Conceptualising and operationalising job quality: Australia in focus

by

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Employment Research

This thesis uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this thesis, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute.

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I am looking forward to getting some balance back in my 4th dimension: being able to '*work less and live more'*.

Declaration

This thesis is submitted to the University of Warwick in support of my application for the Degree of Doctor of Philosophy. I hereby declare that this thesis is my own work and that is has not been submitted for a degree at another university.

The work presented (including the data generated from the index and data analysis) was carried out by the author except for the HILDA dataset, access to which was provided by the HILDA Project, Melbourne Institute.

Parts of the thesis have been published by the author, either as a sole author or co-author:

- Wright, S. (2015). 'Challenges in researching job quality', in A. Knox and C. Warhurst (eds.). Job Quality in Australia: Perspectives, Problems and Proposals, Annandale, NSW: The Federation Press, pp. 15-36.

I declare that the above book chapter (Wright, 2015) is sole-authored and is my own work.

- Warhurst, C., Wright, S. and Lyonette, C. (2017). *Understanding and measuring job quality, Report 1 – Thematic Literature Review*, CIPD Research Services Job Quality Study, London: CIPD.
- Wright, S., Warhurst, C., Lyonette, C. and Sarkar, S. (2018). *Understanding and measuring job quality, Report 2 – Indicators of Job Quality*, CIPD Research Services Job Quality Study, London: CIPD.

Two abovementioned published reports (Warhurst, Wright & Lyonette, 2017; Wright, Warhurst, Lyonette & Sarkar, 2018) arose from a collaborative research project conducted by the Warwick Institute for Employment Research (IER) in 2017. My contribution to each report was significant and original. Material that I had already written for inclusion in my thesis, well in advance of the commencement of the research project, was published in the reports under joint-authorship. I declare that the material published in the two reports is my own work, and that this material was written in advance of commencement of the collaborative research project.

- Stuart, F., Pautz, H., Crimin, S. and Wright, S. (2016). *What makes for decent work? A Study with low paid workers in Scotland* (Initial Findings). A UWS-Oxfam Partnership report with the support of Warwick Institute for Employment Research, Glasgow: Oxfam Scotland.
- Stuart, F., Pautz, H. and Wright, S. (2016). *Decent Work for Scotland's Low-Paid Workers: A Job To Be Done*, Glasgow: Oxfam.

The two abovementioned published reports (Stuart, Pautz, Crimin & Wright, 2016; Stuart, Pautz, & Wright, 2016) arose from a collaborative research project with Oxfam Scotland that was conducted in 2016. My contribution to these two reports was significant and original. Material from the literature review I undertook for my thesis, specifically about dimensions of job quality, was used by Oxfam as the basis for conducting research on decent work. I declare that the material published in the two reports is my own work, and this material was written in advance of commencement of the collaborative project. These two reports have not been cited in this thesis.

Summary

The central problem addressed in this thesis is that, despite being an important topic, there was a lack of understanding of what comprises job quality, and so, how it was measured. As a corollary, there was no comprehensive account of the state of job quality in Australia.

While the main contribution of this thesis is methodological, important conceptual and empirical contributions are made to the body of knowledge about job quality.

For its conceptual contribution, this thesis identifies a set of core dimensions that are important and relevant to understanding job quality. These core dimensions are used to develop a theoretically-grounded conceptual framework for job quality.

For its methodological contribution, the conceptual framework is used as the basis for operationalising a multi-dimensional index of job quality – the Australian Job Quality Index (AJQI). The AJQI is robust, novel, timely and customised for the Australian context.

The thesis also generates new empirical evidence on the nature of job quality in Australia. For the first time, a number is put on the overall quality of jobs for Australian employees. Headline results for overall job quality are reported, as well as results for job quality according to a range of job-holder, job and workplace characteristics.

While reporting of empirical findings in this thesis is limited, it will be possible in the future to publish new material by building on the results presented in the thesis by dimension, as well as by focussing on particular groups of jobs/job-holders. In addition, the AJQI can be replicated to enable the study of trends in job quality. In this respect, the AJQI has utility beyond this thesis.

So overall, this thesis made important conceptual, methodological and empirical contributions to the body of knowledge by providing the first holistic account of job quality in Australia.

Abbreviations

A@W	Australia at Work study
ABS	Australian Bureau of Statistics
ACTU	Australian Council of Trade Unions
Advanced Diploma	Advanced Diploma qualifications are located at level 6 of the Australian Qualifications Framework.
AFP&CS	Australian Fair Pay and Conditions Standard was a set of five minimum statutory entitlements for wages and conditions. The AFP&CS was introduced into labour law in 2006 and then abolished in 2010 (replaced by the NES).
AIRC	Australian Industrial Relations Commission (now FWC)
AJQI	Australian Job Quality Index
ALP	Australian Labor Party
ANZSCO	Australian and New Zealand Standard Classification of Occupations
ANZSIC	Australian and New Zealand Standard Industrial Classification
AQF	The Australian Qualifications Framework is the policy for regulated qualifications in the Australian education and training system.
AWALI	Australian Work + Life Index
Award	Industrial Award are legal documents that specify minimum employment standards, including rates of pay and conditions of employment, for all employees in one industry or occupation. There are 122 industry or occupation awards that cover most employees in Australia. The relevant award applies in addition to the NES.
AWPA	Australian Workplace Productivity Agency
Bachelor Degree	Bachelor Degree qualifications are located at level 7 of the Australian Qualifications Framework.
Bachelor Honours Degree	Bachelor Honours Degree qualifications are located at level 8 of the Australian Qualifications Framework.
Casual	In Australia, casual (temporary) employment status is at the discretion of the employer. Casual employees are not guaranteed continuous employment, rather they are engaged on an irregular basis and do not accrue service-related benefits. They usually receive a higher hourly rate of pay to compensate for not accruing paid annual or sick leave.
Certificate III	Certificate III qualifications are located at level 3 of the Australian Qualifications Framework.

Certificate IV	Certificate IV qualifications are located at level 4 of the Australian Qualifications Framework.
COIN	Composite Indicators Research Group, European Commission JRC Competence Centre on Composite Indicators and Scoreboards
D1	Dimension 1 of the AJQI: Quality of pay
D2	Dimension 2 of the AJQI: Quality of employment
D3	Dimension 3 of the AJQI: Quality of intrinsic characteristics of work
D4	Dimension 4 of the AJQI: Quality of work-life balance
D5	Dimension 5 of the AJQI: Quality of health and safety
D6	Dimension 6 of the AJQI: Quality of voice and collective interest Representation
Diploma	Diploma qualifications are located at level 5 of the Australian Qualifications Framework.
Doctoral Degree	Doctoral Degree qualifications (or doctorates) are located at level 10 of the Australian Qualifications Framework.
EBA	Enterprise Bargaining Agreement (collective agreement negotiated at the enterprise-level)
EES	European Employment Strategy
EJQI	European Job Quality Index
ETUI-REHS	European Trade Union Institute for Research, Education and Health and Safety
EU	European Union
Eurofound	European Foundation for Living and Working Conditions
EWCS	European Working Conditions Survey
FMW	Federal Minimum Wage
FTE	Full-time equivalent
Full-time	The ABS defines full-time work as 35 hours or more per week
FW Act	*Fair Work Act*, 2009 [Cth]
FWC	Fair Work Commission (formerly, the AIRC)
GFC	Global Financial Crisis
Graduate Certificate	Graduate Certificate qualifications are located at level 8 of the Australian Qualifications Framework.
Graduate Diploma	Graduate Diploma qualifications are located at level 8 of the Australian Qualifications Framework.
HDI	United Nations Human Development Programme Human Development Index

HILDA	Household, Income, Labour Dynamics in Australia Survey
HR Managers	Human Resource Managers
HRM	Human Resource Management
IEO	Index of Education and Occupation
IER	Index of Economic Resources
ILO	International Labour Organisation
Industry	The Australian and New Zealand Standard Industrial Classification (ANZSIC) has 19 Industry Divisions
IRSAD	Index of Relative Socio-Economic Advantage/Disadvantage
IRSD	Index of Relative Socio-Economic Disadvantage
JQIP	Job Quality Index for Parents
Low-paid	There is no accepted definition of low-paid. The OECD defines 'low paid' as the incidence of workers defined as the share of full-time workers earning less than two thirds of the gross median earnings of all full-time workers.
LNP	Liberal Party/National Party Coalition
M	Mean
Masters Degree	Masters Degree qualifications are located at level 9 of the Australian Qualifications Framework.
NCVER	National Centre for Vocational Education Research
NES	National Employment Standard
NILF	not in the labour force
NFP	Not for Profit (sector)
NPM	New Public Management is a government charter that seeks to transform public sector industrial relations
OECD	Organisation for Economic Cooperation and Development
OHS	Occupational Health and Safety
Part-time	The ABS defines part-time work as less than 35 hours a week
PCA	Principal Components Analysis
Permanent	Permanent contract of employment where employment is open-ended and continues until it is terminated by either the employer or employee, and the employee accrues service-related benefits (e.g. annual leave, long service leave and sick leave)
Safety net	The minimum standards in wages and conditions of employment contained in either the relevant award or the NES
SCQ	Self-Completion Questionnaire
SD	Standard deviation

Sector	In Australia, the term sector is used to distinguish between the public, private and Not for Profit (NFP) sectors of the economy
SEIFA	Socio-Economic Indexes for Areas
SPSS	Statistical Package for the Social Sciences
SWA	Safe Work Australia
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
VET	Vocational Education and Training
VicWAL	Victorian Work and Life Survey (2009)
VicWAL JQI	Victorian Work and Life Survey Job Quality Index
Work Choices	*Workplace Relations and Other Amendments* (*Work Choices*) *Act*, 2005 [Cth]

1. Introduction

1.1. Introduction

This thesis investigates a key research problem of understanding the level and nature of job quality, using the case of jobs in Australia as an empirical focus. Problems exist with both the conceptualisation and operationalisation of any concept of job quality. Despite being an important topic, there is both a lack of understanding of what comprises job quality, and so how it can be measured. This thesis generates new understanding about the concept of job quality, and how it can be measured.

This chapter is divided into eight sections. After this introduction, the second sets out the aims and objectives of the thesis research (section 1.2). Here, the overarching research problem is articulated and the research questions are explained, and the central focus of this thesis is developed. The third section sets out information about the four main contributions of the thesis to the body of knowledge (section 1.3). The fourth section provides further justification for the research (section 1.4). The fifth section explains the scope and delimitations of the research (section 1.5). The sixth section sets out a number of definitions and conventions that may be useful to the reader (section 1.6). The seventh section outlines how the thesis is structured, including the aims of, and content in, each chapter (section 1.7). The conclusion provides a summary of key information outlined in this chapter (section 1.8).

1.2. Aims and objectives of the research

This section sets out the three aims and objectives of this thesis. The first aim is to develop new understanding on the concept of job quality. Linked to this first aim, the first objective is to identify the core factors that comprise the concept of job quality by collating and reconciling existing literature. The second aim is to assess the viability of creating a robust, multi-dimensional construct of job quality using existing Australian data. The objective is to review the existing Australian datasets to see if any of these datasets are suitable for operationalising a multi-dimensional measure of job quality for Australia. Finally, the third aim is to use the data generated from the AJQI to report on job quality in Australia. Linked to this third aim, the objective is to analyse and report on findings for job quality for Australian employees.

The remainder of this section is divided into two parts. The first part sets out the research problem and the second part articulates the specific research questions that need to be answered in this thesis.

1.2.1. Research problem

This thesis investigates a key research problem: Despite being an important topic, there is a lack of agreement about what comprises job quality. This thesis unpacks this lack of agreement in both conceptual and methodological terms. It also makes the observation that the gap has contributed, in part, to a lack of understanding of the level and nature of job quality in many countries, including the thesis case study of Australia.

Prior to being able to measure job quality, there is first a need to develop an understanding of the core conceptual issues in job quality, and then the set of factors (or dimensions) that reflect that conceptual formulation. Once a core set of factors have been identified, there is a need to use these factors to develop a sound conceptual framework for operationalising the construct of job quality. Suitable Australian data need to be identified. The conceptual framework needs to be used as the basis for operationalising a robust, multi-dimensional measure of job quality using Australian data. If the measure proves robust, the data generated from the multi-dimensional measure needs to be used to provide a holistic account of job quality for employees in Australia.

1.2.2. Research questions

In order to address the research problem, this thesis has three main research questions. Each of the research questions is accompanied by a research objective, and is articulated by way of linking the research question to an identifiable gap in the body of existing knowledge (see Table 1.2.2.1).

Table 1.2.2.1: Research questions, gaps in body of knowledge and research objectives

Research question	Gaps in the body of knowledge	Research objectives
What constitutes the core or essential dimensions of job quality?	No commonly agreed concept of job quality. Multiple concepts and measures disables holistic research and policy development on job quality.	Collate and reconcile existing literature to identify the core or essential dimensions that comprise the concept of job quality.
Can a comprehensive and robust multi-dimensional concept of job quality be operationalised using existing Australian data?	No comprehensive multi-dimensional measure of job quality has been operationalised using Australian data.	Assess the viability of creating a comprehensive and robust multi-dimensional measure of job quality using existing Australian data.
What is the current state of job quality for Australian employees?	No existing empirical research for Australia that is comprehensive in terms of coverage of all of the core dimensions of job quality. No information available on the overall level of job quality for Australian employees.	Analyse and report new empirical findings for the overall level of job quality for Australian employees.

The first research question is concerned with generating new insights on the construct of job quality. While it is generally agreed that job quality is a multi-dimensional construct, researchers have tended to approach the study of job quality from differing starting points, primarily informed by their respective disciplinary and methodological traditions (Wright, 2015). There is no general theory of job quality, no agreed conceptual framework, and as a result, there is no agreed definition of job quality (Burgess, Connell & Dockery, 2013; Findlay, Kalleberg & Warhurst, 2013; Muñoz de Bustillo, Fernández-Macías, Antón & Esteve, 2009; Muñoz de Bustillo, Fernández-Macías, Esteve & Antón, 2011a; Warhurst & Knox, 2015; Wright 2015). By undertaking an extensive review of the literature, the core dimensions that comprise job quality will be identified and then used to develop a conceptual framework for job quality.

Shifting from the conceptual to the methodological, the second research question is about whether it is feasible to develop a comprehensive, robust multi-dimensional construct for job quality for the case study country, Australia. An assessment will be undertaken to establish whether suitable data are available containing the indicators that would be necessary to populate the conceptual framework.

The third research question involves generating new empirical data to report on the current state of play for job quality for employees in Australia. While several multi-dimensional indexes of job quality have been constructed using Australian data, none are comprehensive in terms of coverage of all of the aspects of job quality. Analysis and reporting of findings will generate timely and important new empirical evidence about job quality in Australia.

1.3. Contributions to the body of knowledge

There are three types of contributions to the body of knowledge arising from this thesis. While the main contributions to the body of knowledge are methodological, the thesis also makes important conceptual and empirical contributions to the body of knowledge. The nature of each of these contributions to the body of knowledge is explained in the commentary after the summary table (see Table 1.3.1).

Table 1.3.1: Research contributions

Contributions to the body of knowledge	Type of contribution
Identification of the core or essential dimensions of job quality	Conceptual
Development of a theoretically-grounded conceptual framework of job quality	Conceptual
Assessment of the feasibility of operationalising a comprehensive and robust multi-dimensional index of job quality using an existing Australian dataset	Methodological
Operationalisation of a comprehensive and robust multi-dimensional index of job quality for Australian employees	Methodological
Generation of new data on job quality for Australian employees	Empirical
Reporting of new empirical findings on the level of overall job quality for employees in Australia, and to a lesser extent, new empirical findings about the underlying dimensions of job quality and the links to job-holders, their families, employers and institutions in Australia.	Empirical

While there is no general theory of job quality, and it is beyond the scope of this thesis to build a new theory, the thesis makes an important contribution to body of knowledge by undertaking an extensive review of the literature on the theorisation/conceptualisation of job quality. A new perspective on job quality is provided by identifying the strengths and limitations of the various disciplinary and methodological approaches to job quality. By clearly distinguishing what research on job quality has been done, and what further research needs to be done, this thesis will identify a set of core or essential dimensions that are important and relevant to understanding job quality. In doing so, the 'fuzzy logic' and imprecise notion of job quality will be made more specific and precise (Babbie, 2007: 124). Based on the core dimensions of job quality identified by the literature review, a theoretically-grounded conceptual framework for job quality will be developed.

The second, and major, type of contribution to the body of knowledge is methodological. Important methodological insights will be gained from assessing the feasibility of operationalising a multi-dimensional index of job quality for Australia. An assessment will be made of any shortcomings in coverage, availability and periodicity of Australian data pertinent to measuring job quality.

None of the other quantitative measures of job quality for Australia has been comprehensive in terms of geographic coverage or coverage of all of the aspects of job quality. By operationalising a composite, multi-dimensional measure of job quality using existing Australian data, it will further the methodological understanding of how to operationalise the concept of job quality in Australia.

The third type of contribution to the body of knowledge is empirical. Very little is known empirically about job quality in Australia, that is, prosaically, what the current state of job quality is in Australia. Operationalisation of a multi-dimensional index of job quality using Australia data will generate a rich new source of empirical data on job quality among Australian employees. The empirical findings will be placed in the historical and socio-political context of the case study country of Australia. While reporting on the empirical findings in this thesis is limited, it will be possible in the future to publish a plethora of new material by building on the results presented in the thesis by dimension, as well as by focussing on particular groups of jobs/job-holders.

In summary, this thesis makes contributions to the body of knowledge in conceptual, methodological and empirical constituents of job quality.

1.4. Further justification for the research

The centrality of work to national productivity, firm-level financial performance, and individual and societal wellbeing means that understanding the nature and causes of job quality has become a topic of growing interest for social science researchers. Relevantly, Knox, Warhurst and Pocock (2011: 8) state:

> *A better understanding of the elements that make up a good job, and deeper analysis about how better job quality affects the well-being of workers and the wider social life, as well as economic and workplace outcomes, are vital areas of research into the future.*

At the macro-level, job quality is thought important for national competitiveness and economic and social development (Anker, Chernyshev, Egger, Henhran & Ritter, 2003; Carré, Findlay, Tilly & Warhurst, 2012; Clark, 1997; Knox, et al., 2011; Masterman-Smith & Pocock, 2008; Sieben-Thomas, 2005). At the meso or organisational level, job quality is of relevance to productivity, competitiveness, innovation and skills utilisation. It can also be important for effective use of labour capacity and social mobility. For example, poor quality jobs can have negative consequences for occupational health and safety (OHS); generate a class of working poor; create, and perpetuate inequalities in the labour market (Butterworth, Leach, Strazdins, Oleson, Rodgers & Broom, 2010; Gallie, 2013; Loughlin & Murray, 2013; Masterman-Smith & Pocock, 2008; Warhurst & Knox, 2015; Wilson, Brown & Cregan, 2008).

More directly, managers and human resource managers in particular, aim to attract, recruit and retain good staff. Wilson and colleagues (2008: 473) state that job quality is an important issue in human resource management as ‘it makes work meaningful, providing satisfaction and a source of motivation for employees’.

At the micro-level, job quality is thought important for individual workers and their families. Job quality is important for material and psychological wellbeing. More broadly, job quality is thought important for sustainable communities or the social fabric. Better quality jobs may mean workers can be more engaged in civic matters in their communities. There is also the possibility of improved job quality leading to greater social inclusion (Carré et al., 2012; Knox, et al. 2011; Masterman-Smith & Pocock, 2008; Sieben-Thomas, 2005).

Governments, business owners and HR managers can - and do - make choices about what kind of jobs are created in their firms, thus the national economy. The quality of jobs is central to government policy about the effectiveness (or otherwise) of the labour market in generating jobs, and encouraging and supporting labour market participation across the life course. Job quality has also emerged as one of the key areas of interest for employers interested in how people in jobs with the scope for 'discretionary' effort understand their work. The findings generated from the index are likely to be of interest to both government policy-makers, and the HR fraternity.

Of particular relevance to this thesis, research on job quality is hampered by conceptual problems. Findlay and her colleagues (2013: 442) suggest that while there is renewed interest among social scientists about the topic of job quality, there is a 'conceptualisation deficit' because policy interventions to shape job quality are 'hampered by the need for a robust conceptualisation of job quality'.

While the nature of work itself is changing, there is no agreement as to whether there is a deterioration of, or an improvement in, the quality of jobs (Carré et al., 2012; Goos & Manning, 2007; Handel, 2005; Piore & Sabel, 1986). Forty years after Braverman's degradation of work thesis (1974), differences of opinion remain as to whether changes in the nature of work have led to an increase or decrease in the quality of jobs (Carré, Findlay, Tilly & Warhurst, 2012; Findlay et al., 2013). On the one hand, there is an optimistic view that rising education levels, advances in technology, up-skilling and demand for intrinsic rewards from work are creating an upwards 'trajectory' of 'good jobs'. In contrast, there is a more pessimistic view that many of the new jobs created in the global economy are 'bad jobs'. Low wages, long and often unsociable hours, insecure or precarious contracts of employment, and limited career prospects are among the symptoms contributing to this more pessimistic view (Carré et al., 2012). The dominant view in the literature is that there is increasing 'polarisation' within the job market (Fernández-Macías, 2012).

Gallie (2007: 2-3) contends that new management thinking in the 1980s was dominated by the discourse of 'flexibility' where there was an emphasis on deregulation, whereas in the 1990s there was growing interest in the notion of 'high-performance' management, with a focus on skill development, teamwork and motivation. At the same time, he argues, research was underlining the deleterious implications for employee motivation and health about the way in which jobs were designed. Despite the broad trend for a growing salience of work quality issues in terms of policy, not only did policy differ between countries but policies were refracted through very different social structural contexts in specific countries. Gallie contends that it is possible that the technological infrastructure of work, and its sectoral composition are more powerful determinants of job quality than either government policy or management philosophy. Furthermore, that changes in economic structure may have led to deterioration, rather than improvement, in the quality of work.

Crucially, very little is known about job quality in Australia. While job quality is emerging internationally as relevant, and the importance of job quality is firmly on the policy agenda of international institutions such as the European Union (EU), the Organisation for Economic Co-operation and Development (OECD) and International Labour Organisation (ILO), policy makers and researchers in Australia have not yet fully engaged with this topic. Knox and her colleagues (2011) observe that research and policy development focusing on the quality of jobs in order to create ‘good jobs’ and improve ‘bad jobs’ has been expanding steadily across most developed countries in the northern hemisphere. Nevertheless, the contribution from Australian has remained extraordinarily minor.

In terms of academic research, the prevailing strand of labour market analysis and policy in Australia has focused on the *quantity* of jobs, frequently to the exclusion of the *quality* of jobs (Burgess, 2003). Knox and her colleagues (2011) observe that extant research in Australia has not specifically addressed the recurring debate about job quality that appears elsewhere, that this may create the impression that job quality is not an issue in Australia. To the contrary, they contend that Australian academics have been ‘diverted down another path’. The focus on recent industrial relations reforms – in particular the radical and controversial *Workplace Relations Amendment (Work Choices) Act 2005* – has seen the academy in Australia focus on trying to understand the content, meaning, and implications of industrial relations reform. Yet, they argue, a closer analysis reveals that much of the Australian research and debate is concerned with factors that are highly consistent with the notion of job quality. For instance, defending minimum wages and conditions of employment, job security, working hours, skill development; and the right to collectivise (Knox et al., 2011: 7). More recently, it has been suggested that the lack of attention from academia in Australia on job quality may be due to other countries having suffered more severe job losses and widespread economic problems associated with the Global Financial Crisis (GFC) compared to Australia (Warhurst & Knox, 2015: 1).

In terms of Australian labour law, Murray and Stewart (2015: 38) observe:

Job quality is not a term known to Australian labour law in any formal or technical sense. It is rarely used in the academic literature and is not mentioned in any labour legislation nor, to our knowledge, policy.

While Australian law has no discernible engagement with the explicit European Union (EU) notion of job quality as it has evolved over time, the ILO's Decent Work Agenda (DWA) has proved more influential in Australia (Murray and Stewart, 2015). As evidence, Murray and Stewart cite the work of Owen (2002), who mobilised the concept of decent work to support revision of the boundary between work and care; a re-evaluation of care; and an extension of labour law's concern beyond work to the realms of the social wage.

In terms of government policy, job quality has briefly appeared on the policy agenda during the periods when the more left-leaning Australian Labor Party (ALP) has held office, only for it to slip back off the agenda when the more right-leaning Australian Liberal/National Party Coalition (LNP) took office. For instance, in a statement at the Australian National Press Club in 2012, the (then ALP) Minister for Employment and Workplace Relations, Bill Shorten announced that his government was committed to improving the quality of jobs (Shorten 2012). In the same year, the Australian Workplace Productivity Agency (AWPA) launched a tentative research project on job quality that was intended to help shape future policy. Shortly after launching the project, AWPA itself was disestablished when the LNP regained office in late 2013. Topically, in June 2015, the (then) Australian Treasurer incensed the Australian public with his response to a question about housing affordability at a media conference, where he said:

…the starting point for a first home buyer is to get a good job that pays good money. If you've got a good job and it pays good money and you have security in relation to that job, then you can go to the bank and you can borrow money and that's really affordable.

Then in 2017, now the leader of the opposition, Bill Shorten reaffirmed the ALP's commitment to job quality in a statement made to the Australian National Press Club, where he described a good job as 'an anchor to society' (Shorten, 2017).

While they did not specifically use the term job quality, the Australian Council of Trade Unions (ACTU) commissioned a report on precarious work as part of their Independent Inquiry into Insecure Work (2012), demonstrating the importance of job quality for the Australian trade union movement (ACTU, 2012).

While there has been little empirical research on job quality in Australia, and the fact that that the term job quality is not part of labour law parlance, the topic is particularly salient for Australia. A significant share of the Australian workforce are employed in non-standard and often insecure forms of work. Despite an attachment to the historical notion of a 'fair go', the Australian employment regime has increasingly become characterised by diversity in employment regulation, where outcomes are less favourable for vulnerable groups including women, young workers, older workers, and workers from different ethnic or cultural backgrounds (Pocock & Skinner, 2012: 63). Strong bargaining power for workers is associated with good jobs, and weak bargaining power is associated with bad jobs (Pocock & Skinner 2012: 63). Taken in their entirety, cumulative recent changes in the Australian employment regime have resulted in primacy placed on individual workers (and individual negotiations), so those without the power or skills to negotiate improvements in their job quality are left to the mercy of the market. While women, young workers and those with lower skills are more likely to have their pay and conditions set by awards, powerful employer groups lobby successive governments for further deregulation, including calls for removal of penalty rates for unsociable hours of work. Arguably, there is a pressing need for better understanding of job quality in Australia – and indeed, in relation to conceptualising and measuring job quality more generally.

Research on job quality has also tended to ignore social factors such as class, gender, and race. For example, despite feminisation of the workforce and the highly gendered nature of work, much of the previous work on job quality has either ignored gender or viewed job quality in terms of the male norm. For instance, Walby (2007) highlights that most projections about the future of work ignore the gender dimension. She advocates including gender as a driver in the analysis of the future of work. To shift from what she terms as "the gender ghetto", where gender is treated as a separate topic in a chapter or section of its own is common practice in studies on work.

Relevantly, Kelan (2010: 177) observes that how gender is practiced in organisations, and how organisations prescribe certain gender practices, has been studied for some time. For instance, around 30 years ago, Acker (1990) claims that despite organisational structures being treated as gender-neutral, they are, in fact, gendered, where assumptions about gender underlie the documents and contracts used to construct organisations. Acker argues that 'the structure of the labour market, relations in the workplace, control of the work process, and the underlying wage relation are always affected by symbols of gender, processes of gender identity, and material inequalities between women and men' (1990: 145-146). Furthermore, she argues that these processes are 'complexly related to and powerfully support the reproduction of the class structure' (1990: 146). Relevantly, Kalleberg (2015; v) observes, the notion of a 'good job' is 'a normative construct that is gendered, contested, fluid, contingent, and evolving'. He adds, the 'multi-dimensional nature of job quality emphasises that conceptualising it calls for a multi-disciplinary effort, with contributions needed from sociology, economics, industrial relations, management, law, psychology and political science, among others' (Kalleberg, 2015: v).

In addition, much of the research on job quality has focussed on low skilled or low paid jobs (Antón, Fernández-Macías & Muñoz de Bustillo, 2012; Carré & Tilly, 2012; Goos & Manning, 2007). The growing body of evidence on low paid work is certainly revealing, yet it is insufficient or at least incomplete to restrict the focus to 'low-paid' as 'low quality' jobs. In order to understand changes in job quality, it is useful to adopt an inclusive approach by tracking what is happening to the full spectrum of jobs across the labour market. Going some way to address the full spectrum of jobs, Carré and her colleagues (2012) suggest seven possible scenarios in terms of what is happening to job quality (jobs are getting worse; jobs are getting better; polarisation of job quality; good jobs are getting better; bad jobs are getting worse; and good jobs go bad). This more expansive approach suggests that the use of markers other than pay reveal different job quality trajectories and offers a way forward in terms of devising a broad-based research framework for investigating job quality and whether any or all of the seven possible scenarios are at play.

1.5. Scope and delimitations of the research

It is important to define the scope and delimit the research. Four delimitations are noteworthy: single country analysis; restriction of the sample to employees; cross-sectional data; and no reporting of spatial differences in job quality. Each of the limitations is described below.

1.5.1. Single country analysis

While the review of the literature considers international evidence about job quality, the empirical research is restricted to one country, i.e. Australia. Because a number of multi-dimensional indexes have been constructed using data for other countries or groups of countries (i.e. EU countries), it may be possible, in the future, to compare the results of job quality for Australia with those for other countries. This type of comparison might provide important information about whether the patterns and trends evident for job quality in Australia are idiosyncratic, or patterns and trends common in other national systems. The focus of operationalising job quality is restricted to Australia.

