis and source handbook.

¹ NERF: *Conducting an Evidence Assessment – Methods and Lessons Learned*, <http://www.nerf-uk.org/word/DrugsandAlcoholrapidreview.doc?version=1>

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Databases

2.4 The databases searched include:

- IDOX²;
- ASSIA (Applied Social Sciences Index and Abstracts);
- Scirus;
- BIDS/ATHENS;
- Joseph Rowntree database;
- Google Scholar;
- YCL library;
- British library;
- National Statistics reports.

2.5 Identified studies were logged in an Excel spreadsheet to support the generation of a bibliography.

Additional Sources

2.6 In addition to the above databases we consulted the following organisations by way of **secondary research**, primarily searching websites, and **primary research** in the form of some interviews with experts in the fields. Key organisations included:

- ERI at Napier University (consortia member);
- IER at Warwick University;

² We subscribe annually to the Idox Information Service (IS), which enables us to conduct efficient and professional literature reviews. The IS gives us up-to-date access to government publications and over 500 specialist journals. Through this service we are able to search a vast database and also make use of the services of information professionals who can conduct detailed searches on our behalf at no extra cost.

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- The University of Minnesota, USA;
- University of St Andrews;
- Dundee University
- Futureskills Scotland
- Independent researcher based in Toronto, Canada

2.7 As with the database search, identified studies were logged in the Excel spreadsheet supporting the generation of a bibliography.

Determining Inclusion Criteria

2.8 When the searches were completed, the identified studies were reviewed and scored against selected criteria, in that they:

- focused on definitions and measures of skills shortages;
- focused on the labour market issue of skills shortages related to migration;
- identified possible indicators to measure skills shortages;
- looked at international experience of measuring skill shortages for the purpose of managing migration.

Key Evaluation Criteria

2.9 In order to do this objectively we assessed all relevant evidence identified for quality using a four stage classification system. This weighted evidence using a 4 tier quality check as summarised in **Table 2.1** below.

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Table 2.1 Key Evaluation Criteria	
<i>Quality Rating</i>	<i>Sources</i>
1	<ul style="list-style-type: none"> • Published refereed academic research • Published central government research documents
2	<ul style="list-style-type: none"> • Academic research/working papers • Reports for local government, LSCs and enterprise companies • Evidence from statutory bodies and NDPBs
3	<ul style="list-style-type: none"> • ‘Grey literature’ including conference papers, internal government documents and organisation newsletters and factsheets, for example from voluntary and lobby groups.
4	<ul style="list-style-type: none"> • Press quotations • Anecdotal evidence from interviews, • Unreferenced facts and quotations from voluntary and lobby groups

2.10 Where evidence from more than one source was contradictory, our comparative analysis highlights this, and draws conclusions in a transparent manner, giving appropriate weight to higher-ranked evidence.

3 DEFINITIONS OF SKILL SHORTAGES

Introduction

- 3.1 This chapter reports on our review on the literature on definition of skill shortages, and how these relate to related definitions of labour shortages and skill gaps.
- 3.2 There is unanimous agreement across all the literature that defining skill shortages is a difficult task. The reasons cited for this difficulty are best summarised by Green and Owen, in terms of “complexity and ambiguity”.
- 3.3 We begin this chapter by a summary of the key messages and implications for MAC policy, particularly with reference to the MAC February report³. We then explore in more depth the issues of skill shortage terminology, contrast macroeconomic and microeconomic definitions of skill shortages and finally explores some example definitions of skill shortages.

³ Migration Advisory Committee (2008) *Identifying skilled occupations where migration can sensibly help to fill labour shortages*. February 2008

Key Messages and Implications for the MAC

- The term ‘skill shortages’ has been used interchangeably. The majority of literature differentiates ‘skill gaps’ as a separate issue related to skills of the existing workforce. Skill shortages on the other hand refer to skills of those available in the external labour market.
- For the purposes of the MAC, we would argue that skill gaps are only an issue if there are also skill shortages, i.e. where skill needs of employers cannot be met by developing their current workforce or through the UK/EU resident workforce. We would argue therefore that it makes sense to focus on skill shortages.
- Skill shortages can be confused with ‘labour shortages’. However an accurate definition of skill shortages differs from ‘labour shortages’ in that labour shortages refer to the quantity of the workforce whereas skill shortages refer to particular skills within the workforce.
- For the purposes of the MAC, the narrower definition of skill shortages is most relevant as labour shortages would include low and unskilled labour.
- The evidence we have reviewed supports the typologies of skills deficiencies (Hogarth and Wilson, 2001) as outlined in the February report.
- Skill shortages are generally regarded as a subset of hard-to-fill vacancies (HTFVs). HTFVs or recruitment difficulties can occur for a number of reasons other than skill shortages, including an employers reputation and conditions of work offered. Definitions of skill shortages given by employers may confuse HTFVs with skill shortages.
- For the purposes of the MAC, all HTFVs could potentially be solved by migration. However, a points-based system is designed to address particular skills and occupations rather than issues faced by individual employers and we would argue that HTFVs are not an ideal definition for compilation of shortage occupation lists.

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- Economists argue that skill shortages only occur at a given wage – a rise in wages for that occupation to an appropriate level will clear the market, although this may take time. There are two key points here for the MAC to consider:
 - firstly at what wage level a shortage of workers should be considered a skill shortage, as a failure to attract skilled workers at an unrealistically low wage would be more correctly defined as a non-skill shortage HTFV;
 - secondly, the speed at which the market is likely to clear – for occupations where wages appear to adjust freely skill shortages are likely to be short-lived, whereas where wages are sticky, skill shortages are likely to be persistent and a migration-based solution may be more appropriate.
- Much of the literature argues that skill shortages are occupation and industry specific, and it makes less sense to refer to skill shortages across the economy. The theoretical framework outlined by the MAC in the February report is correct here, but in the context of supply and demand for a particular industry or occupation only.

Terminology

- 3.4 Before attempting to define skill shortages in greater detail, there are two points of clarification relating to the use of language and to the specific application of the term.
- 3.5 The first involves expanding on the shorthand expression ‘skill shortages’. Some authors use the term in relation to unskilled occupations and sometimes labour in general (for example Daniels, 2007). For the purpose of this study however, we are particularly interested in ‘the shortage of labour in skilled occupations’.

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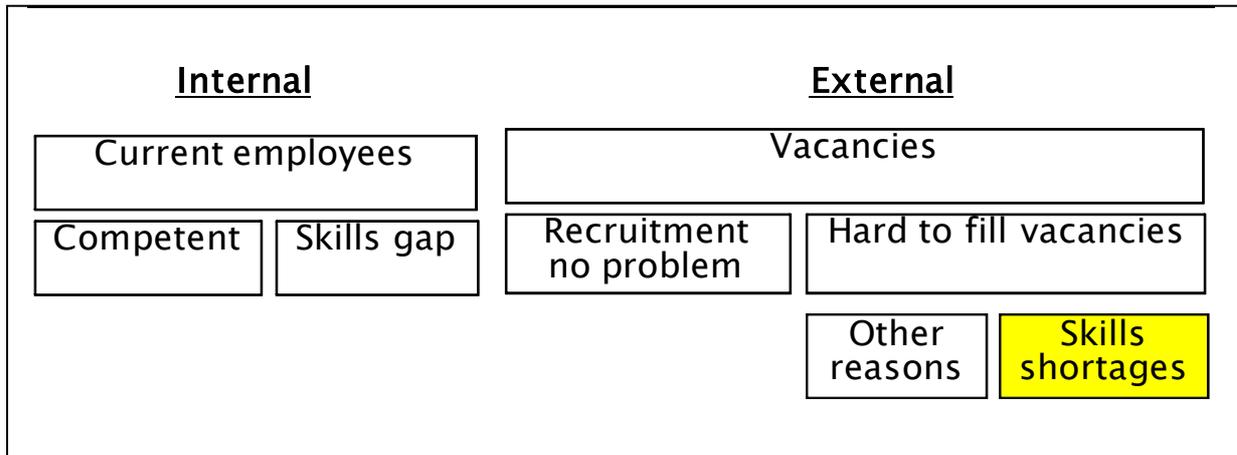
- 3.6 The second point relates to the distinction between skill gaps in employers' existing workforce and the difficulty of finding new recruits externally. Some authors use the term skill shortages to describe both of these phenomenon, whereas, others focus on the external aspect. The insert below expands on this distinction.

Marchante, Ortega and Pagan identify external skill shortages as "*when the difficulties in recruiting the labour force for a given job are due to a greater demand for skills than those available in the external labour market*", and identify internal skill shortages as "*shortage that take place when employers consider that their current workforce has fewer skills than those required to achieve their firms objectives, and/or the new workers, who are apparently trained and skilled, lack certain abilities and knowledge required for the position*" (p793). Skills gaps were included within the definition of internal skill shortages for their work.

According to Green and Ashton 1992 in the UK National Skills Task Force 2000: "*skill shortages taking the form of external recruitment difficulties are frequently conflated with internal skill deficiencies, that is, gaps between firms' current skill levels and some desired or optimum level of skills.*"

- 3.7 It is worthwhile noting that the presence of skill gaps, defined as internal skill shortages, could be an indicator of external skill shortages. Where a firm experiences internal skill gaps, given a certain level of staff turnover, if vacancies are hard to fill they may also experience skill shortages.
- 3.8 Other work such as the UK National Skills Task Force (2000) and Shah and Burke (2005) makes a clear distinction within the external view; separating reasons for hard to fill vacancies into skills shortages and other reasons. Other reasons include conditions of work and unsociable hours plus many more. We have chosen to consider the focus for this work the highlighted skills shortage box in the diagram below.

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3.9 Some definitions of skill shortages start by defining ‘skill’. This is described as being built up from task-based competency to educational qualifications and is sometimes generalised to occupations (UK National Skills Task Force 2000). Stephens (2005) applies human capital theory to describe the stock of skills an individual holds. He then uses the adapted “*transferable human capital*” concept (in Stevens 1994, 1996) to re-affirm the idea of skills that are of use within an industry but not within the wider economy. Giving the following example:

“if the construction industry faces a shortage of skilled bricklayers it is likely to affect the search costs of all construction firms (at least within a geographical locality) similarly. However, these bricklayers are of little use as skilled labour within the electronics industry, where they would probably have to accept an unskilled job at a lower wage.”

3.10 Therefore, Stevens concludes skill shortages need to be considered by sector and taking into account different industrial cycles, recognising that skill shortages are likely to be greater during expansion phases compared with contraction phases. A number of authors emphasises the need to focus on individual sectors or occupations when analysing skills shortages.

The Macro and Micro Perspectives

3.11 A different approach to defining skill shortages involves 2 perspectives, namely the:

- **macro** (economic) perspective – a market-wide perspective of skills shortages using established economic indicators including vacancy rates and wages;
- **micro** (employer) perspective – an employer-specific perspective of skills shortages using primary research with employers to generate information on skill shortages.

3.12 These can each lead to different assessments of whether skill shortages exist (Daniels 2007 and Meagre 1986 in National Skills Task Force 2000).

3.13 A number of authors agree that these are two different ways of perceiving skill shortages. However, there is no real agreement over which is the most useful. We use Shah and Burke’s description below but omit their third *“union perspective”* as this is not commonly cited by other authors.

An economist’s perspective on skill shortages is defined as *“when there is insufficient supply of appropriately qualified workers willing to work under existing market conditions, particularly the prevailing wages”* (p46).

An employer’s perspective is *“usually in terms of recruitment difficulties experienced by individual employers. These do not necessarily lead to unfilled vacancies in the short run but can result in other labour market difficulties or rising labour costs that the employer may regard as a shortage”*

Shah and Burke acknowledge that employers are important in relation to skill shortages, as they are often the only source of data. Importantly, they state *“the employer perspective is, however, usually in terms of recruitment difficulties experienced by individual employers”* (p47).

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- 3.14 At this point there is some degree of connectivity between the approach to defining skill shortages and the approach to measuring skill shortages. As the next section will demonstrate, there are some indicators that are built up from the micro perspective and others which derive from a macro economic analysis.
- 3.15 The macro view essentially sees demand as outstripping supply for labour in skilled occupations. However, the macro perspective focuses on employers' inability to fill vacancies for reasons perceived as skills related. Green, Meehan and Wilkinson believe that employers have no problem interpreting questions on skill shortages but that their assessment is not necessarily uninformed across all employers.
- 3.16 Hart 1990 in National Skills Task Force 2000 identified a distinction between ex ante (anticipated) skill shortages and ex post (actual) skill shortages. In reality employers develop responses and 'coping mechanisms' in an effort to minimise the impact of anticipated shortages, for example, working more overtime, increasing subcontracting, recruiting staff at a lower level than previously hoped for or retraining existing staff. Therefore, actual shortages are very often smaller in scale than those which were initially anticipated.

Some Example Definitions

- 3.17 Some suggested definitions from the literature involve caveats relating to the movement from the short run to the long run, such as, spatial mismatches and wage differences. We discuss below some of the definitions identified in the literature:

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“Skill shortages exist when employers are unable to fill or have considerable difficulty in filling vacancies for an occupation, or specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and reasonably accessible location.” (Australian Government 2005 P3)

“Shortages occur in a market economy when the demand for workers for a particular occupation is greater than the supply of workers who are qualified, available and willing to do that job”. (Veneri 1999)

Marchante, Ortega and Pagan 2006 adopt the earlier work of Bosworth and Warren (1992), defining skill shortages as *“when there is an obvious scarcity of suitably skilled workers in the labour market. This shortage can be the result of a lack of workforce (when unemployment rates are very low) or due to the existence of skills and spatial mismatches in the labour market”.* (p793).

- 3.18 The proximity to full employment is raised by other authors as being a unique situation where, in Boswell, Stiller and Straubhaar’s 2004 terminology, *“aggregate labour shortages”* may exist.

“in the most basic sense, labour shortages occur where the demand for workers in a particular occupation exceeds the supply of workers who are qualified, available, and willing to do that job.” (Boswell, Stiller and Straubhaar 2004 p5)

- 3.19 Shortages due to mismatch in the labour market are identified by Boswell, Stiller and Straubhaar as falling into four categories; qualitative mismatch, regional mismatch, preference mismatch and mismatch due to information deficits.

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3.20 This raises the issue of differences between the existence of skills within the economy compared with those skills being brought to a specified labour market. Perhaps in some cases these are in fact hard to fill vacancies. Haskel and Martin 1993 do not regard shortages as a binding labour supply constraint in the disequilibrium sense, but rather as a situation in which the firm must wait longer than normal, or search more actively.

4 MEASUREMENT OF SKILL SHORTAGES

Introduction

- 4.1 The measurement of skill shortages, labour shortages and skill gaps is to a large extent dependent on the definition of skill shortages used. Definitions of skill shortages that are derived from macroeconomic indicators, for example, an excess of demand over supply for labour, draw on macro measures such as vacancy rates.
- 4.2 Likewise, definitions that are derived from microeconomic indicators, for example, percentage of employers reporting skill shortages, will necessarily draw on micro measures such as employer skill surveys.
- 4.3 We begin this chapter by a summary of the key messages and implications for MAC policy. We then explore in more depth literature on some of the common measures used and comment on their relevance and accuracy in measuring skill shortages.

Key Messages and Implications for the MAC

Introduction

- In this section we summarise our findings in terms of the key indicators discussed by the MAC in the February report (Ibid.).
- Perhaps the most important message is that no single measure of skill shortages is sufficient, and that it is necessary to use a range of indicators to ensure an accurate estimation. This is confirmed by studies such as Veneri (1999), Clarke et al (2004), Shah and Burke (2005) and Infometrics (2006). This is one area where there is almost complete consensus in the literature.
- The use of more than one economic indicator is regarded as more accurate than one, for example the use of data on earnings, unemployment and vacancies together. Even more powerful is the use of multiple macroeconomic indicators alongside information from employer perception surveys or anecdotal evidence for an occupation.
- The following subsections compare and contrast our findings to the issues raised in the MAC February report.

Earnings

- The MAC February report mentions earnings and earnings movements as possible indicators of skill shortages. Evidence we have reviewed suggests that there are a number of possible pitfalls in using wages as a measure. These centre around the fact that wages can move for a number of other reasons, including: changes in productivity, legislation and trade union bargaining power.

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- Evidence we have examined also backs up evidence from the MAC that wages can be ‘sticky’. There is evidence to show that wages in the majority of occupations are unresponsive to changes in skill shortages and may therefore be an ineffective measure, especially in the short-run.
- In terms of practical measurement of earnings, wage levels by industry are available from the ONS Annual Survey of Hours and Earnings (ASHE) and from the Labour Force Survey. The ASHE is recognised as providing the most reliable data on full-time employees, although omits non-PAYE earnings. The LFS includes non-PAYE, although it omits self-employed income.
- Earnings growth has been argued to be a better indicator of skill shortages than static pay. Earnings growth can also be taken from the LFS and from the ONS Annual Earnings Index (AEI).
- Analysis of sources from the US have revealed that data on earnings, employment and unemployment are available from the Current Population Survey (CPS), and specific data on wage movements are available from the Occupational Employment Statistics (OES). These sources are regarded as useful, but most accurate when used alongside contextual information, for example information gained through employer perception surveys.