1.5.2. Sample restricted to employees

The sample is restricted to employees. A decision was made to exclude the self-employed because there were too many indicators that were not applicable to – or that were not asked of –the self-employed. While this means that the results are not strictly generalizable to the entire Australian workforce, a truncated version of the index has been constructed to enable reporting for all workers. Due to the limitation on the length of this thesis, it was not possible to include separate details about how the truncated version of the index was constructed, or to report on any differences in job quality for employees compared to the self-employed. A small number of other cases were excluded from the sample for various reasons (chapter five sets out details on this). Importantly, the sample remains sufficiently large (n=8294/N=9920806) and the HILDA sample weights were designed to mitigate potential biases.

1.5.3. Cross-sectional analysis

The data that are used to construct the multi-dimensional index is cross-sectional. That is, one wave of HILDA data (Wave 14) was used. This means the index is a static measure of job quality at one point in time, i.e. 2014. Because of the way the index was constructed, however, it will be easy to replicate for other waves of the HILDA survey (later and/or earlier), in order to measure changes in job quality.

1.5.4. Geographic/spatial aspects of job quality are not covered

Australia has a relatively small population but it is large in geographic size. The Australian labour market is not homogenous, in fact, because of its size and large unpopulated expanses, there are hundreds if not thousands of regional and local labour markets. Lawson and Dwyer (2002) found considerable divergence in regional labour market outcomes within Australia. While the population is heavily concentrated in urban areas, some Australians live and work in rural, remote or very remote locations, where labour market conditions, including the availability of jobs, are sometimes limited. There are also important regional differences in the industrial structure. It is beyond the scope of this thesis to report on differences in job quality according to geographic location. This can be explored in future research, where it likely most appropriate to conduct separate analyses on job quality in each of the eight States or territories of Australia; and a separate analysis of job quality according to remoteness. The HILDA dataset contains a specially constructed variable for remoteness, so it should be relatively easy to complete this analysis and it is likely to be of interest to regional and State/territory policy-makers.

1.6. Definitions and conventions

1.6.1. Job and job-holder

The unit of analysis is the ‘job’. People, however, occupy these jobs. In some places throughout the thesis, the term ‘job’ is used, while at other times, the term ‘job-holder’ is used, but it is the characteristics of the job which are the primary focus. As mentioned in the previous section, the sample is restricted to employees but the terms of job-holder; employee, worker and individual are used interchangeably throughout the thesis. For chapter six in particular, it is more appropriate to use the terms of 'job-holder' and 'individual' because individuals are either married or single; young or older; born in Australia or another country, and so forth.

1.6.2. Gender and sex

There is a need to define and explain how the terms of 'gender' and 'sex' are used throughout this thesis.

A distinction is made between 'sex' and 'gender' by feminists as a way to differentiate between the term 'sex' to refer to biological traits and 'gender' to describe social characteristics and definitions of masculinity and femininity (Eden, 2017: 20).

The variable contained in the HILDA data is labelled as 'sex' and it has two response categories: female and male. So in this thesis, the term 'sex' is used to report results for women and men (there is no variable for gender in HILDA).

In this thesis, when referring to the literature, theory, or specific findings of other authors, and when linking the findings reported in this thesis to the literature, the term of 'gender' is used, unless the original author/s used a different term, in which case the term used by the original author/s will be used.

1.6.3. Model and framework

The terms of 'model' and 'framework' are often used interchangeably and research methods textbooks are not consistent in in how they define or use these terms. Some research methods textbooks draw a distinction between these two concepts, while others use them interchangeably.

This author holds the view that both models and frameworks are typically presented in a schematic form but a model is more closely related to theory. Economists, mathematicians and statisticians typically refer to modelling when they are testing the statistical relationship between a number of factors or variables, where an equation is mathematically specified. A framework is less closely related to theory because they typically do not show causation, that is the direction of relationships.

In this thesis the concept of a framework is used when discussing the AJQI. However, some of the frameworks for job quality mentioned during the thesis are – either correctly or incorrectly – described as models. In this thesis, when referring to the literature or specific findings of other authors, the term used by the original author is used.

1.7. Outline of the thesis

The thesis is organised into eight chapters. After this introduction, the remaining seven chapters are grouped into three types of reporting. The first two chapters report on two different, yet inter-related, strands of the literature. Chapter two focuses on conceptual and theoretical issues. That is, it focuses on the current understanding on how to define the construct of job quality. Chapter three moves on to review the literature on operational issues. That is, how to measure job quality. Chapter four describes, in detail, the methodology followed in conducting the research. The next three chapters (i.e. chapters five, six & seven) report the empirical findings. The final chapter reports on the contributions to the body of knowledge and identifies areas for future research (chapter eight).

Each chapter is organised in a similar manner, beginning with an introduction outlining the aims of the chapter as well as pointers for the reader about what will be covered in the chapter, and in what order. The core of each chapter contains a number of sub-sections that deal with the substantive issues covered in the chapter. The final part of each chapter provides a summary of the key information relayed in the chapter and concludes with a pointer for the reader of what the next chapter will move on to discuss. Having provided a high-level outline of how the thesis is organised, additional information is set out about the content of each chapter.

Chapter two reviews the international literature on how job quality is theorised and defined. The aim of the chapter is to synthesise the literature so that a core set of factors (or dimensions) that comprise job quality can be identified. Four conceptual problems are discussed. The first conceptual problem is the fact that job quality has been approached from different and often competing disciplinary traditions. The second conceptual problem pertains to the fact that there is no general theory of job quality. The third conceptual problem is concerned with a blurring of boundaries between terms commonly used to discuss job quality. The fourth conceptual problem pertains to the difficulty in translating the general notion of job quality into a set of underlying dimensions. The chapter concludes with an articulation of what can be considered an agreed core of six dimensions of job quality.

Chapter three shifts the focus of the literature review from conceptualisation to operationalisation of job quality. The aim of this chapter is to synthesise the literature in order to make an assessment about the most appropriate way to operationalise – or put another way – to measure the multi-dimensional construct of job quality. The chapter is comprised of five main sections. There is considerable diversity in the methodological approaches that have been used to measure job quality. The first section of chapter three identifies four different methodological approaches to measuring job quality and then ascertains the strengths and weaknesses of the various approaches. Having decided to draw on theories as the basis for developing a multi-dimensional index of job quality in this thesis, the second section provides details about the review that was undertaken on how to construct a multi-dimensional index of job quality. The third section of this chapter provides a summary of the small but relevant body of Australian literature on previous attempts to measure job quality by using an index. The fourth section of chapter three sets out a series of general methodological insights derived from a review of composite indexes external to the field of job quality. The chapter ends with an articulation of the methodological approach that will be adopted in this thesis.

Chapter four sets out how the Australian Job Quality Index (AJQI) was constructed. The first aim of this chapter is to explain, and, more importantly, to justify, the main stages in the research process followed to construct the AJQI. The second aim of the chapter is to set out the rationale for including (or excluding) indicators in the composite index. The third aim of the chapter is to explain the statistical techniques and procedures that were used to identify, construct, interrogate, test, analyse, summarise and interpret the numerical data. The chapter describes the iterative process that was followed in order to deal with conceptual and practical challenges that emerged during the research process. The method and techniques used to construct the AJQI are described and a justification is provided for why the method was chosen. This is followed by information on the conceptual framework that was used as the starting point for populating the index. Then reasons behind selection of the dataset used to construct the index are explained, along with information about the population of interest, sample and sample weights. The sixth section of this chapter sets out seven general principles that served as the logic to guide the construction of the index. The next section provides specific details about the steps followed and the iterative processes used when making the index. This section includes information about the specific indicators included in the index, the method used to standardise the indicators, the treatment of missing values, and the way the indicators were re-coded. Information about the approach to weighting and aggregation is then covered. The eighth section sets out information about the final composition of the AJQI. All significant deviations in methodology from the conventional method for constructing composite indexes are justified. The ninth section identifies a number of gaps in the index, and an explanation is provided about the steps taken to fill or mitigate these gaps, when it was possible to do so. The tenth section, on robustness and sensitivity, provides an overview of how the index was tested for sensitivity to changes in methodological conditions (where details of the robustness checks are set out in a separate technical report in Appendix 11.5). Ethical considerations are covered before the chapter concludes with an assessment of whether the method used to construct the AJQI was conceptually and methodologically sound.

Chapter five is the first of three chapters that report the empirical findings. The aim of this chapter is to provide a first, high-level picture about the overall quality of jobs in Australia. It is in the first part of chapter five where, for the first time, a score is reported for the overall level of job quality for Australian employees. The chapter then proceeds to report on how many jobs there are according to five categories representing: '*very poor';* '*poo*r'; '*middling*'; '*good*'; and '*very good*' quality jobs in Australia. In the third part of chapter five, results for each of the six dimensions found in the index are set out. Namely: quality of pay; quality of employment; quality of intrinsic characteristics of work; quality of work-life balance; quality of health and safety; and quality of voice and collective interest representation. This section also sets out how many jobs are found at each of the five categories (i.e. '*very poor', 'poor'*, etc.) for each dimension. This is followed by reporting on the 'bundling' of different aspects of job quality. Results from the AJQI are then compared to findings from other Australian studies on job quality. In the final part of chapter five, results from the AJQI are checked against measures for job satisfaction, life satisfaction/self-assessed health, and socio-economic status. This information provides an insight into the potential impact of the quality of jobs on the wellbeing of job-holders; and society more broadly. In the conclusion, a summary of key findings about overall job quality in Australia is presented along with an assessment about whether the results seem plausible, given other existing empirical evidence.

Chapter six is the second of three chapters that report the empirical findings. Because of the data used and the way the AJQI has been constructed, it is possible to break down results for each dimension and the overall results by sub-groups of the Australian job-holders. The aim of chapter six is explore whether, and if so, to what extent, job quality varies according to a range of job-holders' personal and household characteristics. In the first part of this chapter, job quality scores by sex, age group and highest educational qualification are examined. In the second section, scores for job quality are reported by tenure with current employer. In the third section, results are examined through the lens of life course and family formation. Job quality results are reported by marital status and household type. This is followed by a break-out analysis for female employees based on the age of the job-holder's youngest child. The final part of this section looks at whether employees with carer responsibilities have better or worse job quality than those without these responsibilities. The next section briefly looks at job quality by nationality, citizenship and residency status. In the last part before the chapter conclusion, the 'bundling' of different aspects of job quality is reported for women and men. In the conclusion, , a summary of key findings about job quality by job-holders' personal and household characteristics is presented, including the identification of those personal and household characteristics that appear to play more important roles in explaining variations in job quality.

Chapter seven is the third of three chapters that report on the empirical findings. This chapter reports on job quality by drawing together aspects about the characteristics of the job and workplace, as well as a limited number of job-holders' personal and household brought forward to the analysis from the previous chapter. In the second part, an overview is provided of the key aspects of the Australian employment relations system. The third section of this chapter is divided into three parts. The first part (section 7.3.1) provides findings on job quality by contract type and working time arrangements. Institutional arrangements are considered in the second part (section 7.3.2), where job quality by trade union membership status and pay-setting arrangements are examined. Job quality scores for each of the eight major occupational group are then presented in the third part (section 7.3.3). This is followed by results by sector, workplace size and industry of employment (section 7.3.4). Building on the analysis presented in section 6.2.3 in chapter six, the interplay between contract type, hours and family formation is explored in section 7.4, where the sample is restricted to working mothers. In section 7.5, results for five sub-dimensions of the AJQI are explored: development opportunities; autonomy; work intensification; voice; and collective interest representation. They were selected on the basis of having much lower scores for quality than the other sub-dimensions in the AJQI. The final section of this chapter draws together the main take away points from the empirical contribution to the thesis.

The **final chapter (chapter eight)** begins by re-stating the focus of the research topic. The second section re-visits the main research questions in order to make an assessment of whether the aims and objectives of this thesis were met (section 8.2). In the third section, the three main contributions to the body of knowledge are articulated (section 8.3). In the next section, a number of limitations to the thesis are identified (section 8.4). In the penultimate section, a number of suggestions for further research are outlined. A short final summary is presented at the very end (section 8.6).

1.8. Conclusion

This chapter set out the background and structure of this thesis and how the research design addresses the research problem. The research problem is articulated and linked to a series of specific aims of the research. A set of three research questions are outlined and explicitly linked to gaps in the existing body of knowledge.

The third section of this chapter outlined the main contributions of the thesis to the body of knowledge. It explains that this thesis makes three types of contributions to the body of knowledge: conceptual, methodological; and empirical contributions. It emphasises, however, that the main type of contribution to the body of knowledge is methodological.

The fourth section of this chapter provides further justification for the thesis topic. It was explained that while job quality is emerging internationally as a topic for policy-makers and researchers, policy makers and researchers in Australia have not yet fully engaged with this topic. To date, the prevailing strand of labour market analysis and policy in Australia has focused on the *quantity* of jobs, frequently to the exclusion of the *quality* of jobs. While there have been a number of major reforms to Australian employment relations system, the academy has focussed its attention to explaining the details of changes in labour law rather than addressing the broader notion of job quality. Furthermore, conceptual problems are highlighted as one of the possible reasons why research on job quality has been hampered. The fact that much of the research on job quality has been blind to issues such as class, gender, and race is also highlighted. In addition, the chapter points to the fact that research on job quality has tended to focus on the low-skilled and/or low-paid segments of the workforce, but that a more expansive approach is required, one that considers job quality across the full spectrum of jobs.

The fifth section of this chapter explains four delimitations of the research: the empirical focus is restricted to job quality in one national system, namely Australia; the reasons behind restricting the sample to employees; a single wave of cross-sectional data is used, restricting the analysis to an assessment of job quality at one particular point in time, however, because of the way the index has been constructed, it will be easy to replicate using data from future waves of the data; due to space limitations, the thesis does not report on spatial differences in job quality in Australia. Nevertheless, the aims of the thesis remain ambitious.

The sixth section sets out three definitions or conventions, to help the reader navigate the information presented in the chapters to follow. The seventh section provides a description of how the remainder of the thesis is structured, including a brief overview of what is covered in each chapter, and in what order. As explained in the seventh section of this chapter, the thesis contains two chapters, rather than the more standard one chapter, reviewing the literature. Because job quality is a multi-dimensional construct and because the literature on job quality is vast and diverse, the two chapters to follow deal with two strands of the literature: conceptual and methodological issues. Current understandings on theorising and conceptualising job quality will be the focus of the next chapter (chapter two).

2. Current understandings of job quality

2.1. Introduction

Having established in chapter one that job quality is not only important but that there is growing interest in it from researchers and policy-makers, it is necessary to define the construct that will be measured. While overall quality of jobs can be broadly defined as the extent to which a set of job attributes contributes to, or detracts from, workers' wellbeing, a number of authors have highlighted the difficulty in translating the general notion of job quality into a set of underlying dimensions (see Burgess, Connell & Dockery, 2013; Findlay, Kalleberg & Warhurst, 2013; Muñoz de Bustillo, Fernández-Macías, Antón & Esteve 2009; Muñoz de Bustillo, Fernández-Macías, Esteve & Antón, 2011a; Sengupta, Edwards & Tsai, 2009; Warhurst & Knox, 2015; Wright, 2015). In part, this difficulty is because while everyone has a notion of what 'good work' (or 'bad work' for that matter) might be, what may be considered a 'good job' (or 'bad job') can mean different things to different workers, social partners and policy-makers.

This chapter considers current understandings of job quality with four inter-related conceptual problems investigated below. Each of these conceptual problems stems from – or is related to – an overarching difficulty in defining the construct of job quality. The first conceptual problem discussed arises from job quality having been approached from different and often competing disciplinary traditions. Nine different disciplinary traditions are identified, each with their own focus and which leads to a discussion about the approach that will be taken in this thesis. The second conceptual problem arises from the fact that there is no general theory of job quality. The third conceptual problem arises due to a blurring of boundaries between terms commonly used to discuss job quality. An unpacking of key terms associated with research on job quality is undertaken so that, for the purposes of this thesis, blurring of boundaries around the related concepts of worker and employee; job, work and employment; job quality, quality of work and quality of employment are clarified. The fourth conceptual problem pertains to the difficulty in translating the general notion of job quality into a set of underlying dimensions. The various dimensions of job quality and existing frameworks or models of job quality are considered. This task is followed by articulation of what can be considered an agreed core of dimensions of job quality. The chapter then concludes with an articulation of the definition of job quality adopted in this thesis.

2.2. Disciplinary traditions

The first conceptual problem arises from interest in this topic from a number of different academic disciplines. These different disciplines have varying – and often competing – approaches to job quality, largely consistent with their own disciplinary traditions (Eurofound, 2012). While the concept of job quality has its origins in the social and political sciences, it has also been the focus of research from other disciplines. For example, Hurley and his colleagues (2012) identified what they call seven disciplinary traditions[1] of research on job quality: orthodox economics, radical economics, traditional sociology, the institutional approach, occupational medicine and health and safety approach, work-life balance approach and the industrial democracy approach. These disciplinary traditions tend to have different foci. For example, orthodox economics tends to focus on compensating wage differentials while traditional sociologists typically focus on alienation and intrinsic characteristics of work.

More recently, Murray and Stewart (2015) identify two further approaches to job quality: the radical economic and the behavioural economic. The former focuses on power relations and exploitation while the later focuses on participation. Job quality has also been a subject of interest to geographers, with Weller and Campbell (2015) explaining that geographers view job quality as 'an outcome of the multiple and inherently spatialised structures and processes at work in labour markets'. Table 2.2.1 sets out the focus of nine different approaches to research on job quality.

Table 2.2.1: Focus of different disciplinary traditions

Disciplinary tradition	Focus
Orthodox economic approach	Compensating wage differentials
Radical economic approach	Power relations and exploitation
Behavioural economic approach	Participation
Traditional sociological approach	Alienation and intrinsic quality of work
Institutional approach	Segmentation and employment quality
Gender regimes approach	Gender inequality in labour markets
Occupational medicine and health & safety approach	Risks and impact of work on health
Work-life balance approach	Working time including duration and intensity
Industrial democracy approach	Voice including union membership and collective bargaining
Geography	Spatialised structures and processes at work in labour markets

Source: Adapted from Hurley, Fernández-Macías & Muñoz de Bustillo, 2012: 157; Murray & Stewart, 2015: 140; Weller & Campbell, 2015: 86.

[1] The seven 'disciplinary traditions' identified by Hurley and his colleagues (2012), in the strict sense, might not be recognised as academic disciplines.

2.3. Theoretical perspectives

While there is no general theory of job quality, it is useful to consider theorisation of job quality before outlining the key aspects of the two theoretical approaches that will be drawn upon to interpret the empirical findings reported in this thesis.

First, building theory is not an aim of this thesis.

Second, it is beyond this thesis to undertake a comprehensive review of the classical theoretical approaches to work; or what may be termed 'grand theories' of work (e.g. Marx and Capitalism; Durkheim and Industrial Society; Weber and Social Stratification). However, there has been a number of attempts to explicitly use theory to consider the issue of job quality. Several prominent examples are outlined below.

In the orthodox economic tradition, theorising about job quality is dominated by a focus on wages, where the theory of compensating (wage) differentials (CWD) assumes that wage differentials equalise or compensate for the non-monetary differences among jobs; whereby the quality of jobs is a consequence of the preferences (and decisions) of workers (Muñoz de Bustillo et al., 2011a). The theory of compensating wage differentials has been empirically tested by many researchers (see for example, Bonhome & Jolivet, 2009; Brown, 1980; Fernández & Nordman, 2009). Bryan and Rafferty (2015: 141) observe 'the most generous conclusion from this research is that robust support for CWD is lacking'. More charitably, Muñoz de Bustillo and his colleagues (2011a) suggest that compensating differentials 'might work for some characteristics of work, but not for others, and for some workers, but not for others' (p. 43). One conclusion mooted by Bryan and Rafferty (2015: 141) it that the evidence shows some support for 'accumulating' job quality factors, that is where good quality jobs tend to be associated with high wages, and vice versa.

Although dominant in orthodox economics, CWD has faced opposition not only from non-economic academic domains (like politics and sociology) but also in other strands of economic thought, in particular, from followers of Marx (Muñoz de Bustillo et al., 2011a).

Those from Marxian traditions believe that workers will always be exploited under capitalism, regardless of whether the labour market is competitive because capitalist societies are inescapably associated with degradation of jobs (see for example, Braverman, 1974; Burawoy, 1979; Knights 1990, 1997). Some four decades after Braverman's degradation of work thesis, however, differences of opinion remain as to whether changes in the nature of work have led to an increase or decrease in the quality of jobs (Carré et al., 2012; Findlay et al., 2013). The dominant view in the literature is that there is increasing 'polarisation' within the job market (Fernández-Macías, 2012).

Labour market segmentation theorists distinguish between a core (or primary) sector of the workforce who have high levels of job security and internal career structures; and the periphery (or secondary) sector who have poor quality jobs where employees are in low-skilled, low-paid, insecure jobs (see for example, Doeringer & Piore, 1971; Piore & Sabel, 1986). Moreover, institutional theories have been used to understand apparent cross-national differences in job quality (see for example Gallie, 2007; Soskice, 2005). For example, Gallie (2007) reviewed the quality of working life in seven European countries with very different institutional systems and concluded that an 'employment regime' perspective provided the most convincing account of the factors that affect the quality of work in capitalist societies. In other research, Holman (2013a) used the varieties of capitalism (VoC) approach to develop a typology of 'job types' as the basis to consider job quality in 27 EU countries while Vidal (2013) used Post-Fordism and labour process theory to develop a framework for analysing job quality in the USA.

Closely related to earlier Marxian theories of class formation and class conflict, theorisation and empirical work undertaken on production regimes primarily focusses on welfare regimes (Gallie, 2007). The work of Esping-Andersen, however, emphasised the mutual implications of welfare regimes and employment policies (Gallie, 2007). While Fligstein and Byrkjeflot (1996) explicitly linked the power resources approach to a notion of 'employment systems' (Gallie, 2007). Fligstein and Byrkjeflot give central positioning to systems of skill formation in developing their contrast between systems based on vocationalism, professionalism, and managerialism (Gallie, 2007). The level of state intervention is considered a central structuring feature, which in turn reflects the labour market power of workers, rooted partly in skill and partly in the ability to control labour and skills supply.

The employment regimes approach was developed by Gallie (2007), where this approach distinguishing itself from the production regimes approach because it emphasises the importance of employment policies and the power of organised labour within particular countries, where institutional structures such as employment and the industrial relations policies that underlie them are categorised into three kinds of employment regimes: inclusive, dualist and market-based (Gallie, 2007).

Inclusive employment regimes are those where policies are designed extend both employment and common rights as widely as possible through the working age population. Dualist regimes guarantee strong rights to a core workforce of skilled long-term employees, at the expense of poor conditions and low security of the periphery. Finally, market employment regimes emphasise minimal employment regulation, assuming that market forces will bring about longer tem high employment levels and benefits to employees based on their productivity

(Gallie, 2007). Gallie identifies seven key aspects where the three models of inclusive, dualist and market-based employment regimes differ systematically, as follows:

- Systems of skill formation;
- Extent of involvement of organised labour in decision-making;
- Principles underlying employment policy;
- Role of the public sector;
- Salience of quality of working life programmes;
- Institutional provision to support the combination of paid work and family; and
- Level of welfare protection offered to the unemployed.

Advocates of the employment regimes approach place emphasis on the importance of understanding the national institutional arrangements which shape the quality of jobs. For example, national laws, policies and institutions establish minimum standards for pay and working conditions can be conceived as forms of intervention designed to improve (or reduce) job quality (Murray & Stewart, 2015) and are important for adequately interpreting statistical indicators on job quality (UNECE, 2015).

Feminist researchers believe that traditional approaches to the study of work do not adequately take account of differences that are likely to be observed between women and men. To date, much of the previous work on job quality has either ignored gender or viewed it in terms of the male norm (Wright, 2015). A strong argument can be made that notions of 'good quality' jobs rest on the male breadwinner model of employment, that is, payment of a family wage, standard working hours, and permanent employment. There remains a need to examine the specific contexts of jobs and in explicitly viewing those in paid employment as class and gendered subjects who are subject to other social forces (Charlesworth & Chalmers, 2005:2). As Pocock and Skinner (2012: 5) state, it is 'not adequate to analyse work as if it does not occur in socially-embedded ways: it is vital to link up analysis of work with that of household and community life'.

Since the early work of Acker, new approaches to the study of paid (and unpaid) work, particular studies of the labour process, see organisations as gendered, not as gender-neutral and conceptualise organisations as one of the locations where gender and class relations are produced and reproduced. One particular aspect where the gender regimes approach may useful in the study of job quality is in trying to understand why women are more likely to occupy lower status jobs (Budig & England, 2001).

The gender regimes approach contends that 'gendered behaviour and identities are influenced by structural, institutional and personal characteristics'. Moreover, that the cultural assumptions held by men, women and employers in relation to women's participation in the labour market ‘subvert formal organisational policies and influence the male and female roles in relation to childcare responsibilities’ (Eden 2017:104). Aspects such as breadwinner models, gender segregation in the workforce, women’s labour force participation rates, wage penalties for part-time hours and/or motherhood; the organisation of care work, and child-bearing are matters of interest for this approach. Rubery and Hebson (2018: 414) suggest that a gender lens ‘provides opportunities for revitalisation through bringing in social reproduction alongside production, introducing intersectional identities alongside class, developing gendered critiques of ‘neutral’ markets and recognising the ‘doing of gender’ within the workplace’.

Crucially, given the focus in this thesis is on job quality, the concept of a ‘job’ is implicitly a gendered concept, even though the organisation may present it as gender-neutral. Acker (1990: 148) observed that job evaluation appraises jobs, not their incumbents, where jobs exist as a thing apart from individuals, and every job has a place in a hierarchy, where hierarchies are also without actual workers. Levels of skill, complexity and responsibility, all used in constructing the hierarchy, are conceptualised as existing independently of any concrete worker (Acker, 1990: 149). The closest the disembodied worker doing the abstract job comes to a real worker, she argues, is the male whose life centres on his full-time, life-long job, while his wife or another women takes care of his personal needs and his children. The woman worker, assumed to have legitimate obligations other than those required by the job, does not fit with the abstract job (Acker, 1990: 149).

Importantly, gender intersects with other forms of inequality. These include age, class, race and domestic relations (Acker, 2006; Durbin & Conley, 2010; Hancock, 2007; Walby, Armstrong & Strid, 2012). Intersectionality is an important and increasingly utilised concept in feminist theory used to theorise about the relationship between different forms of social inequality (Durbin & Conley, 2010). The intersectionality of gender with other forms of inequality will, where possible, be taken into consideration.

Each of the disciplinary traditions identified above, with their various and intersecting theorising, has added to current understanding of job quality however each, alone, is insufficient in understanding the complexity of the multi-dimensionality of job quality. By drawing from each of the various disciplines, the approach undertaken in this thesis is multi-disciplinary so that a holistic understanding of job quality can be gained.

2.4. Blurring of terminology and focus

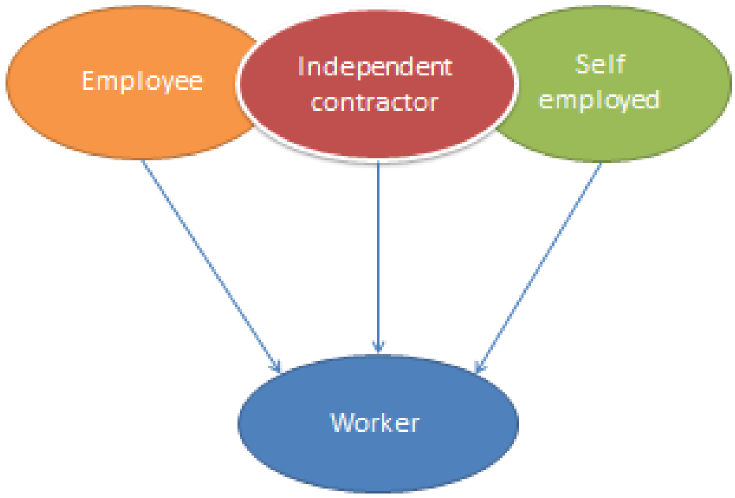
Intricately related to the problems associated with the different disciplinary traditions of research on job quality and a lack of theory on job quality, the third conceptual problem around blurred boundaries arises because there is a plethora of different terms associated with research in this area. Some of the terms are narrow, others broad. In some cases, overlap exists while in other cases terms are taken as synonymous, despite differences in meaning, scope or foci.

As outlined in section 2.2, the inter-disciplinary nature of job quality has meant that the boundaries of what is under investigation are often blurred and researchers from different disciplinary traditions might consider different things when investigating job quality. For this reason, it is necessary to unpack some of the building blocks to establish boundaries between the different terms so as to clarify how the construct of job quality differs conceptually from other similar concepts.

2.4.1. Worker or employee

While it may seem rudimentary, it is important to clarify the target group of workers considered in any analysis of job quality (Muñoz de Bustillo et al., 2011a). While the basic terms of 'worker' and 'employee' are often used interchangeably, research in the field of job quality has typically been restricted to analysis of job quality among 'employees'. In part, this focus has arisen because researchers from the sociological and radical approaches to job quality have been particularly interested in the nature of asymmetric power in the employment relationship; where managerial prerogative potentially leads to exploitation of employees. It can also be due to a lack of suitable data, which is more of a measurement issue than a definitional one. For example, the labour force survey data collected by the Australian Bureau of Statistics (ABS) changed to distinguish between three main categories of workers: employees, independent contractors and the self-employed. There is also a real (as opposed to definitional) blurring between the different types of workers (Figure 2.3.1.1 below). For example, while some workers may be classified as independent contractors, when tested against labour law or taxation rules, they would more accurately be classified as employees. The new ride-sharing service of Uber is a current example of where this kind of blurring exists. The business model developed by Uber involves individual drivers using their own cars to transport customers. Passengers (or ride-sharers) make bookings and payments via a mobile phone application. While Uber classifies the drivers as independent contractors, legal challenges in several countries have found the drivers to be employees (see Somerville, 2015).

Figure 2.4.1.1: Categories of workers in Australia



While the arrangements in place at Uber are in the headlines at the time of writing, the blurring of boundaries between employees and contractors is not a new phenomenon. Bornstein, a prominent Australian barrister, views Uber as 'merely the latest battleground for the same debate' (Bornstein, 2015). There is ongoing debate about whether there is a growing percentage of contractors or self-employed workers who are in fact 'employees in disguise' or 'sham contractors' as a result of contracting out of firms and their preference for commercial law contracts rather than employment contracts (Roles & Stewart, 2012). In principle, independent contractors and the self-employed have more latitude to specify their own working conditions however contracting and self-employment, or at least part of it, can be driven by competitive pressures so workers may have little choice in accepting undesirable working conditions if they wish to remain in work (Muñoz de Bustillo et al., 2011b).

The emergence of new forms of work as illustrated with the example from Uber means that asymmetry and exploitation can and does extend beyond the traditional employer-employee relationship. Furthermore, given that in most developed countries, contractors and the self-employed represent a sizeable and growing proportion of the labour force, any empirical assessment of job quality should, where possible, include all categories of workers. However for data reasons, the empirical analysis of job quality in Australia is restricted in focus on employees.

2.4.2. Job, work and employment

It is also important to clarify the focus of activities included in any analysis of job quality (Muñoz de Bustillo et al., 2011b). A second set of basic terms that need clarification are the terms of 'job', 'work' and 'employment'. The concept of a 'job' is narrower than the concept of 'work', and as mentioned above employees are not the only category of workers.

Cooke and his colleagues (2013) explore the relationship between jobs and work, where 'work' is conceptualised as a much broader concept than a 'job'. They define 'work' as 'a purposeful human activity involving physical or mental exertion that is not undertaken solely for pleasure and has economic value, and it includes paid and unpaid tasks inside and outside the home, volunteering and seeking employment' (Cooke, Donaghey & Zeytinoglu, 2013: 504). Their definition of 'work' is broad in that it duly recognises that work can be paid or unpaid, including such activities as unpaid domestic and carer work and volunteering. While unpaid care work and volunteering are both important topics in themselves, the focus of analysis in this thesis is restricted to paid work. Furthermore, while their definition includes the 'seeking of employment', job search activities fall outside the notion of 'work' adopted in this thesis. A further point of issue is taken with their definition where they construe work as 'not being undertaken solely for pleasure'. This phrasing implies that people necessarily must gain at least some degree of pleasure from performing their work. It is possible to conceive the situation where some workers do not find any pleasure in their work; merely performing it entirely out of economic necessity. Whether a worker enjoys their work, finds their work rewarding or fulfilling are important issues but they lie outside the scope of this thesis (see Budd, 2011 on the purpose of work).

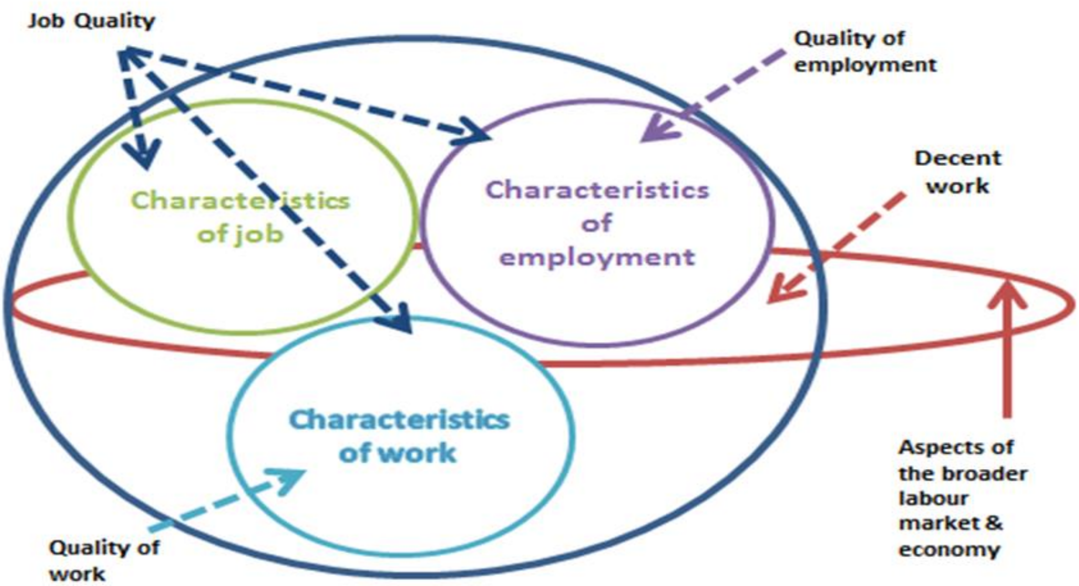
Moving on to the narrower concept of a 'job', Cooke and his colleagues define it as "a paid position in an organisation consisting of a number of tasks" where 'the usual situation involves undertaking a set of tasks, specified by an employer, ostensibly in return for financial compensation' (2013: 504). In reality, the same 'job' could be performed with or without financial compensation. For the purposes of this thesis, the concept of work will also be restricted to paid work. The definition from Cooke and colleagues (2013) also refers to the 'usual situation' that it is an 'employee' who is performing the tasks of the job. Linked to the discussion in the previous section about the different categories of workers, in this thesis it is held that a 'job' may, in some instances, be performed by an employee, an independent contractor or a self-employed worker (op. cit., 504).

The terms 'employment' and 'work' are also often used interchangeably. Being 'employed' can include an employer-employee relationship, being engaged as an independent contractor or self-employment. In this thesis, a paid worker undertakes a specific job and performs their work in their workplace (which may include one or more locations and could include their home). The combination of the job, work, workplace and any contractual nature of the employment relationship (employment) all interact in the 'sphere of work'.

2.4.3. Job quality, quality of work and quality of employment

Thirdly, related to the interchangeable use of the terms of job, work and employment, the concepts of 'job quality', 'quality of work' and 'quality of employment' are often thought of synonymously. Muñoz de Bustillo and his colleagues (2011b) use the term of 'quality of work' to pertain to aspects of the workplace such as responsibilities and work organisation. They use the term 'quality of employment' to pertain to contractual aspects of the employment relationship and they use 'job quality' as an overarching term encompassing all three aspects of the characteristics of the job, quality of work and quality of employment (Muñoz de Bustillo et al., 2009). Consistent with this understanding, Muñoz de Bustillo and his colleagues (2011b) see the concept of job quality encompassing the characteristics of the work performed (i.e. the job), the work environment (i.e. the workplace including factors such as the level of autonomy at work as well as the social and physical environment) and the employment dimension (i.e. the contractual conditions under which the work is performed). This broad understanding is adopted in this thesis. Figure 2.3.3.1 maps how job quality is best understood as including job, work, and employment characteristics.

Figure 2.4.3.1: Overlapping terms



Confusing matters, the European Employment Strategy (EES) refers to 'employment quality', where this broader notion includes what is happening in the broader labour market (Davoine & Erhel, 2006). Along similar lines, the term used by the International Labour Organisation (ILO) of 'decent work' could be construed as narrow in one sense, as it focuses on minimum 'acceptable' or 'adequate' standards of work and working conditions meant to apply in all countries and sectors, including the informal sector, yet with a particular focus on the poorest and most vulnerable (Anker, et al. 2003). Moreover, some ILO indicators of decent work are concerned with matters beyond the workplace, such as information about the broader labour market (e.g. unemployment rates) and economy (e.g. productivity rates). Relevantly, Muñoz de Bustillo and his colleagues (2011a: 101) view the ILO's notion of decent work as 'more an expression of social or political goals for desirable working conditions rather than an operational and policy-oriented concept' of job quality. Figure 2.4.3.1 above shows the overlap of decent work with job quality as well as how the notion of decent work extends outside the boundaries of job quality to incorporate aspects of the broader labour market and economy. The concept of job quality that is adopted in this thesis excludes concepts which are concerned with the broader labour market (such as the level of unemployment) and/or economy (such as productivity).

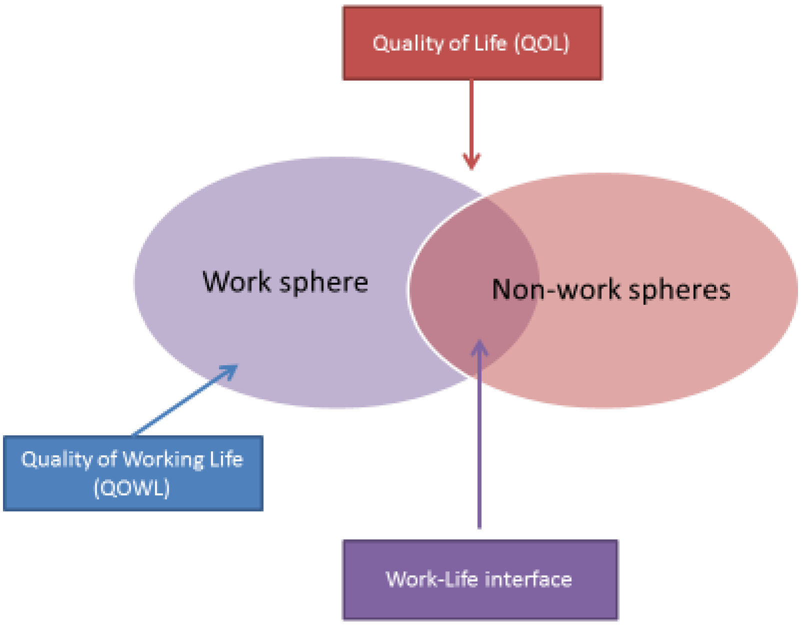
2.4.4. Job quality, quality of work and Quality of Working Life (QoWL)

The fourth set of terms requiring unpacking are those of quality of work and quality of working life (QoWL). While it has already been established that a broad notion of job quality which incorporates the notion of quality of work will be adopted throughout this thesis, sometimes the term of quality of working life (QoWL) enters the job quality debate. Typically, research on QoWL is coupled with the broader quality of life (QoL) research agenda.

There are two main approaches to research on QoL. On the one hand, Swedish research on quality of life has a strong focus on objective living conditions where QoL 'depends crucially on the individual's command over – under given determinants – mobilisable resources, with whose help he/she can control and consciously direct his/her living conditions' (Erikson, 1974 cited in Drobnič, Beham & Präg, 2010). In contrast, US research tends to focus on individual subjective evaluations to assess QoL, where individuals' resources are not considered relevant for the welfare of an individual; instead the focus of this approach is on the needs of an individual.

With both approaches to QoL, the domain of work is considered important (Drobnič et al., 2010). Hence, included in the notion of quality of life is the sphere of QoWL. In turn, QoWL includes, but is not limited to, the quality of work (QoW). Figure 2.3.4.1, below, shows how the broad concept of QoWL interacts with non-work spheres of life.

Figure 2.4.4.1: Interaction of work and non-work spheres



Having established that what happens in the work domain (QoWL) is important to an individual's quality of life (QoL), the question then becomes one of how the concept of job quality is distinct from these other two concepts. Quality of working life (QoWL) has been found to be a key element in the quality of life (QoL), where both having work and certain job characteristics (such as worker-centred flexibility and autonomy) have a clear impact on subjective wellbeing (Brown, Charlwood, Forde & Spencer, 2007; Drobnič et al., 2010; Muñoz de Bustillo et al., 2011a). For this reason, some researchers consider it necessary to broaden the analysis to examine job quality against its wider socio-economic context, that is, in relation to family, community and the wider society. Hence, their definitions of job quality extend to include how the effects of job quality flow on to the workers' own quality of life outside work and to the quality of life of their families (Burgess, 2003 & 2005; Burgess et al., 2013; Charlesworth, Welsh, Strazdins, Baird & Campbell, 2014; Cooke et al., 2013; Erhel & Guergoat-Larivière, 2010a, 2010b; Pocock & Skinner, 2012).

Cooke and his colleagues (2013) see this broader approach as reconfiguring the frame of analysis to include the context against which workers are embedded. They argue that 'work quality is dependent on the workers' individual circumstances such as age, family/personal relationships, location, life stage and their values on life and work, along with available alternatives for achieving personal life goals' (Cooke et al., 2013: 504). Along similar lines, Erhel and Guergoat-Larivière (2010b) suggest that a 'modern definition of job quality' should also include the impact of employment on other spheres of life. They see inclusion of 'out-of-work quality dimensions' such as the right to training, to occupational redeployment or retraining, to family life, and to decide one's working hours throughout the life cycle as important additional dimensions of job quality (Erhel & Guergoat-Larivière, 2010b: 1). While it is accepted that interaction between work and non-work spheres occurs and is important, the central focus of this thesis is narrower, focusing on job quality rather than on the broader notion of quality of working life. The concept of job quality that is used in this thesis includes work-related aspects, to the extent that the work-related training forms part of one of the six sub-dimensions and work-life balance forms one of the six dimensions (capturing four aspects of working time: duration; scheduling; flexibility; and work intensity).

2.5. Underlying dimensions

The fourth conceptual problem pertains to the difficulty in translating the general notion of job quality into a set of underlying dimensions or characteristics of a job. While a consensus has emerged that job quality is a multi-dimensional concept, where the overall quality of jobs reflects a series of attributes or dimensions, there is variance in the type and number of dimensions that have been proposed (Burgess, 2003; Kalleberg, 2011; Warhurst & Knox, 2015). Details about the two main debates about the type of dimensions that should be considered are discussed below. This discussion is followed with a review of the number and combination of various dimensions that have been used by researchers to operationalise job quality.

2.5.1. Type of dimensions

In deciding which attributes or dimensions of jobs have an impact on job quality, one of the divides is about whether the analysis should focus on extrinsic or intrinsic dimensions of a job. Some researchers have included both extrinsic (such as earnings and prospects) and intrinsic aspects (such as skill use and discretion, social environment, physical environment, work intensity and working time quality) of the job when identifying the components or elements comprising the construct of job quality (Clark, 2005a & b; Eurofound, 2012; Gallie, 2007; Sutherland, 2011). The decision about whether to focus on extrinsic aspects of the job, intrinsic aspects of the job, or both is once again related to disciplinary traditions of the researchers. In this thesis, both extrinsic and intrinsic characteristics of the job are incorporated into the index.

More controversial is the question of whether the analysis of job quality should be restricted to the characteristics of the job itself (objective dimensions) or broadened to include consideration of whether the job meets the perceived needs of individual workers (subjective dimensions) (Green, 2006). When measuring job quality, the distinction between 'objective' and 'subjective' refers to the substance of the indicators: while 'objective' indicators describe the actual conditions shaping the quality of employment (for example, the number of hours worked); ‘subjective’ indicators focus on how workers perceive certain aspects of quality of employment (for example, whether working hours are too long/few). As in the broader area of quality of life, comprehensively measuring job quality requires both objective and subjective indicators (UNECE, 2015). At the same time, it should be noted that it is not always straightforward to draw a clear line between ‘objective’ and ‘subjective’ indicators, as the perception of the respondents is often involved to some degree when measuring factual information (UNECE, 2015).

An objective concept of job quality focuses on the essential characteristics of work, its environment and the contractual conditions under which the work is performed that have a clear and direct impact on the wellbeing of workers (Eurofound, 2012; Hurley, Fernández-Macías & Muñoz de Bustillo, 2012). The aim of the objective approach is to obtain a measure of job quality independent of workers’ personal circumstances and the external labour market – i.e. features of work and employment, which on average, meet workers’ needs (Eurofound, 2012). So a job that features one or more low quality characteristics is not offset by the high quality of one or more other job characteristics (e.g. unsafe working conditions cannot be offset by high pay).

In contrast, a subjective approach to defining job quality works from the assumption that each worker has preferences over different job features. The aim of the subjective approach is to obtain measures of the extent to which a job meets workers’ needs (Eurofound, 2012). For example, the European Commission views job quality as a relative concept regarding the job-worker relationship (2001: 65):

> *Job quality is a relative concept regarding a job-worker-relationship, which takes into account both objective characteristics related to the job and the match between worker characteristics, on the one hand, and job requirements, on the other. It also involves subjective evaluation of these characteristics by the respective worker on the basis of his or her characteristics, experience, and expectations.*

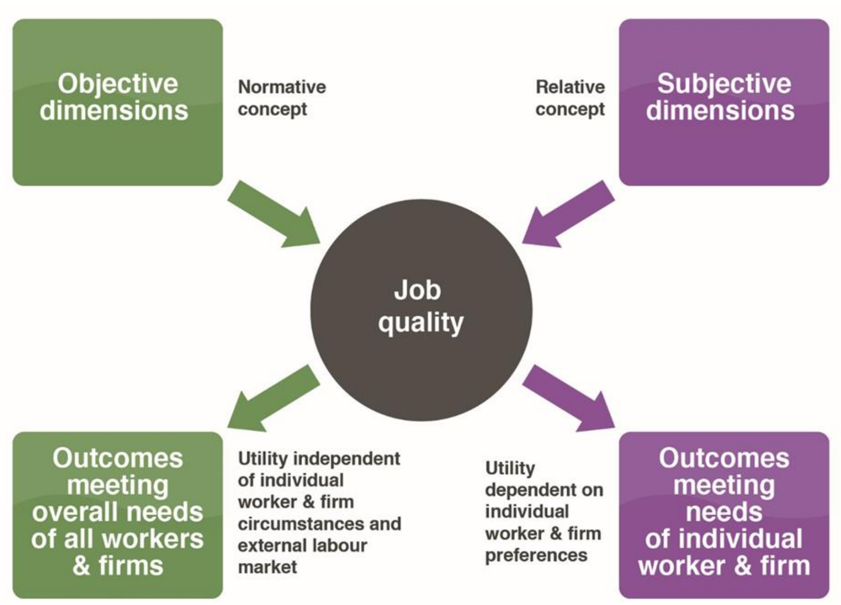
Researchers from the subjective tradition do not support a universally applicable approach to defining job quality. They believe that the objective approach views jobs as neutral, and in doing so, ignores worker characteristics such as gender, race and class (Charlesworth & Chalmers, 2005; Green, 2006; Pocock & Skinner, 2012). For example, Charlesworth and Chalmers (2005: 2) defines job quality as ‘encompassing not only characteristics of the jobs themselves but also the characteristics of the workers (in relation to the degree to which the job meets the needs of the individual worker) as well as broader characteristics of the workplace and labour market’. Along similar lines, Pocock and Skinner (2012) contend that good or bad aspects of a worker’s job vary according to their circumstances – for example, workers' gender, health, household situation or life stage. And Cooke and his colleagues (2013) contend that the focus of job quality 'should be on the broader concept of work quality, which places the job against its wider socio-economic context'.

Knox, Warhurst, Nickson and Dutton (2015: 1562) argue that including both objective and subjective assessments of job quality:

> *…provides a more nuanced and comprehensive account of job quality because it rightly maintains and incorporates the objective and subjective dimensions and provides a more comprehensive analytical framework of worker types.*

Figure 2.4.1.1 below shows the relationship between the objective and subjective dimensions of job quality. While Figure 2.4.1.1 may give the impression that it is easy to distinguish between objective and subjective dimensions of job quality, inconsistencies are evident in the understanding of what constitutes a 'subjective' measure. In some surveys, job-holders themselves are the informants about the working conditions of their job, i.e. worker self-reporting. For example, a worker could be asked about the number of hours they usually work each week along with the number of hours they are paid to work. There is some confusion about the distinction between what is – and is not – a subjective measure of job quality. It is not automatic that if a worker self-reports this constitutes a 'subjective' measure. It is only when the worker is asked to for their opinion, attitude, perception or feeling, that a variable is subjective. For example, asking a worker how satisfied they are with their pay would be classified as a 'subjective' measure whereas asking the same worker how much they are paid would be classified as an objective measure.

Figure 2.5.1.1: Objective and subjective dimensions of job quality



Self-reported variables are sometimes incorrectly referred to as ‘subjective’ but this is a potential source of confusion as these types of self-reports are about ‘objective’ features of their job (Eurofound, 2012). In contrast, asking a worker to self-report whether they are happy with the number of hours they work, whether they are satisfied with their pay or whether they find their work fulfilling are all subjective because the answer will depend on factors that are personal to the worker and influenced by their own circumstances. For this reason, the term ‘subjective’ should more appropriately be restricted to self-reports of feelings, perceptions, attitudes or values (Eurofound, 2012).

Critical of using subjective measures, Osterman and Shulman (2011) argue that research on the correlates of job traits with the degree of contentment people express about their work is interesting, but not the point. For them, job quality research should focus on developing a baseline for all jobs by enforcing and raising minimum standards, strengthening of employee voice and working with firms to upgrade work. Following this reasoning, those critical of using subjective measures would contend that items in an index of job quality should be restricted to the objective characteristics of jobs. Subjective items would lie outside the (objective) index itself.

As foreshadowed above, the choice in adopting objective dimensions, subjective dimensions or a combination of both tends to be linked to the disciplinary traditions of the researcher. The index of job quality that is the focus of this thesis incorporates both objective and subjective measures. However subjective measures were only incorporated into the index for two reasons. The first reason is connected to the difficulty in objectively capturing certain aspects of job quality; in particular, the aspect of autonomy. Autonomy is a very subjective concept concerned with perceptions of the degree of control and the degree of influence a worker has over their job (Esser & Olsen, 2011). It would be difficult to devise a question (or set of questions) that could be included in a large-scale survey that was capable of capturing an objective assessment about the degree of autonomy a worker was afforded in their job. The second reason for including a subjective indicator in the index is due to there being a lack of relevant questions in the survey data, despite it being technically possible to operationalise, objectively, the particular aspect of job quality. That is, the absence of relevant objective indicators in the dataset resulted in the need to incorporate a number of subjective indicators in order to adequately populate the conceptual framework.

2.5.2. Number and combination of dimensions

Debate not only remains around what type of characteristics of the job to include in the definition of job quality, there is also considerable variance in the number of dimensions of job quality that have been proposed.

A mapping exercise of the dimensions of job quality captured in more than 60 different studies published between 2001 and 2017 reveals that typically, between four and ten dimensions have been used, but that the number and combination of dimensions used by researchers varies considerably (author's own work published in Warhurst, Wright & Lyonnette, 2017; Wright, Warhurst, Lyonette & Sarkar, 2018).

There is considerable variation in the number and combination of dimensions used by researchers, however six core or essential dimensions of job quality emerge:

- **Pay and other rewards**: including objective aspects such as wage level, type of payment (for example, fixed salary, performance pay) and non-wage fringe benefits (such as employer-provided pension and health cover) and subjective aspects (such as satisfaction with pay);
- **Intrinsic characteristics of work**: including objective aspects (such as skills, autonomy, control, variety, work effort) and subjective aspects (such as meaningfulness, fulfilment, social support and powerfulness);
- **Terms of employment**: including objective aspects (such as contractual stability and opportunities for training, development and progression) and subjective aspects (such as perception of job security);
- **Health and safety**: including physical and psychosocial risks;
- **Work-life balance**: including working time arrangements such as duration, scheduling and flexibility, as well as work intensity;
- **Representation and voice**: including employee consultation, trade union representation and employee involvement in decision-making (author's own work, published in Warhurst, Wright & Lyonnette, 2017: 21).

Table 11.1 in Appendix 11.1 sets out the dimensions and aspects of job quality identified as a result of the mapping exercise (including an indication of the aspects that were incorporated into the AJQI).

On the basis of a literature review, the above six dimensions were identified as the core dimensions of job quality, and as such were used to develop the conceptual framework that was used to operationalise the index (the AJQI) constructed as part of this thesis.

2.6. Frameworks and models of job quality

While the number and combinations of underlying dimensions used to conceptualise job quality varies, very few researchers have articulated a model of job quality (albeit they may have labelled or described their framework as a model).

Based on a list of eight criteria adopted at a European Summit meeting held in Stockholm in 2001, in 2002 the European Foundation for Working and Living Conditions (Eurofound, 2002) developed a conceptual framework for job and employment quality. This framework draws solely on the characteristics of jobs with four main building blocks: career and employment security; health and wellbeing; reconciliation of working and non-working life; and skills development. Muñoz de Bustillo and his colleagues (2009) were critical of this model because, in their opinion, it was published by Eurofound without justification of either the underlying dimensions or the structure of the model and because the model failed to include the important dimension of the intrinsic characteristics of work.

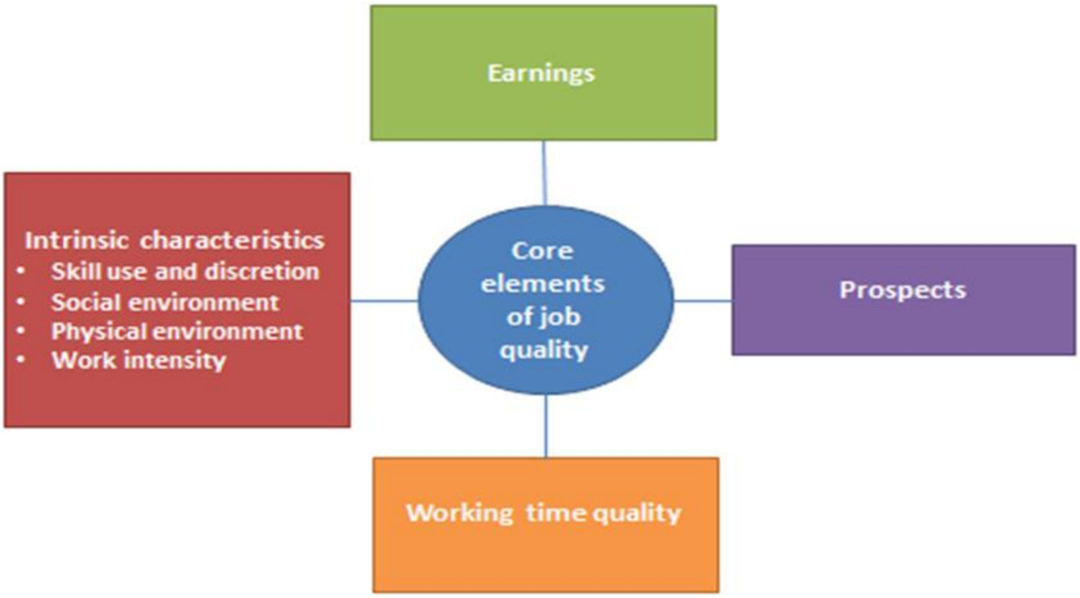
Critical of earlier attempts to conceptualise job quality, Muñoz de Bustillo and his colleagues (2009) suggested a general model for job quality that could serve as a theoretical basis for the construction of a European job quality indicator. They drew from the social sciences literature in order to identify which job attributes have a direct impact on the wellbeing of workers. Their general model divides job quality into two broad areas: employment quality and work quality. Their proposed dimensions of employment quality are: wages; social or fringe benefits; working hours; work schedules and time flexibility; job security; participation; and skills development. Their proposed dimensions of work quality are: autonomy; physical working conditions; health variables and risks of accidents; psychosocial risk factors; intensity of work; and meaningfulness of work.

While Muñoz de Bustillo and his colleagues acknowledge the importance of the social context comprising public and private institutions like the state and the family, their model of job quality omits dimensions of social policy and other public and private interventions. They argue that despite their impact on the wellbeing of workers, these contextual aspects are not part of either work or employment quality as they extend beyond the characteristics directly related to the job.

Grimshaw and Lehndorff (2010) developed a three-level framework of job quality: quality of working conditions; quality of employment conditions; and the quality of empowerment (cited in Holman & McClelland, 2011). Holman and McClelland (2011) then mapped what they considered as five underlying dimensions of job quality to a three-level framework: work organisation; wages and payment system; security and flexibility; skills and development; and engagement and representation). Just as job satisfaction should be more correctly viewed as an outcome rather than an underlying dimension of job quality, the same can be said about employee engagement.

Drawing on multi-disciplinary insights, Eurofound (2012) revised its 2002 conceptual framework. The revised framework adopts an objective concept of job quality that is restricted to the essential characteristics of jobs that meet workers' need for good work. It is comprised of four building blocks of job quality with seven underlying dimensions. The building blocks are configured differently to the 2002 framework to include two sets of extrinsic job features: earnings and prospects and two sets of intrinsic features of work: intrinsic job quality (comprised of four dimensions of skill use and discretion; social environment; physical working environment; and work intensity); and working time quality. Unlike the 2002 framework, earnings is treated as a separate building block because of its importance for living standards (see Figure 2.5.2.1, below). The four building blocks were used to operationalise four sub-indexes (measurement issues are discussed further in chapter 3).