Indicators of Imbalance

Vacancies and vacancy ratios

- The MAC February report discusses macroeconomic indicators of imbalance in the labour market, namely unemployment, the vacancy level and vacancy to unemployment (V/U) ratios. It highlights the need to focus on relative levels of vacancies and unemployment. In particular, overshooting wages are argued to lead to long run unemployment in place of short-term vacancies.

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- Our research uncovered other vacancy-related indicators in use, including vacancy duration, vacancy fill rates, and vacancy/employment ratios (which measure the scale of vacancies relative to the size of the labour market).
- Vacancy ratios appear to be well-regarded as measures of skill shortages in the literature. The number of vacancies relative to unemployment (V/U), employment (V/E), and vacancy fill-rate relative to unemployment or employment are seen as good measures of the severity of skill shortages. A high level of vacancies with a low level of unemployment in a skilled occupation could suggest skill shortages, and a high level of vacancies with a high level of unemployment may indicate some type of labour market mismatch, possibly skill shortages but possibly employer-related.
- Vacancies in Britain are collected through the ONS Vacancy Survey, regarded as the most reliable source. This is a survey approach, unlike Jobcentre Plus vacancies, and although it covers a wider range of occupations, sectors and skill levels, disaggregation by occupation is not possible.
- Evidence from New Zealand comments on the Job Vacancy Monitor, a monthly sample of job advertisements from 25 newspapers and two websites. It concludes this approach is accurate in avoiding duplication, but as it is a snapshot, will underestimate the total number of vacancies.
- However, there are issues with using V and U ratios. In particular, unemployment as a supply of labour is prone to overestimation, as this is measured from peoples' last occupation held, which may not correspond to the occupation being sought. This would lead to interpretation of labour market mismatch, where the problem may in fact be a shortage of appropriately skilled people seeking work in that occupation.

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Hard-to fill vacancies

- Hard-to fill vacancies were mentioned in the literature as a possible measure, although there was less consensus about the appropriateness of this measure. We would argue that, on balance, HTFVs could occur due to employer-related factors such as working conditions, therefore using this as a measure of skill shortages may lead to overestimation.

Unemployment

- Unemployment as a single measure can signal skill shortages. The MAC February report suggests that labour shortage may be characterised by low, or falling unemployment of people previously employed in a relevant occupation. Studies have shown a weak negative relationship between the ILO unemployment rate and skill shortages, in other words a fall in unemployment resulted in a rise in skill shortages.
- Where a relationship has been found between unemployment and skill shortages, it is weak due in part to labour market mismatch. For example, a rise in unemployment may occur *at the same time* as a rise in skill shortages if workers are not qualified to fill, or cannot physically access jobs, or if the employer is fundamentally unattractive to workers.
- There is a problem with using unemployment as a measure, as unemployment by occupation is recorded from a person's last occupation – this may not be the occupation they are currently seeking employment in. The available pool of labour will be overestimated as a result.
- Other studies argue that unemployment may be an inappropriate measure as unemployed workers make up a relatively small proportion of new employees. The overlap between entrants to unemployment and new recruits may be quite small.
- Conversely, unemployment may underestimate occupational unemployment by failing to include people employed in one occupation but seeking work in another. For example, new graduates may work in low status jobs to gain work experience and income, while searching for a job that better suits their qualifications.
- Unemployment is practically measured using Claimant Count or ILO unemployment. ILO unemployment has the advantage of being internationally comparable and includes those actively seeking work but not claiming benefit.

Labour Market Adjustment

- The MAC February report hypothesises that following a positive demand shock, the labour market for an occupation will be slow to clear in the short-run, as wages will fail to meet the level necessary to attract extra workers – thus creating skill shortages. In the long-run, it argues, wages may overshoot the market clearing level and result in long term unemployment.
- Our findings agree that it would be useful to attempt to collect evidence on the time taken for labour markets to clear in a given occupation. Where this does not happen, or the time taken to clear is unacceptable long, there are serious sustained skill shortages.
- We found that one determinant of labour market adjustment time is the length of time taken to train individuals in an occupation. In summary, more specialised and more skilled occupations may require longer training and therefore may take longer to respond to skill shortages.
- The MAC February report discusses the concept of dynamic shortages – where labour supply is rising but continually lags behind demand. We have uncovered supporting evidence that this may exist as a result of slow wage level adjustment for trades, although not for professionals (Veneri, 1999).
- We also found a long-term dynamic in that training can lag behind demand in an occupation, resulting in people qualifying when the industry was on a downturn. This would then further discourage new entrants creating a negative downward spiral. The authors researched this phenomenon first-hand in the Scottish electronics industry during 2000–2004.

Indirect Indicators

- The MAC February report mentions several indirect indicators that can be used to measure skill shortages including employment levels within an occupation, levels of overtime, employer recruitment efforts and staff turnover. Evidence from the literature on many of these measures is sparse, however we can comment on the potential usefulness of employment and of overtime worked as measures.
- Employment growth within an occupation signifies increased demand and may be an indicator of rising skill shortages. Studies we have examined have reported a significant positive relationship between employment growth and skill shortages. However it is possible that all measured employment growth is filled by available labour, or that it reflects increased labour market participation, therefore this measure does not necessarily indicate current or future skill shortages.
- Employment levels in the UK are most reliably sourced from the LFS. Evidence from abroad has considered indicators of fill-rates by occupation and found that surveys such as SERA in New Zealand focus on larger occupations to ensure sample size. This boosts accuracy but misses out smaller occupations.
- The MAC February report highlights overtime worked as a possible measure of skill shortages. Our research revealed arguments that this may be a better indicator than hours worked of *temporary* skill shortages. Overtime is most reliably measured in the UK using the ASHE and LFS.

Employer Perceptions

- The MAC February report notes that another method of measuring skill shortages is by examining employer perceptions.
- Our research uncovered a number of theoretical and practical papers on this. Generally, these involved employer surveys and direct questions relating to the presence of skill shortages, for example firms reporting vacancies, HTFVs, skill shortages and internal skill gaps.
- Surveys of employer perceptions may result in accidental or deliberate over-reporting of skill shortages. Accidental reporting can occur when employers confuse skill shortages in their industry with other types of HTFV or with long-term macroeconomic fluctuations. In-depth studies, such as the DEWR in Australia, may help to overcome this. These studies have the advantage of focusing only on employers who are actively recruiting, and the use of follow-up surveys to examine the duration of vacancies and reasons for this.
- Deliberate misreporting can occur when employers exaggerate skill shortages with the aim of shaping policy, for example receiving a larger training grant or cheaper labour.
- The most commonly used source of national employer opinion in the UK is the National Employer Skills Survey (NESS). The CBI Quarterly Industrial Trends survey also covers skill shortages although there have been concerns that misinterpretation of questions by employers may be affecting accuracy.
- In summary, we consider that employer perception surveys are most useful when used alongside harder macroeconomic indicators such as unemployment and vacancy data.
- In the following sections in this chapter we discuss our findings on measures of skill shortages in detail.

Types of measures

- 4.4 Skill shortage measures are inexorably linked with the definition of skill shortages, as discussed in the previous chapter. Shah and Burke (2005) argue that the measures are “critically dependent on the practical definition of skills shortages adopted, including its aggregation, time and geographical dimensions” (2005, p55).
- 4.5 As mentioned above, Shah and Burke (2005) state that two broad measurement classes can be used:
- economic indicators (macro indicators) for example, vacancy, hiring and separation rates, relative wage movements and employment and unemployment changes; and
 - ad-hoc (micro indicators), for example employer interviews, surveys and focus groups.
- 4.6 Macroeconomic measures rely on the collection of ‘hard’ macroeconomic labour market data to provide an overview of the relative strengths of labour market supply and demand. Boswell, Stiller and Straubhaar (2004) summarise these measures as
- “... essentially snapshots of the relationship between supply and demand in a given labour market at a particular point of time”.* Boswell, Stiller and Straubhaar (2004)
- 4.7 Microeconomic indicators, on the other hand, tend to be ‘softer’ data, based on employer perceptions on the severity of skill shortages. The evidence suggests that the most reliable measure of skills shortages involve the use of both micro and macro measures (Veneri, 1999; Shah and Burke, 2005).
- 4.8 We have presented a summary of the arguments surrounding the use of specific indicators, both macro and micro, below, and examined evidence for and against each.
-

Macroeconomic Measures

- 4.9 As stated above, these refer to core indicators of economic performance that are available from central Government. These indicators provide a market-wide perspective of skill shortages. This section looks at some of the evidence for using these and examines their usefulness as practical measures of skill shortages.

Vacancies

- 4.10 Our review revealed that the most widely used macroeconomic measure of skill shortages was vacancies. Research into skill shortages has made use of a number of measures. These include measures of stock, flow and vacancy ratios, for example vacancy/unemployment, vacancy/employment and relative vacancy rates of different occupations. A rise in the stock of vacancies or vacancy duration may indicate the presence of hard to fill vacancies and hence possible increased skill shortages.
- 4.11 Examples we have noted include: fill rate and volume relative to the size of the labour market (Infometrics, 2006, Green and Owen, 2003); unfilled vacancies and vacancy hiring and turnover rates (Australian Government, 2005); hard to fill vacancies (Haskel and Martin, 1993; Watson, Webb and Johnston, 2006) and vacancy rates (Shah and Burke, 2005).
- 4.12 Infometrics (2006) argue that of the above, the most relevant measures are the those that measure the *relative* importance of vacancies with respect to the size of labour market. For example, they argue that good indicators are:
- a low vacancy fill rate relative to total stock of vacancies or employment, i.e. V_f/V or V_f/E
 - A high number of vacancies relative to the labour market e.g. V/U or V_x/E_x for occupation x.

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- 4.13 The use of vacancy ratios as a measure of skill shortages comes with several health warnings.
- Shah and Burke (2005) argue that although the V/U ratio is a useful measure, measures of unemployment can often be exaggerated, and therefore underestimate skill shortages.
 - In addition, they note that large numbers of unfilled vacancies can exist due to labour turnover (short-term frictional unemployment), which is not an indicator of underlying skill shortages.
 - The V/U ratio is sensitive to the economic cycle, with vacancies higher during economic growth, and unemployment higher during recession. Again this may reflect short-run disequilibrium rather than underlying skill shortages.

Hard to fill vacancies

- 4.14 Central to the argument surrounding the use of vacancies is that hard-to-fill vacancies (HTFVs) are analogous to skill shortages, as they represent the inability of employers to fill vacant jobs. For example Haskel and Martin (1993) use measures relating skill shortages to vacancy duration, as they argue skill shortages correspond to hard to fill vacancies.
- 4.15 In contrast, Green, Machin and Wilkinson (1998) argue that skill shortages cannot be equated with hard to fill vacancies. They argue many employers view skill shortages as a wider problem, including internal skill gaps. They report a substantial, but incomplete, overlap between skill shortages and hard to fill vacancies, questioning the use of hard to fill vacancies as a reliable measure.
- 4.16 Using HTFVs as a measure of skill shortages can present challenges. Vacancy rates are often derived from employer surveys, and employers may misinterpret recruitment problems due to other issues (for example, poor working conditions) as skill shortages.
-

Wage Movement

- 4.17 Movements of wages have been used as measures of skill shortages under the premise that an upward movement of wages will signify a tightening of the labour market and therefore increasing skill shortages.
- 4.18 Examples of the use of wages as a measure of skill shortages include: relative wage movements (Australian Government, 2005); average annual wage change by occupation (Cohen and Zaidi, 2002); and evidence of excessive wage pressure (Infometrics, 2006). Infometrics argue that it is important to correct wage movements for productivity, as an increase in wages may reflect increased productivity rather than skill shortages.
- 4.19 There are a number of issues connected with the use of wages as a measure of skill shortages, as highlighted by Shah and Burke (2005) and others:
- Where wages are highly inelastic, i.e. large changes in wages result in small changes in labour supply, a sizeable movement in wages may result from a small skill shortage imbalance. In this case wage movements are likely to overestimate skill shortages.
 - Conversely, in a market with highly elastic wages, wage movements are likely to underestimate imbalances in supply.
 - Wages may move for reasons other than demand for labour. For example, wages may rise as a result of increased productivity, minimum wage legislation, or a change in trade union power (Shah and Burke, 2005)
 - Empirical evidence has shown that wages tend to be 'sticky', i.e. do not respond quickly, if at all, to imbalances of supply and demand caused, for example, by skill shortages. This implies that skill shortage in an occupation would not feed through to a wage rise, therefore wages may be an ineffective measure of skill shortages. Shah and Burke (2005) argue that wages in most occupations tend to be unresponsive.

Unemployment

- 4.20 As with employment, unemployment can be used as a barometer of either aggregate demand or demand within specific occupations. A fall in unemployment may indicate a rise in demand and/or a fall in supply of labour and therefore possible increased skill shortages.
- 4.21 Unemployment as a measure of skill shortages is used for example through: changes in the unemployment rate (Australian Government, 2005; Shah and Burke, 2005; Marchante, Ortega and Pagan, 2006; Green and Owen, 2003); average unemployment rate by occupation (Cohen and Zaidi, 2002); and unemployment ratios differentiated by sector and region (Boswell, Stiller and Straubhaar, 2004; Infometrics, 2006).
- 4.22 Green and Owen (2003) found a weak negative relationship between the ILO unemployment rate and skill shortages, in other words a fall in unemployment resulted in a rise in skill shortages and *vice versa*. They note that the relationship is weak due in part to occupational and geographical mismatch: a rise in unemployment may occur at the same time as a rise in skill shortages if workers are not qualified to fill, or cannot physically access jobs.
- 4.23 Hogarth, Wilson *et al* (2003) also find a negative relationship between unemployment and skill shortages or vacancies, but this was not the case for all areas. They note that the co-existence of unemployment and vacancies in some areas is most likely explainable by the existence of short-term frictional vacancies and recurrent frictional unemployment.
- 4.24 However, unemployment cannot be taken as a direct indicator of skill shortages. Unemployment may fall due to reduced labour force participation rather than an increase in demand. Shah and Burke (2005) note that there will always be some unemployment in an economy (representing the natural rate due to frictional unemployment), and it is only unemployment above this that may indicate skill shortages.

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4.25 Likewise, measuring skill shortages within an occupation using unemployment can be difficult. Veneri (1999) and Shah and Burke (2005) argue that unemployment may overestimate skills supply of an occupation, as unemployment by occupation is recorded from a person's last known occupation – this may not be the occupation they are currently seeking employment in. Available labour will be overestimated as a result.

4.26 Hogarth, Wilson *et al* (2003) note that unemployment may overestimate skills supply, as unemployed workers make up a relatively small proportion of new employees. They note that unemployed people are in competition with women returners, retirees, students and migrant workers for entry level jobs. They state:

The reality is that there is only a very partial overlap between that part of the labour market where people are becoming unemployed and that part of the market that is generating new employment.

Hogarth, Wilson *et al* (2003)

4.27 Conversely, unemployment may underestimate unemployment by failing to include people temporarily employed in one occupation but seeking work in another. For example, many new graduates may work in low status jobs to gain work experience and income, while searching for a job that better suits their qualifications.

Employment Growth

4.28 Growth in employment within an occupation signifies increased demand and may be an indicator of rising skill shortages. Green and Owen (2003) found a significant positive relationship between employment growth and skill shortages. Other studies include Cohen and Zaidi (2002), who use average annual employment growth by the occupation; the Australian Government (2005) examines the use of employment changes, as do Shah and Burke (2005).

- 4.29 However it is possible that employment growth may be met completely by filled vacancies, therefore this measure does not necessarily indicate current or future skill shortages. Employment may also rise due to surplus labour and/or the substitution of capital for labour.

Occupational Specialisation and Qualifications

- 4.30 Infometrics (2006) argue that occupational specialisation is linked to skill shortages. More specialist occupations will prove harder to fill and therefore are likely to be more susceptible to skill shortages in the short-term because they have a limited pool of labour to draw from. For example, professions requiring very specific skills such as medicine and accountancy would fall into this category. In the long-term market forces may drive up wages to increase labour supply.
- 4.31 Qualifications are often used as a proxy for skills levels, given that they are easy to measure and used by many employers (National Statistics, 2004; Keep, 2007). A shortage of appropriately qualified labour, or numbers in training would therefore be a good indicator of future skill shortages. The Ruiz (2004) paper argues using qualifications as a proxy for skills is reasonable where NVQs are used as they measure competencies in a wide sense. Ruiz notes increased use of qualifications by employers and an increase in numbers qualified in sectors such as construction.
- 4.32 However, Neugart and Schomann (2002) discuss the issue of how skills are related to types of education and occupations, including the wider measurement of skills, and, in the context of forecasts, argue the need to extend the existing models and complement occupational forecasts with skill requirement studies based upon wider measures of human capital than merely qualifications.