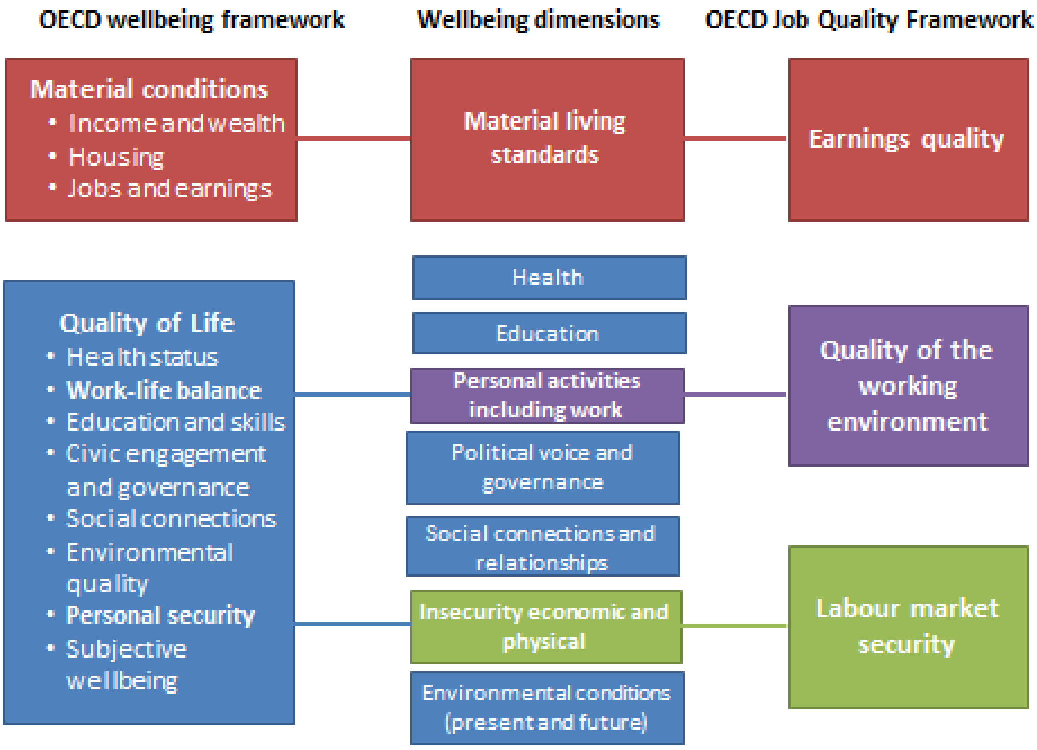
Figure 2.5.2.1: Eurofound's model of job quality, 2012



Source: Eurofound, 2012: 13-15, author's own depiction.

Building on its work on wellbeing, the OECD put forward a framework to measure and assess the quality of jobs. The OECD's framework considers three objective dimensions of job quality: earnings quality, quality of the working environment and labour market security (Cazes, Hijzen & Saint-Martin, 2015). Earnings quality is defined by the OECD as "the extent to which earnings received by workers in their jobs contribute to their wellbeing" and is measured by an index that accounts for both the level of earnings and their distribution across the workforce (OECD, 2016: 1). Quality of the working environment captures "non-economic aspects of job quality and includes factors that relate to the nature and content of work performed, working-time arrangements and workplace relationships" (OECD, 2016: 1). The OECD defines labour market security as 'the probability of job loss and its economic costs for workers' (OECD, 2016: 1) (see Figure 2.5.2.2 below). The OECD's job quality framework suffers from the same problems as the ILO's Decent Work indicators and the EU's Laeken indicators because the third dimension of labour market security is defined to extend beyond the job and workplace to include an assessment of labour market performance.

Figure 2.5.2.2: OECD's job quality framework, 2016



Source: Cazes et al., 2015: 15.

As apparent in the above descriptions, some frameworks include additional aspects that are not necessarily dimensions of job quality. For example, Leshke and Watt (2008) include trade union density[2]; Davoine and her colleagues (2008a, 2008b) include aspects such as unemployment rates; employment gap between men and women; productivity; and length of maternity leave. Furthermore, Holman and McClelland (2011) include: engagement while the OECD includes: labour market performance (see Caze et al., 2015). Hauff and Kirchner (2014) view the abovementioned aspects as either possible influencing factors of the work and employment conditions (such as trade union density; and length of maternity leave) or labour

[2] Union density is measured on an industry basis, whereby workers may work in an industry with high/low density, but this does not necessary mean that they are members of a union. As will be outlined in chapter four, the index includes trade union membership at the job-level as a job-level indicator of collective interest representation.

market conditions (such as unemployment rates; employment gaps between men and women; and productivity). That is, important, but not strictly dimensions of job quality in itself.

2.7. Conclusion

In summary, the lack of an agreed definition of job quality has meant that researchers have approached the topic from very different starting points. Furthermore, researchers have generally assumed they are all talking about the same thing – but which is not necessarily the case. Having first unpacked some of the related concepts, it is evident that while the number of dimensions seems to differ quite a bit, a great deal of overlap exists in the type of dimensions used by various researchers. The choice of dimensions largely reflects the disciplinary traditions of the researchers. Central to common notions of job quality is the idea that it impacts on workers' wellbeing. In addition, good job quality is one that meets workers' needs. An identifiable core of dimensions that focus on the essential characteristics of the job; aspects of work organisation; and contractual aspects of the employment relationship will be adopted in this thesis. This concept of job quality excludes aspects of the broader labour market and the economy; as well as issues that are likely to be related to the wellbeing of workers, but which are not characteristics of the jobs they perform, such as the social support they have outside work.

An existing model of job quality that was developed by Eurofound (2012), and that draws upon multi-disciplinary insights, was used as a starting point for operationalising a composite index of job quality in this thesis. The items in the index will be, as far as possible, restricted to the objective characteristics of the job; where those objective characteristics may include both extrinsic (e.g. wages) and intrinsic aspects (e.g. autonomy) of the job. Characteristics of the job or workplace (such as: occupation; industry; sector; and firm size) and characteristics of the job-holder (such as: age; gender; caring responsibilities; and highest education level) will be used as analytical categories in order to understand and explain why there may be differences between the objective and subjective assessments of job quality.

Having reviewed the literature on current understandings of job quality; identified a core set of dimensions; and reviewed existing models of job quality, the next chapter shifts from a review of the literature to measuring – or operationalising – the construct of job quality.

3. Measuring job quality

3.1. Introduction

With the previous chapter having outlined current understandings of job quality, this chapter focuses on measuring or operationalising the construct of job quality and developing a measure for the job quality index in this thesis. Reflecting the different definitions and dimensions of job quality outlined in chapter two, there is diversity in methodological approaches to measurement of job quality. In many respects, such diversity is largely consistent with the disciplinary traditions of the researchers.

After this introduction, the chapter is divided into five main sections. The first section considers the key issue of what type of approach to take for measuring job quality. Four main approaches for measuring job quality are identified. The first approach uses a single indicator as a proxy for job quality. The second approach asks workers to identify important dimensions of job quality. The third approach uses theory to develop taxonomies or clusters of job quality. The fourth approach uses theory to develop a multi-dimensional model of job quality.

Having decided to use the core aspects of job quality that emerge from the theoretical literature on job quality as the basis for developing a multi-dimensional index of job quality in this thesis, the second section begins with the distinction being drawn between developing a system of indicators, constructing a number of separate indices and constructing a composite index. Examples of each of the three methods for measuring job quality are presented. The third section in this chapter reviews the relevant body of quantitative research that has attempted to measure job quality in Australia. Research conducted before and after the availability of large-scale survey data are both considered. The fourth section sets out a series of general methodological insights derived from a review of composite indexes external to the field of job quality. The chapter ends with an articulation of the methodological approach to measuring job quality that will be adopted in this thesis.

3.2. Approaches

Both qualitative and quantitative research approaches have been used by researchers to study job quality. Because a quantitative approach is used to assess job quality in this thesis, it is important to consider the various approaches that have been used to measure job quality. Four main approaches for measuring job quality have been identified in the literature. The strengths and weaknesses of each of these approaches are discussed below.

3.2.1. Using a single indicator as a proxy for measuring job quality

Despite the general consensus that job quality is multi-dimensional, one of the main approaches used for measuring job quality uses a single indicator as an overall indicator or proxy for job quality. While it is easy to use one indicator, Muñoz de Bustillo and his colleagues (2009) described this approach as a 'shortcut'.

First, wages data have typically been used as proxy measures for job quality by economists (for example, Eurofound, 2008; Goos, Manning & Salomans, 2009; Leontaridi & Sloane, 2001; Vieira, Menezes & Gabriel, 2005). Some economists consider it sufficient to look at wages in order to understand both the quality of a job and determining the type of jobs being generated in an economy (see discussion in Davoine et al., 2008a; Leschke & Watt, 2008; Osterman, 2012; Storrie et al., 2012;).

Apart from it being easy to use one indicator, Storrie and his colleagues (2012) provide three reasons given for using wages as a proxy for job quality. From a practical point of view, wage data are more readily available than most other dimensions of job quality. The second reason for using wage data as a proxy for job quality is because it is quantifiable. In addition, wages have been found to be positively correlated with other dimensions of job quality. So by extension, it has been argued that by obtaining a picture of the wage distribution may not substantially differ from a more detailed analysis of overall job quality.

However, the use of wages as an indicator of job quality has been questioned by a number of researchers. For example, Green (2006) identifies a paradox of improvements in wages and better physical working conditions combined with worsening of other aspects of work, such as work effort and job autonomy. Other researchers point out that wages are not the attribute most valued by workers themselves (for example, Antón, Fernández-Macías & Bustillo, 2012; Sutherland, 2011). Warhurst and Knox (2015: 3) also contend that using a single item measure will translate into single item interventions to improve job quality. For instance, they cite the example of using pay as the measure, and this may translate into a wages policy or incomes policy; and while this may help low-paid workers, it does nothing to improve job quality for those workers earning higher wages yet who may have other job characteristics that negatively impact upon their health.

Second, job satisfaction has also been used as a single indicator to measure job quality. Osterman (2012) identifies a large literature in sociology and economics linking job quality with the correlates of reported job satisfaction. That is, traits of the job – wages, autonomy, prestige, security and so on – that are correlated with the degree of contentment workers express about their work (see also Clark, 1998, 2005a & b; Handel, 2005; Jencks, Perman & Rainwater, 1988).

Using job satisfaction as a proxy for job quality has been questioned by a number of researchers. For example, Muñoz de Bustillo and Fernández-Macías (2005) found that job satisfaction has no apparent relevant relation to other objective indicators of job quality, making this indicator of little adequacy for evaluating job quality. Also against using job satisfaction as a proxy for job quality, Green (2006) explains that while measures of job satisfaction have been robustly shown to predict behavior – in particular, job mobility - it is doubtful whether measures of job satisfaction capture wellbeing. Green states 'job satisfaction is assessed by workers in part in relation to what they expect from a job. Workers might be conditioned to expect a lot or a little from different jobs' (2006: 11). Similarly, Muñoz de Bustillo and his colleagues (2009; 2011b) view job satisfaction as a 'very unsatisfactory' indicator of job quality because there are many other variables not related to job quality that can affect the level of job satisfaction. Furthermore, they are critical of using a single subjective indicator to measure job quality because this approach focusses on measuring the output (i.e. job satisfaction) whereas the focus should more correctly be on the inputs (that is, the characteristics of the job).

Third, emergence of the 'economics of happiness' has seen some economists using happiness of workers as a proxy for measuring their wellbeing (for example, Layard, 2004). This approach draws upon developments in psychology and neurophysiology to 'resurrect the concept of cardinal utility' (Brown et al., 2007: 944). By extension, the same criticisms identified above for using job satisfaction as a measure for job quality equally apply to using other subjective measures (such as happiness at work).

In summary, the major strength of using a single indicator as a proxy of job quality lies in its simplicity. Wage data and single indicator measures of job satisfaction are readily found in most large-scale surveys. The major weakness of using a single indicator is that will not be able to capture, holistically, the multi-dimensionality of the concept of job quality. In some cases, the proxy is not measuring job quality at all, but another (perhaps important) concept altogether, such as engagement or turnover intentions.

3.2.2. Using workers to identify important dimensions of job quality

The second main approach identified by Muñoz de Bustillo and his colleagues (2009) is what they describe as 'an intermediate option' where workers are asked what they consider as being more important for job quality, and then their answers are used to study job quality. For example, Clark (2005a) asked workers to rate eight different job characteristics (high income, flexible working hours, good opportunities for advancement, job security, interesting job, allows to work independently, allows to help others and useful to society). Overall, employees rated job security and job interest, followed by independence highest. Similarly, Sutherland (2011) found that while wage was an important aspect of job quality, other aspects were of equal or greater importance to workers. Using the 2006 Employee Skills Survey to review job quality in the United Kingdom, Sutherland considered seven extrinsic and eight intrinsic attributes. While different sub-groups might rate attributes differently, he found that overall, the four of the top five job characteristics rated most highly by workers were intrinsic; the exception being job security.

An advantage to this approach is that most surveys on the quality of working life include questions about the desirability of specific job attributes, so there is often readily available data from workers (Muñoz de Bustillo et al., 2009). While this approach gives workers a voice in the definition of what makes a good job, it requires presenting workers with a predefined set of options (attributes to be ranked). In terms of disadvantages, identification of the elements to be included in the list is 'almost as tricky as the model of job quality itself', and leaving out important elements would have a 'disastrous effect on the modelling of job quality' (Muñoz de Bustillo et al., 2009: 13).

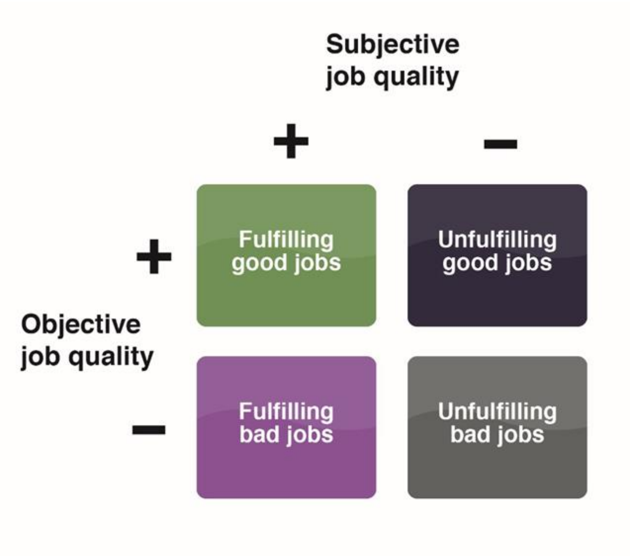
3.2.3. Identifying taxonomies or clusters of job quality types

A third and commonly used approach to measuring job quality involves classifying jobs into a set of distinct categories on the basis of their quality. When using this approach, the researcher uses theory to decide what measures to include in the taxonomy. The researcher also needs to decide the cut-off points for categories. Often these cut-off points are somewhat arbitrary, although statistical techniques such as cluster analysis may be used to groups jobs displaying mutual combinations of attributes (Burgess et al., 2013: 16; Eurofound, 2012: 48; Holman & McClelland, 2011: 138).

The taxonomy most commonly used in discussions on job quality is the simple dichotomy of 'good jobs' and 'bad jobs'. For US workers, for example, Schmitt (2008) defines good and bad jobs according to three (objective) criteria of pay (at least $17 per hour/less than $17 per hour; has employer-provided health insurance/does not have employer-sponsored health insurance and has employer-sponsored pension or retirement plan/does not have employer-sponsored retirement plan). Clearly analysis based on such a categorisation will be sensitive to the cut-off hour wage rate as the cusp for delineating good and bad jobs. Furthermore, the two other dimensions (employer-sponsored health insurance and pension plans) are US-centric, so have little relevance in the majority of OECD countries (including Australia[3]) where health insurance and pensions are provided by the state.

In another example where a taxonomy was used to assess job quality, Knox and her colleagues (2015) considered the quality of jobs among a specific sub-group of workers: hotel room attendants. Objective and subjective dimensions of job quality are enjoined into a taxonomy with four categories: fulfilling bad jobs (subjectively good but objectively bad) or unfulfilling bad jobs (i.e. subjectively and objectively bad), 'fulfilling good jobs' (subjectively and objectively good) or 'unfulfilling good jobs' (subjectively bad but objectively good). Their taxonomy recognises that workers' characteristics can mediate perceptions of job quality (Knox et al., 2015: 1562) (see Figure 3.2.3.1 below).

Figure 3.2.3.1: Knox, Warhurst, Nickson and Dutton's job quality categorisation



Source: Knox, et al., 2015, Figure 1, p.1563.

Cluster analysis has also been used to identify different categories of job quality. For example, Butterworth and his colleagues (2011) classify jobs according to the number of adverse psychosocial measures identified in the literature (high demands and complexity, low job control, job insecurity and unfair pay), with the poorest jobs being those in which all four were observed. Drawing upon some of the same psychosocial measures as those used by Butterworth, Holman (2013b) considers five objective indicators (work organisation; wages

[3] In Australia, a hybrid system exists while all citizens have access to the universal public health system but this may be combined with private health cover that is sometimes provided by employers as a 'fringe benefit' or cover may be purchased by the individual. Similarly, a hybrid system of pension funding exists. While the government provides an aged pension, a compulsory government-mandated but privately managed system superannuation was introduced in 1992 to supplement the aged pension. Under this scheme, employers are required make contributions to superannuation on behalf of their employees. Some Australian employers also offer salary packaging arrangements whereby an individual's taxable income may be reduced if they make voluntary contributions to their superannuation.

and payment systems; security and flexibility; skills and development, and engagement and representation) along with subjective experiences of job-holders to categorise jobs into six cluster types: active jobs (high level of discretion and social support, but also with high job demands and complexity), saturated jobs (like active jobs but with higher demands and working hours), team-based jobs (involve working in teams and with a high level of team autonomy), passive-independent jobs (with low demands and complexity and jobs independent rather than requiring team work), insecure jobs (featuring non-permanent contracts, low development opportunities and job insecurity) and high-strain jobs (combining high work-loads and job demands, with low levels of discretion). One of the problems with Holman's taxonomy is that he does not separately consider objective and subjective measures. Furthermore, describing the six job types as taxonomic is problematic because the categories used to form the cluster types are not discrete. For example, insecure jobs may also involve a high level of discretion and social support. Similarly, jobs involving a high level of team work and autonomy may also be jobs with non-permanent contracts.

Using principal components analysis (PCA), Davoine and her colleagues (2008a) use different sources of data to identify four national models or clusters of job quality in Europe. The northern cluster (Sweden, Denmark, Finland and the UK) is characterised by high participation in training, high employment rates and high job satisfaction. A continental cluster (Germany, France, Belgium, Luxembourg, Austria, the Netherlands, Ireland and Slovenia) is close to the EU average situation regarding most of the indicators considered in their analysis. The southern cluster (Spain, Italy, Portugal, Greece and Malta) is characterised by little employee involvement and narrow gender pay gaps. The cluster of new EU member states (Hungary, the Czech Republic, Poland and the Slovak Republic) is characterised by low socio-economic security (i.e. low wages, high long-term unemployment) and bad working conditions (such as long working days, health risks) but the intensity of work is comparatively much lower compared to other clusters.

While Hauff and Kirchner (2014) consider this method as one that provides insights into the interrelations of certain work and employment conditions of a country, they highlight that the results are sometimes unclear because both positive and negative features co-exist. They also note that the approach also involves a loss of detail because it is not possible to analyse the variety within countries (Hauff & Kirchner, 2014: 8).

In this thesis a simple taxonomy is used where jobs are grouped into five categories based on scores for the AJQI: '*very poor*', '*poor*', '*middling*', '*good*' and '*very good*' quality jobs. The same exercise is conducted for each of the dimensions of the AJQI in order to produce a 6 x 5 taxonomy on the share of jobs with 0 to 6 dimensions at each of the five levels of quality (the results for the first and second taxonomy are reported in section 5.3 of chapter five).

3.2.4. Using theory to develop a multi-dimensional framework of job quality

The fourth approach, the one advocated by Muñoz de Bustillo and his colleagues (2009, 2011a, 2011b) draws upon the literature of the social sciences of how work and employment affects the wellbeing of workers, from many different perspectives and approaches. They consider the literature as 'most valuable' for development of a sound framework to be used as a background for measurement of job quality (Muñoz de Bustillo et al., 2009: 13).

This approach is adopted in this thesis. Literature from the social sciences is used to identify the core aspects of the concept of job quality. These core aspects are then used as the basis for developing a conceptual framework and in operationalising a multi-dimensional index. Having reached this decision, it is now necessary to assess the various quantitative methodologies available to operationalise the concept of job quality.

3.3. Systems of indicators or composite indexes

In terms of quantitative methodology, the multi-dimensional concept of job quality can be operationalised by a system of separate indicators, via series of sub-indexes or via a composite index. In all cases, the goal is the same: to simplify a complex and multi-dimensional construct in order to better understand it (Muñoz de Bustillo et al., 2009: 57). Sets of indicators, sub-indexes and composite indexes can all be constructed either at the macro-economic or micro-economic level.

At the macro-economic level, multi-dimensional measures of job quality provide frameworks for assessing the country-level effects of economic policies on the labour market and working conditions, including evaluations of the existence of trade-offs between quantity (i.e. more jobs) and quality (i.e. better jobs) or whether it is possible to simultaneously promote these two policy objectives (Crespo Simões & Pinto, 2013). The development of macro-level indicators of job quality has been driven by the importance of this topic on the international agenda. For example, the goal of 'promoting more and better jobs' included in the Lisbon Strategy, the debate about 'decent work' by the ILO, and the OECD's policies for 'more and better jobs' have all played key roles in the development of this type of job quality indicator (Crespo et al., 2013).

At the micro-economic level, the focus on measurement is based on definitions of job quality that are more worker-focused and consider the characteristics of the job (i.e. objective dimensions) and may also include dimensions related to the job-worker relationship (i.e.

subjective dimensions) (Crespo et al., 2013). The motivations behind creating micro-level indicators are more comprehensive, including aims to evaluate how the dimensional indices influence the overall assessment that workers make in their jobs and identification of the determinant factors of some job quality dimensions (Crespo et al., 2013). For this reason, a multi-dimensional approach is often used when considering job quality from the micro-perspective.

Each of the three approaches is outlined below accompanied by examples of how job quality has been operationalised using each method.

3.3.1. A separate system of indicators

With the first approach (a system of separate indicators) a coherent and inter-related set of measures of the different attributes is developed. When a system of indicators is used, the process ends once there are scores for each of the indicators.

With the aim of assisting countries with monitoring and developing policies to improve job quality, systems of indicators have been produced at the supra-national level by the ILO (Anker et al., 2003; Bescond, Chataigner & Mehran, 2003; Bonnet, Figueiredo & Standing, 2003; Ghai, 2003; Standing, 2002), European Commission (Crespo et al., 2013; Davoine et al., 2008a; UNECE, 2015) and the OECD (Cazes et al., 2015; OECD, 2016). The ILO's indicators of Decent Work cover four strategic objectives of the Decent Work Agenda: employment creation, guaranteeing rights at work, extending social protection and promoting social dialogue (Anker et al., 2003; Bescond et al., 2003; Bonnet et al., 2003; UNECE, 2015). The ILO's indicators of Decent Work are relatively broad and have a strong focus on developing countries and those countries' particular needs. For example, children not at school and old age without pension are two of the ILO's indicators of Decent Work. With the aim of promoting job quality in the European Union's (EU) member states, the Laeken Indicators were established in 2001. The definition of job quality underlying the Laeken Indicators is very broad and, similar to the ILO's indicators of decent work, its ten indicators are not restricted to the attributes of the job or job-worker match and extends to include aspects of the labour market (Crespo et al., 2013: 5-6). The Laeken Indicators have also been criticised because they do not have a theoretical basis. Moreover, they do not include certain important dimensions (e.g. pay and work intensity) and others are insufficiently covered (e.g. training), they include dimensions only indirectly related to job quality (e.g. inclusion and access to the labour market and overall economic performance and productivity) and job satisfaction is included in the list of indicators despite it being a synthetic proxy for overall job quality (Crespo et al., 2013; Davoine et al., 2008a; Munoz de Bustillo et al., 2009).

Of greater potential utility because of its potential application to Australia (i.e. a developed, rather than developing, country), the OECD developed a framework to measure and assess the quality of jobs (Cazes et al., 2015). The OECD's framework considers three objective dimensions of job quality: earnings quality, labour market security and quality of the working environment (OECD, 2016). Up to 13 indicators are used to provide data on the three dimensions of job quality. Earnings quality is measured by combining two indicators that account for both the level of earnings and their distribution across the workforce into an index. Labour market security is measured by three indicators that accounts for both the level of earnings and their distribution across the workforce (OECD, 2016: 1). Quality of the working environment is measured by seven indicators for the incidence of job strain, which is a combination of high job demands and limited job resources (OECD, 2016: 1). Indicators for each OECD country are available in an OECD database, however not every indicator is available for every country and there are large gaps due to differences in the periodicity of underlying data collection. This is a particular problem for Australia. For example, OECD data for the dimension of quality of the working environment are either not available or were last collected in Australia more than a decade ago.

More recently, the Bureau of the Conferences of European Statisticians established an Expert Group on Measuring Quality of Employment with to the aim of developing a set of internationally agreed upon guidelines for compiling quality of employment statistics. In recognising quality of employment is a multi-dimensional concept, the framework has seven dimensions with twelve sub-dimensions, with a number of statistical indicators for measuring each. The seven dimensions were identified as follows: safety and ethics of employment; income and benefits from employment; working time and work-life balance; security of employment and social protection; social dialogue; and skills development and training (UNECE, 2015).

Each of the above-mentioned supra-national sets of indicators of job quality was developed in the context of a particular policy agenda so they were designed to monitor progress towards specific targets. For this reason, their utility for Australia is limited.

3.3.2. Sub-indexes

With the second approach, a number of separate indexes (sub-indexes) are devised to measure each of the different dimensions of job quality. When sub-indexes are used, the process ends when there is an aggregated score for each sub-index.

An example of this approach, researchers at Eurofound extended their earlier work (Eurofound, 2002) by building on four core elements of job quality previously developed (that is, career and employment security, health and wellbeing, reconciliation of working and non-working life and skills development) but their second effort at measuring job quality is set up in a different way to their earlier index (Eurofound, 2012). Rather than creating a single index, micro-level data from the fifth (2010) European Working Conditions Survey (EWCS) are used to construct four sub-indices of job quality comprised of two sets of extrinsic job features (earnings and prospects) along with two sets of intrinsic features of work (intrinsic job quality and working time quality). Sitting outside the index are additional job features including those for discrimination, participation and representation, psychological risk factors, wellbeing, gender and socio-economic variables such as level of education, age, occupation, industry, sector, ownership type, establishment size and type of employment (Eurofound, 2012: 25-26). The researchers accorded equal weights when the multiple indices were aggregated together unless it was found that the indices had considerably different associations with subjective wellbeing and other outcomes. They described this approach to weighting as 'guided by – but not determined by – the relationships with wellbeing' (Eurofound, 2012: 19). Results from each sub-index can be analysed separately in order to see how the different aspects may rank differently across countries and socio-economic groups. This approach, they contend, is likely to be of more value for policy purposes than analysis of an overall index (Eurofound, 2012: 15).

3.3.3. A single aggregate measure

With the third approach (a composite index), all of the dimensions are aggregated to give a single overall measure (Muñoz de Bustillo et al., 2009). Composite indexes are generally additive, where individual components are compiled into a single index on the basis of an underlying model (Booysen, 2002; OECD, 2008). In general terms, an index is a quantitative measure that can reveal relative positions for a given subject area. When evaluated at regular intervals, an index can point out the direction of change across different units and through time (OECD, 2008). Indexes are intended to be useful in identifying trends, in identifying and setting policy priorities and in benchmarking or monitoring performance (OECD, 2008). In this instance, a composite index can be used to compare changes in job quality across countries (at one or more points in time) as well as within countries (at more than one point in time) and can be constructed either at the macro- or micro-level.

The feasibility of operationalising either a macro- or micro-level index is dependent upon the availability of suitable data. In particular, the sample size of the data needs to be large enough to be able to construct a valid index. Secondly, the data needs to include the right set of indicators of job quality. Furthermore, if the aim is to track changes in job quality over time then periodicity becomes an important consideration. In this respect, job quality can be measured at one point in time, i.e. static or at more than one point in time i.e. dynamic. Using a dynamic approach to measuring job quality requires a suitable micro-level longitudinal or panel dataset.

A number of aggregate job quality indexes have been developed that enable comparisons between countries and sometimes over time. Similarly, there are indexes that have used data from EU27 countries (see for example, Antón et al., 2012; Curtarelli, Frik, Vargas & Welz, 2014; Erhel, Guergoat-Larivière, Leschke & Watt, 2012; Hurley et al., 2012; Leschke & Watt, 2008; Leschke, Watt & Finn, 2008; Munoz de Bustillo et al., 2011a). In addition, indexes have been developed using data from one (Berglund, 2014; Gallie et al., 2014; Holzer, Lane, Rosenblum & Andersson, 2011; Kalleberg, 2011; Osterman & Shulman, 2011; Vidal, 2013) or several countries (for example, Clark 2005a & b; Cloutier-Villeneuve, 2012; Gallie 2007; Olsen, Kalleberg & Nesheim, 2010).

Because both of the following indexes were developed from an underlying theoretical framework of job quality, they are of particular relevance. As it happens; both of the indexes were created using European data. Each one differs in terms of the data that were used (i.e. macro or micro-level data), the number of dimensions captured and importance placed on the different dimensions (i.e. weights). The construction and merits of each of index are discussed below.

The first European index of job quality was developed by a team of researchers from the European Trade Union Institute for Research, Education and Health and Safety (ETUI-REHS). The ETUI-REHS JQI is a macro-level index created to compare job quality between countries. The underlying framework captures six dimensions of job quality: wages, non-standard forms of employment, work-life balance and working time, working conditions and job security, access to training and career advancement, and collective interest representation and participation (Leschke & Watt, 2008). The ETUI-REHS JQI was developed for the 27 EU countries and was operationalised by using 2005 and 2006 data from multiple sources. This method of coupling together various sources of data is known as a synthetic index. The index is compiled on the basis of six sub-indices. In terms of weights, the researchers assigned their own normative weights within each index but they applied equal weighting to the six sub-indexes that make up their overall index of job quality. The ETUI-REHS JQI was updated in 2010, allowing for a comparison of job quality before and after the Global Financial Crisis (GFC) (Leskhke et al., 2012). While separate results are produced for women, men and overall, because this index uses macro-level data, it does not allow for a detailed analysis of the distribution of job quality within each country.