Labour Market Dynamics

- 4.33 While it is widely accepted that skill shortages can be measured on a macroeconomic scale by examining the disequilibrium of supply and demand, it may be the extent to which this imbalance is sustained that is the primary cause of skill shortages.
- 4.34 Infometrics (2006) argue that it is important to measure evidence that the current growth in skill demands will be sustained. Market forces, they argue, should result in equilibrating forces increasing wage levels and therefore attracting more workers to enter the profession. Only where this does not happen, or where the time taken is unacceptably long, is there a serious skill shortage.
- 4.35 The time it takes a labour market experiencing skill shortages to adjust back to a position of equilibrium will be partially dependent on the length of time it takes to train workers in an occupation. This is noted by Cohen and Zaidi (2002) and Infometrics (2006). For example, in the medical profession it takes over 5 years to train a doctor, and for skilled trades an apprenticeship can last over 3 years.
- 4.36 Veneri (1999) discusses Arrow and Capron's concept of 'dynamic shortage' in which demand continually outstrips supply. This is typically explained by the slow market reaction for example in employers adjusting wage levels.
- 4.37 The time taken to train skilled workers in an occupation could have a recursive negative effect on the labour market. For example, consider a situation where people undertook training in an occupation in response to skill shortages and wage rises, but the time taken to train workers in that occupation was lagged. There is a possibility that these workers would complete training at the same time as a downturn in the industry. These people would experience low returns to qualification, and this signal would feed through the labour market, thus discouraging future entrants.

4.38 The above effect was observed by the authors of this report in connection with the electronics industry in Scotland over 2000–2004 and has been discussed by Forth and Mason (2006) in a study of ICT skills in the UK.

Summary

4.39 Perhaps the most useful overall summary of macroeconomic indicators is provided by Infometrics (2006):

Identifying the presence of skill shortages

- A low fill rate for vacancies;
- A high volume of vacancies relative to the size of occupation or labour market;
- Evidence of excessive wage pressure.

Appropriateness of immigration as an intervention

- Evidence that excess wage pressures are not the result of product or labour market institutions other than skill shortages;
- Evidence that the current growth in skill demands will be sustained.

Where skill shortages are likely to occur

- Evidence that it will take time for the education system to fill the gap;
- Evidence about the degree of specialisation in occupations.

Infometrics, 2006 [11]

Other Issues with Macroeconomic Measures

4.40 A number of wider issues have been raised regarding the suitability and accuracy of the macroeconomic measures identified above. These relate to both the accuracy of measures and the practicality of their use.

Accuracy

- 4.41 The Infometrics (2006) study for the New Zealand Department of Labour argues that symptoms such as unfilled vacancies and wage rises that appear to indicate skill shortages may in reality be the result of other factors. For example, wages may rise due to a firm's monopoly power and growth in demand, or unfilled vacancies may arise due to poor recruitment practices.
- 4.42 The reliability of measures will depend to an extent on the intended use. Shah and Burke (2005) argue that aggregate data on skills imbalances are sufficient for producing guidance on education and vocation policy. However, they argue that this is not sufficient in providing information to initiatives aimed at increasing the supply of a particular skill or for a specific training programme. This seems an obvious point, but is an important one.
- 4.43 The Australian Government (2005) notes inconsistent interpretation of vacancy statistics can be a problem in the use of vacancy data.
- 4.44 The Ruiz (2004) report states that using qualifications as a proxy for skills is easier and more objective, but notes that this measure does not quantify work experience.
- 4.45 There are data-specific issues highlighted by Veneri (1999) in a review of work by Cohen. Problems of the weakness in the data include sampling errors associated with employment and wage surveys, unemployment calculations being based on the person's last job and that comprehensive occupational vacancy data do not exist.

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- 4.46 Shah and Burke (2005) make a related point, arguing that aggregated measures are less likely to reveal market imbalances than, say, occupation or employer specific data. This is because imbalances can offset each other when using aggregated data. Similarly, analysis of measures over a longer-term may smooth out shortages, for example analysis over a 5 year period may not pick out fluctuations within a business cycle.
- 4.47 There are also spatial imbalances that can be masked by aggregated macro data. National measures of vacancies or wage movements will obscure the fact that some regions have skill shortages and others have skill surpluses.
- 4.48 Keep (2007) provides useful commentary on the use of qualifications as a skill measure. Although critical of qualifications as a measure, Keep does not comment in detail or identify specific skills measures and indicators that are currently used, other than qualifications, or indeed propose any wider measures of human capital of his own. Keep's points on the use of qualifications are given below.

- International comparability – a critical issue in migration policy;
- The time validity of certification – how long does a qualification last?
- The link between low-level qualifications and recruitment is tenuous – how can their value be increased?
- New ways of measuring human capital and skills stocks are evolving – wider usage measures need to be adopted to complement existing indicators of workforce skills that currently underpin policy development.

Keep (2007)

Practicality

- 4.49 Regarding practicality, Frogner (2002) argues that it is difficult to measure what skills people have and therefore determine population-based movements in the level of skills over time.

- 4.50 Veneri (1999) discusses the feasibility of using a range of indicators, and states that “much of the difficulty stems from problems of interpreting the data, especially when measures from different data sets lead to different conclusions about job market conditions”. The implication here is that although using multiple measures is preferable to single indicators in theory, in practice, interpreting contradictory results may prevent meaningful conclusions.

Microeconomic Measures

- 4.51 Microeconomic measures of skill shortages draw on primary research with employers to determine the extent and nature of skill shortages faced in an industry or occupation. These provide an indicator of employer-specific skill shortages. Micro measures have the advantage of addressing the issues of skill shortages directly, not relying on proxy measures as is the case for macro measures. However, there are a number of potential issues associated with employer surveys, which are summarised later in this section.
- 4.52 The paper by Haskel and Martin (2001) illustrates the direct approach taken by employer surveys in measuring skill shortages. They attempt to measure shortages through the following questions.

Skills shortages: *“Would you say this establishment has experienced a ‘skills shortage’ in the last 12 months, or not?”*

Hard-to-fill vacancies: *“Do you currently have vacancies that are proving to be hard to fill?”*

Hiring difficulties: *“How easily have you been able to fill vacancies in each of the following occupational groups in the last 12 months?”*

Haskel and Martin (2001)

- 4.53 Green and Owen (2003) use a similar range of micro indicators to measure skill shortages. They use a wide range of measures that address criticisms of purely vacancy-based measures as noted by Green, Machin and Wilkinson (1998). Green and Owen use the following:
- firms reporting all vacancies;
 - firms reporting hard-to-fill vacancies;
 - firms reporting skill shortage vacancies;
 - the percentage of firms reporting internal skill gaps.
- 4.54 Neugart and Schomann (2002) note that basic data sources for labour market forecasts are similar across a number of countries; namely, labour force and employer surveys generating micro-census data. This, they argue is the method by which skill shortage data can be disaggregated by industry, occupation and skill level.

Issues With Microeconomic Data

- 4.55 Although the micro employer survey approach has the advantages of measuring skill shortages directly, there are a number of potential issues. Green, Machin and Wilkinson (1998) and Richardson (2007) highlight the issue of over-reporting, as employers are incentivised to exaggerate skill shortages with the aim of encouraging policy based at boosting the workforce, and thereby reducing wages.
- 4.56 Watson, Webb and Johnston (2006) agree, arguing that over-reporting of skill shortages can lead to market distortion.

“Distributional conflict in organisations and the pursuance of influence may lead to the misreporting of skills shortages and to a sub optimal level of investment in training both within organisations and at the wider governmental and agency level”

Watson, Webb and Johnston (2006)

- 4.57 There is also a danger that employers may believe they are experiencing skill shortages when they are not. This may be due to:
- Employer-specific recruitment difficulties, such as a poor reputation for working conditions or low pay;
 - Labour shortages due to macroeconomic fluctuations, for example excess aggregate demand that is addressable only by macroeconomic policy, not by training in one occupation or by increased migration.
- 4.58 Another issue is the ambiguity of survey questions. For example, The Department for Education and Employment (2000) analysed the CBI Quarterly Industrial Trends Survey and quote Clarke *et al* (1998) that some employers thought the question referred to their existing workforce, while others believed it referred to recruitment. The ability of the CBI survey to differentiate skill gaps from skill shortages is blurred by this.
- 4.59 The ambiguity of micro data is also discussed by Shah and Burke (2005), who examine ad-hoc employer-based surveys and in-depth studies. They argue that caution needs to be exercised when interpreting ad-hoc employer studies because employers can misinterpret questions. The most effective method, they argue, is to conduct in-depth studies that allow an understanding of the distinctive features of a particular skill market.

Use of Existing Indicators to Measure Skill Shortages

UK Indicators

- 4.60 The above arguments have dealt with the theoretical aspects of measuring skill shortages. It is also useful to look at existing indicators as measurements of skill shortages and examine the usefulness of these in practice.

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4.61 Williams (2004) provides a useful overview of UK data sources for measuring labour demand. The report recommends a number of recommended sources for key labour market data used to estimate skill shortages including:

- **Direct measure of skill shortages** – the National Employers Skill Survey (NESS)
- **Employment (number of jobs)** – the workforce jobs series and the Labour Force Survey (LFS);
- **Employment (number of people in employment)** – the LFS;
- **Public and private sector employment breakdown** – use both the workforce jobs series and the LFS together;
- **Job density** (filled jobs/resident population) – Annual Business Inquiry ;
- **Job vacancies** across the economy – the ONS Vacancy Survey, an IDBR based sample of employers;
- **Wages** – the Annual Survey of Hours and Earnings (ASHE) and the LFS ;
- **Hours worked** –the LFS and ASHE;
- **Earnings growth** – the ONS Average Earnings Index (AEI).

4.62 The Ruiz (2004) report discusses the use of a number of these indicators, including Jobcentre Plus, the National Employer Skills Survey (NESS), Labour Force Survey (LFS) and New Earnings Survey/Annual Survey of Hours and Earnings (NES/ASHE) as potential sources of indicators.

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- 4.63 It highlights the fact that Jobcentre Plus vacancies provide an indicator of skill shortages through the inflow of notified vacancies, unfilled vacancies (stock), and duration of vacancies. There are breaks in Jobcentre plus vacancy data in 2002 and 2006 linked to vacancy handling procedures. Jobcentre Plus vacancy data also includes only around 35–40% of advertised vacancies⁴ and generally under-represents high skilled occupations.
- 4.64 The National Employer Skills Survey (NESS) provides data on a range of useful indicators including: skill shortage vacancies; intensity of skill-shortage vacancies (proportion of total vacancies – more indicative of skill-related problems); vacancies by occupation; vacancies by sector; and hard to fill vacancies. The NESS does not allow direct comparison over time, as the questionnaire has evolved each year⁵, but it provides a more comprehensive picture of vacancies than data from Jobcentre Plus (Ruiz, 2004) and is now regarded as the standard survey on skill deficiencies in the UK.
- 4.65 LFS data provides indicators including: rate of change of pay – argued to be more indicative of skills shortage than level of pay; unemployment rate by last occupation; duration of unemployment; hours worked (measures workload and therefore demand for skills); and usual hours of paid overtime, which may be a better indicator of *temporary* skill shortages than hours worked. A constraint around LFS data is that there are no data on self-employed income, this may affect the accuracy of income data for occupations with high proportions of self-employment such as skilled trades and company directors.

⁴ Department for Work and Pensions (2007) *Jobcentre Plus Annual Employer (Market View) Survey 2006–07* <http://www.dwp.gov.uk/asd/asd5/summ2007–2008/437summ.pdf>

⁵ For example new questions on the recruitment of young people and re-ordering of questions asking about the employment profile of the establishment were introduced in 2005.

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- 4.66 The report notes NES/ASHE provides data on earnings by occupation, giving an indication of labour market tightness, and the author quotes Wilkinson (1998)⁶ in stating that this may be a more reliable source of data than the LFS for full-time employees.
- 4.67 The issue with NES/ASHE is that it covers PAYE records only and therefore under-represents those below the PAYE threshold. This is more of an issue for part-time workers, and NES/ASHE data for full-time workers is accepted to be more accurate than LFS data. NES/ASHE data on weekly earnings should be more accurate for occupations with a higher percentage of full-time employees, as the absence of part-time workers is less of an issue.
- 4.68 Another employer-based indicator is the CBI's quarterly Industrial Trends Survey which asks employers to indicate whether skilled labour is likely to limit their output in the following four-month period. However, there is evidence of different interpretation of this question. The Department for Education and Employment (2000) quote Clarke *et al* (1998) that "60% of respondents interpreted the question as referring to external recruitment difficulties while 45% thought it referred to the skills possessed by their existing workforce". The CBI survey may be measuring skill gaps in addition to skill shortages.

Outside the UK

New Zealand

- 4.69 The Infometrics (2006) study report provides a critique of New Zealand indicators. While these are not identical to UK indicators, the report highlights a number of arguments that could be applied to UK indicators. Here we provide a brief summary of their critique.

⁶ Wilkinson, D. (1998) "Towards reconciliation of NES and LFS earnings data" *Labour market Trends* May 1998

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- 4.70 New Zealand data are available from the Survey of Employers who have Recently Advertised (SERA). SERA calculates fill rates for occupations where at least 10 employers are interviewed. This is good from an accuracy perspective, but may miss some occupations that are experiencing skill shortages.
- 4.71 Data are available from the NZ Dept of Labour's Job vacancy Monitor – is a monthly sample of job advertisements from 25 regional newspapers and two IT websites. Infometrics highlight the advantages of: regular collection; classification consistent with other NZ statistics; vacancies counted per advertised position (rather than per advertisement); and newspaper vacancies counted once a month only to avoid duplication. However, because vacancies are collected as a snapshot of advertised vacancies, the figure will underestimate the total number and is therefore more useful as time series data than as a measure in itself.

United States

- 4.72 Veneri (1999) examines measurement of labour shortages in the US and discusses Cohen and Trutko's use of labour market indicators for the purposes of determining labour market imbalances. This like many of the other research studies reviewed by Veneri consider multiple measures of labour market conditions and are tracked over time to determine whether shortages exist.
- 4.73 Veneri reviewed US Current Population (CPS) and Occupational Employment Statistics (OES) data for the period 1991–1998 to test if the data identified shortages in particular occupations. The CPS provided employment, wages and unemployment, and the OES provided data on wage movements. Three tests were established:
- do occupational wages increase relative to other occupations?
 - has employment growth been strong?

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- has the unemployment rate for that occupation declined or remained relatively low?

4.74 Veneri concludes that although CPS and OES data on employment, unemployment and wages are useful, data can only reveal information on skill shortages if it is contextualised by background information and knowledge of the labour market of the occupation in question:

“Labour market data should be combined with background information on the occupation and knowledge the workings of the labour market. In addition, information on supply such as data on demographic characteristics, education by field of study and employers requirement regarding education and training play a significant role in completing an analysis of occupational labour market”.

4.75 The key point regarding use of indicators here is that they should only form part of an analysis, which should also include contextual qualitative information.

Summary

- 4.76 This chapter has discussed measurement of skill shortages from a theoretical and practical perspective, but not specifically related to migration.
- 4.77 The following chapter discusses international experience of using skill shortages specifically for the purpose of managing migration.

5 INTERNATIONAL APPLICATIONS

Introduction

- 5.1 In the international sphere, the literature indicates that skills shortage indicators are applied for two broad purposes:
- as a driver of policy advice in labour market and migration arenas;
 - as key variables in economic and labour market forecasting models.
- 5.2 In this chapter we consider the key messages and implications for the MAC, and then consider in more detail each of the above applications in turn. We then examine some practical examples from outside the UK of applying skill shortage measures to managing migration. Finally we draw some general conclusions from this element of the review.

Key Messages and Implications for the MAC

- To determine the appropriateness of immigration as a response to skill shortages, it is important to collect evidence that excess wage pressures are not the result of product or labour market institutions other than skill shortages.
- However, this is not easy. Lack of empirical evidence of market adjustments is seen as the biggest obstacle to formulating policy for effective intervention (Shah and Burke, 2005).
- Likewise it is necessary to collect evidence that growth in skill demands will be sustained. The MAC February report acknowledges the existence of frictions in the labour market, indicating short-run turnover. Our evidence supports the argument that market intervention is necessary only to address sustained imbalance.
- Evidence in practice from New Zealand shows that the NZ Department of Labour compiles a Long Term Skill Shortage List to feed into its points system. This list is compiled using data from the Survey of Employers who have Recently Advertised (SERA) – employers are asked whether positions they advertised were filled. Occupations with a fill rate of under 80% are included in the list.
- Evidence in practice from Australia highlights the use of *targeted* employer surveys to draw up shortage lists of occupations. These are conducted only with employers who have current vacancies, and a follow-up survey is conducted to determine vacancy duration and their perceived reasons for this. This survey addresses some of the limitations of the NZ SERA survey.
- Our evidence also supports the danger of a time lag between identification of skill shortages and the arrival of appropriately skilled migrants.
- In evidence gathering the MAC February report proposes both ‘top-down’ and ‘bottom-up’ activities to analyse the extent of skill shortages. Evidence from Australia indicates that bottom-up surveys can be informative if conducted correctly.
- In order to be effective, these employer surveys should be detailed, target only those employers with active vacancies and should be followed up with a survey to determine the duration of vacancies and the perceived reasons for these.