The second index emerged from a contention that none of the existing indexes had been accepted as standard measures of job quality. Addressing this problem, Muñoz de Bustillo and his colleagues used data from the fifth (2010) European Working Conditions Survey (EWCS) to construct a JQI (hereafter EJQI) for 27 EU countries. Unlike the ETUI-REHS JQI, this index was constructed at the individual level to allow for analysis of the situation of specific groups of workers (Muñoz de Bustillo et al., 2011a). This approach makes it feasible to study the dispersion of job quality and thus to evaluate what happens at the bottom on the distribution (Antón et al., 2012).

The construction of the index was based on a number of general principles (Antón et al., 2012; Muñoz de Bustillo et al., 2011a). Dimensions were selected according to a theoretical framework based on empirical research, where the framework is restricted to information about the attributes of jobs, not of the workers who hold them. In addition, it does not include any contextual information (Muñoz de Bustillo et al., 2011a: 150). The dimensions, sub-dimensions and indicators of job quality are organised using a transparent, logical structure. The nested structure of the EJQI, which includes five dimensions, is based on the traditions of the study of job quality: pay and amenities; intrinsic characteristics of work; terms of employment; health and safety and work-life balance (Antón et al., 2012: 26-27). At the highest level, the five dimensions are split into two groups: pay and amenities. The reason behind using this structure is based on the theory of compensating differentials, which was originally proposed by Adam Smith and which is still an important tenet of orthodox economic theory. According to this categorisation, pay is viewed as playing a special function in the determination of job quality as the main compensating mechanism for the 'disagreeableness' of work (reflected by the other four dimensions) (Muñoz de Bustillo et al., 2011a: 156).

The indicators are – wherever possible – restricted to objective dimensions. When there are several variables measuring the same underlying concept from different angles, the use of more than one variable for each individual indicator/dimension in the framework is used, aiming to increase the robustness of measurement (Muñoz de Bustillo et al., 2011a). Except in the case of pay, the original variables are not standardised using Z-scores. While this approach is commonly used when constructing an index, the authors argued that standardisation loses important information about the actual distribution of the different dimension. For all variables except pay, the original variables in the EJQI were consistently recoded into a metric of 0-100, according to the desirability in terms of job quality for each attribute. Zero is the least desirable outcome and 100 is the most desirable outcome with any intermediate values graded accordingly. Because the answer categories of each variable vary considerably, different recodifications are applied. In terms of the treatment of missing values, where missing values are the result of logical filters in the questionnaire (e.g. self-employed are not asked what type of employment contract they have), the available information for each individual was used. This means that the calculation of the index differs for each individual depending on available information. When the missing values are a result of a refusal to answer a particular question (e.g. how much they earn), an ordered logit imputation model is used to impute values.

Aggregation of the information within each dimension is done by arithmetically averaging the scores of the individual variables following the hierarchical structure in the framework. Components at the same hierarchical level are mostly assigned equal weights within their dimension. Aggregation of information at the highest level is carried out by geometrically averaging the five dimensions into the overall index score. The authors argue that using a geometric rather than arithmetic average in the final stage of the construction of the index has two important advantages. First, the contribution of each dimension to the overall index is not linear, but decreasing (that is, an increase in a dimension from a low initial value produces a larger expansion of job quality than the same increase from a high initial value) and secondly, the contribution of each dimension depends on the values of all the other dimensions (that is, even if the sum of scores is the same, a job with more balanced values in the five dimensions would have a higher quality than a job with very high values in two dimensions but very low values in the other three). What this means is that the EJQI assumes decreasing returns for the different dimensions and imperfect substitutability among the different dimensions with penalisation for significant imbalances between them (Muñoz de Bustillo et al., 2011a: 155-156).

While a different concept of job quality is used in this thesis and a different dataset, a number of the guiding principles that were used to construct the EJQI were used as a starting point for developing the AJQI. As the thesis developed, the method used to construct the AJQI diverged from the method used to construct the EJQI. In part this was due to using different data, but also because the AJQI was customised to take into account the specifics of the Australian employment and labour law system; and finally due to this thesis adopting a different approach to the weighting of the dimensions included in the AJQI.

3.4. Australian quantitative research on job quality

While there is a large body of Australian research about various aspects of job quality and/or among particular categories of workers (such as among low paid, women or part-time workers), there is much less research specifically conducted through the lens of job quality; and even less research that is quantitative in nature (Knox, et al., 2011; Warhurst & Knox, 2015; Wright, 2015). On this point, Knox and her colleagues (2011: 7) state:

> *…(e)xtant research in Australia does not specifically address the recurring job quality debate that appears elsewhere, which may create the impression that job quality, or more precisely 'bad jobs', is not an issue here.*

Around the time that a flurry of researchers in the US and Europe began developing indexes of job quality, Australian academics were predominantly focused on analysing recent changes in employment regulation (see for example, Baird, Frino & Williamson, 2009; Cooper & Ellem, 2009; Forsyth & Sutherland, 2006; Isaac, 2007; McCallum, 2007; van Wanrooy, Wright & Buchanan, 2009). Yet, Knox and her colleagues (2011) suggest a closer analysis reveals that much of this research and debate revolves around factors that are highly consistent with the notion of job quality'. More recently, in 2015 an edited book on job quality in Australia was published (Knox & Warhurst, 2015). This book, however, focuses on the contributions made by different disciplines in understanding job quality. There remains little by way of sets of indicators for, or indexes of, job quality (Wright, 2015). There is, however, a very small body of relevant quantitative research that has made some inroads into measuring job quality in Australia. This research can be broadly grouped into studies that were conducted prior to the availability of large-scale, micro-level Australian survey data and more recent research that has been conducted since such data became available. The following two sub-sections review this existing, albeit it limited, body of research in this area.

3.4.1. Early Australian research

Prior to the availability of large-scale, micro-level survey data, Watson (2000) used a range of Australian Bureau of Statistics (ABS) nationally representative separate data to develop a set of macro-level indicators to measure the health of the Australian labour market. Data were included for the period 1998 to 2000. Five indices were constructed to measure the quantity of jobs (employment; full-time employment; underemployment; unemployment and long-term unemployment) and seven indices were constructed to measure the quality of jobs (skills; extent of long working hours; casualisation; turnover; industry earnings, general earnings and gender earnings). This index was constructed almost two decades ago and its focus was on national labour market outcomes, as opposed to job quality.

Around the same time, Considine and Callus (2001) developed a multi-dimensional quality of working life index. The aim of this research was to provide a national benchmark on the working life issues that concern Australian workers (Considine & Callus, 2001: 3). The index consisted of 14 subjective items deemed to affect the quality of work-life covering pay; job security; discrimination in the workplace; manager-employee relations; job content; co-worker relations; promotional opportunities; job autonomy; workplace safety; work-life balance; workload and stress) (2001: 3). Workers' views were used to weight the data. At the time of conducting the research, Considine and Callus (2001) recognised the methodological challenges in constructing robust measures able to effectively operationalise the indicators. It was possible to disaggregate their results to consider the inter-relationship between dimensions. As the same survey was also conducted in other countries, it was also possible, at the time, to compare the results to those in other countries. The focus of this index was on quality of working life. The sample was small and it has not been replicated, so its utility was time-limited.

Burgess (2003) then developed a simple, macro-level index of job quality using a range of ABS nationally representative annual data for the period 1996 to 2001. The index took the form of a weighted linear index set at 100 for the year 1996 (Burgess, 2003: 5). Five dimensions of job quality were included in the index: rate of permanent employment; rate of long working hours; rate of workers happy with the number of hours worked; trade union density and rate of managerial or professional jobs. All components of job quality were weighted equally. As it was a synthetic index (combining data from a range of separate sources), it was not possible to conduct analysis by different categories of workers. The index only covered employees and was missing both a wage measure and a training measure. Similar to the index developed by Watson, the focus of the index developed by Burgess was on national labour market performance, not job quality. It has not been replicated, so its utility was time-limited.

3.4.2. Job Quality Index for Parents (JQIP)

The second phase of research shifted in methodological focus from one of either trying to couple together separate indicators from aggregate-level data, or the problems associated with one-off, in-house small-scale surveys to researchers using larger, and sometimes longitudinal or panel surveys in order to track changes in job quality over time. For instance, Strazdins and her colleagues (2010) developed an index using data from *Growing Up in Australia – the Longitudinal Study of Australian Children* (LSAC).

Not only was this index constructed with a different type of data (i.e. large-scale panel data), this index has a different purpose to the earlier indexes. In the context of rising rates of parental employment in Australia, Strazdins and her colleagues (2010: 2052) used longitudinal data from *Growing up in Australia* – the Longitudinal Study of Australian Children (LSAC) – to investigate whether poor quality jobs could pose a health risk to the children of working parents. Working mothers and fathers completed a questionnaire on their own health and wellbeing, and working conditions. The job quality for parents (JQIP) classified jobs in a typology according to four conditions: job control; perceived security; flexibility; and access to paid family-related leave. The presence of good job quality conditions were counted so jobs could range from poor quality (none or just one of the above conditions) through to good quality (all four conditions) (Strazdins et al., 2010: 2055). Although direction of causation was unknown, multiple regression modelling revealed a connection between bad job conditions and parent and child wellbeing (2007: 2058).

Because the purpose of the JQIP was to assess the potential risk to the health of children and because the sample that was used to operationalise the index was restricted to working parents, it does not provide a comprehensive assessment on job quality for Australia.

3.4.3. Australian Work + Life Index (AWALI)

As already mentioned above, it is possible to use a single set of data to analyse job quality. An example of this approach, the Australian Work and Life Index (AWALI) survey measured how work intersects with other life activities (Skinner & Pockock, 2014). Survey data were collected annually from 2007 to 2010 and then bi-annually (i.e. 2012, 2014). The AWALI index contained five measures which assess respondents' perceptions of work to life interference: impact of work on satisfactorily engaging in the activities and responsibilities in other spheres of life; time available to spend on activities outside work; the effects of work on community connections; time pressure in daily life and a general assessment of satisfaction with work-life balance (Skinner & Pocock, 2014: 8). The survey also contained a core set of items relating to employment and social demographics. The index was calculated by standardising the five measures where the minimum score on the index is 0 and the maximum score is 100 (Skinner & Pocock, 2014: 8.). The AWALI survey was cross-sectional, as a different sample of people were surveyed each year. In addition, the survey was largely confined to the dimension of work-life interference. The findings from the AWALI provided important insights into the work-life dimension of job quality, in particular, a range of employment factors (including jobs that lack flexibility and high workloads, an unsupportive organisational culture, long hours, unsocial hours such as evenings and weekends) were found to be associated with poor work-life outcomes (Skinner & Pocock, 2014: 10).

Because the AWALI was restricted in focus to work-life balance, it does not fully capture the multi-dimensionality of the concept of job quality. Moreover, the last AWALI survey was conducted in 2014, and to best knowledge, there are no plans for a future wave of the survey.

3.4.4. Australian Index on Psychosocial Job Quality

A further example of where a single, large-scale set of data was used, Leach and her colleagues (2010) used seven waves of the HILDA data to investigate longitudinally whether the benefits of having a job depend on its psychosocial quality and whether poor quality jobs are associated with poorer mental health. They constructed a composite index of job quality for all workers, where the index was restricted to 12 items about the psychosocial aspects of job quality (Butterworth, Leach, Strazdins, Oleson, Rodgers & Broom, 2011; Leach, Butterworth, Rodgers & Strazdins, 2010). Ten items formed three separate factors or dimensions of job quality: job demands and complexity (4 items); job control (3 items) and perceived job security (3 items). In addition, a single item measuring effort-reward imbalance was included based on whether respondents considered they were paid fairly for their efforts at work and a single item was used to assess stress. Table 11.2.1 in Appendix 11.2 maps the 12 items in Leach's index against where they would be located in the nested structure of the AJQI.

To develop an overall scale of psychosocial job quality, factor scores for all respondents across all waves were dichotomised and a composite measure was then constructed by summing the number of adverse psychosocial job conditions (high job demands and complexity, low job control, job insecurity and unfair pay) (Butterworth et al., 2011). Because the small number of respondents reporting all four job adversities was small, the composite scale was top-coded at three and, thus, produced four categories ranging from 0 (optimal jobs) to three or more psychosocial adversities (poorest quality jobs). In addition, a categorical measure combined data on employment status (unemployment or NILF) and psychosocial job quality.

Four adversities were identified: high job demands and complexity; low job control; job insecurity; and unfair pay. Using cut-off points based on factor scores, they created four categories of psychosocial job quality ranging from optimal jobs (0 adversities) to poorest quality jobs (3 or more adversities). An item which assessed whether respondents had changed jobs in the past year was used to differentiate between those who remained in the same job but reported changed job conditions and those who moved between jobs with different characteristics. Covariates included age, sex, partnered status, physical disability, post-education life in employment, educational qualifications, experience of financial hardship, and residence in a socially disadvantaged area.

Overall, it was found that unemployed respondents had poorer mental health than those who were employed. However, the mental health of those who were unemployed was comparable or better than those in jobs with poor psychosocial quality (Butterworth et. al., 2011).

While only a partial index of job quality, as it only incorporated subjective, psychosocial aspects of job quality and extrinsic outcomes of jobs, a number of insights were gained from their use of the HILDA dataset and the methodology they followed. As their index is restricted to the aspects of psychosocial health, it does not capture all aspects of the multi-dimensional concept of job quality.

3.4.5. The ViCWAL JQI

Charlesworth and her colleagues (2014) used cross-sectional micro-level data from the 2009 Victorian Work and Life survey (VicWAL) to construct a job quality index. The VicWAL JQI is comprised of 15 items grouped into six components of job quality: working time autonomy (4 items); job security (2 items); job control (2 items); workload (1 item); skill development (1 item); and access to work-life provisions (5 items). Table 11.2.2 in Appendix 11.2 maps the 15 items in the VicWAL against where they would be located in the nested structure of the AJQI.

The index was created by identifying cut-off points or scores for each dimension and converted into 0/1 measures (where 1 represented the poorest score and all other scores were coded to 0). The index was created by adding the 0/1 scores for the six dimensions (Charlesworth et al., 2014: 109). Importantly, the ViCWAL JQI does not contain indicators for a number of important aspects of job quality such as pay, health and safety; and voice and representation. Furthermore, the VicWAL JQI was constructed to estimate *poor* job quality, rather than job quality per se, where scores could range from 0 to 6, where a higher score represented poorer job quality (Charlesworth et. al., 2014: 110). In addition, while weighted to ABS labour force data for Victoria, it is important to note that the sample was restricted to employees living in one region of Australia (i.e. Victoria) (Charlesworth et. al., 2014: 107).

Post-hoc, three categories were constructed: very poor job quality, poor job quality and better job quality, where almost one-fifth of the sample (17.8%) fell into the first category of very poor jobs with deficits of two or more components, 46.1 percent fell into the second category and just over one third (36.2%) were classified into the third category, where no deficit was recorded in any of the components (Charlesworth et. al., 2014: 112). Interestingly, no statistical differences were found in job quality between men and women; those who worked full-time compared to part-time or those who lived in regional or rural locations compared to those in metropolitan locations (Charlesworth et. al., 2014: 114). However a linear relationship between job quality and work-life interference (using the AWALI measure of work-life interference) was found, whereby those with better job quality reported the lowest work-life interference (as will be outlined in chapter five of this thesis, the results from the AJQI are consistent with this last finding).

While the VicWAL JQI allowed analysis of job quality to go beyond single indicators or aggregate labour force data, it has a number of limitations. First, the JQI does not include a dimension measuring wages. While the wage dimension may not be considered as the only or even the most important aspect of job quality, it is difficult to see how a holistic approach to measuring job quality would exclude this dimension. Secondly, data were restricted to one geographic region of Australia, i.e. Victoria. Furthermore, while the researchers explicitly decided to focus on poor job quality, the method used to construct the index, while leading to a conservative assessment of poor job quality, means that very little information is gained about the situation of workers situated in the middle or higher end of the spectrum. To best knowledge, there are no plans for a future wave of the VicWAL.

3.4.6. Summary

While other accounts of job quality in Australia have been published in the academic literature, and they have undeniably resulted in some useful information on various aspects of job quality, or for certain groups of workers, previous efforts to report on the multi-dimensionality of job quality in Australia have suffered from one or more of a number of shortcomings. For instance, a number of indexes were produced during the late 1990s or early 2000s. These indexes were constructed prior to the availability of large-scale datasets like HILDA.

More recent indexes of job quality were created for specific purposes, such as for parents in the case of the JQIP. For others, their samples were not representative of the Australian workforce, such as the VicWAL JQI where the sample was restricted to workers in one State of Australia. Other indexes were restricted in focus to certain aspects of job quality, such as the Australian Index of Psychosocial Health, which is focused on psychosocial health; or the AWALI, which was primarily focused on work-life balance.

In summary, in terms of existing Australian academic research, while there have been a number of attempts to operationalise partial indexes, to date, no Australian empirical research has operationalised a comprehensive, multi-dimensional measure of job quality in Australia.

This AJQI developed in this thesis addresses these shortcomings.

3.5. General methodological insights on indexes

This section of the chapter shifts in focus from specific attempts to operationalise indexes of job quality to focus on general methodological insights learned from a review of the literature on index construction.

The prevalence of multi-dimensional indices to assess various aspects of society (e.g. wellbeing, poverty, human development, happiness, innovation, corruption, environmental performance) has increased in recent years, partly due to improvements in data availability. Composite indexes are increasingly recognised as a useful tool in policy analysis and public communication with the number of composite indexes in existence worldwide growing year-on-year (OECD, 2008). For example, in a review of composite indicators measuring country performance, Bandura (2006) found that the quantity of indices had accelerated since the

1990s; a greater number of institutions and academics have developed indices and the issues covered by the indices has been growing and is varied in nature. In the review, Bandura (2006) cited 165 composite indicators, where around 83 percent of the indices in the sample were created in the 1991 to 2006 period with 50 percent having been created in the previous five-year period 2001 to 2006. While most of these indices were constructed to measure concepts that are of limited relevance to job quality, important lessons can be drawn from the methods that have been used to construct them, any criticisms that have been made about them, and the reasons behind any revisions or modifications that have been made to improve them. Of particular relevance is a number of indexes that have been constructed in order to measure poverty, human development and wellbeing.

3.5.1. Purpose of a composite index

The main aim of constructing a multidimensional index is to be able to compare within a group (i.e. country) across time and space. Developing an index moves beyond the focus on a single indicator, yet its results – if well designed – should be easy to present and communicate (Decancq & Lugo, 2010: 2). In this respect, an index can be seen as a useful tool for government and researchers to readily obtain a picture of the distribution of the phenomenon in a society (Decancq & Lugo, 2010:2). While the multi-dimensionality of a composite index is one of its main advantages, the index represents an aggregate measure of a complex phenomenon. For this reason, construction of a multi-dimensional index raises both conceptual and practical challenges. Practical challenges include identifying a suitable dataset (data quality) while conceptual challenges include how to group, weight and aggregate indicators into suitable sub-dimensions, dimensions and an overall index. Pertinently, Muñoz de Bustillo and his colleagues (2011a: 74) state:

> *A composite index implies a harsh simplification of a reality which is by nature complex and multi-dimensional. If not well constructed, it can easily lead to mercilessly wrong conclusions, which could have a very bad impact on the credibility and usefulness of the whole effort of index building.*

The OECD handbook on constructing composite indicators describes composite indicators as 'much like mathematical or computational models' (OECD, 2008: 14). Constructing a composite index is complex and there is no agreed single method for construction. The 'justification for a composite indicator lies in its fitness for the intended purpose and in peer acceptance' and its construction 'owes more to the craftsmanship of the modeller than to universally-accepted scientific rules' (OECD, 2008: 14). So put simply, for a composite index to make a substantive contribution to the relevant body of knowledge, it must simplify a complex construct in order to present data in a way that is greater than the sum of the individual parts.

3.5.2. Methods employed to construct composite indexes

While the quality of underlying data that is used to construct an index is crucial, a wide range of methodological approaches have been used and some of the methods employed to construct other composite indexes have received criticism (OECD, 2008). In particular, despite the relative objectivity of the methods employed in their construction, composite indexes involve a degree of subjectivity. A sound theoretical framework should be used as the starting point when constructing a composite index (OECD, 2008: 22). The framework should clearly define the phenomenon to be measured and its sub-components, selecting individual indicators and weights that reflect their relative importance because the strengths and weaknesses of composite indicators largely derive from the quality of the underlying variables (OECD, 2008: 22). However, one of the major criticisms made of composite indexes is that individual indicators are selected in an arbitrary manner with little attention paid to the inter-relationships between them. This can lead to indices which overwhelm, confuse and mislead decision-makers and the general public (OECD, 2008: 25). From a pragmatic point of view, however, compromises usually need to be made when constructing a composite index (Haq, 1995 cited in OECD, 2008: 138).

In the general sense, constructing an index involves bringing together different pieces of information, however, different types of data cannot simply be combined to form an index. Indicators need to be standardised to make them comparable and negatively scaled items need to be reversed. Leshke and her colleagues (2008) identify three main ways of determining maxima/minima. The first way sets the minimum (maximum) at the value of the worst (best) performer in the current year. This is easy to compute but comparisons over time do not make sense as they can result from either changes in the value for a given year or changes in the minima and maxima. The second way sets the value of the worst (best) performer in a base year. This approach permits comparisons to be made over time. The third option is to set 'political values' for the maxima and minima. The advantage of this approach is that it can give policy-makers a sense of how far away current circumstances are from some 'target' (Leshke et al., 2008).

After the indicators have been standardised and prior to aggregation, Athanasoglou, Weziak-Bialowolska and Saisana (2014) recommend that an assessment should be made about the amount of missing values (addressed with descriptive statistics); indicators with strong collinearity, or that behave as noise, or that point in the opposite direction (each addressed with correlation analysis) as well as statistical dimensionality and reliability of components (addressed with PCA).

Based on the methodological insights gained from reviewing the literature on constructing multidimensional indexes, the AJQI developed in this thesis is operationalised according to a conceptual framework where the indicators were selected and weights on the basis of their relative importance; the method that was used is transparent (as set out in chapter four); and the scoring logic that was used is easy to interpret (i.e. 0 to 100).

3.5.3. Approaches to weighting

Each element must then receive a level of weighting. Selection of the relative weights for different dimensions is a crucial step in the construction of any multi-dimensional index because weights are central in determining the trade-offs between dimensions. The choice of different approaches to weights is inherently connected to the choice on the other elements of the index including the transformation functions and degree of substitutability (Decancq & Lugo, 2010: 10). Any choice of weights should be open to questioning, so it is essential that the judgements that are implicit in weighting decisions are transparent (Anand & Sen, 1997: 6).

Relevantly, Decancq and Lugo (2010: 10-16) identify three main classes of approaches to set weights, comparing their respective advantages and disadvantages: data-driven; normative and hybrid weighting. Data-driven weights are described as a function of the distribution of the achievements[4] and are not based, at least explicitly, on any value judgement about how the trade-offs between the dimensions should be (Decancq & Lugo, 2010: 3). A fundamental problem with using data-driven approaches rests on the weights being obtained from the distribution of ‘what is’ rather than ‘what could or should be’ (Decancq & Lugo, 2010: 4). That is, the index no longer depends upon the dimensionality of the dataset but it is rather based on ‘statistical’ dimensions of the data (Composite Indicators Research Group online forum, hereafter COIN). Looking at the statistical properties of an index is mostly based on correlations. Relevantly, Brandolini (2007: 10) warns that ‘we should be cautious in entrusting a mathematical algorithm with a fundamentally normative task’. A composite index needs to correspond with real world phenomena, where correlations may not necessarily reflect the real influence of the individual indicators on the phenomena being measured (Athanasoglou, Weziak-Bialowolska & Saisana, 2014: 10). Athanasoglou and colleagues (2014: 10) make the point that the validity of an index relies on the interplay between both statistical and conceptual soundness, whereby ‘a sound composite indicator involves an iterative process that goes back and forth between the theoretical understanding of a phenomenon on the one hand, and the empirical observations on the other’.

[4] Decancq and Lugo (2010) discuss weighting in relation to multidimensional indices of well-being. So when they use the term ‘achievements’, they mean achievements in terms of well-being. The term achievements can equally apply to constructs, including job quality.

A data-driven approach to weights relies on multi-variate statistical models to describe or summarise the data where the most commonly used technique is based on principal components analysis (PCA), where lower weights are assigned to dimensions that are poorly correlated. However, it could be argued that a multi-dimensional approach is called upon precisely because important dimensions are not strongly correlated (Decancq & Lugo, 2010: 13). The use of PCA is often motivated by a concern for the so-called problem of double-counting. In many empirical applications, the indicators in indexes are found to be strongly correlated and capturing the same latent dimension (as found with the indicators in the AJQI). Decancq and Lugo (2010: 12) point out that the existence of correlation between the dimensions in an index reflects an important aspect of the society's situation and as such, it should be included, and not eliminated, from the analysis. So correcting for correlation between the dimensions might be inappropriate. Furthermore, the derivation of weights through PCA or other explanatory models is not straightforward and lacks transparency, which makes this less attractive as a method to inform policy-makers (Decancq & Lugo, 2010: 13).

Normative approaches, on the other hand, depend on the value judgements about the trade-offs and are not based on the actual distribution. When a normative approach to setting weights is used, you must decide whose value judgements on 'good' or 'bad' job quality should be used and there will necessarily be inter-personal variation in opinions. Normative approaches have been criticised for suffering from paternalism (Decancq & Lugo, 2010: 4).

Decancq and Lugo (2010) identify three types of normative approaches to weights: equal or arbitrary weights; expert opinion weights and price-based weights. The approach of equal or arbitrary weighting is commonly used for weighting multi-dimensional indices. This method has been used for a range of reasons including its simplicity, because there are no statistical or empirical grounds for choosing a different scheme, because there is insufficient knowledge of causal relationships; due to ignorance about the correct model to apply, a lack of consensus on alternative solutions or because all of the indicators or dimensions are deemed to be of equal importance (COIN online forum). Despite its popularity, equal weighting remains controversial. If equal weighting is used, there is a chance that indicators that are highly correlated are combined, which may introduce an element of 'double-counting' into the index. There will almost always be some positive correlation between different measures of the same aggregate. By testing for statistical correlation (such as Pearson correlation coefficient) and choosing only indicators that have a low degree of correlation or adjusting weights accordingly, the degree of double-counting may be removed or minimised. A general rule of thumb should be used to decide the threshold beyond which correlation entails double counting. Furthermore, minimising the number of indicators in the index may be desirable on the grounds of parsimony (COIN online forum).

One high profile example of equal weighting is the UN Human Development Index (HDI)[5] where it has been argued that the main motivation for using equal weighting is to treat its three main dimensions equally because all three dimensions are considered equally important (Decancq & Lugo, 2010: 14). The original method for aggregating and weighting the HDI was criticised for a number of reasons. Originally, the HDI was calculated using the simple average of the sum of three equally weighted indices, so the absolute value of each component affected the level of HDI. This meant that extreme values in one or more indices would affect the value of the index resulting in a change in the ranking order. The three components were spread around different means with different variances, so the simple averaging of these components for the purposes of building an index was dubious (Noorbakhsh, 1998: 591). The HDI was also criticised because it produces the same ranking results as some of its components (redundancy) and because the judgements underlying the trade-offs built into the index were not made explicit (Decancq & Lugo, 2010; Noorbakhsh, 1998; Ravallion, 2010). In response to criticisms, some aspects of the method for constructing the HDI were revised. While the index continues to assign equal weights to all three dimensions, the three indices are now normalised and after calculating the indices, the scores are aggregated into a composite index (HDI) using a geometric mean (that is, the cube root of the product of the three dimension indices) (UNDP, 2016).

At this juncture, it is important to note that weights can also be set in an arbitrary, but unequal, way where researchers or policy-makers may decide to give more weight to dimensions that are deemed to be more important. With this approach, the crucial question becomes how to identify the relative importance of the different dimensions (Decancq & Lugo, 2010: 15). To avoid the arbitrariness of one researcher or policy maker, the opinion of a group of experts or informed persons can be sought (Decancq & Lugo, 2010: 15). Using this approach will reveal the nature and extent of (dis)agreement within the scientific community (Decancq & Lugo, 2010: 15). There are two typical methods to elicit views from experts: the Budget Allocation technique and the Analytical Hierarchy process.

With the Budget Allocation technique, experts are asked to distribute a budget of points to a number of dimensions, paying more for those dimensions whose importance they want to stress (COIN online forum; Decancq & Lugo, 2010: 15). An example of where this method has

[5] The HDI is a composite index of four indicators developed to reflect three major dimensions of human development: longevity, knowledge and access to resources. The dimensions were derived from the notion of human capabilities as proposed by Amartya Sen and regarded to be essential requirements for enhancing human capabilities (see Noorbakhsh, 1998: 590).

been used was for the Active Citizens Composite Indicator. A group of 27 experts from various fields were questioned on the importance of the dimensions in the Indicator. The final weights were obtained by computing the median of the distribution of responses (standardised to sum to 100) (Mascherini & Hoskins, 2008, cited in Decancq & Lugo, 2010: 15). The main source of concern with using expert opinion weights relates to the selection of the experts, so it is essential to bring together experts that have a wide spectrum of knowledge and experience (COIN online forum; Decancq & Lugo, 2010: 16). A second concern is that, even when the selection of experts is bias-free, the opinions of the experts may be unrepresentative of the population under analysis, leading to paternalism (Decancq & Lugo, 2010: 16).

Proposed by Saaty (1987), the Analytical Hierarch Process originates from multi-attribute decision-making (cited in Decancq & Lugo, 2010: 16). All members of the representative group are asked to compare pairs of indicators to assess which of the two is more important and by how much. The strength of preference per pairs of indicators is expressed on a scale. A comparison matrix is produced from which the relative weights can be calculated using an eigenvector technique (Nardo et al., 2005 cited in Decancq & Lugo, 2010: 16).