Policy Advice Applications

- 5.3 The use of skill shortage indicators in immigration policy is based upon their definition as vacancies specifically attributed to a lack of job applicants with the required skills, qualifications or work experience, and not merely short term recruitment difficulties being experienced by employers.
- 5.4 Furthermore, skills shortages are a unique category of systemic and structurally determined vacancies that require specific policy attention and merit the use of in-migration of suitable workers to achieve a wider economic benefit than addressing short term issues in the labour market.
- 5.5 This view is summarised in a report for the New Zealand Government, which recommends seven key criteria to assess skill shortages for inclusion on skill shortage lists that may underpin points-based immigration systems. These criteria are given below.

Identifying the presence of skill shortages

- A low fill rate for vacancies;
- A high volume of vacancies relative to the size of occupation or labour market;
- Evidence of excessive wage pressure.

Appropriateness of immigration as an intervention

- Evidence that excess wage pressures are not the result of product or labour market institutions other than skill shortages;
- Evidence that the current growth in skill demands will be sustained.

Where skill shortages are likely to occur

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- Evidence that it will take time for the education system to fill the gap;
- Evidence about the degree of specialisation in occupations.

Infometrics, 2006 [11]

5.6 In practice, the New Zealand Department of Labour compiles a Long Term Skill Shortage List⁷. This is discussed in the section on Current Applications in Use below.

5.7 The literature also suggests the scenarios in which migration policy can help to address skill shortage problems, in the event that the labour market signals excess demand for skilled workers by employers in the face of a restricted supply in the domestic economy. Three such scenarios are given below.

Scenario 1: An increase in demand is not met by any migration response. In the short-run domestic workers enjoy a rise in wages until equilibrating forces (newly trained labour and firm rationalising) reduce wages to a level still higher than before. There is an increase in national (consumer and capitalist) surplus.

Scenario 2: As above, but the excess demand is met by limited and targeted migration. This allows firms to fill vacancies quicker than would be the case if relying on training the domestic workforce. As a result wages fall more quickly, but still to a higher level than before the increased demand. As before, there is an increase in national (consumer and capitalist) surplus.

Scenario 3: The excess demand is met by unlimited immigration. This equates the supply of labour to infinity and there is no wage increase following an increase in demand. There is an increase in national surplus, although part of this is gained by the migrant workers and the *domestic* surplus is less than the full gain.

Infometrics, 2006 [11]

⁷ The current (2007) list of occupations can be found at <http://www.immigration.govt.nz/NR/rdonlyres/063ECB35-F5D5-44D8-8325-7041A727A9D5/0/1093.pdf>

- 5.8 One issue with using migration as a solution to skill shortages is the time lag between identifying skill shortages and the arrival of migrants. This may result in migrants arriving when demand for their skills has subsided, leaving them employed in inappropriate jobs (Shah and Burke, 2005).
- 5.9 Migration policy is therefore a key measure in equilibrating labour market forces in the long term without significant fluctuations in wage rates and domestic labour mobility. Its success though, is predicated upon accurate skill shortage measures being used to underpin the policy solutions to labour market scenarios and their dynamic outcomes.

Forecasting Model Applications

- 5.10 Allied to the points made above, the use of skill shortage indicators is also critical to the 'success' or accuracy of statistical future scenarios in the labour market and wider economy that result from forecasting models using econometric methodologies.
- 5.11 Here again, the use of proxy variables such as a defined subset of vacancies as skill shortages, and the use of qualifications for measuring skills is largely a technical requirement. Broad measures can detect the influence of a wide range of labour market features, with extremes averaged out through large scale sampling – but miss the nuances of for example, wider measures of human capital that may underpin skills supply and needs.
- 5.12 The core data for forecasts comes largely from national, governmental economic and workforce statistics. This point is elaborated below.

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The basic data sources for forecasts are similar across a number of countries; namely, labour force and employer surveys generating micro-census data that seeks to achieve a sufficient level of disaggregation of employment trends by industrial sector, major occupational groups and qualification levels. Skills are therefore largely measured by qualifications as a broad proxy variable.

Neugart and Schomann, 2002 [17]

- 5.13 Given the methodological preference for broad proxy variables outlined above, and mass statistics to even out skewness, it is perhaps not surprising that economic forecasters have not by and large given much attention to the technical specification and metric basis of the variables they use, and particularly for trans-national labour market studies. This point is echoed below.

The whole issue of how skills are related to types of education and occupations, including the wider measurement of skills, has only recently started to attract the interest of researchers this decade. This does not make forecasts an inappropriate tool, they suggest. Rather, it requires scholars to extend the existing models and complement occupational forecasts with skill requirement studies based upon wider measures of human capital than merely qualifications.

Neugart and Schomann, 2002 [17]

- 5.14 If successful policy solutions are to be based upon accurate information, acknowledging the limitations of forecasts (i.e. they are not facts waiting to happen), then transnational studies such as EU level skills forecasts will lead to more internationally standardised skills shortage measures. This will facilitate greater international comparability of skills shortages between nations.

Current Applications in Use

- 5.15 This section highlights examples of current use of skill shortage measures to compile shortage occupation lists for the purpose of managing migration.

New Zealand

- 5.16 In practice, the New Zealand Department of Labour compiles a Long Term Skill Shortage List⁸ to feed into its points system. These are occupations which are deemed to be of absolute skill shortage – defined as occupations in which New Zealand has a significant shortage of skilled workers.
- 5.17 The above list is compiled using data from the Survey of Employers who have Recently Advertised (SERA). In this survey employers are asked whether the positions they advertised were filled, and the number and suitability of applicants. Occupations typically regarded as experiencing skill shortages are those with a fill rate of less than 80%, i.e. where employers report that less than 80% of vacancies are filled with a suitable candidate.
- 5.18 Key shortage occupations identified in the most recent report (New Zealand Department of Labour, 2007) were:
- Trades workers – 37% of vacancies filled with a suitable candidate;
 - Service and sales workers – 51%;
 - Professionals – 54%;
 - Plant and machine operators and assemblers – 54%;
 - Technicians and associate professionals – 57%;
 - Clerks – 57%;

⁸ The current (2007) list of occupations can be found at <http://www.immigration.govt.nz/NR/ronlyres/063ECB35-F5D5-44D8-8325-7041A727A9D5/0/1093.pdf>

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- Legislators, administrators, and managers – 61%;
- Elementary occupations (such as labourers and freight handlers) – 63%;
- Agriculture and fishery workers — 65%.

5.19 The methodology used to compile the Long Term Skills Shortage List from the SERA is as follows. More detail, is available from New Zealand Department of Labour (2007).

- A short telephone survey was undertaken with over 6,500 employers who had recently advertised job vacancies. The sample was drawn from the New Zealand Job Vacancy Monitor (JVM)
- Employers were approached 6 to 10 weeks after advertising and were asked whether they had filled their vacancy, and the number of suitable applicants (including whether they had the right to work in New Zealand at the time they were interviewed)
- Employers were phoned back if they had not yet filled the position on offer, but they expected to do so within 10 weeks of advertising.
- Vacancies that were not filled with a suitable candidate within 10 weeks of advertising were deemed to not be filled
- Fill rates, as illustrated above, were then calculated for each occupation

New Zealand Department of Labour (2007)

5.20 There are some limitations with the SERA. It does not differentiate between skill shortages and recruitment difficulties that may be for other reasons, such as employer reputation or working conditions. Nor does it ask why employers believe the shortage exists.

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Australia

- 5.21 Shah and Burke (2005) report on the current use of skill shortages by the Australian Government to draw up occupation shortage lists. The Department of Employment and Workplace Relations (DEWR) in Australia publishes an annual list of skill shortage occupations, which are used to compile the Migration Occupations in Demand (MODL) list. The MODL is used to prioritise occupations to be filled by migration through the Skills Migration program. This is updated every year for professionals and trades and every six months for ICT.
- 5.22 The methodology used to determine shortages is a detailed telephone survey of employers. Unlike ad-hoc employer surveys, only employers who have recently advertised positions in selected occupations are surveyed. A follow-up survey is then conducted to determine which of these vacancies remain unfilled. A hard-to-fill vacancy (HTFV) is defined as four weeks unfilled for manual occupations and six weeks for professional occupations.
- 5.23 Shah and Burke note that skill shortages are measured by the DEWR for 'specialised and experienced workers', which may be subgroups within an occupation. Skill shortages are also assessed for particular geographical areas. Therefore it is possible to have high unemployment across the occupation but shortages within a particular skill: for example there may be a good supply of teachers, but a shortage of experienced mathematics teachers.
- 5.24 This method of drawing up shortage occupation lists is seen as more accurate than using ad hoc employer surveys, as only employers with advertised positions are surveyed. The use of a follow-up survey ensures actual HTFVs rather than speculative ones are reported.

- 5.25 A possible weakness of this approach is that employers may confuse HTFVs with skill shortages, whereas in reality skill shortages may be just a subset of HTFVs. Nonetheless it provides a useful insight into the practical application of skill shortages for the purposes of managing migration in Australia.

General Points

- 5.26 In summary, we suggest that the literature makes the following key points regard to the international applications of skill shortage measures:
- greater labour mobility within the EU has focussed attention on the need to more carefully define and measure skills shortages as key features of trans-national labour markets;
 - the traditional migration-focussed countries such as New Zealand and Australia view skills shortages as key to underpinning specific policy solutions and place attention on a dynamic evolution of appropriate measures;
 - in practice, skill shortage occupation lists in Australia have been drawn up using in-depth surveys of employers with active vacancies;
 - economic forecasting has tended to use blunt measures of skill shortages but now acknowledges the need to consider wider measures of human capital, in particular non-certified work experience.

6 CONCLUSIONS

Definition of Skill Shortages

- 6.1 The term ‘skill shortages’ has been used interchangeably. The majority of literature differentiates ‘skill gaps’ as a separate issue related to skills of the existing workforce. Skill shortages on the other hand refer to skills of those available in the external labour market.
- 6.2 For the purposes of the MAC, we would argue that skill gaps are only an issue if there are also skill shortages, i.e. where skill needs of employers cannot be met by developing their current workforce or through the UK/EU resident workforce. We would argue therefore that it makes sense to focus on skill shortages.
- 6.3 Skill shortages can be confused with ‘labour shortages’ However an accurate definition of skill shortages differs from labour shortages in that labour shortages refer to the quantity of the workforce whereas skill shortages refer to particular skills within the workforce.
- 6.4 For the purposes of the MAC, the narrower definition of skill shortages is most relevant as labour shortages would include low and unskilled labour. The evidence we have reviewed supports the typologies of skills deficiencies (Hogarth and Wilson, 2001) as outlined in the February report.
- 6.5 Definitions of skill shortages given by employers may confuse HTFVs with skill shortages. Skill shortages are generally regarded as a subset of hard-to-fill vacancies (HTFVs). HTFVs or recruitment difficulties can occur for a number of reasons other than skill shortages, including an employers reputation and conditions of work offered.

- 6.6 For the purposes of the MAC, all HTFVs could potentially be solved by migration. However, a points-based system is designed to address particular skills and occupations rather than issues faced by individual employers and we would argue that HTFVs are not an ideal definition for compilation of shortage occupation lists.

Measurement of Skill Shortages

- 6.7 Perhaps the most important message is that no single measure of skill shortages is sufficient, and that it is necessary to use a range of indicators to ensure an accurate estimation. This is confirmed by studies such as Veneri (1999), Clarke et al (2004), Shah and Burke (2005) and Infometrics (2006). This is one area where there is almost complete consensus in the literature.
- 6.8 In practice, this suggests the use of more than one macroeconomic indicator is regarded as more accurate than using only one. A single economic indicator, such as vacancy duration or wage rate, may be the result of a number of non-skills related factors such as a rise in productivity. However, when an economy experiences, for example, a high level of vacancies together with long vacancy duration, low unemployment and upward wage movement at the same time, there is more chance that this is the result of skills shortages rather than another aspect of the economic environment.
- 6.9 When a range of both macroeconomic and micro (employer perception) measures are used, the evidence for skills shortages becomes even more compelling. Macro indicators can provide impartial evidence to counter employers over or under-reporting skill shortages, and conversely, employer surveys can add context to trends observed in macroeconomic indicators.

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- 6.10 The MAC February report mentions earnings and earnings movements as possible indicators of skill shortages. Evidence we have reviewed suggests that there are a number of possible pitfalls in using wages as a measure. These centre around the fact that wages can move for a number of other reasons, including: changes in productivity, legislation and trade union bargaining power. Wages may also be 'sticky' and may not respond to skill shortages.
- 6.11 Vacancy ratios appear to be well-regarded as measures of skill shortages in the literature. The number of vacancies relative to unemployment (V/U) or employment (V/E), vacancy rates across occupations and vacancy fill-rate relative to unemployment or employment are seen as good measures of the severity of skill shortages. A high level of vacancies with a low level of unemployment in a skilled occupation could suggest skill shortages, and a high level of vacancies with a high level of unemployment may indicate some type of labour market mismatch, possibly skill shortages but possibly employer-related.
- 6.12 However, there are issues with using vacancy ratios. In particular, unemployment as a supply of labour is prone to overestimation, as this is measured from a person's last occupation held, which may not correspond to the occupation being sought. This may lead to a conclusion of labour market mismatch, where the problem may in fact be a shortage of qualified people seeking work in that occupation.
- 6.13 Unemployment as a single measure can signal skill shortages. The MAC February report suggests that labour shortage may be characterised by low, or falling, unemployment of people previously employed in a relevant occupation. Studies have shown a weak negative relationship between the ILO unemployment rate and skill shortages, in other words a fall in unemployment resulted in a rise in skill shortages.

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- 6.14 There is a problem with unemployment as a measure due to the fact that unemployment by occupation is recorded from a person's last occupation – this may not be the occupation they are currently seeking employment in. The available pool of labour will be overestimated as a result. In addition, Hogarth, Wilson et al (2003) note that unemployment may be an inappropriate measure of skills supply, as unemployed workers make up a relatively small proportion of new employees.
- 6.15 Hard-to fill vacancies were mentioned in the literature as a possible measure, although there was less consensus about the appropriateness of this measure. We would argue that, on balance, HTFVs could occur due to employer-related factors such as working conditions, therefore using these as a measure of skill shortages may lead to overestimation.
- 6.16 The MAC February report hypothesises that following a positive demand shock, the labour market for an occupation will be slow to clear in the short-run as wages will fail to meet the level necessary to attract extra workers – thus creating skill shortages.
- 6.17 Our findings agree that it would be useful to attempt to collect evidence on the time taken for labour markets to clear in a given occupation. Where this does not happen, or the time taken to clear is unacceptable long, there are serious sustained skill shortages.
- 6.18 We found that one determinant of labour market adjustment time is the length of time taken to train individuals in an occupation. In general, more specialised and more skilled occupations will require longer training and therefore may take longer to respond to skill shortages.

- 6.19 The MAC February report mentions several indirect indicators that can be used to measure skill shortages including: employment levels within an occupation; levels of overtime; employer recruitment efforts and; staff turnover. Evidence from the literature on many of these measures is sparse, however we can comment on the potential usefulness of employment and overtime worked.
- 6.20 Employment growth within an occupation signifies increased demand and may be an indicator of rising skill shortages. Studies we have examined have reported a significant positive relationship between employment growth and skill shortages. However it is possible that all measured employment growth is filled by available labour, or that it may reflect a rise in labour force participation, therefore this measure does not necessarily indicate current or future skill shortages.
- 6.21 The MAC February report highlights overtime worked as a possible measure of skill shortages. Our research revealed arguments that this may be a better indicator of temporary skill shortages than hours worked. Overtime is most reliably measured in the UK using the ASHE and LFS.
- 6.22 The MAC report also discusses the concept of dynamic shortages – where labour supply is rising but continually lags behind demand. We have uncovered supporting evidence that this may exist as a result of slow wage level adjustment for trade occupations, although not for professionals (Veneri, 1999).

Employer Perceptions

- 6.23 The MAC February report notes that another method of measuring skill shortages is by examining employer perceptions.

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- 6.24 Our research uncovered a number of theoretical and practical studies on this. Generally, these involved employer surveys and direct questions relating to the presence of skill shortages, for example firms reporting vacancies, HTFVs, skill shortages and internal skill gaps.
- 6.25 Our research suggests that surveys of employer perceptions may result in accidental or deliberate over-reporting of skill shortages. Accidental reporting can occur when employers confuse skill shortages in their industry with other types of HTFV or with long-term macroeconomic fluctuations. In-depth studies, such as the DEWR in Australia, may help to overcome this. These studies have the advantage of focusing only on employers who are actively recruiting, and use follow-up surveys to examine the duration of vacancies and reasons for this.
- 6.26 Deliberate misreporting can occur when employers exaggerate skill shortages with the aim of shaping policy, for example to receive a larger training grant or benefit from cheaper labour.
- 6.27 In summary, we consider that employer perception surveys are useful, and regarded as most useful when used alongside harder macroeconomic indicators such as unemployment and vacancy data.