The third normative approach identified by Decancq and Lugo (2010: 16) is setting price based weights, where weights are derived once the marginal rates of substitution are known and some assumptions are made on the transformation functions and degree of substitutability. This method is not very popular in the literature. For example, Foster and Sen (1997) argue that even if implicit prices can be obtained, they are generally inappropriate for wellbeing comparisons (and therefore, presumably also inappropriate for job quality) (cited in Decancq & Lugo, 2010: 16).

Public opinion polls are sometimes used when issues are already on the public agenda. Respondents focus on the notion of concern, where people are asked to express 'much' or 'little' concern about certain problems measured by the indicators. The budget allocation technique can also be applied to public opinion polls, however it is likely to be more difficult for the public to allocate points to several dimensions than to express a degree of concern about the problems that the indicators represent (COIN online forum).

In terms of hybrid approaches, these methods combine information on the actual distribution of the achievements (i.e. data-driven) with individual valuations of these achievements (i.e. normative value judgements) (Decancq & Lugo, 2010: 4). Two different hybrid methods were identified by Decancq and Lugo: Stated Preference Weights and Regression based weights (also labelled hedonic weights in the wellbeing literature). Instead of imposing trade-offs chosen by a set of experts, stated preference weights are based directly on the opinions of (a representative group) of individuals (workers, in the case of job quality) in the society. In this sense, it is both a data-driven approach and one that depends on the valuations of the individuals themselves (Decancq & Lugo, 2010: 17). For each individual, the weight for a dimension is computed as a function of the total number of dimensions and the specific rankings for that dimension. An average weight across individuals is used to compute weights. For example, the special 2007 Eurobarometer survey on the perception of poverty and social exclusion asked respondents to evaluate the necessity of the same set of indicators they were asked about. Most surveys/datasets do not include questions that would allow calculation of individual valuations, limiting the application of this approach.

The idea with regression based weights is to retrieve information about the implicit valuation of - in this instance - job quality by the individual through information about her/his self-reported satisfaction with the quality of their job. The weights can be obtained from estimating coefficients for the variables representing the different dimensions of job quality. In general, regression based weights have the drawback that they need an appropriate variable, which might not always be available. With regression based weights, one drawback is that a (normative) decision still has to be made about which variables to treat as dimensions of the construct being measured and which are exogenous control variables (Decancq & Lugo, 2010: 19).

Ultimately, the definite test for any weighting scheme should be in terms of its reasonability in terms of trade-offs between the dimensions (Decancq & Lugo, 2010: 10). Regardless of the weighting method that is used, weights are essentially value judgements and should be made explicit and transparent (COIN online forum).

3.5.4. Approaches to aggregation

Once a decision has been made about weighting individual indicators within dimensions or sub-indexes, aggregation can be undertaken. Two main options exist: either calculating a simple arithmetic mean or by calculating a geometric mean. The first option is to add the scores for each indicator or dimension together then divide the total by the number of indicators or dimensions, i.e. a simple average (Muñoz de Bustillo et al., 2011a: 85). The problem with this approach is that one indicator or dimension may be more important than another (Muñoz de Bustillo et al., 2011a: 153). Decision-theory practitioners have challenged the use of simple arithmetic averages because of their fully compensatory nature, in which a comparatively high advantage on a few variables can compensate a comparative disadvantage on many variables (Billaut, Bouyssou & Vincke, 2010; Munda, 2012; Paruolo, Saisana & Saltelli, 2013). The second approach is to weight indicators or dimensions in accordance with their relative importance (Muñoz de Bustillo et al., 2011a: 96). This requires a subjective, possibly arbitrary, assessment about the relative importance of dimensions and indicators.

Decisions in relation to the selection of indicators, weighting and aggregation are non-trivial so robustness tests and a sensitivity analysis should be used to determine whether results are solely driven by the specific values of the weights selected (Decancq & Lugo, 2010: 20-21).

3.6. Summary and conclusion

A range of alternative approaches to quantitatively measure job quality has been used. Efforts to operationalise indicators of job quality have all, to a greater or less degree, been hampered by the availability and content of suitable data. While a number of multi-dimensional indexes of job quality have been developed, there is considerable diversity in both the number of dimensions used to construct the index and the method, if any, to weight each dimension. The diversity of approaches and indexes reflecting them reinforce that not only is theoretical understanding of job quality unresolved but also that measurement and operational issues remain. Nevertheless, important methodological insights have been gained from reviewing the existing body of research.

Taking guidance from the approach used by the team who developed the EJQI, and having learned a number of important lessons from undertaking a review of the methodological literature on index construction, the concept of job quality that is developed in this thesis will be operationalised via an index with a nested structure that is based on the core dimensions of job quality. In order to be able to compare the quality of jobs in Australia between employees with employment and personal characteristics, micro-level data will be used to construct the index at the individual level of the job. Items in the index will be restricted to those that have a direct impact on worker wellbeing. In the first instance, a set of sub-indexes will be constructed so that it is possible to examine the interaction of different components of job quality. An overall composite index will be computed with weights assigned to take account of the relative importance of the different dimensions. Full details about the Australian dataset that will be used (HILDA) as well as the specific methodology that was used to construct the Australian job quality index (AJQI) are set out in the next chapter (chapter four).

4. Methodology

4.1. Introduction

Having drawn important lessons from the literature on definitional and measurement issues, this chapter sets out how the Australian Job Quality Index (AJQI) was constructed. Construction of a multi-dimensional index raises both conceptual and practical challenges. Practical challenges included identification of a suitable dataset (data quality). Conceptual challenges included how to group indicators into suitable sub-dimensions, dimensions and an overall index. The main stages in the research process as well as the statistical techniques that were used to construct the index are set out below. In order to do this, the remainder of this chapter is broken into twelve sections following the introduction.

The second section of this chapter sets out the method and technique used to operationalise the multi-dimensional construct of job quality, including a justification for why this method was chosen as 'fit for purpose'. The third section sets out details of the conceptual framework that was used as the starting point for operationalising the construct of job quality. The fourth section outlines the reasons behind selection of the HILDA dataset to construct the AJQI. The fifth section describes the population of interest, HILDA sample and sample weights.

The sixth section sets out seven general principles that served as the logic to guide the basis for construction of the index. The seventh section details the specific steps used in constructing the index. This section discusses the iterative process of selecting the set of specific indicators to operationalise each of the six dimensions of job quality. The method used to standardise the indicators and the way indicators were re-coded is then explained. This is followed by a description of the approach to weighting and aggregating the indicators, sub-dimensions and dimensions into the final composite index. The way that missing values were treated is then explained. The eighth section outlines the final hierarchical structure of the AJQI as well as providing a detailed description of the composition of each of the six dimensions. Each indicator is explained and how the fifty (50) indicators were combined into the six dimensions and thirteen sub-dimensions are specified. All significant deviations in methodology from either the conventional method for constructing composite indexes recommended by the OECD or the method used to construct the EJQI are justified. The ninth section identifies a number of gaps in the index, and an explanation is provided on the steps taken to fill or mitigate these gaps, when it was possible to do so. The tenth section, on robustness and sensitivity, provides an overview of how the index was tested for sensitivity to changes in methodological conditions (where details of the robustness checks are set out in Technical Report found at Appendix 11.5). The eleventh section details how ethical considerations were handled during the research process. The chapter concludes with an assessment of whether the method used to construct the AJQI was conceptually and methodologically sound.

4.2. Method and technique

A mixed methods approach was adopted. In the first instance, qualitative research methods were used to synthesise the literature to inform development of a theoretically-grounded, concept of job quality (as outlined in chapter two). Quantitative research methods were then used to construct and test the AJQI. In chapter three, the literature on methodological approaches and methods employed in the construction of composite indexes was reviewed.

Following the review of the literature, two main sources were used as a starting point to guide the construction of the AJQI. First, the methodology used by Muñoz de Bustillo and his colleagues (2011) to operationalise their European Job Quality Index (EJQI). Second, the OECD handbook (2008) on constructing composite indicators. While the method adopted by Muñoz de Bustillo and his colleagues was used as the initial basis for conceptualising and operationalising the AJQI, the OECD handbook provided a general guide on the technical aspects of constructing an index. In particular, the OECD handbook advocates transparency when constructing an index. So wherever the method used to construct the AJQI deviated from that advocated in the methodological literature, a justification is provided for such deviations. In addition, elements of the respective methodologies used to construct two other indexes of job quality (namely: the ETUI-REHS JQI developed by Leschke, Watt & Finn, 2008 and the index of psychosocial job quality developed by Leach, Butterworth, Rodgers & Strazdins, 2010) informed some aspects of the design of the AJQI.

Statistical procedures were performed using the statistical software package of SPSS (version 23) where details of the specific statistical procedures are set out in detail in the relevant sections below.

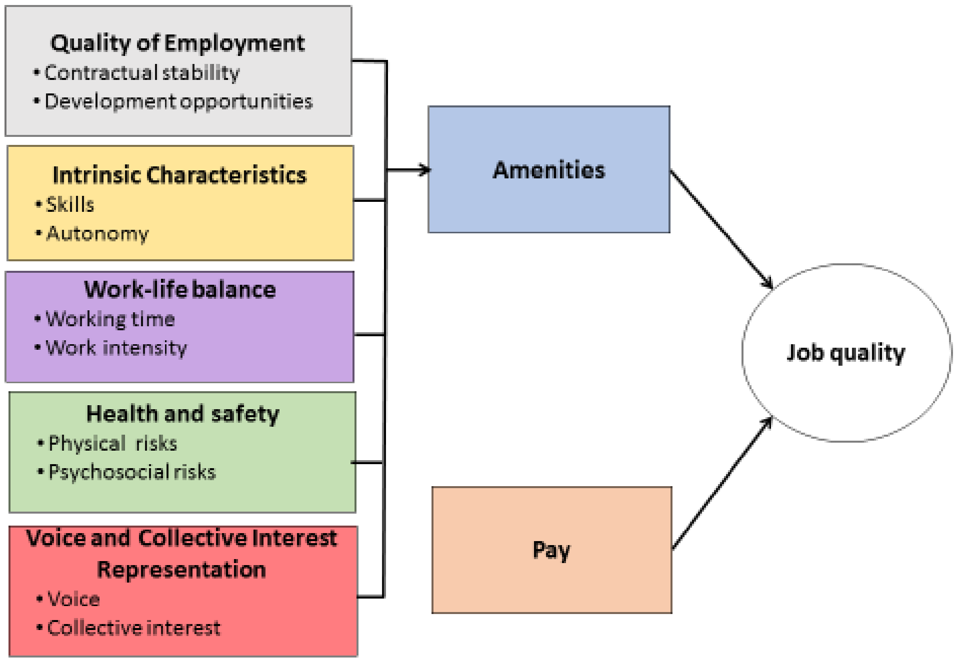
Having provided an overview of the methods and techniques used to construct the AJQI, the next section provides details on the conceptual framework.

4.3. Conceptual framework

As discussed in chapter three, a sound conceptual framework should be used as the starting point when constructing a composite index and the framework should be based on 'what is desirable to measure as opposed to what indicators are available' (OECD, 2008: 22). The framework used to conceptualise job quality in this thesis was grounded in the literature; drawing upon multiple disciplinary traditions (as discussed in chapter two). The framework for the index itself was restricted to information about the attributes of jobs, not of the workers who hold them and not any contextual information.

The dimensions, sub-dimensions and indicators of job quality were organised using a transparent, logical structure. The framework has two main elements: pay and amenities. The result is six underlying core dimensions of job quality: pay; intrinsic characteristics; quality of employment; health and safety; work-life balance; and voice and collective interest representation (see Figure 4.3.1, below).

Figure 4.3.1: Conceptual framework used as the basis for operationalising AJQI



The structure of the conceptual framework for the AJQI was similar to the framework developed by Muñoz de Bustillo and his colleagues (2011: 150-151). On the basis of the review of the literature, an additional sixth dimension of voice and collective interest representation was included in the conceptual framework developed in this thesis, and used to operationalise the AJQI. Power relations and participation are important elements of job quality as suggested by the disciplinary traditions of the radical economic approaches and behavioural economic approaches (Muñoz de Bustillo et al., 2011). The ETUI-REHS JQI developed by Leschke and her colleagues (2008: 12) included, among its six dimensions, the dimension of collective interest and voice. So the structure of the AJQI incorporated elements from both the EJQI and the ETUI-REHS JQI, resulting in an index that covered all of the main elements of job quality found in the literature. In addition to taking guidance from other indexes of job quality, the AJQI was customised by way of including indicators specific to the Australian context. Specifically, indicators were included in the index to capture four idiosyncratic aspects of the Australian industrial relations system: the national minimum wage regime; casual contracts of employment; enterprise-based collective bargaining; and the unfair dismissal regime. Each of the customised elements aligns with one of the core dimensions of job quality, so their incorporation into the AJQI did not violate the conceptual framework.

Having set out details of the framework used to conceptualise job quality, the next section turns to a discussion about the dataset used to operationalise the AJQI.

4.4. Selection of the dataset

As discussed in chapter three, there are two main ways to construct a system of indicators or composite measure. The first way involves drawing in data to operationalise a system of separate indictors. The second way involves using a single dataset to operationalise the construct For reasons set out in section 4.8.5 (to follow), however, one set of external data (rates of workplace injury) were incorporated into the dataset. The remainder of the AJQI was constructed from variables contained in HILDA.

Adopting the second approach of using a single dataset to operationalise the index requires the availability of a suitable dataset. There were two relatively large-scale datasets that contain micro-level data that could have been used to construct a reasonably comprehensive multi-dimensional index of job quality. The first is derived from the Australia at Work survey (AWS), conducted by the former Workplace Research Centre annually from 2007 to 2011. The second dataset is derived from the Household, Income and Labour Dynamics in Australia (HILDA) survey. HILDA is a large, household panel data survey that collects annual information about households and individuals within those households, concerning their economic and subjective wellbeing, labour market dynamics and family dynamics. The HILDA survey began in 2001 with a panel consisting of 7,682 households and 19,914 individuals. In wave 11 (2011), the sample was topped up with an additional 2,153 households and 5,451 individuals (Wilkins, 2014: 114).

The HILDA dataset had a number of advantages over the AWS. While both datasets are longitudinal, the first wave of the Australia at Work survey excluded people who were not in the labour force (NILF) as well as those with intentions to retire in the near future. In contrast, the HILDA sample was nationally representative and contained robust cross-sectional and longitudinal weights (Watson 2012 provides a detailed discussion on the HILDA weighting methodology). The AWS ran annually for five years from 2007 to 2011 with data collection ceasing in 2011. In contrast, the HILDA survey began in 2001 and had guaranteed funding for at least 16 waves.

So, while the index constructed for this thesis used only one wave of cross-sectional data, it will be possible to replicate the AJQI in the future to consider changes in job quality over time.

In addition to unit record data on the characteristics of the worker (i.e. gender, age group, ethnicity, marital status, parental status, socio-economic status), job (i.e. occupation) and employer (i.e. industry, firm size, location), the HILDA dataset (as opposed to the index itself) included a number of additional contextual variables of interest to the study of job quality. For example, self-assessed health, unemployment rate by ABS major statistical region and variables based on a number of externally validated indexes (such as relative socio-economic advantage/disadvantage, economic resources, and education and occupation).

There is a detailed user manual for HILDA and a series of technical papers were available. A combination of multiple methods were used to impute missing values before the data were released for general use. An additional strength of HILDA lay in the fact that cross-national equivalent files have been generated for the German Socio-Economic Panel (SOEP) and the American Panel Study of Income Dynamics (PSID) to include longitudinal household panel studies (Australia, Canada, Germany, Great Britain, Korea, Switzerland and the United States) where the range of data included employment, health and psychological measures (Summerfield, Freidin, Hahn, Li, Macalalad, Mundy, Watson, Wilkins & Wooden, 2016: 9). For all of these reasons, it was decided that the HILDA dataset was superior to the AWS dataset, and therefore, was the best currently available dataset for creating the AJQI.

Having established the HILDA dataset as the best currently available single dataset for operationalising the AJQI, the next section provides details about the HILDA sample.

4.5. The HILDA sample and weights

This section sets out details on the HILDA sample as well as information on use of the HILDA sample weights. While HILDA contained panel data, one cross-sectional wave of data (wave 14, release 14, 2015) were used to construct the AJQI. The interviews for Wave 14 occurred between 29 July 2014 and 8 February 2015 (Summerfield et al., 2016: 141). Using one cross-sectional wave meant that a static assessment of job quality in Australia will be reported in this thesis. However because HILDA contained panel data, it will be possible in the future to replicate the methodology using different waves of the data to assess the changing nature of job quality.

In wave 14, the HILDA Survey comprised data collected from four different instruments: the Household Form (HF), the Household Questionnaire (HQ), the Person Questionnaire (PQ, continuing person CPQ & new person NPQ) and the Self-Completion Questionnaire (SCQ) (Summerfield et al., 2016). A combination of variables from the PQ and SCQ were used to construct the AJQI. The PQ was administered to every member of the household aged 15 years and over. Among other topics, the PQ included a wealth of questions about the respondent's current employment. All persons completing a PQ were also asked to complete the SCQ which was either collected at a later date or returned by mail. The SCQ comprised mainly attitudinal questions, many of which cover topics which respondents may have felt slightly uncomfortable answering in face-to-face interviews (Summerfield et al., 2016).

The original HILDA dataset (*rPerson n140c*) containing 3,936 variables from the wave 14 PQ and SCQ plus derived variables (such as sample weights and variables with imputed values) was copied to make a working file. Details on each indicator used to construct the index by dimension, including which questionnaire they originated from, will be discussed later in this chapter. The dataset included cases for all persons in paid employment aged 15 and over. In terms of the size of the unweighted sample, there was a total of *n*=17,512 respondents in Wave 14, of those *n*=10,976 were employed, *n*=750 were unemployed and *n*=5,786 were not in the labour force (NILF). Cases for the unemployed and NILF were removed from the working file. Of those *n*=10,976 employed persons, *n*=9,413 were employees, *n*=533 were employees of their own business, *n*=988 were the employer/self-employed and *n*=42 were unpaid family workers. A decision was made to remove the *n*=42 cases of unpaid family workers from the working file, leaving a retained sample of *n*=10,934 cases of employed persons. The removal of cases of unpaid family workers was consistent with the definition of employed persons used by the Australian Bureau of Statistics (ABS) (see ABS 2015a & b).

Many of the variables required to construct the AJQI were found in the Self Completed Questionnaire (SCQ), so a further *n*=1,207 cases were removed from the sample because this sub-set of employed persons did not complete the self-completed questionnaire (SCQ), leaving a reduced sample of *n*=9,637. The HILDA sample weights were adjusted to take account of bias due to non-response of the SCQ (discussed below in the sub-section about the HILDA sample weights). A total of *n*=356 cases were not asked some of the relevant questions in the SCQ and values were not imputed. However because these respondents provided responses to some of the other questions used to create the index, it was not necessary to further reduce the sample by removing these cases.

It is important to mention that the reduced raw sample of *n*=8,299 employees can be considered sufficiently large enough for the purposes of creating the AJQI. In comparison, the size of the sample for the VicWAL survey used to construct the VicWAL JQI was around 3,000.[6]

In terms of sample weights, in general they should be used when inferences are made about the Australian population (Summerfield et al., 2016: 96); more specifically in this instance when inferences were made about Australian employees. The HILDA person-level weights are

[6] The authors do not report the sample size, but an addition of responses reported in some of the tables contained in the published material varies to totals of between just below to just above 3,000 workers.

based on the household-level weights, with adjustments made based on information collected about all the people listed in the responding households. The HILDA person-level weights were also calibrated to ensure that the weighted person estimates matched several known person-level benchmarks, where benchmarking is undertaken for sex by broad age band, State by part of State, State by labour force status, marital status and household composition (Summerfield et al., 2016).

The HILDA wave 14 dataset contained four sets of person (as opposed to household) cross-sectional weights (Summerfield et al., 2016). Because the AJQI was constructed using information collected from the Person Questionnaire (PQ) and Self Completion Questionnaire (SCQ) during the wave 14 interviews, the wave 14 cross-sectional SCQ Responding Person (SCQ RP) population weights were used when reporting inferences about the population of Australian employees.[7]

As discussed in chapter two, three main categories of workers can be distinguished: employees, contractors and the self-employed. It is common to restrict the analysis of job quality to the category of employees, and this approach of constructing the AJQI for employees only was adopted. While this means that a substantial proportion of Australian workers (approximately 13.5%) were excluded from the analysis, the HILDA dataset contained a large number of questions about job quality that were only asked of employees.

For the AJQI, the final reduced raw sample was *n*=8,299 employee cases (after removal of non-completion of SCQ and unpaid workers in family businesses) however a final AJQI scores was calculated for *n*=8,294 cases due to *n*=5 cases being excluded because there was no score for one or more of the six dimensions. After weighting using the SCQ population weight, the population equated to *N*=9,925,076 Australian employees.

As an external reference check, the weighted sample used to construct the AJQI was compared to ABS estimate of employed persons in the Australian labour force in August 2014. ABS seasonally adjusted estimate for the number of employed persons in the Australian labour force in August 2014 was 11,583,900, with an estimate of 9,585,100 employees (82.7%) and 1,997,800 self-employed (17.2%) (ABS, 2015a). That is, the ABS estimate produced a slightly lower proportion of employees and correspondingly, a slightly higher, yet still acceptable, proportion of self-employed. This was likely due to a difference in the categories for the self-employed used by HILDA compared to the ABS, as well as the fact that the relevant ABS survey did not include those who worked as contributing family workers in their main job.

[7] Note: Sample weights were not applied when performing statistical procedures, such as PCA.

The weighted samples used to construct the AJQI served as reasonably good approximations of employees in the 2014 Australian population, respectively. Table 11.3.1 in Appendix 11.3 sets out a breakdown of additional characteristics of the sample. The HILDA dataset was, therefore, deemed adequate for the purpose of making inferences about the overall quality of jobs for Australian employees.

Having provided details of the sample of cases used to both construct the AJQI, the next section of the chapter focuses on specific details of how the AJQI was constructed.

4.6. General principles used to construct the AJQI

The rationale for selecting the six dimensions of job quality has already been set out in chapter two (definitional issues), methodological insights gained from reviewing how other composite indexes have been constructed were discussed in chapter three and the conceptual framework that served as the starting point for populating the index was specified earlier in this chapter (Figure 4.3.1). In this section, six general principles concerning the logic behind the construction of the AJQI are discussed. These general principles were guided by the logic and methodology used by the team who developed the European Job Quality Index (EJQI), methodological advice contained in the OECD handbook on constructing composite indicators, as well as by methodological insights gained from conducting a review of the literature on index construction.

4.6.1. Jobs not job-holders

While the AJQI was constructed by aggregating individual indicators using variables contained in the HILDA dataset, the first important principle to note is that the unit of analysis for constructing the index was the 'job' itself, as opposed to the 'job-holder'. In this respect, the intention was to create an index to measure the quality of jobs, not worker utility. Some employees held more than one job (7.7% of employees). In the cases of multiple job-holders, the variables used to construct the AJQI pertained to the employee's main job as most of the data are only available for the individual's main job.

4.6.2. Selection of indicators

As discussed in chapter two, there is no single definitive or agreed set of indicators of job quality. Ultimately, the final set of indicators used to construct the AJQI was selected on the basis of relevance, coverage, relationship to one another and analytical soundness in terms of the conceptual framework. When there were several variables measuring the same underlying concept from different angles, more than one variable for each individual dimension in the framework was used, aimed at increasing the robustness of measurement. This general principle was over-ridden only in circumstances where data redundancy occurred. That is, where the pair-wise correlation was very strong (r=.6 or above) and where dropping one of the strongly correlated variables would not result in too many cases being removed from the index.

4.6.3. Type of indicators

Where possible, the indicators included in the AJQI were restricted to objective dimensions of the job, however where suitable objective indicators were not available in the HILDA dataset, it was necessary to include subjective indicators. In total, half of the indicators used to construct the AJQI were objective and half were subjective. Data unavailability is a common problem faced by researchers when they try to operationalise a complex, multi-dimensional concept. For instance, the problem of unavailability of objective data items was also faced by Muñoz de Bustillo and his colleagues (2011) when constructing the EJQI, in particular where subjective indicators measuring intrinsic characteristics of work (powerfulness, meaningfulness, social support and self-fulfilment) were included in their index. Specific details on the indicators that were incorporated into the AJQI are described in section 4.7.

4.6.4. Gaps in the data

Any gaps in the HILDA data vis-à-vis the conceptual framework were also identified at this stage. When possible, external data were incorporated into the index. In several instances, no suitable external data were available, so a number of gaps remained. The gaps are identified later in section 4.9.

4.6.5. Missing values

As is often the case, not all variables used for constructing the AJQI had values for all cases. In other words, for some respondents of Wave 14 of HILDA, answers for some of the indicators used to construct the index were missing. There are a number of reasons why there were missing values in the HILDA dataset. The first occurred because a respondent refused to answer a particular question. The second was due to an implausible response (e.g. having worked more than 28 days in a four-week period). The third reason occurred because the information was not relevant for a particular category of worker. Possible solutions to this problem of missing values included leaving out all respondents for which there were missing values, calculating the index using the information available for each individual (even if the framework is in some cases incomplete) or imputing the missing information using a statistical procedure.

The first solution (elimination of cases with missing values) was not a reasonable option as it would have resulted in dropping too many cases which would bias the results in an uncontrollable way. For instance, 69 percent of cases in the HILDA dataset had at least one missing value in at least one of the underlying variables used to construct the index.

The other two solutions were more reasonable, but also had some problems. The second solution (using the available information for each individual for the calculation of the index) means that the underlying framework of job quality would differ between individuals (because in each case, the framework depends on the available information). When the missing values were the result of logical filters in the questionnaire (for instance, the question on type of contract is not asked to the self- employed), this solution was used because in this case, it made sense that the framework of job quality changed for such particular dimension, since the information that was missing was irrelevant anyway. This means that the calculation of the index differed for each individual depending on available information. Because there were a large number of missing values for the self-employed (including all of the questions for dimension six, voice and collective interest representation, and some of dimension two, quality of employment), the AJQI was constructed for employees only.

The third solution (imputation of missing values) has the problem of being based in an ultimately hypothetical model, which would have required making some relatively arbitrary assumptions. Nevertheless, imputation is useful when there is a key variable for which there is a high percentage of missing values. This strategy of imputation of missing values was used for the underlying variable that was used to construct the two objective pay indicators. The original variable for gross weekly wage (main job) had 2.3 percent of missing values among employees (*n*=187 cases): so the second approach was used (imputation based on available information). HILDA data managers used an ordered *logit* imputation model, under the assumption that pay depends on sex, occupation, age, employment status and working hours. The imputed values tend to be higher than the average, because the categories of workers that were most likely to refuse answering to this question tended to be in higher skilled/paid jobs. The derived variable with imputed missing values (and top-coding) was used to construct both of the two objective indicators for pay (where after imputation, there were no missing values).

Where missing values were as a result of a refusal to answer a particular question, the HILDA survey team used a combination of four imputation methods, to varying extents, to impute missing values: Nearest Neighbour Regression method; the Little and Su method, the Population Carryover method and the Hotdeck method (Summerfield et al., 2016). The particular combination of methods adopted for the imputation of income data (including the wage and salary variable that was used to construct the pay indicators in the AJQI) resulted from a detailed study undertaken by Watson and Starick (2011) and employed the first three of these four methods (cited in Summerfield et al., 2016). So where available, derived variables with imputed values rather than original variables were used to create the index.

4.6.6. Standardisation

The sixth important principle concerns the approach taken to standardisation of variables. The variables (or indicators) used to construct the AJQI were comprised of a combination of categorical, ordinal and scaled items and in the main, these variables were not normally distributed (non-parametric[8]). As discussed in chapter three, different types of data cannot simply be combined to form an index. Indicators need to be standardised to make them comparable and negatively scaled items need to be reversed.

Most guidance on constructing composite indexes recommends the use of Z-scores (for example, the OECD Manual on Constructing Composite Indexes 2005 recommends this approach). The reason why this approach is often adopted is because it is not possible to interpret particular scores unless you can compare them with the mean of the distribution.

Thus, the Z-score of an observation takes the score minus the mean, where the standard error squared is the variance. The Z-score takes positive and negative values with a mean of zero and the distribution has a standard error of unity. Crucially, for the AJQI it is not the distance to the mean value that is important, but the actual value itself. As long as the distribution of responses is reasonably spread across the scales for two indices, then it is of interest whether one index has a higher value than the other. In cases where responses are restricted to, say the highest (e.g. very good) and lowest (e.g. very poor) categories, then the mean may have little meaning. If the variables in the HILDA dataset were standardised using Z-scores, the scores for each variable would be expressed in standard deviation units, which means that the degree of dispersion of the original variables would also be homogenised and relevant information on the actual distribution (in absolute terms) of the different attributes would have been lost. For instance, the psychosocial risk component in the health and safety dimension in the AJQI had, in general, very positive values and very little dispersion because there was a consistently low level of reporting of psychosocial risks. If converted into Z-scores values, scores that were very close the average would have appeared as very far away, giving the impression of greater variation than there was in reality.

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[8] See Pallant (2007: 210) for an explanation of how non-parametric statistical techniques are used when data are measured on categorical or ordinal ranked scales, for small samples or when data violate assumptions of parametric techniques.

For the AJQI, the z-score method was restricted to use in two indicators derived from external data that was then incorporated into the index. Namely, external data on the incidence of work-related accidents or injuries were used to create synthetic indicators (D5C1 and D5C2). For these two indicators, incidence rates of injury by occupation and industry were converted into z-scores, reversed, scored (i.e. 0.00 to 100.00) and then matched to individual cases (additional information on how these two synthetic indicators were made is set out in section 4.8.5).

For all of the other indicators in the AJQI, the distribution in the original variables was retained, even for indicators with very little variability. So prior to any aggregation, all of the relevant original variables in the HILDA dataset were re-coded into a metric of zero (0.0) to 100.0, according to a logic where zero (0.0) represented the worst possible value (i.e. the least desirable outcome) and 100.0 represented the best possible value (i.e. the most desirable outcome) and intermediate values were graded accordingly.