Use of Existing Indicators

- 6.28 Existing sources such as Jobcentre Plus vacancy data, the LFS, ASHE and NESS all offer data that could be used to measure skill shortages. Again, each of these sources has advantages, with ONS Vacancy Survey data providing comprehensive estimates across the economy from April 2001, ASHE providing wage data for full-time employees, NESS providing direct data on skill shortages by occupation, Jobcentre Plus providing data on vacancy duration and LFS data providing good indicators of short-term demand fluctuations.

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- 6.29 The most reliable source of vacancies in Britain is regarded as the ONS Vacancy Survey. This is a survey approach, unlike Jobcentre Plus vacancies, but it has the advantage of covering a wider range of occupations, sectors and skill levels than Jobcentre Plus data. However, it is not possible to disaggregate vacancies by occupation at all, or by sector at a detailed level. It's application for the MAC's purposes is therefore limited.
- 6.30 Evidence from New Zealand comments on the Survey of Employers who have Recently Advertised – based on a data from the Job Vacancy Monitor, a monthly sample of job advertisements from 25 newspapers and two websites. It concludes this approach is accurate in avoiding duplication, but as it is a snapshot, will underestimate the total number of vacancies.
- 6.31 Analysis of sources from the US have revealed that data on earnings, employment and unemployment are available from the Current Population Survey (CPS), and specific data on wage movements are available from the Occupational Employment Statistics (OES). These sources are regarded as useful, but most accurate when used alongside contextual information, for example information gained through employer perception surveys.

International Applications

- 6.32 Evidence in practice from New Zealand shows that the NZ Department of Labour compiles a Long Term Skill Shortage List to feed into its migration points system. This list is compiled using data from the Survey of Employers who have Recently Advertised (SERA), as mentioned above. In this survey employers are asked whether the positions they advertised were filled. Occupations with a fill rate of less than 80% are included in the list.

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- 6.33 Evidence in practice from Australia highlights the use of *targeted* employer surveys to draw up shortage lists of occupations. These are conducted only with employers who have current vacancies, and a follow-up survey is conducted to determine vacancy duration and their perceived reasons for this. This survey addresses some of the limitations of the NZ SERA survey.
- 6.34 The MAC February report acknowledges the existence of frictions in the labour market, indicating short-run turnover. Our evidence supports the argument that market intervention through immigration is necessary only to address sustained imbalance.
- 6.35 Our evidence also supports the danger of a time lag between identification of skill shortages and the arrival of appropriately skilled migrants.
- 6.36 In evidence gathering the MAC February report proposes both ‘top-down’ and ‘bottom-up’ activities to analyse the extent of skill shortages. Evidence from Australia and New Zealand indicates that bottom-up surveys are informative if conducted correctly.
- 6.37 Evidence suggests that in order to be effective, employer surveys should be detailed, target only those employers with active vacancies and should be followed up with a survey to determine the duration of vacancies and the perceived reasons for these.

7 APPENDIX 1: SYNPOSES OF SELECTED REFERENCES

Introduction

- 7.1 Here we provide synopses of the selected papers reviewed, which totals 26 papers, around 30 per cent of the total obtained.
- 7.2 Papers are presented below according to the Harvard style of scholarly referencing and listed in alphabetical order by the first author's name.
- 7.3 Thematic sections are completed for those for which the paper is relevant. Where one of the above thematic sections is not included, the paper was not deemed to be relevant. The scores allocated to each thematic heading are also summarised for each paper below.

Skill Shortages: Concepts Definitions and Indicators

Australian Government Department for Employment and Workplace Relations,
March 2005

Definitions	Measurement	Indicator Critique	Intl. Applications
3	2	2	

Overview of Paper

- 7.4 This paper describes the concept of 'skill' and its different dimensions. In particular it focuses on skill shortages, their causes and indicators. It concurs with other authors in identifying that a "Lack of a common understanding can make it problematic to define skill and obscures the identification of problems, their causes and possible solutions."

Definition of Skills Shortages

7.5 The definition of skill is drawn from the UK National Skills Task Force (2000): *“an ability to perform a task to a pre-defined standard of competence”*. The paper goes on to describe skill when applied to an individual as denoting *“knowledge or ability, both of which are more or less acquired through education, training or experience at work”*.

7.6 Four dimensions of skills are presented:

- *“motor skills: for example, the degree of manual dexterity;*
- *perceptual skills: sensing, measuring and judging;*
- *conceptual skills: abstracting, calculating and inferring;*
- *discretionary skills: decision-making and responsibility.”* (p2)

7.7 Further classifications include:

- general and specific. With general being *“portable across a wide array of occupations”* and specific being relevant to a particular industry or occupation;
- technical and employability skills. Employability skills are defined as *“skills required not only to gain employment, but also to progress”*.

7.8 The definition of skills shortages is adapted from the UK:

“Skill shortages exist when employers are unable to fill or have considerable difficulty in filling vacancies for an occupation, or specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and reasonably accessible location.” (p3)

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- 7.9 The paper goes on to define skills gaps and recruitment difficulties before concluding that *“the term ‘skills shortages’ is often used as a proxy for a wide range of recruitment difficulties as well as skill deficiencies of the existing workforce in an industry or enterprise”*.
- 7.10 Research identified an aging workforce in particular sectors as a major factor in contributing to skill shortages.

Measurement of Skills Shortages

- 7.11 Indicators of skill shortages suggested include: vacancy hiring and turnover rates, relative wage movements and employment and unemployment changes. The report focuses on vacancies, suggesting that *“Large numbers of unfilled vacancies, strong vacancy growth and/or hard-to-fill vacancies may indicate that there are skill shortages”*. However, inconsistent interpretation of vacancy statistics is cited as a problem in relying on this form of measure. Other measures which could be indicative of skills imbalance according to this paper are: hours and intensity of work (overtime, short time etc), production levels, training expenditure by firms, levels of subcontracting, hiring standards and levels of immigration.

Forecasting Labour and Skills Shortages: How can Projections Better Inform Labour Migration Policy?

Boswell C., Stiller, S. and Straubhaar T. (2004) *Forecasting Labour and Skills Shortages: How can Projections Better Inform Labour Migration Policy*, Paper prepared for the European Commission DG Employment and Social Affairs, July

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4		4

Overview of Paper

7.12 Boswell, Stiller and Straubhaar provide a review of *“best practice for forecasting and planning labour migration policies”* (p4). Specifically, they look at three areas that they feel necessary to fill labour gaps, with particular focus given to migrant workers and immigration policies. These three areas are:

- *“Understanding the causes of the current and potential labour and skill shortages”*;
- *“Estimating and projecting their scale”*;
- *“Evaluating the appropriateness of different policy responses for reducing shortages, including migration policy”* (p4).

7.13 The authors declare that they are not offering their own projections of shortages or recommendations for how to solve shortages through policy options.

7.14 After defining a labour market, they provide both a simple and a comprehensive definition for shortages. They define a labour market as having *“three main relevant dimensions for characterising labour markets: occupation and/or skills, sector, and geographical area (regional, national, or EU level)”* (p5).

Definition of Skills Shortages

7.15 Boswell, Stiller and Straubhaar state *“in the most basic sense, labour shortages occur where the demand for workers in a particular occupation exceeds the supply of workers who are qualified, available, and willing to do that job. Within this definition, we can distinguish between two types of shortage – aggregate labour shortage and shortages due to mismatch on the labour market”* (p5).

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7.16 This definition provides the authors with their working definition for the remainder of the paper. Significantly, they go on to elaborate further on the two types of shortages that they identified.

7.17 In relation to aggregate labour shortages, they describe this happening *“when there is (near) full employment, and a general difficulty in finding workers to fill vacancies”* (p5).

7.18 For shortages due to mismatch on the labour market, they list four sub-types of shortages, and it is within these sub-types that the authors clearly define skill shortages:

- **qualitative mismatch** – *“this arises when the qualification of workers and the qualified profiles of vacancies are not matched. Qualitative mismatch may also be referred to as skills shortages, describing a labour market situation in which there is a lack of people with the qualification, skills or experience necessary to carry out the jobs in question”*;
- **regional mismatch** – *“this occurs where unemployed persons seeking work and firms offering suitable jobs are located in different regions, and the jobs and/or workers are immobile”*;
- **preference mismatch** – *“this refers to a mismatch between the types of jobs that unemployed people are willing to take on, and existing vacancies in the relevant region. Those out of work are unwilling to take up certain types of work because of inadequate remuneration or working conditions or statues, despite the fact that such jobs match their qualifications and skills profile, or are located in the relevant geographical region”*;

- **mismatch due to information deficits** – *“in this case there is no aggregate shortage of labour or skills, but supply does not meet demand because of lack of information. Unemployed workers do not acquire information on relevant existing vacancies because of inefficiencies on the labour market; and firms do not have the information necessary for finding persons with adequate qualifications”* (p5).

7.19 Through their qualitative mismatch description, Boswell, Stiller and Straubhaar give an insight to what is meant by skills shortages. They elaborate further, but more so with solutions for shortages within the labour market, and not specifically in relation to skills shortages.

Measurement of Skills Shortages

7.20 When discussing the causes of labour and skills shortages, the authors also provide a brief discussion on methods for measuring labour and/or skills shortages. They suggest that estimates of current labour market or skills shortages *“are essentially snapshots of the relationship between supply and demand in a given labour market at a particular point of time. Such shortages may be measured in absolute numbers for particular occupations, sectors or areas, or as vacancy and unemployment ratios, again differentiated by sector and/or region”* (p7).

Can Foreign Talent Fill Gaps in the US Labour Force? – The Contributions of Recent Literature

Clarke, J., Geserich, N., and Toft, G. (2004) Can Foreign Talent Fill Gaps in the US Labour Force? – The Contributions of Recent Literature, Hudson Institute

Definitions	Measurement	Indicator Critique	Intl. Applications
3	3	3	3

Overview

- 7.21 John Clarke, Nadine Geserich and Graham Toft of the Hudson Institute reviewed the evidence of shortages of skilled workers in the US and the impact of the H-1B visa programme which allows for temporary (maximum of 6 years) entry and employment of highly educated foreign nationals who hold at least a degree or equivalent work experience in positions called 'speciality occupations'.

Measurement of Skill Shortages

- 7.22 Early in their analysis the authors state that direct measurement of skills shortages of workers is not easy. It requires more than just looking at simple measures of 'multiple indirect indicators' such as employment and unemployment, wage growth and required training time. They feel that anecdotal evidence and supply side factors should be considered.

International Applications

- 7.23 A key conclusion from their analysis is that American workers must be better educated and more highly skilled. Enrolments are declining and America's share of international student enrolments may be slowing down.
- 7.24 The authors' analysis of the performance of the H-1B visa programme indicates that there is strong agreement by other authors that the US economy requires greater supply of workers in high skilled occupations in specific fields such as computer science, health care and education.
- 7.25 The H-1B programme is perceived to play a flexible role in providing needed foreign workers allowing skills in particular short supply to be filled speedily.

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7.26 In particular its flexibility has helped to address persistent structural shortages as well as short term or cyclical problems. There is limited evidence that foreign talent displaces native workers in relevant occupations. The authors state that *“at most, pressure on jobs is exerted only by poorly educated foreign workers and even these effects seem statistically insignificant”*.

7.27 Empirical evidence is perceived to be mixed about the effect of highly educated foreign workers on wages:

“There is no clear consensus about the net wage impact on overall native workforce...modest evidence supports a negative wage effect of immigration on low skill workers...there does not seem to be any evidence of adverse wage impacts on highly educated native workers”.

7.28 The US is perceived to traditionally have been very successful in attracting highly educated foreign workers. Justin Heet is referenced as arguing that this advantage results from historical US dominance in higher education.

7.29 Wider evidence points to improved creativity and innovation gained from foreign workers. The nature of the programme means that companies would only recruit these workers if they perceive the value to be greater than the expense and bureaucratic barriers. Studies have suggested that spill over and indirect benefits include languages, cultural skills and specialised skills that stimulate innovation. Other benefits include increased trading and investment flows with workers’ home countries and high proportions of foreign born workers’ children achieving in high schools.

7.30 The authors’ conclusions are that the US faces supply shortfalls of certain highly educated workers to meet increasing demand and that the H-1B programme continues to address employer needs of a temporary nature. However increased flexibility would improve the programme.

Global Skill Shortages

Cohen, M.S. and Zaidi, M.A. (2002), Global Skill Shortages, Edward Elgar Publisher, Cheltenham UK

Definitions	Measurement	Indicator Critique	Intl. Applications
	4		3

Overview of Paper

- 7.31 Shortages occur through out economic cycles depending on the occupation, geographic/region, industrial sector and sub-specialty of an occupation.
- 7.32 Skill shortages draw greater attention during times of extended economic expansion when shortages can be bottlenecks to economic growth.

Measurement of Skill Shortages

- 7.33 There is no generally agreed upon methodology for measuring skill shortages.
- 7.34 A review of theoretical aspects of skills shortages highlights several possible reasons that labour markets fail to provide skilled labour where and when employers need them:
- Efficiency Wage Theory;
 - the Insider–Outsider approach;
 - Barriers to Mobility;
 - Path Dependency.
- 7.35 A lack of incentives for people to acquire skills and that labour is not a commodity so will not behave the same as a product market is also noted.

International Applications

- 7.36 Globalisation is closely entwined with skills shortages. Corporations no longer think in terms of national labour markets but worldwide labour markets. Brain circulation, rather than brain drain, has led to global trade in global markets with global production.
- 7.37 Construction of accurate measures of skill shortages that could be used by policy makers to target programs to reduce these bottlenecks has proven to be challenging.
- 7.38 Cohen and Zaidi present a new indicator of skill shortages by occupations across 19 countries. The four indicators are:
- average annual employment growth by the occupation;
 - average unemployment rate by occupation;
 - average annual wage change by occupation;
 - amount of time required to prepare for the occupation.
- 7.39 The indicators are compared to anecdotal reports about shortages in the countries studied as well as correlated with various economic, political and institutional indicators.
- 7.40 Some occupations such as health professionals and computer scientists were common across many countries studied and part of a global shortage.

Skill Shortages in South Africa: A Literature Review

Daniels R. C., *Skill Shortages in South Africa: a literature review*, Development Policy Research Unit Working Paper 07/121, May 2007

Definitions	Measurement	Indicator Critique	Intl. Applications
4			2

Overview of Paper

- 7.41 Daniels reviews the literature on skills shortages in South Africa. Different Government departments are identified as having different views concerning the definition of skills shortages. Furthermore a distinction is made between an ‘economist view’ of skills shortages and a generic ‘government perspective’.

Definition of Skills Shortages

- 7.42 The paper states that *“at the heart of the matter is the idea that the demand for certain skills exceeds supply”*. An economist’s perspective of skills shortages is articulated as being defined by its relationship to productivity in the firm. This compares with the government perspective which does not take this relationship into account, but just considers skills shortages in terms of absolute and relative values. However, the remainder of the paper focuses on the latter of these two perspectives.
- 7.43 Skills shortages are described in stages. Skills are *“understood to refer to both qualifications and experience”*. Scarce skills is described by reference to occupations where there is *“a scarcity of qualified and experienced people, currently or anticipated in the future”*.
- 7.44 Daniels feels that skills shortages should be considered to comprise the entire range of skills and occupations, *“from the most advanced qualifications to the most elementary”*.

Skills for all: Research Report from the National Skills Task Force

Department for Education and Employment (2000), *Skills for all: Research Report from the National Skills Task Force*.

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4	4	

Overview of Paper

- 7.45 This report describes in more detail the research evidence which underpins the conclusions in the final report from the Skills Task Force as to where the UK's main skills gaps and shortages are to be found.

Definition of Skills Shortages

- 7.46 The term skill is defined by reference to competence and knowledge:

“The core of the term skill is the idea of competence or proficiency – the ability to do something well..... the ability to perform a task to a pre-defined standard of competence..... An individual is unlikely to be able to do something well if he or she does not have a good grasp of the processes involved and how they work. Skills therefore go hand in hand with knowledge.”

- 7.47 Many dimensions to skills are discussed including cognitive and manual skills, generic skills, vocational (occupational or technical) skills and personal attributes.

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7.48 The analysis of skills shortages is perceived as complicated by *“inconsistencies in definition and measurement”*. Meagre (1986) is quoted as identifying two different approaches which are commonly adopted: the ‘employer perspective’ which defined skills shortages in terms of recruitment difficulties and the ‘market perspective’ which recognises skills shortages only if there are insufficient ‘appropriate people in the market, to fill existing posts at going wages’.

7.49 The report perceives that within the above two perspectives there are inconsistencies in the ways that terms are used. In particular differences between internal (skills gaps) and external (skills shortages). For example the quote Green and Ashton (1992) who note that:

“Skill shortages taking the form of external recruitment difficulties are frequently conflated with internal skill deficiencies, that is, gaps between firms’ current skill levels and some desired or optimum level of skills.”

7.50 Further problems identified by Hart (1990) in the analysis of skill shortages involved the distinction between ex ante (anticipated) skill shortages and ex post (actual) skill shortages.