Because the response categories varied, different re-codifications were applied based on the underlying response categories or an external scoring logic. Seven different scoring metrics were used: continuous (0.0 to 100.0), an 11-point ordinal scale, 7-point ordinal scale; 5-point ordinal scale; 4-point ordinal scale; a 3-point ordinal scale; a 2-point ordinal of absence or presence. In addition, a number of potential indicators needed to be reversed to ensure zero (0.0) was the least desirable score and 100.0 was the most desirable score. Beyond reversal of some original variables and re-coding into a 0.0-100.0 metric, no further manipulation was applied to the original HILDA variables.

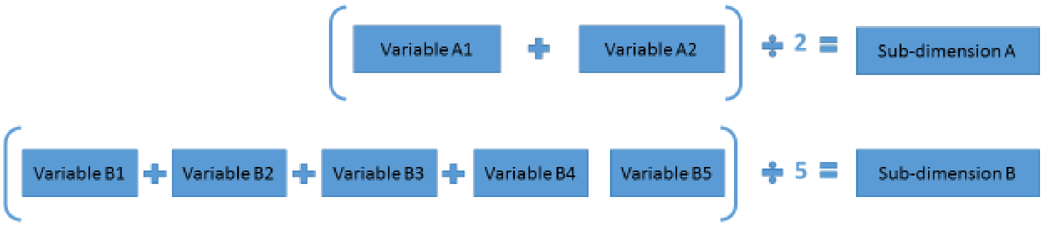
The approach used to standardisation maintained the original distribution of the variables and will permit comparisons to be made over time, should the AJQI be replicated in the future. A technical note in the Technical Report found in Appendix 11.5 sets out the implications of using a combination of categorical, ordinal and scaled items that are not normally distributed.

4.6.7. Weighting and aggregation

The seventh general principle concerns weighting and aggregation. Aggregation of the information within each dimension was done by arithmetically averaging the scores of the individual variables following the hierarchical structure in the framework. Unless specified otherwise, components at the same hierarchical level were assigned equal weights within their dimension.

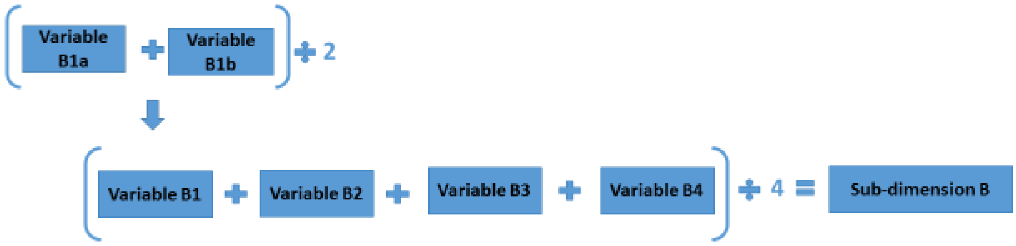
When two or more variables were included in the index because they were measuring the same underlying concept from different angles, the similar variables were aggregated at the lowest level in the nested structure prior to aggregation at the next highest level. For example, if there were seven variables in one dimension of the index, split across two sub-dimensions and where two of the variables captured the same one underlying aspect of job quality and another five variables captured a second aspect of the same underlying aspect of job quality, the first two variables were first aggregated (e.g. 1A); the second set of five variables were aggregated (e.g. 1B) and then the two new variables were aggregated to form the final dimension in the nested structure (e.g. (1A + 1B)/2= Dimension 1) (as illustrated in Figure 4.6.7.1 below). Because the HILDA survey was not specifically designed to measure job quality, however, it was not always possible to include more than one indicator for each of the sub-dimensions (specific circumstances of where this eventuated are discussed later in this chapter).

Figure 4.6.7.1: Example of aggregation method to the sub-dimension level



While it is important for variables of a particular dimension at the same level of the index to be positively correlated (i.e. they are capturing some aspects of the same underlying concept), in some instances two or more variables were highly correlated. When this occurred, there were two choices. The first choice would have involved dropping at least one of the highly correlated variables, however due to the presence of missing cases in either variable, this may have resulted in cases being dropped from the index and it may have meant that an important aspect of the underlying concept was no longer captured. The second choice (the method that was adopted in this thesis) involved creating an additional step in the aggregation process where highly correlated variables were combined prior to further aggregation. A general rule was followed to retain highly correlated variables where two or more variables with a correlation coefficient of r=0.60 or higher were first combined, prior to being aggregated with other indicators at the same level. Applying this rule meant that each of the highly correlated variables had a lower total weight in the final index, but once combined the newly derived combined variable was assigned the same weight as other indicators at the same level in the index (as illustrated in Figure 4.6.7.2 below).

Figure 4.6.7.2: Example of aggregation method used when two highly correlated variables

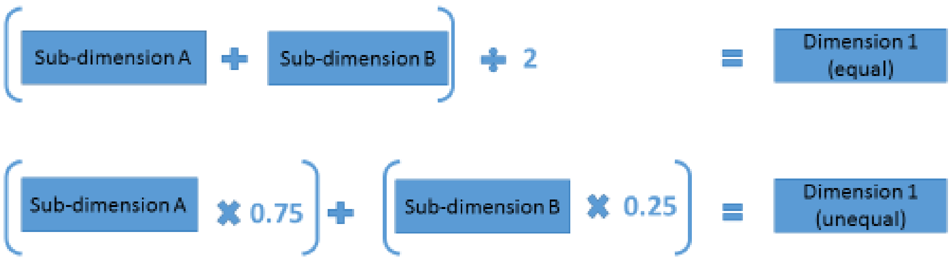


The next step in the aggregation process involved aggregating the sub-dimensions up to the level of each of the six main dimensions. The same process was followed where a simple arithmetic mean was calculated for each dimension following the hierarchical structure shown in Figure 4.3.1. At this step, the approach taken was to use equal weighting unless equal weighting did not adequately reflect the relative importance of the sub-dimensions in the literature.

An equal weighting strategy has typically been adopted by researchers who have constructed other JQIs (e.g. Antón et al., 2012; Leschke et al., 2008; Muñoz de Bustillo et al., 2009). For example, for the EJQI, the five dimensions (sub-indexes) were assigned equal weighting and then scores from each dimension were geometrically aggregated to derive the final score. In contrast, the approach adopted in constructing the AJQI was based on evidence that some sub-dimensions of job quality were more important than others. On this basis, it made sense conceptually to weight the indicators in accordance with their relative importance (Mascherini & Hoskins, 2008 cited in Decancq & Lugo, 2010).

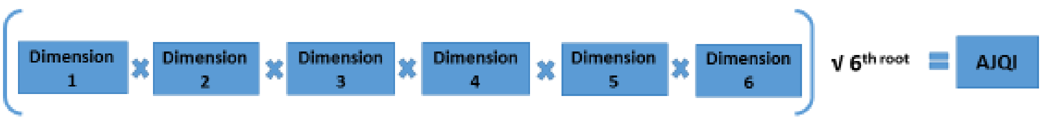
Equal weights were applied in the case of three dimensions (Dimension 3 Intrinsic characteristics of work, Dimension 5 Health and safety and Dimension 6 Voice and collective interest representation). Unequal weights were applied in the case of three dimensions (Dimension 1 Pay, Dimension 2 Quality of employment and Dimension 4 Work-life balance). For the work-life balance dimension, the four aspects of duration (D4AA), scheduling (D4AB), flexibility (D4AC) and work intensity (D4B) were weighted equally, where the three aspects of working time (duration, schedule and flexibility) were aggregated into the sub-dimension of working time (75.0%) prior to be being aggregated with the sub-dimension work intensity (25.0%). In the other two instances where unequal weights were assigned, this was because the literature pointed towards one aspect being more important than another to overall job quality. Specific justifications are set out in the section below where the final structure of the AJQI is explained. Figure 4.6.7.3 illustrates the aggregation process for a dimension with equally-weighted sub-dimensions as well as for a dimension with unequally-weighted sub-dimensions.

Figure 4.6.7.3: Examples of equal and unequal weighting when aggregating a dimension



Aggregation of information at the highest level was carried out by geometrically averaging the six dimensions into the overall index score. Based on the relative strengths and weaknesses of the different approaches to weighting (as discussed in chapter three), shifting from a linear to geometric aggregation method at this stage in the aggregation process was deemed appropriate. Using a geometric rather than arithmetic average in the final stage of the construction of the index has two important advantages. First, the contribution of each dimension to the overall index is not linear, but decreasing (that is, an increase in a dimension from a low initial value produces a larger expansion of job quality than the same increase from a high initial value). Secondly, the contribution of each dimension depends on the values of all the other dimensions (that is, even if the sum of scores was the same, a job with more balanced values in the six dimensions would have a higher quality than a job with very high values in two dimensions but very low values in the other four). What this means is that the AJQI assumed decreasing returns for the different dimensions and imperfect substitutability among the different dimensions with penalisation for significant imbalances between them (Muñoz de Bustillo et al., 2011). For example, a job with a low score on one indicator (e.g. low pay) would need a much higher score on the other indicators (e.g. quality of employment and work-life balance) to improve overall job quality. Figure 4.6.7.4 illustrates the geometric aggregation of the six dimensions into the final AJQI score.

Figure 4.6.7.4: Illustration of aggregation of dimensions to the overall index-level



In summary, a number of different decisions about aggregation and weighting were made due to three main reasons. First, because of the nature of the dataset that was used (i.e. HILDA). Second, because the AJQI is a single-country index (i.e. Australia) as opposed to multi-country (e.g. EU-level or international in the case of the UN-HDI, for example). Third and perhaps more importantly, rather than assigning no (and therefore equal) weights, weights for the sub-dimensions were based on their relative importance to overall job quality.

4.7. Construction of the index

Having set out the general principles that guided construction of the index, specific details about the selection of indicators and statistical interrogation of the theoretically-grounded, nested structure are explained.

4.7.1. Selection of potential indicators

An iterative process was used to determine the final content and structure of the AJQI. As an initial step, the HILDA wave 14 dataset was scrutinised to identify a list of potential indicators that mapped to each of the six dimensions in the nested structure of the conceptual framework. Simple and multivariate statistical procedures were then used to check the frequency, distribution as well as the incidence of outliers and missing values of all of the potential indicators.

Initially, when there were several variables measuring the same underlying concept from different angles, more than one variable for each individual dimension in the framework was used, aimed at increasing the robustness of measurement.

4.7.2. Interrogating the nested structure

The initial selected and grouped indicators were tested for correlation and collinearity to get an understanding of whether the indicators were all measuring some aspect of the same underlying aspect of job quality. To do this, a correlation matrix was produced for each sub-dimension. Pearson correlations were run to explore the strength of pair-wise correlations between variables and to check statistical significance (Palliant, 2007: 101). Each matrix was then examined to check, at each level, whether indicators were positively correlated; though not so much as to be redundant and if correlated, the strength of the correlation coefficients. As a general rule, the strength of relationships were categorised into small (r=0.10 to .29), medium (r=0.30 to 0.49) and large (r=0.50 to 1.0) correlations. The Technical Report found in Appendix 11.5 sets out a technical note justifying the use of parametric tests for data that is not continuous and/or not normally distributed.

Decisions on whether to retain indicators were based on a combination of factors including whether the amount of explained variance was improved by retaining or dropping certain variables and also whether dropping a variable would result in an unacceptably large increase in the number of cases with a missing value at the level of each sub-dimension. In particular, where the strength of the relationship among any pair-wise correlation exceeded r=0.60, the impact of retaining versus dropping any strongly correlated items was carefully investigated. Where potential indicators were negatively correlated with other indicators in the group, the indicators were either dropped or moved to another relevant part of the nested structure so as to be positively correlated to the other indicators in the new group.

In addition, there were a number of variables where it seemed both theoretically and statistically feasible to locate in more than once place in the AJQI. Given the complex and multi-dimensional nature of job quality, overlaps between various different aspects of job quality are not surprising. In three particular instances, rather than including an indicator in only one dimension of the AJQI, the same indicator was incorporated into two different parts of the index (i.e. duplication). While this duplication resulted in these indicators being assigned more weight in the final AJQI score, both the literature and statistical 'fit' supported duplication.

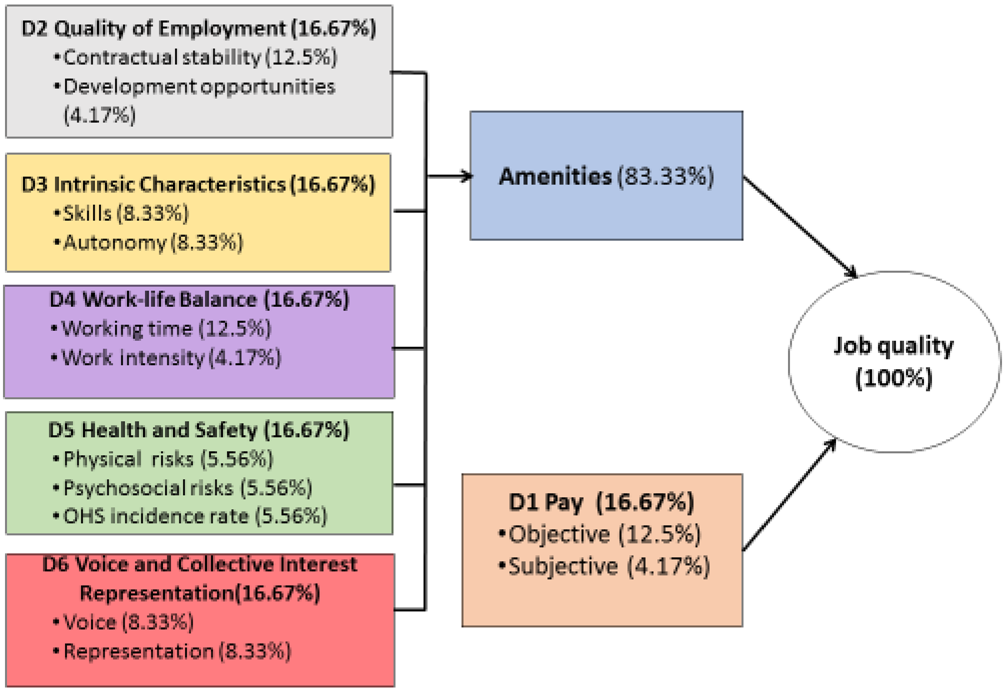
In the first instance, two indicators related to shift patterns and discretion about when to take a break were incorporated into the work-life dimension (D4AB2 and D4AB3b) were also incorporated into the aspect of physical risk in the health and safety dimension (D5A3 and D5A4). In the second instance, one indicator about discretion about when to do work was incorporated into the work-life balance dimension (D4AC3a) as well as into the aspect of autonomy in the dimension for intrinsic characteristics of work (D3B3). In the third instance, one indicator about influence over work was incorporated into the autonomy aspect in the intrinsic characteristics of work (D3B4) as well as into the voice aspect in the dimension of voice and collective interest representation (D6A).

4.8. Final structure of the AJQI

Figure 4.8.1 depicts the final structure of the AJQI showing the weights for each dimension and sub-dimension. The nested structure of the conceptual framework is comprised of six dimensions and 13 sub-dimensions. A total of fifty indicators were used as the underlying basis of the index, by standardising into scores (and where necessary, reversal) and combining via the aggregation methods outlined above.

Specific details on the rationale for inclusion of each indicator and composition of each sub-dimension and dimension that were included in the AJQI are set out below. Correlation matrixes for all dimensions are set out in Technical Report in Appendix 11.5.

Figure 4.8.1: Final Hierarchical structure of AJQI



4.8.1. Dimension 1: Pay (D1)

Taken together, three indicators (two objective and one subjective) were used to construct the pay dimension. The three indicators in the pay dimension capture elements of legal compliance, inequality of wage distribution and a subjective assessment of pay fairness. The sub-dimension of objective pay was weighted to account for 75 percent and the sub-dimension of subjective pay was weighted to account for 25 percent of the total score for this dimension, respectively (see text box 4.8.1.1 below).

Text box 4.8.1.1: Structure and composition of Dimension 1

- **D1A Objective pay (75.0%)**
  - D1A1: FTE Weekly wage or salary for main job [deciles recoded into 11-point ordinal scale, scored 0.0, 10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0] (37.5%) [Obj]
  - D1A2: FMW adherence [2-point scoring: no (0.0), yes (100.0)] (37.5%) [Obj]
- **D1B Subjective pay (25.0%)**
  - 'D1B1: I get paid fairly for the things I do in my job' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (50%) (Subj]

The reasoning behind why objective pay is allocated a higher weighting (75%) than subjective pay (25%) is because the wage level (D1A) and whether the job-holder is paid below the legal minimum are considered more important than whether the job-holder feels they are paid fairly. However, the subjective indicator was included as a way to tap into whether the job-holder believes there is any wage discrimination at play either in their workplace or in the labour market more broadly (Rasch & Szypko, 2013).

Before describing how the objective pay indicators were constructed, it must be acknowledged that the distribution of earnings is known to be asymmetric, where a relatively small number of employees have comparatively very high earnings (ABS, 2015b). Top-coding has been used to provide confidentiality and to preserve the weighted distribution means. The top-coding thresholds are adjusted over time to overcome the tendency of income and wealth measures to inflate (Summerfield et al., 2016). In Wave 14, there were *n*=4 cases where an employee's weekly wage was equal to or exceeded $8,836 and where the value was replaced by $11,467 (the weighted average of the four cases) (HILDA Thresholds by Wave 140 Excel file).

Two objective indicators were aggregated to form the sub-dimension of objective pay (D1A). The same underlying variable for Gross Weekly Wage in main job (with imputed values and top-coded as described above) was used to derive both of the two objective indicators: first, full time equivalent (FTE) gross weekly wage for main job scored by decile (D1A1) and second, FTE gross weekly wage compared to the applicable age-related Australian Federal Minimum Wage (FMW) rates (D1A2) (FWC, 2014). Scoring for the two objective indicators was calculated for all employees, however there were *n*=75 cases where employees reported a zero gross weekly wage for their main job (and no imputation was undertaken for zero wages, only for missing values).[9] For both of the objective pay indicators, cases with zero wages were assigned a score of 0.0. For those working full-time hours, the figure for the gross weekly wage in main job was used.

For part-time workers, an hourly rate was calculated based on gross weekly wage for main job and usual weekly hours of work. The derived hourly rate was multiplied by 35 (where 35 hours is the standard usual full-time weekly hours of work adopted by the Australian Bureau of Statistics) to produce a full-time equivalent gross weekly wage. There were *n*=3 cases of part-time workers where dividing reported gross weekly wage in main job by reported usual hours per week in main job resulted in a full-time equivalent gross weekly wage that was higher than HILDA top-coded gross weekly wage (i.e. $11,467 per week). A check of the cases resulted in the decision to remove these 3 outlier cases from this derived variable.

[9]A number of reasons exist for why an employee might report a zero wage in the reference week. For casual employees (n=29), they likely did not work in the reference week. For the fixed term contract (n=4) and permanent employees (n=42), they may have been on some form of unpaid leave (such as unpaid parental leave, unpaid sick leave or some other type of unpaid leave).

For D1A1, because a number of the other indicators in the AJQI are based on 11-point scales, for consistency, it was decided to create an 11-item ordinal scale where the full-time equivalent wage distribution was broken into eleven roughly equal groups and scored.

For D1A2, as mentioned above, the interviews for Wave 14 took place between August 2014 and February 2015. To incorporate into the pay dimension of the index an indicator scored in comparison to legislative minimum rates of pay, rates from the 2014 Federal Minimum Wage Order were applied to the full-time equivalent gross weekly wage for the employee's main job. The 2014 wage rates took effect on 1 July 2014 (that is, just prior to the commencement of HILDA survey fieldwork) and remained in place until 30 June 2015 (that is, after completion of the HILDA survey fieldwork) (FWC, 2014). Fourteen different minima were applied dependent on the worker's permanent/casual status and age.[10] As stressed in the HILDA User Manual (Summerfield et al., 2016: 47), some respondents report low wages and salaries with high hours and vice versa, so despite using the variables and method recommended in the HILDA User Manual for deriving hourly rates and full-time equivalent gross weekly wages some odd cases remained. Those employees who are paid at or above the minimum wage are scored as 100.00 and those below (including zero) are scored as zero (i.e. 0.0). So in this sense, this variable is a simple dummy indicating compliance/non-compliance with the statutory minimum rates of pay. This indicator provides an objective assessment about whether an employee's wage meets or exceeds the Australian legislative minima.

For the sub-dimension of subjective pay (D1B), one indicator was included in the AJQI. The HILDA dataset contains two subjective variables for pay: satisfaction with pay (C35a in PQ), and perception of fairness with pay (D2c in SCQ). The variable for total pay satisfaction forms part of a battery of five questions about various aspects of job satisfaction, as well as an overall assessment of job satisfaction. The decision was made not to include the variable for total pay satisfaction in the AJQI. As discussed earlier in chapter three, while job satisfaction is interesting in and of itself, a study by Muñoz de Bustillo and Fernández-Macías (2005) did not find support for using job satisfaction as a measure of job quality. It is more appropriate to compare, as a separate exercise, the AJQI results with worker perceptions of job satisfaction. In contrast, there is evidence in the literature indicating that the perception of fairness in pay is considered important by workers and they based their perception on a combination of objective and subjective elements (Falope 2017; Kenexa, 2013; Rasch & Szypko, 2013). In the end, only the subjective variable on perception of fairness of pay was included in the AJQI.

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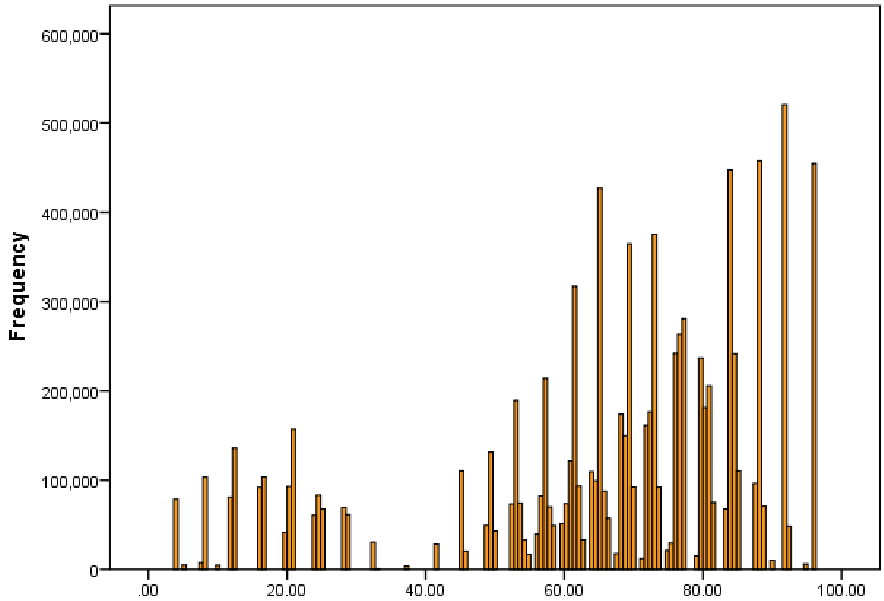
[10]Additional special minimum rates of pay exist for apprentices, trainees under formal training arrangements and employees with disabilities. It was not possible to ascertain from the HILDA dataset whether any of these special minimum rates applied, so only the federal national minimum rates were applied.

After aggregation to the dimension-level, both sub-dimensions were positively correlated to the overall dimension, where the sub-dimension of objective pay had a pairwise correlation coefficient of r=0.87 and the sub-dimension of subjective pay had a pairwise correlation co-efficient of r=0.37 (both significant at the 0.01 level, 2-tailed) (Table 11.4.1 in Appendix 11.4 sets out the final correlation matrix for the pay dimension).

There are numerous variables in HILDA about other aspects of remuneration such as non-cash benefits (e.g. employer funded superannuation, personal salary sacrificing into superannuation, weekly value of salary sacrificing items, weekly value of non-cash benefits, childcare facilities or subsidised child care, dividends). However after interrogating the responses, there appears to be limited knowledge and/or low response rates, so no additional remuneration variables were included in the AJQI.

Figure 4.8.1.1, below, plots the histogram showing the distribution for the pay dimension. It can be seen that the distribution for the pay dimension is bi-modal, with the left part ranging from the lowest score of 0 up to 37.5 (14.251% of the sample) and then the second side of scores ranging from 41.25 up to the highest score of 100.0 (the remaining 85.8% of the sample). Overall, the scores for pay lean to the right-hand side of the chart because both the mean (66.96) and median (71.68) are above fifty. The distribution for pay is negatively skewed[11] (-1.11) and light-tailed (kurtosis of 0.52).[12]

Figure 4.8.1.1: Histogram for Pay (D1)



[11] If skewness is less than -1 or greater than 1, the distribution is highly skewed. If skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed. If skewness is between -0.5 and 0.5, the distribution is approximately symmetric.
[12] A standard (bell curve) distribution has kurtosis of 3. So kurtosis of less than 3 is light-tailed and higher than 3 is heavy tailed.

4.8.2. Dimension 2: Quality of employment (D2)

Twelve indicators (seven objective and five subjective) were used to construct the quality of employment dimension. The dimension contains two sub-dimensions capturing elements of contractual stability and development opportunities. The sub-dimension of contract stability was weighted to account for 75 percent and the sub-dimension of development opportunities was weighted to account for 25 percent of the total score for this dimension, respectively (see text box 4.8.2.1 below).

For the AJQI it was not deemed appropriate to assign equal weighting to contract stability and development opportunities. There is an extensive body of literature on the deleterious effects of precarious work (for example, Bohle, Quinlan & Mayhew, 2001; Esser & Olsen, 2012; Paugam & Zhou, 2007). Furthermore, a worker may not have attended any employer-provided training during the past twelve months but there may be other ways that (although not captured) their employer has assisted or facilitated their career progression.

Seven indicators (two objective and five subjective) relating to contractual stability were included in this sub-dimension (D2A). The two equally-weighted objective indicators captured aspects of paid leave entitlements (D2A1) and legal protection in the case of unfair dismissal (D2A2).

In relation to the first indicator (D2A2), while it would have been possible to construct an indicator based on type of employment contract (as found in the EJQI), a decision was made to abandon this variable. It was decided that it was too arbitrary to try to assign scores to permanent, fixed term and casual contracts of employment. For example, if an employee had just re-negotiated a new fixed term contract, they would arguably have greater job security than a counterpart who was engaged on an open-ended, permanent contract. Moreover, many ‘casual’ workers in Australia have long tenure, to the point where they commonly refer to themselves as ‘permanent-casuals’ (i.e. oxymoronic) (Watson, 2013; Markey & McIvor, 2018).

In order to better capture, objectively, the notion of contractual stability, an indicator was made based on entitlement to paid leave (i.e. paid annual leave and/or paid sick leave). If a worker was entitled to either paid annual leave, paid sick leave or both, they were (objectively) assigned a score of 100.0. If not, they were assigned as score of zero (i.e. 0.0). This approach is consistent with the Australian Bureau of Statistics (ABS), where absence of paid leave entitlements as a proxy measure of casual employment has been used since 1988 (Kryger, 2015).

Text box 4.8.2.1: Structure and composition of Dimension 2

Dimension 2 Quality of Employment (100.0%)

- **D2A Contract Stability (75.0%)**
  - D2AObj: Objective Contractual Stability (37.5%)
    - Paid leave entitlement [2-point scoring: no (0.0), yes (100.0)] (18.75%) [Obj]
    - Unfair dismissal protection [2-point scoring: no (0.0), yes (100.0)] (18.75%) [Obj]
  - D2ASub: Subjective Contractual Stability (37.5%)
    - D2Asub1: 'I worry about the future of my job' [7-point ordinal scale, reversed, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (9.38%) [Subj]
    - D2Asub2: 'Percent change of losing my job in the next 12 months' [reversed, 0 to 100 continuous scale]. (9.38%) [Subj]
    - D2Asub3: 'The company I work for will still be in business 5 years from now' [7-point ordinal scale, reversed). (9.38%) [Subj]
    - D2Asub4 (9.375%):
      - D2Asub4a'I have a secure future in my job' [7-point ordinal scale, reversed, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (4.69%) [Subj]
      - D2Asub4b'Job security satisfaction' [11-point ordinal scale, scored 0.0, 10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0] (4.69%) [Subj]
- **D2B Development Opportunities (25.0%)**
  - D2BA: Work-related training (12.5%)
    - D2BA1 (6.75%):
      - D2BA1a: Work related training in past twelve months [3-point ordinal: no (0.0), yes, but not in paid work time (50.0), yes, in paid work time (100.0)]. (2.25%) [Obj]
      - D2BA1b: Amount of work-related training in past twelve months [11-point ordinal scale, scored 0 hrs (0.0), 1 to 9 hrs (10.0), 10 to 19 hrs (20.0), 20 to 29 hrs (30.0), 30 to 39 hrs (40.0), 40 to 49 hrs (50.0), 50 to 59 hrs (60.0), 60 to 69 hrs (70.0), 70 to 79 hrs (80.0), 80 to 89 hrs (90.0), 90 hrs or more (100.0)]. (2.25%) [Obj]
      - D2BA1c: 'To what extent do you think you could use the new skills you have acquired from any of this training if you got a new job?' [5-point ordinal scale, scored no training (0.0), did not learn any new skills (0.0), limited extent (25.0), moderate extent (50.0), great extent (75.0) and very great extent (100.0)]. (2.25%) [Subj]
    - D2BA2: Employer contributed to cost of training [2-point scoring: no (0.0), yes (100.0)]. (6.75%) [Obj]
  - D2BB: Development Opportunities (12.5%)
    - D2BB1: Satisfaction with employment opportunities [11-point ordinal scale, scored 0 hrs (0.0), 1 to 9 hrs (10.0), 10 to 19 hrs (20.0), 20 to 29 hrs (30.0), 30 to 39 hrs (40.0), 40 to 49 hrs (50.0), 50 to 59 hrs (60.0), 60 to 69 hrs (70.0), 70 to 79 hrs (80.0), 80 to 89 hrs (90.0), 90 hrs or more (100.0)] (12.5%) [Subj]

In relation to the second indicator (D2A2), protection from harsh, unjust or unreasonable dismissal has long been enshrined in Australian labour law. The *Fair Work Act 2009* sets out eligibility for when employees are able to lodge an unfair dismissal claim. The eligibility criteria has been changed by successive governments, making this an interesting variable to include in the AJQI. An indicator was constructed using underlying variables for size of workforce, tenure with employer[13], and income level.[14] A score of zero (i.e. 0.0) was assigned to workers who did not qualify for unfair dismissal protection and a score of 100.0 was assigned to those who do qualify.