7.51 The authors explain that employers develop responses and ‘coping mechanisms’ in an effort to minimise the impact of anticipated shortages, for example, working more overtime, increasing subcontracting, recruiting staff at a lower level than previously hoped for or retraining existing staff. Therefore, actual shortages are very often smaller in scale than those which were initially anticipated. However, the measures taken to reduce their impact typically impose additional costs on employers and may well restrict their ability to achieve desired quality standards.

Measuring Skills Shortages

7.52 The following key conclusions have emerged from hard to fill vacancy analysis across a number of studies focusing on employer recruitment difficulties:

- strong cyclical pattern;
- strong company-specific factors such as limited efforts at job advertising or relatively unattractive salaries or job conditions;
- perceived shortcomings in ‘quality’ of job applicants even though no deficiency in quantitative terms.

Critique of Existing Indicators

7.53 The longest running data series is the CBIs quarterly Industrial Trends Survey which asks employers to indicate whether skills labour is likely to limit their output in the following four-month period. There is however, evidence of different interpretation of this question. Mann and Junankar 1998 identified that *“60% of respondents interpreted the question as referring to external recruitment difficulties while 45% thought it referred to the skills possessed by their existing workforce”*.

Skills Shortages

Frogner, M. L. (2002) Skills Shortages, *Labour Market Trends*, pp 17–27, January

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4	4	

Overview of Paper

7.54 The paper examines a range of relevant technical and practical issues concerning the definitions and measurement of skills shortages and their use in labour market and economic modelling. These are covered in detail below but the key conclusion is qualifications are the most useful technical measure of skills as a proxy economic variable, despite their limitations as wider measures of other key aspects of human capital such as work-related experience.

Definition of Skills Shortages

7.55 Frogner defines skill as the ability to perform a task to a predefined level of competence and indicates that the Employer Skill Survey (ESS) provides two definitions of lack of skills.

- **skill shortages** – defined as recruitment difficulties caused specifically by a shortage of individuals with the required skills in the accessible labour market;
- **skills gaps** – defined as deficiencies in the skills of an employer’s existing workforce, both at the individual level and overall, which prevent the firm from achieving its business objectives.

7.56 Frogner indicates that the 2001 ESS found the employers most affected by skills shortages were primarily in high skill occupations typically requiring long periods of education and training. In contrast, skill gaps were most common in low-skilled occupations such as operative and assembly occupations.

7.57 Frogner also covers other definitions used by sources such as the Confederation of British Industry (CBI) and British Chamber of Commerce (BCC), but indicates that they are less rigorous in their technical definition compared to ESS, in using more limited terms such as ‘skilled labour’ and ‘recruitment difficulties’.

Measurement of Skills Shortages

- 7.58 Frogner argues that it is difficult to measure what skills people have and therefore determine population-based movements in the level of skills over time.
- 7.59 She suggests that using qualifications as a proxy for skills is easier and more objective than attempting to develop a fuller measure of an individual's skill base. She recognises though that the use of qualifications as a proxy has major caveats in that it ignores the skill-base gained through work-based experience.

Critique of Skills Shortage Indicators

- 7.60 Frogner raises an interesting point in the application of skills shortage indicators in labour market econometric modelling – the question of time lags in determining the impact of skill shortages on the labour market and their reporting in employer surveys.
- 7.61 Specifically, in an empirical investigation of the lag effect using ONS business growth and CBI employer survey data covering the mid-1980s to mid-1990s, to estimate the impact of reported skills shortages on business earnings growth, she found that skills shortages were more significant when lagged by one year rather than not lagged at all, or if the lags were of shorter or longer duration.
- 7.62 Frogner suggests that a shorter lag structure for the impact of skills shortages is consistent with a more flexible labour market, and potentially indicates that a more flexible labour market has less inertia and can achieve equilibrating market adjustments over the short rather than the long term.

Skill Shortages: Local Perspectives from England

Green, A.E. and Owen, D. (2003) "Skill shortages: local perspectives from England", *Regional Studies*, 37, 2, pp123–134

Definitions	Measurement	Indicator Critique	Intl. Applications
4	2		

Overview of Paper

- 7.63 Green and Owen make a distinction within the external labour market of two kinds of skill shortages. They identify skill shortages in terms of vacancies, with the two kinds of vacancies being hard-to-fill vacancies and a sub-set of skill-shortage vacancies. Like previous authors discussed above, they make acknowledgement to the complexity and ambiguity surrounding the term skill shortages.

Definition of Skills Shortages

- 7.64 Hard-to-fill vacancies are defined by Green and Owen, "*which may arise to limited efforts at job advertising, relatively unattractive salaries or job conditions on offer, or an excess of demand over supply of required skills*" (p125).
- 7.65 A sub-set of skill shortages is defined as "*hard-to-fill vacancies that are skill related, due to one of the following causes: a low number of applicants with the required skills; a lack of work experience the company demands; or a lack of qualifications the company demands*"(p125).
- 7.66 Additionally, the authors distinguish between "*new skill shortages*" and "*recurrent skill shortages*" (p125). They describe new skill shortages as "*reflecting changes in product markets and services*", whilst describing recurrent skill shortages as being specific to "*skilled trades in engineering and construction*"(p125). Furthermore, they state that there may be other types of skill shortages, but do not allude to these in any detail.

Measurement of Skills Shortages

7.67 Building upon their definitions of skill shortages, Green and Owen list the following as important factors in identifying where skill shortages exist: *“relative wages, training patterns, mobility patterns (between industries, occupations and geographical areas), and shortcoming in labour market information flows also play a role in generating skill shortages vacancies”* (p126).

7.68 The research reported focused on identifying the following as indicators of skill deficiencies:

- firms reporting all vacancies;
- firms reporting hard-to-fill vacancies;
- firms reporting skill shortage vacancies;
- skill shortage vacancies as a percentage of employment;
- the percentage of firms reporting internal skill gaps;
- skill gaps as a percentage of employment.

The Meaning and Determinants of Skill Shortages

Green, F., Machin, S. and Wilkinson, D. (1998) “The meaning and determinants of skill shortages”, Oxford Bulletin of Economic and Statistics, 60, 2, pp165–187

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4		

Overview of Paper

7.69 The authors aim to elaborate on what employer’s perception of skill shortage is by using data compiled by the Employer Manpower and Skills Practices Survey. Interestingly, the authors state *“our analysis seems to suggest that employers appear not to have any problem for themselves in interpreting questions on ‘skills shortages’ but they are not being perceived in a uniform way by all employers”*(p167).

Definition of Skills Shortages

7.70 In terms of measuring skill shortages and hard-to-fill vacancies, the study uses two methods, *“the matching of responses to separate questions, and a classification and examination of the perceived indicators are reported by respondents”*(p168).

7.71 Green, Machin and Wilkinson identify skill shortages as being either:

- generic hard-to-fill vacancies;
- hard-to-fill skilled vacancies (being craft and skilled service occupation, professional associate and technical occupation, professional occupation, management and administrative occupation), or employees lack quality.

The Causes of Skills Shortages in Britain

Haskel, J. and Martin, C. (1993) “The causes of skills shortages in Britain”, *Oxford Economic Papers*, 45, pp573–588

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4		

Overview of Paper

7.72 Whilst using the manufacturing sector as their case study, Haskel and Martin identify that skill shortages exist either as internal to the firm, and therefore *“to some extent under its control”* or external to the firm, and therefore *“beyond the power of the firm to change”* (p575). Their paper seeks to define skills shortages and then detail the causes of skills shortages as an internal cause or an external cause to the firm.

Definition of Skills Shortages

7.73 In describing their notion of a skill shortage, the authors state *“we do this by relating skill shortages to vacancy duration. We argue that a skill shortage corresponds to a vacancy for a skilled worker that a firm finds difficult to fill. We therefore do not regard shortages as a binding labour supply constraint in the disequilibrium sense, but rather as a situation in which the firm must wait longer than normal, or search more actively, to hire a worker”* (p576).

Technology, Wages and Skill Shortages

Haskel, M. and Martin, C. (2001) “Technology, wages and skill shortages: evidence from UK micro data”, Oxford Economic Papers, 53, pp 642–658

Definitions	Measurement	Indicator Critique	Intl. Applications
3	2		

Overview of Paper

7.74 Haskel and Martin report on their study that they feel, ultimately, demonstrates the importance of addressing skill shortages if technology continues to be such an important factor within the United Kingdom's economy. This link, for them, has *"clear implications for policy. If technological progress continues to be skilled biased, policies that address skills deficiencies will only be successful if they produce a continual, rather than temporary, increase in levels of skills among the workforce"* (p642).

Definitions of Skills Shortages

7.75 Haskel and Martin, like other authors, acknowledge the difficulty surrounding attempts to define skills shortages. They state *"the interpretation of skills shortages is a controversial topic, discussed in a number of papers"* (p646). After discussing several perspectives that attempt to define the term, they identify three types of shortages: skills shortages, hard-to-fill vacancies and hiring difficulties. Importantly, the authors allude *"the determinants of these variables are broadly similar, which leads us to regard as different symptoms of the same underlying process"* (p643).

Measurement of Skills Shortages

7.76 As part of their research, they measure skills shortages using a survey, with questions addressing skills shortages, hard-to-fill vacancies and hiring difficulties.

7.77 Specifically, the questions they asked of firms and/or managers were as follows:

- **skills shortages** – *"would you say this establishment has experienced a 'skills shortages' in the last 12 months, or not?"*

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- **Hard-to-fill vacancies** – *“do you currently have vacancies that are proving to be hard to fill?”*
- **Hiring difficulties** – *“how easily have you been able to fill vacancies in each of the following occupational groups in the last 12 months?”* (they used 9 occupational groups, with responses being measured on a scale of 1–5, where 1 represented no difficulty was experienced).

Labour Market Outcomes for Migrant Professionals: Canada and Australia Compared

Hawthorne, L. (2006) Labour Market Outcomes for Migrant Professionals: Canada and Australia Compared, This report was co-funded by Citizenship and Immigration Canada, Human Resources and Social Development Canada, and Statistics Canada

Definitions	Measurement	Indicator Critique	Intl. Applications
			3

Overview of Paper

- 7.78 Canada and Australia are global exemplars of nation-building through government planned and administered economic, family and humanitarian migration programs. By 2005 Australia included the world’s highest percentage of foreign-born (24.6% of the population, with over 240 nationalities) followed by Canada at 19.2% and the US at 11.7%.
- 7.79 Within the past decade Canada and Australia have also placed extraordinary emphasis on the recruitment of migrants with skills. In 2004, skilled migrants constituted 59.6% of Canada’s total planned intake.
- 7.80 While both Canada and Australia use points-based selection criteria to select economic migrants, there has been sharp divergence since 1996 on the values and priorities informing these programs.

Applications to Migration Issues

- 7.81 Canada has maintained a general human capital approach to assessing potential migrant skills while Australia has pursued a specific employable skills approach to assessing potential migrants.
- 7.82 Since 1999 Australia has developed substantial onshore as well as offshore economic migration flows, based on 'two step migration'. By 2005 former international students with host-country degrees constituted 52% of all economic migrants – in particular from India and China, who had self-funded in advance to address local employers' language, training and credential, needs. Such students had previously been ineligible to participate in the program.
- 7.83 The primary goal for Canada remains nation building, based on sustained high-level intakes regardless of economic cycles, and informed by a human capital model of immigrant selection. The prevailing Canadian view is that 'well-trained flexible individuals... who have experience in the labour force' should be able to 'adapt to rapidly changing labour market circumstances'.
- 7.84 In consequence 'general' rather than 'specific' competence is sought – Canadian selection criteria admitting Principal Applicants with limited or no host country language skills, non-recognised qualifications, and in fields of minimal labour market demand on an equal basis to those with more immediately sought after attributes.
- 7.85 Australia by contrast progressively abandoned the human capital model from 1996. The Australian government in 1996 defined six attributes as making 'a good skill(ed) applicant', most notably 'obtaining a job soon after arrival that uses their skills... become quickly established' and '(n)ot require benefits'.

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- 7.86 Since 1999 Principal Applicants at perceived risk of delayed or de-skilled employment have been excluded from migration to Australia at point of entry, through rigorous expansion of pre-migration English language testing, mandatory credential screening, assessment of labour market demand, plus a range of additional modifications to the points selection process.
- 7.87 Since these changes were implemented, Australia has secured early and increasingly positive employment outcomes, with results at six months strongly correlated to longer-term labour market integration rates. These post-1999 results far exceed the level of benefit attributable to Australia's improved domestic business cycle.
- 7.88 Economic migrants perform indisputably better in Australia post-arrival – their immediate work outcomes strongly correlated to longer-term labour market integration rates. New arrivals in Australia secure positions fast, access professional or managerial status, earn high salaries, and use their credentials in work more than in Canada. Generally these migrants are avoiding the labour market disadvantages typically associated with certain birthplace, language, age and gender-related groups.
- 7.89 In redesigning its economic selection criteria, the Australian government from 1999 affirmed the program's original intent – to select skilled migrants able to make an immediate contribution to the economy through use of their skills at an appropriate place in the labour market.
- 7.90 Australia's transformation of its economic migration program was viewed as legitimate and essential in a context where governments frame policy, but employers retain the power to offer or withhold work.

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- 7.91 The human capital model of selection had proven flawed – delivering Principal Applicants lacking the ‘knowledge economy’ attributes employers sought (sophisticated English language ability, recognised credentials, and qualification in fields associated with buoyant labour market demand).
- 7.92 Since 1999, in consequence of the research findings, perceived ‘employability’ has determined Principal Applicants’ capacity to proceed with skilled migration to Australia.
- 7.93 In terms of credential recognition, economic Principal Applicants qualified in regulated fields have been required to apply for pre-migration screening by the relevant Australian national or state licensing bodies (typically a three month postal process) – a strategy designed to avoid years of forced labour market displacement due to non-recognition of skills.
- 7.94 Given the existence of niche economies, Australia gives priority processing and additional migration points to applicants qualified in high-demand fields. Recognising the importance of host country language ability, candidates have been required to achieve ‘vocational’ or higher level scores on the independently administered International English Language Testing System (or approved equivalent), administered globally and monthly by the British Council for a modest fee.
- 7.95 In terms of overall program impacts, it is essential to note that these 1999+ policy changes have not discouraged or distorted skilled flows to Australia. Economic intakes rose to 97,500 in 2005–06, from 77,800 in 2004–05 and a third that level in the mid 1990s.

Indicators of Skill Shortage

Infometrics (2006) *Indicators of Skill Shortage* Report, report for New Zealand Department of Labour (2006), August

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4	4	4

Overview of Paper

7.96 This study aims to foster a better understanding about which indicators provide useful information about the presence of skill shortages and how such indicators should be interpreted when developing policy advice. The authors aim to:

- develop a conceptual framework for assessing what constitutes a skill shortage and the policy issues arising from these;
- identify the ‘ideal’ set of indicators that would inform an assessment of skill shortages, using a suite of 7 indicators;
- examine the sources of potential indicators and the practical issues surrounding construction and interpretation of these.

Definition of Skill Shortages

7.97 The authors quote Wallis (2002) in defining a skill shortage as:

“A situation where there is a genuine shortage in the accessible external labour market of the type of skill being sought, and which leads to difficulty in recruitment”.

7.98 Key to this definition above is the term ‘genuine’ which distinguishes it from merely a reported skill shortage.

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7.99 The paper defines skill shortage vacancies as vacancies specifically attributed to a lack of job applicants with the requires skills, qualifications or work experience. They argue that this is the type of skill shortage of most relevance to immigration policy decision making. However, they also define a number of other reasons why employers may experience recruitment difficulties.

- **skill gaps:** a situation where employees current skills are insufficient to meet the business objectives of the employer
- **recruitment difficulties:** where there are adequate numbers of available skilled workers, but employers have difficulty in attracting them to work for their organisation.
- **labour shortages:** cyclical shortages, largely due to macroeconomic fluctuations, that can only be cured by macroeconomic interventions.
- **latent skill gaps:** Where employers do not report a problem, or do not perceive that they have a problem.

Measurement of Skill Shortages

7.100 The article recommends seven key criteria to assess skill shortages for inclusion on skill shortage lists:

Identifying the Presence of Skill Shortages

- a low fill rate for vacancies;
- a high volume of vacancies relative to the size of occupation or labour market;
- evidence of excessive wage pressure.

Appropriateness of Immigration as an Intervention

- evidence that excess wage pressures are not the result of product or labour market institutions other than skill shortages;

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- evidence that the current growth in skill demands will be sustained.

Where Skill Shortages are Likely to Occur

- evidence that it will take time for the education system to fill the gap;
- evidence about the degree of specialisation in occupations.

Use of Indicators

7.101 The report examines the potential of New Zealand indicators for migration decision purposes. Despite this, there are a number of arguments that could be applied to UK indicators. Here we provide a brief summary of their critique

Indicator 1: Fill Rate

7.102 New Zealand data are available from the Survey of Employers who have Recently Advertised (SERA). SERA reports occupations with fill rates less than 80% as having skill shortages, but the authors dispute the evidence for this claim.

7.103 SERA calculates fill rates for occupations where at least 10 employers are interviewed. This is good from an accuracy perspective, but may miss some occupations that are experiencing skill shortages.

Indicator 2: Vacancy Count

7.104 Data are available from the NZ Dept of Labour's Job vacancy Monitor. It has the advantages of: regular collection; classification consistent with other NZ statistics; vacancies counted per advertised position (rather than per advertisement); duplicates are removed; and newspaper vacancies are counted once a month only to avoid duplication.

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7.105 The most relevant measures argued to be the vacancy/unemployment vacancy/employment or occupational vacancy/total vacancy as this measures the relative importance of vacancies.

7.106 Because vacancies are collected as a snapshot of advertised vacancies, the figure will underestimate the total number and is therefore more useful as time series data than as a measure in itself.

Indicators 3-7

International Applications

7.107 The article presents a detailed discussion relevant to the role of immigration policy in alleviating skill shortages.

7.108 Key to their argument is that a relative unmet increase in demand for skills will result in upward pressure on wages, which will eventually fall again through self-equilibrating forces: for example as more people train in that occupation as a result of higher wages; or lower profitability forces firms to leave the industry or substitute capital for labour.

7.109 However, the article argue that this can take time, and one method of speeding up the equilibrating process is to allow appropriately skilled foreign workers to enter the domestic economy.

7.110 The article examines possible policy responses to an increase in demand for labour from an economic perspective:

- **Scenario 1:** An increase in demand is not met by any migration response. In the short-run domestic workers enjoy a rise in wages until equilibrating forces (newly trained labour and firm rationalising) reduce wages to a level still higher than before. There is an increase in national (consumer and capitalist) surplus;

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- **Scenario 2:** As above, but the excess demand is met by limited and targeted migration. This allows firms to fill vacancies quicker than would be the case if relying on training domestic workforce. As a result wages fall more quickly, but still to a higher level than before the increased demand. As before, there is an increase in national (consumer and capitalist) surplus;
- **Scenario 3:** The excess demand is met by unlimited immigration. This equates the supply of labour to infinity and there is no wage increase following an increase in demand. There is an increase in national surplus, although part of this is gained by the migrant workers and the *domestic* surplus is less than the full gain;
- although Scenario 3 is a relatively minor problem in the short-run, the article argues that the long-run effect of over-reliance on migrant labour may be to discourage domestic workers from training in particular industries, thus generating a long-term dynamic, thus creating future shortfalls and a long-term continued dependence on migrant labour.

7.111 The article also argues that measures of occupational specialisation can provide an indicator of occupations that are more susceptible to skill shortages, and that training indicators can provide an indication of the length of time to resolve shortages. *Therefore occupation and training indicators used together can indicate which occupations could potentially be filled by migration.*

7.112 The authors warn that symptoms such as unfilled vacancies and wage rises that appear to indicate skill shortages may be the result of other factors. For example wages may rise due to a firm's monopoly power and growth in demand, or unfilled vacancies may arise due to poor recruitment practices. It is therefore useful to examine *multiple indicators* in drawing up a list of occupations to be included on Skill Shortage Lists for immigration purposes.

Policies for Migration and Development: A European Perspective

Katseli, L.T., Lucas, R.E.B. and Xenogiani, T. (2006), Policy Brief No. 30 Policies for Migration and Development: A European Perspective, Development Centre, Organisation for Economic Co-operation and Development

Definitions	Measurement	Indicator Critique	Intl. Applications
			2

Overview of Paper

7.113 The key message of the Policy Brief is that joint consideration of migration and development issues including development assistance could facilitate policy making and make difficult trade-offs easier to handle.

7.114 There are currently about 40 million expatriates (foreign-born individuals) in the EU25 countries, which represent about 8.6 per cent of its total population.

7.115 Of the foreign born adults living in the EU25, 74 per cent are low or medium-skilled and only 26 per cent are highly-skilled.

Applications to Migration Issues

7.116 Europe lags behind North America in attracting highly skilled migrants. According to available data which pertain only to EU15, the EU15 countries have attracted only one quarter of the total number of highly skilled migrants, versus two-thirds who went to North America.

7.117 More than half of the foreign-born migrants in EU15 have come from other EU15 countries. A great part of the other half (or 26.4 per cent) have come from Wider Europe and North Africa.

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- 7.118 Migration of low-skilled workers to the EU originated primarily from neighbouring countries. High-skilled workers to the EU have been drawn from further a field, most notably Africa.
- 7.119 Demand for workers in many low-skill occupations is likely to remain high, particularly in caring services and in seasonal agriculture, construction and tourism.
- 7.120 The European Commission's Lisbon Agenda establishes that reducing high unemployment rates among EU nationals is a priority.
- 7.121 Over time, migration pressures from the CEEC-10 countries will ease as their per capita incomes and living standards converge at least to those of low-income EU countries. Thus, European member-states - both old and new - can expect increasing immigration inflows from non-European countries.
- 7.122 Rapid growth in trade, investment, R&D activities and technology-intensive industries will increase the demand for highly-skilled personnel and will worsen the skilled labour shortages that the Asia/ Pacific region is already facing. A combination of pull and push factors will likely lead to increased numbers of qualified specialists, intra-corporate transferees and educated personnel from abroad - including Europe - relocating in the Asia/Pacific region
- 7.123 Interlinking migration and development policies can facilitate the management of migration and make difficult trade-offs easier to handle.
- 7.124 Multi-annual visas for short-term work, supported by an integrated monitoring system, can help manage migration flows more effectively.

Key Labour Market and Skills Issues in Scotland (and Beyond)

Keep, E. (2007) *Key Future Labour Market Skills Issues in Scotland (and Beyond)*, Expert Briefing Paper prepared for Futureskills Scotland, December

Definitions	Measurement	Indicator Critique	Intl. Applications
	3		

Overview of Paper

7.125 In this paper, Professor Ewart Keep of Cardiff University provides an expert briefing to those concerned with policy formation and research in the skills area, highlighting a number of important obstacles and areas for discussion.

7.126 Specifically, he identifies the following key areas in relation to skills policy:

- the potential gap between the nature of employer demand and the policy drive towards increasingly higher-skilled job opportunities;
- the recognition that there is a diversity of needs and aspirations in the population of employers so that skills policies must be differentiated;
- the balance between skills for work and general education;
- the clarification required for any differential between employers' demand for skilled workers and workers' own desires to be more highly skilled. In other words, in a demand-led skills policy framework - who is providing the demand?

7.127 Keep argues that Scotland, more than any part of the UK has undergone a skills revolution, with a massive expansion of post-compulsory and higher education and a sharp reduction of those in the workforce with no qualifications. He suggests that the real problems for the skills balance in Scotland lie with patchy demand for skills, and poor usage of workforce skills by employers – issues which demand a very different agenda and focus than existing research concerns with skills supply. This in turn requires a fresh look at the issues around the certification and measurement of skills.

Measurement of Skills Shortages

7.128 Keep focuses on the measurement of skills, rather than skill shortages, but his points on the use of qualifications are relevant in measuring skills as an indicator of labour supply.

7.129 Keep argues that policy discourse in the UK has chosen qualifications as the main currency for exchange within the education and training system, the chief output measure for learning, and qualifications reform as an engine to drive improvements in education and training. In the context of the changing economic and labour market structure, Keep suggests that given the high priority given to qualifications, some re-thinking of the definition, measurement and certification of skill may be in order. While a policy view of skills and qualifications being synonymous appears to be in evidence in the UK, wider research over the past 20 years suggests there has been a tendency for definitions of skills to widen beyond qualifications and include transferable experience.

7.130 Specifically, Keep raises the following points with regard to the relatedness of skills and qualifications:

- **international comparability** – a critical issues in migration policy;
- **the time validity of certification** – how long does a qualification last?;

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- the link between low – level qualifications and recruitment is tenuous – how can their value be increased?;
- **new ways of measuring human capital and skills stocks are evolving** – wider usage measures need to be adopted to complement existing indicators of workforce skills that currently underpin policy development.

7.131 The importance of looking beyond qualifications in defining and measuring skills is critical, Keep argues, in reforming an economic development model that is based upon a ‘supply–push’ view of labour market dynamics – the more qualified the workforce is, the better will be economic performance. The reality is that a wider view of skills supply is needed and a recognition of the demand–side of the market as a key driver and definer of skills.

7.132 Finally, Keep emphasises that his analysis is not a complete future research agenda but rather a starting point for debate about what is needed. As such, he does not comment in detail or identify specific skills measures and indicators that are currently used, other than qualifications, or indeed propose any wider measures of human capital of his own.

Determinants of Skills Shortages and Hard–to–Fill Vacancies in the Hospitality Sector

Marchante, A.J., Ortega, B. and Pagan, R. (2006) “Determinants of skills shortages and hard–to–fill vacancies in the hospitality sector”, *Tourism Management*, 27, pp 791–802

Definitions	Measurement	Indicator Critique	Intl. Applications
2			

Overview of Paper

7.133 Analysing the skill shortages and hard-to-fill vacancies specifically in the hospitality sector, Marchante, Ortega and Pagan adopt a clear definition of skill shortages.

Definition of Skills Shortages

7.134 They adopt the earlier work of Bosworth and Warren (1992), defining skill shortages as *“when there is an obvious scarcity of suitably skilled workers in the labour market. This shortage can be the result of a lack of workforce (when unemployment rates are very low) or due to the existence of skills and spatial mismatches in the labour market”* (p793).

7.135 Furthermore, they make a distinction between external and internal skill shortages, identifying external skill shortages as *“when the difficulties in recruiting the labour force for a given job are due to a greater demand for skills than those available in the external labour market”*, and identifying the internal skill shortages as *“shortage takes place when employers consider that their current workforce has fewer skills than those required to achieve their firms objectives, and/or the new workers, who are apparently trained and skilled, lack certain abilities and knowledge required for the position”* (p793). Skills gaps were included within the definition of internal skill shortages for their work.

Raising Sector Skill Levels – How Responsive is Local Training Supply?

Mason, G., Osborne, M. & Rincon-Aznar, A. (2005), *Raising Sector Skill Levels – How Responsive is Local Training Supply?* Research Report 9, London, National Institute of Economic and Social Research, April 2005

Definitions	Measurement	Indicator Critique	Intl. Applications
	2		

Overview of Paper

7.136 This study sought to shed new light on the extent and nature of any mismatches between employers' training requirements and local vocational and educational training (VET) provision. It used an innovative methodology which proceeded in two stages:

- a telephone survey of establishments in selected sectors and regions, designed to capture in finer detail than hitherto available the extent and nature of employers' current skill improvement and updating needs (conducted in June and July 2004);
- interviews with staff in colleges and training providers in the same regions to discuss the survey findings on local employers' training requirements, and then to probe the extent to which these providers are already catering to those requirements and the nature of any constraints which may be impeding them from doing so (conducted between September and December 2004).

Measurement of Skill Shortages

7.137 Mason et al say that the bulk of skill upgrading needs identified in the 2003 National Employers Survey (NESS) related firstly to adult employees and secondly to gaps in skills which could be filled through reasonably short courses of training noting that there was a reluctance on the part of some Further Education colleges to invest time in developing relationships with small and medium-sized enterprises (SMEs) who could only offer small numbers of trainees, who were seen as unlikely to be willing to pay the full costs of training.

7.138 Additionally, the survey identified significant gaps in training provision within the vehicle maintenance, telecommunications services, mechanical engineering and textile manufacturing sectors, particularly in short courses designed to update employees in SMEs.

7.139 It was also found that the detailed nature of the skill requirement and accompanying solutions varied across the four sectors, each requiring a different approach, building on the existing skills and qualifications within the sector, in meeting skill upgrading needs to surmount the specific barriers faced.

Employment Outlooks: Why Forecast the Labour Market and for Whom?

Neugart, M. and Schomann, K. (2002) *Employment Forecasts: Why Forecast the Labour Market and for Whom?*, Discussion Paper FS 1 02 -206, Wissenschaftszentrum Berlin für Sozialforschung, May

Definitions	Measurement	Indicator Critique	Intl. Applications
	3		3

Overview of Paper

7.140 In this paper, Neugart and Schomann argue that high-quality labour market forecasting is essential to policy-making in the skills arena, and that the need for forecasts at the present time follows mainly from widely acknowledged market failure arguments. They indicate that even though there seems to be a wide consensus on the importance of a highly qualified labour force, future skill and qualifications levels are uncertain. This is a result largely of imperfect labour markets, where adjustments are slow and market information is not available to all participants – employers and workers.

7.141 In this context active policy interventions are necessary and must be based upon as rigorous a view of current status and future scenarios as possible, hence the importance of labour market intelligence and forecasts. In turn, the validity of forecasts is contingent upon the accuracy of the metrics underlying their specification and calculation. Neugart and Schomann do not however discuss in detail the technical aspects of measuring key market processes and artefacts, such as skills shortages.

Measurement of Skills Shortages

7.142 Neugart and Schomann indicate that the basic data sources for forecasts are similar across a number of countries; namely, labour force and employer surveys generating micro-census data that seeks to achieve a sufficient level of disaggregation of employment trends by industrial sector, major occupational groups and qualification levels. Skills are therefore largely measured by qualifications as a broad proxy variable.

7.143 They argue that the whole issue of how skills are related to types of education and occupations, including the wider measurement of skills, has only recently started to attract the interest of researchers this decade. This does not make forecasts an inappropriate tool from which policymakers cannot gain information, they suggest. Rather, it requires scholars to extend the existing models and complement occupational forecasts with skill requirement studies based upon wider measures of human capital than merely qualifications.

Economic Survey of the Netherlands

OECD (2008) Policy Brief: Economic Survey of the Netherlands 2008, Public Affairs Division/Public Affairs and Communications Directorate, Organisation for Economic Co-operation and Development, January 2008

Definitions	Measurement	Indicator Critique	Intl. Applications
			4

Overview of Paper

7.144 This policy brief by the OECD addresses how the Dutch economy can benefit more from immigration. The most important recommendation is to allow supply side immigration by allowing high skill migrants to inter without a pre-existing employment contract.

7.145 Immigrants have traditionally made an important contribution to increasing the labour supply in the Netherlands with first-generation immigrants and their children constituting 19% of the labour force.

Applications to Migration Issues

7.146 In recent years the net flows of migration has been negative, as emigration increased while inward migration dropped.

7.147 The drop in inward migration was partly caused by the tightening of requirements, a changed in asylum policy and the introduction of language and cultural tests. However, entry procedures for high-skilled workers from outside the European Economic Area (EEA) have been simplified by abolishing the work permit requirement for employees with an income above € 45 000 (€ 33 600 for employees younger than 30 years).

7.148 To increase the attractiveness of the Netherlands for high-skilled migrants, the current scheme, which is largely demand-driven, should be supplemented by a supply-driven immigration system, under which workers with desired characteristics would be granted a work permit without the ex-ante requirement of holding a job contract.

7.149 Several labour market institutions seem to pose barriers to immigrants as outsiders on the Dutch labour market:

- strict employment protection legislation for regular contracts hampers opportunities for migrants;
- administrative and regulatory burdens should be further reduced, as they can be particularly discouraging to immigrant entrepreneurship.

7.150 Allowing/promoting earlier entry into the labour market of asylum seekers and women who enter for family-formation or reunification reasons.

7.151 Educational attainment of immigrants' children lags behind partially as the result of the Dutch educational system in which early streaming taking place at the start in secondary education (age 12).

7.152 Regulations in the rental housing market that hamper labour, geographic and social mobility.

Skills Shortages in Skilled Construction and Metal Trade Occupations

Ruiz (2004) *Skills shortages in skilled construction and metal trade occupations*. Yolanda Ruiz, Labour Market Division, Office for National Statistics

Definitions	Measurement	Indicator Critique	Intl. Applications
2	3		

Overview

7.153 Discusses the use of data in identifying and measuring skills shortages in the key building trades. Although sector-specific, the data discussed can be applied to the whole economy.

7.154 Gap: Some datasets referred to, such as NES have changed.

Definition of Skills Shortages

7.155 Skills shortages are understood as a shortage of individuals with the required skills in the external labour market (potential workforce).

Measurement of Skills

7.156 States that qualifications are usually used as a proxy for skills. This is reasonable where NVQs are used as they measure competencies in a wide sense.

7.157 The increased use of qualifications in some sectors (NVQ3 construction, metal trade) and the increasing number of employees holding these qualifications imply that skills shortages will be more directly measurable in terms of qualifications.

7.158 Notes that some studies tackle skills shortages by analysing the unfilled **demand** for some occupational groups, while others concentrate on the **supply** side of the market by analysing evidence of the stock or lack of relevant skills in the current and potential workforce. Argues that analysis of the lack of skills in the workforce is more appropriate as this relates better to mismatches between labour supply and demand.

Indicators Identified

Labour Force Survey

7.159 The LFS provides a number of useful indicators.

- **rate of change of pay** – more indicative of skills shortage than level of pay;
- Unemployment rate by last occupation – skills shortages should lead to a better employment situation;
- **duration of unemployment** – may be better measure than unemployment rate as would exclude short-term frictional unemployment;
- **hours worked** – measures workload and therefore demand for skills. May differ between sectors, as those with higher proportions of self-employed will tend to work longer hours;

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- **usual hours of paid overtime** – may be a better indicator of temporary skill shortages than hours worked.

7.160 However, the LFS focuses primarily on individuals in employment and contains no data on self-employed income

National Employer Skill Survey (NESS)

7.161 The NESS provides useful direct measures of skill shortages and hard-to-fill vacancies including the following.

- vacancies related to skills shortages;
- skill shortage vacancies (number);
- density of skill-shortage vacancies (ratio of skill shortage vacancies to total employment);
- intensity of skill-shortage vacancies (proportion of total vacancies – more indicative of skill-related problems);
- vacancies by occupation;
- vacancies by sector;
- hard to fill vacancies.

7.162 One downside is that the NESS is not a standard survey therefore does not allow comparison over time.

Jobcentre Plus Data

7.163 Jobcentre Plus data provides useful indicators of vacancies including the following.

- inflow of notified vacancies – could be indicative of current skill shortages;
- unfilled vacancies (stock);
- duration of vacancies;

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- duration of self-employed vacancies.

7.164 There are issues with Jobcentre Plus data. There are discontinuities in data, – data on notified vacancies from June 2002 onwards not comparable with earlier series.

New Earnings Survey (NES/ASHE)

7.165 This survey provides data on earnings by occupation. The report quotes Wilkinson (1998)⁶ in stating that it is a more reliable source of data than LFS for full-time employees. Comparisons on weekly earnings between NES and LFS should ALSO be more accurate for occupations with a higher percentage of full-time employees, as the absence of part-time workers from NES is less of an issue.

7.166 The survey focuses on jobs – data provided by employers from payroll records, and there is therefore no data on self-employed income. It also covers PAYE records only – it under-represents those below PAYE threshold, therefore NES earnings are consistently higher than LFS figures. This is more of an issue for part-time workers, and NES data for full-time workers is accepted to be more accurate than LFS data.

Skill Shortages: Concepts, Measurement and Policy

Shah, C. and Burke, G. (2005) “Skill shortages: concepts, measurement and policy responses”, *Australian Bulletin of Labour*, 31, 1, pp 44–71

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4		4

Overview of Paper

7.167 Shah and Burke identify three different perspectives on skill shortages; an economic perspective, an employer perspective and a union perspective. The authors point out that a general consensus does not exist on what skill shortages mean and this can often cause problems for attempting to solve them. As well as defining skills shortages, the authors discuss possible measurements of skills shortages together with policy options to tackle these. [31]

Definition of Skills Shortages

7.168 Shah and Burke identify three types of skill shortages; hard-to-fill vacancies, skills gap, and recruitment difficulties.

7.169 Hard-to-fill vacancies *“exist when employers are unable to fill or have considerable difficulty filling vacancies for an occupation (or specialised skill need) at current levels of remuneration and conditions of employment, and reasonable location. Hard-to-fill vacancies are those that are still unfilled after a reasonable period”* (p49).

7.170 Skills gaps *“occur where existing employees lack the required qualifications, experience and/or specialised skills to meet the firms’ skill needs for an occupation. Skill gaps may apply to new employees, where employers are unable to find suitable applicants for an occupation and recruit workers who need further training and/or experience to meet the firm’s skill needs for the occupation”* (p49).

7.171 Recruitment difficulties *“occur when employers have some difficulty filling vacancies for an occupation. There may be an adequate supply of skilled workers, but employers are still unable to attract and recruit sufficient suitable employees...recruitment problems are not widespread enough for them to be declared a market-wide shortage”* (p50).

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7.172 As mentioned above, Shah and Burke identify three perspectives concerning the task of defining skills shortages. In detail, they discuss these as follows:

- an **economist's perspective** on skill shortages is defined as "*when there is insufficient supply of appropriately qualified workers willing to work under existing market conditions, particularly the prevailing wages*" (p46);
- an **employer's perspective** "*may regard as a shortage some recruitment or labour cost issues that have not resulted in an increase in unfilled vacancies*" (p48). *Shah and Burke acknowledge that employers are important in relation to skill shortages, as they are often the only source of data. Importantly, they state "the employer perspective, however, usually in terms of recruitment difficulties experienced by individual employers"* (p47).
- the **union perspective** is "*not uniform and depend on the union's strength and the nature of the labour market in which it operates*" (p48). *Shah and Burke do not define a union perspective explicitly, except that "it would appear to be in the interest of the union to overstate the extent of current and future skills shortages because it helps push up the wages of new entrants and increase union membership...Often the union's perspective of shortages is that of a desired level of staffing seen as necessary to offer better quality services"* (p48).

Measurement of Skills Shortages

7.173 Shah and Burke declare "it is rarely possible to provide an unambiguous single measure of skills imbalance. It is thus important to use a range of measures" (p54). They state that two broad measurement classes can be used; economic indicators (namely, vacancy, hiring and separation rates, relative wage movements and employment and unemployment changes) and ad-hoc employer interviews, surveys and focus groups. [31]

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7.174 Importantly for Shah and Burke, they state *“irrespective of the approach taken – economic indicator or ad-hoc employer based survey – to find evidence of skills shortages, the results depend critically on the practical definition of skills shortages adopted, including its aggregation, time and geographical dimensions”* (2005, p55).

7.175 Specifically, they identify the following as ways of measuring skill shortages:

- classification of occupational skills and aggregation;
- time dimension;
- spatial dimension;
- hard-to-fill vacancies and vacancy rate;
- unemployment rates;
- net vacancies
- wages;
- employer-based surveys;
- structural models;
- in-depth studies.

**Towards a Shared Understanding of Skill Shortages:
 Different Perceptions of Training and Development Needs**

Skinner, D., Saunders, M.N.K. and Beresford, R. (2004) “Towards a shared understanding of skill shortages: differing perceptions of training and development needs”, *Education and Training*, 46, 4, pp 182–193

Definitions	Measurement	Indicator Critique	Intl. Applications
4	2		

Overview of Paper

7.176 Skinner, Saunders and Beresford provide a review of several authors on the topic of defining skill shortages, demonstrating the various perceptions that exist on skill shortages, stating “however, the extent to which the picture is complete or accurate is open to question” (p183).

7.177 Moreover, they relate the problems associated with the perception of skill shortages to the measuring of skill shortages, saying “it is not surprising that recent skills surveys have also highlighted possible discrepancies between the perceptions of employees and the perceptions of employers in relation to skills” (p184).

7.178 Without assigning their own definition of skills shortages, they do discuss thorough various perspectives. Their paper focuses on the UK automotive sector.

Definition of Skills Shortages

7.179 In a literature review various key authors are discussed, and those relating specifically to defining skill shortages are as follows:

“Wallis (2002) defines a skills shortage in the terms used by the Department for Education and Skills (DfES), as a situation where there is a genuine scarcity in the accessible external labour market of the type of skill being sought, and which results in recruitment difficulties”(2004, p183).

“An internal skill gap reflects a situation where employees current skills are insufficient to meet the business objectives of the employer”(LSC, 2004).

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Latent skill gaps, as described by the DfES, are *“those where, for a variety of reasons, employers fail to report problems and those where employers fail to perceive a problem. The former may occur because the respondent is unaware that the problem exists or they may choose not to report vacancies. The latter occurs when respondents do not perceive that they have a problem, possibly because they are not fully aware of skills that might be needed to optimise their company’s performance”* (2004, p183).

“Green and Owen (2003) argue that skill shortages are part of a complex process where changes in the external product/service market and the policies of organisations designed to anticipate or react to changes give rise to a longer-term process of skill change. Conceptually, they suggest, it is possible to make a distinction between ‘new’ skill shortages which reflect changes in product markets and services and ‘recurrent’ shortages as seen in skilled trades in engineering and construction. However, wherever skill shortages arise they are important because they impede economic performance” (2004, p183).

Skills Shortages and Firms’ Employment Behaviour

Stevens P.A. (2005) *Skills shortages and firms’ employment behaviour*, NIESR, Labour Economics 14 (2007) 231–249

Definitions	Measurement	Indicator Critique	Intl. Applications
3	2	1	

Overview of Paper

7.180 Stevens investigates the effects of skill shortages on the dynamics of employment at the firm level for UK manufacturing between 1984–94.

Definition of Skills Shortages

7.181 Stevens references other authors who attest that *“demand for skilled labour has been outstripping the supply for some time”*. He purports that skill shortages can only be understood effectively at the firm level rather than at the economy level, because *“some skills are of use only in certain industries”*, furthermore, *“business cycles of industries are likely to differ in length, phase and amplitude”*. (p234)

7.182 Therefore it is possible, Stevens contends:

“... for recruitment in certain industries to be constrained by a lack of skilled labour, even when there is an apparent abundance of labour – possibly qualified, but with inappropriate skills.”(p234)

7.183 Stevens uses the adapted “transferable’ human capital” concept (in Stevens 1994, 1996) to re-affirm the concept of skills that are of use within an industry but not within the wider economy. Giving the following example:

“If the construction industry faces a shortage of skilled bricklayers it is likely to affect the search costs of all construction firms (at least within a geographical locality) similarly. However, these bricklayers are of little use as skilled labour within the electronics industry, where they would probably have to accept an unskilled job at a lower wage”.

7.184 Therefore, Stevens concludes skill shortages need to be considered by sector and taking into account different industrial cycles, recognising that skill shortages are likely to be greater during expansion phases compared with contraction phases.

Can Occupational Labour Shortages be Identified using Available Data?

Veneri, C. M. (1999) "Can Occupational Labour Shortages be Identified using Available Data?", *Monthly Labor Review*, March

Definitions	Measurement	Indicator Critique	Intl. Applications
4	4	4	

Overview

7.185 Veneri reviews labor market data augmented by background information, anecdotal evidence and factors of demand and supply for specific occupations to access occupational shortages.

Definition

7.186 In terms of defining the shortage Veneri posits the following definition
"shortages occur in a market economy when the demand for workers for a particular occupation is greater than the supplier workers who are qualified, available and willing to do that job".

Measurement

7.187 The author is clear that no single source of data can provide a definitive measure of occupational shortages. Types of labor market data regularly used include employment, earnings and unemployment data.

7.188 Vacancies will remain while employers seek to hire staff who are willing to work at the prevailing wage. This leads to a discussion about 'actual shortages'. She explains that it may be possible to fill positions if higher wages are offered or if they accept lower calibre staff. This raises the distinction between 'quality' of job candidates compared with 'quantity'. The author discusses Arrow and Capron's concept of 'dynamic shortage' in which demand continually outstrips supply. This is typically explained by the slow market reaction for example in employers adjusting wage levels.

7.189 Most labour shortage studies reviewed by the author recognise the existence of different types of shortages which cause different types of responses from employers and employees.

Critique of Indicators

7.190 Veneri examines labour shortages in the US and discusses Cohen and Trutko's use of labour market indicators for the purposes of determining labour market imbalances. This like many of the other research studies reviewed by Veneri consider multiple measures of labour market conditions and are tracked over time to determine whether shortages exist.

7.191 A review of Cohen's work discusses the feasibility of using a range of indicators, the author states that "much of the difficulty stems from problems of interpreting the data, especially when measures from different data sets lead to different conclusions about job market conditions".

7.192 Furthermore Cohen highlights problems of the weakness in the data, such as sampling errors associated with employment and wage surveys, unemployment calculations being based on the person's last job and that comprehensive occupational vacancy data do not exist.

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7.193 The study reviewed data for the period 1991–1998 to test if the data identified shortages in particular occupations. Three tests were established:

- do occupational wages increase relative to other occupations?
- has employment growth been strong?
- has the unemployment rate for that occupation declined or remained relatively low?

7.194 The analysis using Bureau of Labor Statistics (BLS) indicated that seven out of 68 occupations met the three conditions identified above. Additional data supported the argument that one of the seven occupations was experiencing shortages, however little or no evidence was identified in the case study of the other six occupations.

7.195 The author's conclusion is that:

“Labour market data should be combined with background information on the occupation and knowledge the workings of the labour market. In addition, information on supply such as data on demographic characteristics, education by field of study and employers requirement regarding education and training play a significant role in completing an analysis of occupational labour market”.

7.196 Critically, occupational shortages need to be analysed individually or as part of a group of related occupations and conclusions should not be based on general statistics or anecdotal evidence alone.

Skilled Migrants in New Zealand: A Study of Settlement Outcomes

Wallis, R. (2006), Skilled Migrants in New Zealand: A Study of Settlement Outcomes, Report prepared by the Workforce Research and Evaluation, Department of Labour, New Zealand, February.

Definitions	Measurement	Indicator Critique	Intl. Applications
			1

Overview of Paper

- 7.197 This report presents findings from responses to the New Migrant Follow-up Survey (NMFS), which is designed to monitor short-term outcomes for skilled and business stream migrants who have taken up residence in New Zealand since August 2003.
- 7.198 The survey was set up as part of the Customised Service programme, which was a new business strategy implemented in stages from August 2003.
- 7.199 The aim of the initiative was to move the strategic direction of the Department of Labour's immigration services from demand-driven processing to a targeted-market approach with a focus on meeting the needs of New Zealand in terms of skill shortages and growth.
- 7.200 The survey was designed to be representative of skilled and business migrants, but issues with the administration of the survey meant that the overall contact/response rate is 25-30 percent for the bulk of the population relevant for this analysis. This low contact/response rate has introduced bias which has caused an over representation of some applicant groups.

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7.201 Despite the low overall contact and response rate, and some bias in the demographics of the survey respondents, the data collected can still be used to represent the migrants approved for residence and work-to-residence through the skilled and business categories.

Applications to Migration Issues

7.202 The findings collected by the survey show very good settlement outcomes for skilled and business migrants. Overall, 84 percent of respondents were currently working for pay or profit, with 95 percent of principal applicants and 65 percent of secondary applicants working.

7.203 Forty percent of these migrants are working in occupations that are listed on the Long Term Skill Shortage List, which is a list of occupations in which the Department has identified an absolute (ongoing and sustained) shortage of skilled workers both nationally and globally.

7.204 Seventy percent of respondents were earning between \$30,000NZ and \$100,000NZ from their main jobs, with the largest group (24 percent) earning \$50,000NZ to \$70,000NZ.

7.205 Average weekly earnings for New Zealanders in fulltime employment were \$794.83NZ per week in the March 2005 quarter. This totals \$41,000NZ for a 52-week period.

7.206 Sixty-one percent of the respondents were earning \$40,001NZ or more annually from their main jobs. Slightly more than one third of the migrants were living in the Auckland region, about one third living elsewhere in the North Island and about one third living in the South Island. This reflects the objective of encouraging migrants to settle outside of the Auckland region and consequently contribute to regional growth.

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- 7.207 Eighty-one percent of the migrants were satisfied with their housing. Forty-two percent of the migrants were parents or guardians of children and 89 percent of this group were satisfied with their children's schools. Overall, the majority of migrants were able to get the services they needed in the areas where their need was the greatest, such as getting a driver licence, help with the tax system and finding a family doctor.
- 7.208 The survey results show that during the first year of settlement, the vast majority of skilled and business migrants were happy with their decision to move to New Zealand. The high cost of health services, housing and living generally as well as lower-than expected salaries and wages were the most often experienced shocks.

Influence Costs and the Reporting of Skill Deficiencies

Watson, D., Webb, R. and Johnston, S. (2006) "Influence costs and the reporting of skill deficiencies", *Human Relations*, 59, 1, pp37-59.

Definitions	Measurement	Indicator Critique	Intl. Applications
4	1		

Overview of Paper

- 7.209 Watson, Webb and Johnson review previous literature that discusses the problems associated with defining the term 'skill shortages' and acknowledge the complexity surrounding the various definitions. Their report focuses on the reporting of skills shortages by personnel departments within organisations.
- 7.210 Four categories were used to identify the kind of skill shortages (skill deficiencies) that organisations who participated in the authors study experienced. Their study used data from the 1998 Dorset Employer Survey, which interviewed 1005 firms on workforce skill needs, gaps and shortages.

Definition of Skills Shortages

- 7.211 For their study, they define skill shortages within four categories, that is; current skills gap, hard to fill vacancy (HTFV), anticipated skill problem and emerging skill problem. The authors also state *“the term skill deficiency is used to encompass all of the above definitions”* (p44).
- 7.212 **Current skill gap** is when *“there exist gaps between the skills currently available within your workforce and the skills which your organisation needs to achieve its business objectives”* (p44).
- 7.213 **Hard to fill vacancy** is defined as *“any difficulty in recruiting the staff you need during the 12 months prior to the survey”* (p44).
- 7.214 **Anticipated skill problem** relates to *“those answering ‘yes’ to the question ‘could you say whether you anticipate that skill shortages in the next 3 to 5 years will affect your company’* (p44).
- 7.215 **Emerging skill problems** are *“employers that do not feel that they have a current skill gap, but anticipate that skill problems of some kind will emerge in the future”* (p44).

Measurement of Skills Shortages

- 7.216 Importantly, in reference to measuring skills shortages, the authors put forward the concept *“that distributional conflict in organisations and the pursuance of influence may lead to the misreporting of skills shortages and to a sub optimal level of investment in training both within organisations and at the wider governmental and agency level”* (p38).

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