The HILDA dataset contained five variables capturing subjective aspects of job security. There were benefits in including five variables because they capture various aspects of insecurity and because not all respondents were asked or responded to all five questions.

After the variables were standardised and scored, they were subjected to exploratory principal components analysis (PCA). The correlation matrix revealed the presence of correlation coefficients of r=0.30 and above for almost all the variables. The Keiser-Meyer-Oklin value was 0.8, exceeding the recommended minimum value of 0.60 and Bartlett's Test of Sphericity reached statistical significance (.000), supporting the feasibility of the correlation matrix. The results from this analysis support using all five items as one component, where the one component solution explained a total of 55.0 percent of the variance.

However, pair-wise correlation for 'Job security satisfaction' (D2ASub4a) and 'I have a secure future in my job' (D2ASub4a) was high (r=0.60), so following the general rule, these two variables were first combined with equal weights (D2ASub4) before further aggregation at the sub-dimension level. A simple arithmetic mean was then used to calculate a score for this sub-dimension, where the four resulting variables were equally weighted.

The revised four items were subjected to further exploratory PCA. The correlation matrix revealed the presence of correlations of 0.30 and above for most of the coefficients. The Keiser-Meyer-Oklin value was 0.70, exceeding the recommended minimum value of 0.6 and Bartlett's Test of Sphericity reached statistical significance (.000), supporting the feasibility of the correlation matrix. The results from this analysis support using all four items as one component, where the one component solution explained a total of 55.70 percent of the variance.

The sub-dimension of development opportunities (D2B) was captured via the two equally-weighted aspects of work-related training (D2BA) and prospects for advancement (D2BB).

[13] For workplaces with 15 employees or more the minimum qualifying period (i.e. tenure) is six months and for workplaces with less than 15 employees, it is 12 months. The size ranges in the HILDA survey meant that it was only possible to re-code into a category of 20 employees or less. So this was used as the threshold instead of 15.

[14] A high income threshold is set where employees earning above this threshold are not entitled to make an unfair dismissal claim. At the time of the HILDA wave 14 survey, the high income threshold was AUD$133,000 (effective 1st July 2014).

Four indicators are used to construct the first aspect of work-related training (D2BA). Strong correlations (above 0.60) were found between three of the indicators (D2B1a, D2B1b and D2B1c) so they were aggregated at the lowest level with equal weighting, after which the new derived variable (D2B1) was aggregated with the other remaining variable (D2B2) using a simple weighted average.

For the second aspect of development opportunities (D2BB), one indicator was used to capture prospects for advancement. A pairwise correlation for work-related training (D2BA) and satisfaction with development opportunities (D2BB) shows the two aspects had a significant yet weak, positive correlation (r=0.10).

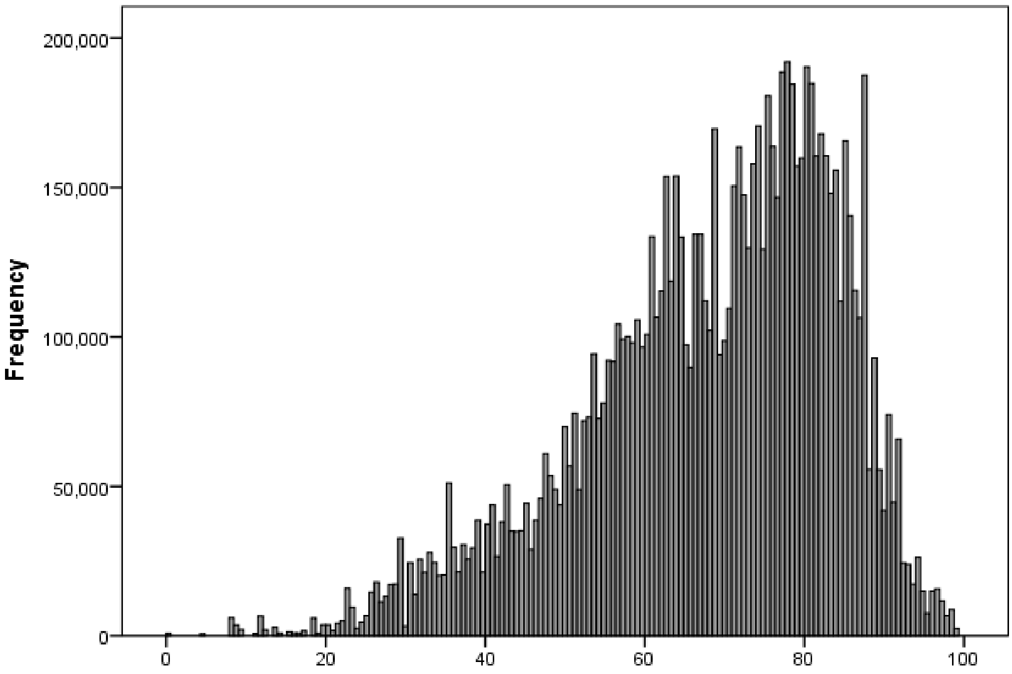
The dimension of quality of employment was then made by combining contractual stability (D2A) and development opportunities (D2B), where contractual stability was assigned a weight of 75 percent and development opportunities was assigned a weight of 25 percent. While there was a weak correlation between contractual stability and development opportunities (r=0.20), contractual stability was strongly correlated to the aggregate dimension (r=0.97) while development opportunities was moderately correlated to the aggregate dimension (r=0.50).

Confirmatory PCA was undertaken on the structure of the dimension with all of the indicators items used to construct the dimension. While the correlation matrix revealed the presence of some correlation coefficients of lower than r=0.30, the Keiser-Meyer-Oklin value was 0.70, exceeding the recommended minimum value of 0.60 and Bartlett's Test of Sphericity reached statistical significance (.000), supporting the general feasibility of the correlation matrix. The results from this analysis support the three components (objective contractual stability, subjective contractual stability and work-related training), where the three component solution explained 59.5 percent of the total variance.

Once aggregated to the dimension-level, the two sub-dimensions were both positively correlated to the overall dimension, where the sub-dimension of contractual stability had a pairwise correlation co-efficient of r=0.97 and the sub-dimension of development opportunities had a pairwise correlation co-efficient of r=0.50 (both significant at the 0.01 level, 2-tailed). (Table 11.4.2 in Appendix 11.4 sets out the final correlation matrix for the dimension of quality of employment).

Figure 4.8.2.1 plots the histogram showing the distribution for the quality of employment dimension. From Figure 4.8.2.1 it can be seen that scores for quality of employment lean to the right-hand side because both the mean (68.12) and median (71.30) are above fifty. In other words the distribution is moderately negatively skewed (-0.76) so the left-hand tail of the distribution is longer than the right-hand tail; and is light-tailed (kurtosis of 0.22).

Figure 4.8.2.1: Histogram for Quality of employment (D2)



4.8.3. Dimension 3: Intrinsic Characteristics of Work (D3)

Eleven indicators (one objective and ten subjective) were used to construct the dimension of intrinsic characteristics of work with two sub-dimensions capturing the elements of skill and autonomy. The sub-dimensions of skill and autonomy were equally weighted so as to each account for 50 percent of the total score for this dimension, respectively (see text box 4.8.3.1 below).

The sub-dimension of skill (D3A) was constructed using seven indicators (one objective and six subjective). For the first aspect of objective skill (D3AObj), an indicator was constructed based the skill level of the job. This was done re-coding and reversing the 0ccupation 2-digit ANZSCO 2006 variable into five skill levels.[15] For the second aspect of subjective skill (D3ASub), six subjective variables were used to capture the two aspects of job complexity (D3AsubA1, D3AsubA2) and job variety (D3AsubB1, D3AsubB2, D3AsubB3, D3AsubB4). The two new derived variables for complexity (D3ASubA) and variety (D3ASubB) were then aggregated to form a combined indicator for subjective skill (D3Asub) using a simple average.

Confirmatory PCA was undertaken on the structure of the sub-dimension with all of the seven indicators used to construct the sub-dimension of skill. The correlation matrix revealed the presence of correlation coefficients of r=0.30 and above for most of the coefficients. The Keiser-Meyer-Oklin value was 0.80 exceeding the minimum recommended value of 0.60 and

[15] ANZSCO 2006 is the abbreviation for the Australian and New Zealand Standard Classification of Occupations, 2006, First Edition, Revision 1. All occupations are assigned to one of five skill levels (ABS, 2009).

Bartlett's Test of statistical significance (.000), supporting the feasibility of the correlation matrix. The results from this analysis supported the theoretically-driven structure of sub-dimension of skill, where the component solution explained 47.3 percent of the total variance.

Text box 4.8.3.1: Structure and composition of Dimension 3

Dimension 3 Intrinsic Characteristics of Work (100.0%)

- **D3A Skills (50.0%)**
  - D3AObj: Objective Skill (25.0%)
    - ANZSOC skill level for occupation [5-point ordinal scale, reversed, scored level 5 (0.0), level 4 (25.0), level 3 (50.0), level 2 (75.0), level 1 (100.0)] [Obj]
  - D3ASub: Subjective Skill (25.0%)
    - D3ASubA: Complexity (12.5%)
      - D3ASubA1: 'My job is complex and difficult' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (6.25%) [Subj]
      - D3ASubA2: 'My job often requires me to learn new skills difficult' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (6.25%) [Subj]
    - D3ASubB: Variety (12.5%)
      - D3ASubB1: 'My job requires me to take initiative' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (3.125%) [Subj]
      - D3ASubB2: 'I use many of my skills and abilities in my current job' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)]. (3.125%) [Subj]
      - D3ASubB3: 'My job provides me with a variety of interesting things to [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)]. (3.125%)[Subj]
      - D3ASub4: 'My job requires me to do the same things over and over again' [7-point ordinal scale, reversed, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (3.125%) [Subj]
- **D3B Autonomy (50.0%)**
  - 'I have a lot of choice in deciding what I do at work' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (12.5%) [Subj]
  - 'I have a lot of freedom to decide how I do my own work' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (12.5%) [Subj]
  - 'I have a lot of freedom to decide when I do my work' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (12.5%) [Subj] {# }
  - 'I have a lot of say about what happens in my job' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (12.5%) [Subj] {*}

Also included in D4A Flexibility * Also included in D6A Voice.

The objective skill indicator (D3AObj) and the subjective skill indicator (D3Asub) were then aggregated using a simple average to assign equal weighting. For the sub-dimension of autonomy (D3B), four equally-weighted subjective indicators capturing various aspects of autonomy were included in the index (D3B1, D3B2, D3B3, D3B4).

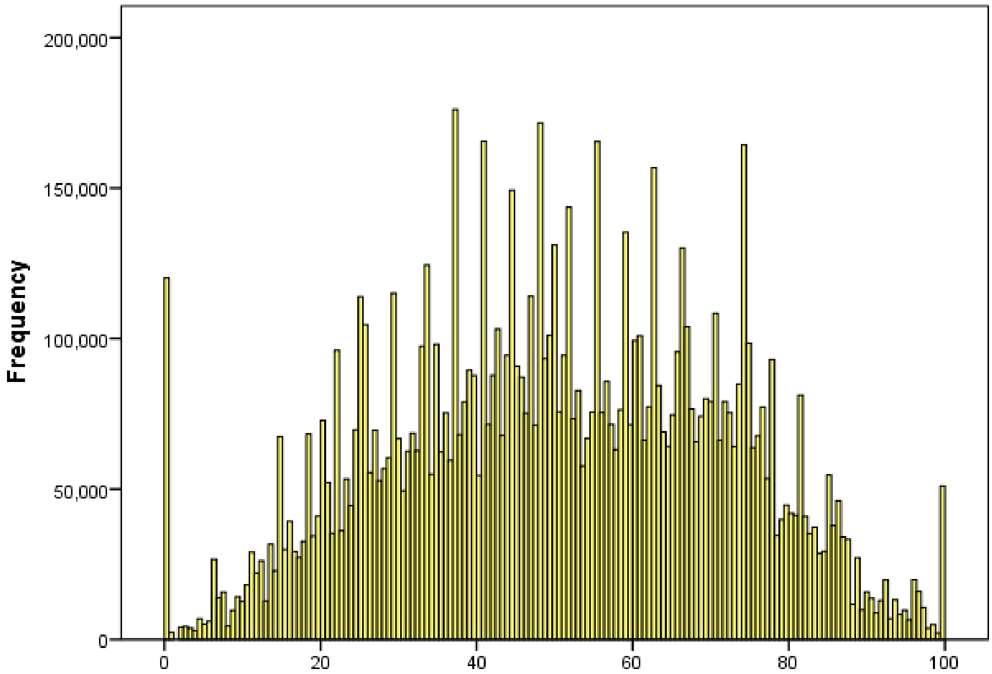
Confirmatory PCA was undertaken on the structure of the dimension with all of the four indicators for autonomy. The correlation matrix revealed the presence of correlation coefficients of r=0.30 and above. The Keiser-Meyer-Oklin value was 0.80 exceeding the minimum recommended value of 0.60 and Bartlett's Test of Sphericity reached statistical significance (.000), supporting the feasibility of the correlation matrix. The results from this analysis supported one component (autonomy), where the one component solution explained 71.7 percent of the total variance.

The two sub-dimensions (D3A Skill and D3B Autonomy) were aggregated using a simple weighted average to form the dimension of intrinsic characteristics of work. Once aggregated to the dimension-level, the two sub-dimensions were both positively correlated to the overall dimension, both correlation coefficients were r=0.80 (both significant at the 0.01 level, 2-tailed). (Table 11.4.3 in Appendix 11.4 sets out the final correlation matrix for the dimension of intrinsic characteristics of work).

Confirmatory PCA was again undertaken on the structure of the dimension with all of the eleven indicators used to construct the sub-dimension. The correlation matrix revealed the presence of correlation coefficients of r=0.30 and above for most of the coefficients. The Keiser-Meyer-Oklin value was 0.90 exceeding the minimum recommended value of 0.60 and Bartlett's Test of Sphericity reached statistical significance (.000), supporting the feasibility of the correlation matrix. The results from this analysis support three components, where the three component solution explained 66.3 percent of the total variance.

Figure 4.8.3.1 plots the histogram showing the distribution for intrinsic characteristics of work. From Figure 4.8.3.1 it can be seen that the distribution for this dimension is approximately symmetric (skewness of -0.07). The distribution has lighter tails than a normal distribution (kurtosis is -0.62), where all indicators used to construct this dimension followed this pattern of a light-tailed distribution.

Figure 4.8.3.1: Histograms for Intrinsic Characteristics of Work (D3)



A decision was made to include the aspects of autonomy in working time arrangements, work schedules, hours flexibility and working hours in the work-life balance dimension rather than in the sub-dimension of autonomy. While the AJQI captured autonomy (and powerfulness) via four indicators, HILDA does not contain variables for meaningfulness, social support or self-fulfilment. This was not considered a major shortcoming of the AJQI, due to adequate coverage of this dimension and the highly subjective nature of the aspects of meaningfulness, social support and self-fulfilment.

4.8.4. Dimension 4: Work-Life Balance (D4)

The fourth dimension of work-life balance was constructed from thirteen indicators (eight objective and five subjective). The dimension captures aspects of the elements of working time and work intensity. At the dimension-level, a score was calculated for all of the *n*=8,299 employees. The sub-dimension of working time was weighted to account for 75 percent and the sub-dimension of working intensity was weighted to account for 25 percent of the total score respectively (see text box 4.8.4.1 below).

The reason for not assigning equal weights to the sub-dimensions is simply because the four aspects (duration, scheduling, flexibility and work intensity) are all considered equally important).

For the sub-dimension of working time (D4A), three aspects are captured in the AJQI: duration (D4AA), scheduling (D4AB) and flexibility (D4AC).

Duration (D4AA) was operationalised by constructing two objective indicators. The first indicator (D4AA1) re-coded the HILDA variable for usual weekly hours into groups, scored according to a logic whereby working fewer hours was more favourable than working longer hours. The second indicator for duration (D4AA2) re-coded the HILDA variable into groups and scored the number of days usually worked in a four-week period according to a logic whereby working fewer days was more favourable than working more days. The two objective variables for duration of working hours were strongly correlated (r=0.60) so they were combined to form a new derived variable (D4AA), using a simple arithmetic mean.

While the HILDA dataset contained two subjective indicators related to working time (satisfaction with hours of work and working time preference), they were not included in the AJQI because of the general principle of trying to restrict the index to objective indicators and only including subjective indicators in the absence of sufficient objective indicators. The two subjective indicators are among the variables used to analyse the findings (see analysis of AJQI results by outcome measures reported in chapter five).

Scheduling (D4AB) was constructed using four indicators. The first indicator (D4AB1) is related to weekend work, where working weekends was scored less favourably than not normally working weekends. The second indicator (D4AB2) is related to the ability for an employee to determine the timing of their own rest breaks. The third indicator (D4AB3a) is related to predictability of the work schedule. The fourth indicator (D4AB3b) is related to unsocial work schedules, where working rotating shifts, regular evening or night shifts, split shifts were scored less favourably than working a regular day time schedule.

The indicators of the predictability of work schedule (D4AB3a) and unsociable work schedule (D4AB3b) were highly correlated (r=0.95) so they were combined prior to further aggregation at the higher level. Afterwards, the three indicators were aggregated using a simple arithmetic mean to form the scheduling component of this sub-dimension.

Flexibility (D4AC) was also constructed using four indicators. The first is a subjective indicator where employees are asked to rate flexibility to balance work and non-work commitments (D4AC1). The second (objective) indicator is based on whether an employee has access to flexible work arrangements (i.e. flexible start & finish times) (D4AC2). The third indicator (D4AC3a) pertains to latitude in deciding when work is undertaken. The fourth indicator (D4AC3b) pertains to the perception of flexible working times. Pairwise correlations revealed that two indicators (D4AC3a & D4AC3b) were strongly correlated (r=0.60) so these two indicators were aggregated at the lowest level before higher aggregation (D4AC3).

For the sub-dimension of work intensity (D4B), three subjective indicators were used in the index. The first indicator is related to the pace of work (D4B1). The second and third indicators

(D4B2a & D4B2b, respectively) are related to workload. Pairwise correlations revealed that two indicators (D4B2a & D4B2b) were strongly correlated (r=0.60) so these two indicators were combined (D4B2) before higher aggregation with the third indicator.

Text box 4.8.4.1: Structure and composition of Dimension 4

Dimension 4 Work-Life Balance (100.0%)

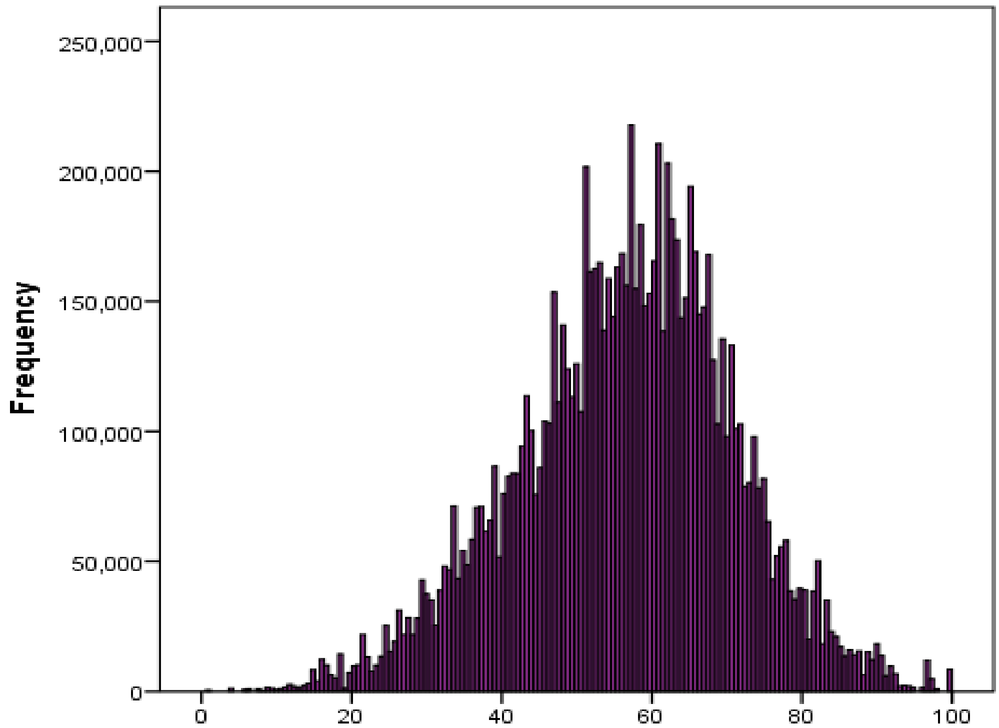
- **D4A Working time (75.0%)**
  - D4AA Duration (25.0%)
    - D4AA1: Usual weekly hours [5-point ordinal scale, scored 0-20 hrs (100.0), 21-38 hrs (75.0), 38-42 hrs (50.0), 43-50 hrs (25.0) and More 50 hrs (0.0)] (12.5%) [Obj]
    - D4AA2: Number of days usually worked in four-week period [7-point ordinal scale, scored 1-4 days (100.0), 5-8 days (83.3), 9-12 days (67.7), 13-16 days (50.0), 17-20 days (33.3), 21-24 days (16.7) and 25-28 days (0.0)] (12.5%) [Obj]
  - D4AB Scheduling (25.0%)
    - D4B1: Normally work weekends [2-point scoring: no (100.0), yes (0.0)] (8.33%) [Obj]
    - D4B2: ‘I can decide when to take a break’ [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (8.33%) [Obj] {**}
    - D4B3: Combined (8.33%):
      - D4B3a: Predictability of work schedule [2-point ordinal scale: unpredictable schedule (0.0) and predictable schedule (100.0)]. (4.17%) [Obj]
      - D4B3b: Unsociable work schedule [3-point ordinal: rotating shift (0.0), regular evening or night schedule or split shift (50.0) and regular day time schedule (100.0)]. (4.17%) [Obj]
  - D4AC Flexibility (25.0%)
      - D4AC1: ‘The flexibility to balance work and non-work commitments [11-point ordinal scale, scored 0(0.0), 1(10.0), 2(20.0), 3(30.0), 4(40.0), 5(50.0), 6(60.0), 7(70.0), 8(80.0), 9(90.0) and 10 (100.0)] (8.33%) [Subj]
      - D4AC2: ‘Workplace entitlements: Flexible start/finish times’ (2-point scoring no (0.0), yes (100.0)] (8.33%) [Obj]
      - D4AC3: Combined: (8.33%)
        - D4AC3a: ‘I have a lot of freedom to decide when I do my work’ job’ [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)]. (4.17%) [Subj] {#}
        - D4AC3b: ‘My working times can be flexible’ job’ [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (4.17%) [Obj]
- **D4B Work Intensity (25.0%)**
  - D4B1: Pace of work: (12.5%)
    - D4B1: ‘I have to work fast in my job’ [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (12.5%) [Subj]
    - D4B2: Combined (12.5%):
      - D4B2a: ‘I have to work very intensely in my job’ [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (6.25%) [Subj]
      - D4B2b: ‘I don’t have enough time to do everything in my job’ [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (6.25%) [Subj]

**Also included in D5A Physical risks. # Also included in D3B Autonomy

Scores from the two sub-dimensions (working time and work intensity) were aggregated with a 75 percent weighting to working time and a 25 percent weighting assigned to work intensity. Once aggregated to the dimension-level, the two sub-dimensions were both positively correlated to the overall dimension, where the sub-dimension of working time had a correlation coefficient of r=0.90 and the sub-dimension of autonomy had a correlation coefficient of r=0.50 (both significant at the 0.01 level, 2-tailed). Table 11.4.4 in Appendix 11.4 sets out the final correlation matrix for the dimension of Work-life Balance.

Figure 4.8.4.1 plots the histogram showing the distribution for the work-life balance dimension. From Figure 4.8.4.1 it can be seen that the distribution for the dimension of work-life balance is approximately symmetric (skewness is -0.23); and is light-tailed (kurtosis is 0.07).

Figure 4.8.4.1: Histogram for Work-Life Balance (D4)



The range of indicators used in the AJQI results in very good coverage for each of the four aspects of work-life balance (duration, scheduling, flexibility & work intensity).

4.8.5. Dimension 5: Health and Safety (D5)

Eight indicators (six objective & two subjective) were used to construct the health and safety dimension. The dimension has three sub-dimensions of physical risks, psychosocial risks and overall Occupational Health and Safety (OHS) risk. For this dimension, a score was calculated for all of the *n*=8,299 employees. In the absence of a theoretical reason for assigning alternative weights, scores from the three sub-dimensions (physical risks, psychosocial risks & OHS risk) were assigned equal weights (i.e. 33.3%) (see text box 4.8.5.1 below).

Text box 4.8.5.1: Structure and composition of Dimension 5

Dimension 5 Health and Safety (100.0%)

- **D5A Physical risks (33.3%)**
  - D5A1: Excessive weekly hours of work [2-point scoring no (0.0), yes (100.0)] (8.33%) [Obj]
  - D5A2: Excessive monthly work schedule [2-point scoring no (0.0), yes (100.0)] (8.33%) [Obj]
  - D5A3: Shift work (4-point ordinal, scoring regular night shift (0.0), rotating shift (0.0), on-call (0.0) and irregular schedule (0.0), split shift (25.0), regular evening shift (50.0), regular day schedule (100.0)]. (8.33%) [Obj]
  - D5A4: 'I can decide when to take a break' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (8.33%) [Obj] {**}
- **D5B Psycho-social risks (33.3%)**
  - D5B1: 'I fear that the amount of stress in my job will make me physically ill' break' [7-point ordinal scale, reversed, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (16.67%) [Subj]
  - D5B2: 'My job is more stressful than I had ever imagined' break' [7-point ordinal scale, reversed, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (16.67%) [Subj]
- **D5C OHS WSA Incident rates averaged for occupation/industry (33.3%)**
  - D5C1: SWA Occupation Incidence rate (serious claims per 1000 employees) 2013 [made by matching ID (*xwaveid*) by 2-digit ANZSCO variable (*njbmo62*), transforming into Z scores, reversed, to get score range 0 to 100 [continuous, 0 to 100] (16.67%) [Obj]
  - D5C2: SWA Industry rate (serious claims per 1000 employees) 2013 [made by matching ID (*xwaveid*) by 2-digit ANZSIC 2006 variable (n*jbmi62*), transforming into Z scores, reversed, multiplied to get score [continuous, 0 to 100] (16.67%) [Obj]

**Also included in D4B Flexibility

Four equally-weighted indicators were used to operationalise the sub-dimension of physical risk (D5A). For the first indicator (D5A1), three HILDA variables were used to construct an indicator related to excessively long working hours. Employees with normal work schedules that did not provide for at least 8 days off per month were scored unfavourably and those who usually had eight days or more off per month were scored favourably. The second indicator (D5A2) was constructed by re-coding the original HILDA variable of usual weekly hours in main job, where employees who usually worked 49 hours or more per week were scored unfavourably and those who usually worked 48 hours of less per week were scored favourably. [16] The third indicator (D5A3) was constructed by re-coding and scoring a HILDA variable on shift arrangements. Jobs with irregular schedules, on-call arrangements, rotating shifts, regular

[16] The Australian National Employment Standard (NES) specifies a maximum of 38 hours per week, however the same standard also states that 'reasonable' additional hours can be worked. The threshold of 48 hours per week is based on European Working Time regulations where weekly working hours must not exceed 48 hours on average including any overtime (see http://ec.europa.eu/social/main.jsp?catId=706&langId=en&intPageId=205).

night shifts or split shifts were scored unfavourably. Those jobs with regular evening shifts were assigned an intermediate score while those jobs with regular day schedules were scored most favourably. The fourth indicator (D5A4) was constructed using a HILDA variable asking the job-holder whether they can themselves decide when to take a break.

The pairwise correlations for the four indicators for physical risk are low, and in some cases, negative. This is not problematic because the four aspects are capturing diverse aspects found in the literature to be risks to physical health (excessive hours, shift work & insufficient rest between shifts). It is plausible, for example, those most likely to work excessive hours are probably less likely to do shift work and vice versa. Once aggregated at the sub-dimension level, all four indicators are strongly and positively correlated to the aggregated indicator (D5A).

There are no questions in the HILDA survey on various types of physical risks at work, so for this sub-dimension of the AJQI, the indicators were restricted to aspects associated with negative effects of long working hours, shift work and insufficient time off during or between shifts. In addition, two equally-weighted indicators were used to operationalise the sub-dimension of psychosocial risk (D5B). Both of the indicators related to stress (D5B1, D5B2), which the literature has found to be a psychosocial factor associated with poor health outcomes. The two indicators were strongly correlated (r=0.70) and were aggregated using a simple arithmetic mean (D5B).

A third sub-dimension (D5C) was included in the AJQI where two synthetic indicators for risk of work-related injury or illness were derived from external data (Safe Work Australia, hereafter SWA). Cross-tabulated data for occupation and industry was not publically available, so incidence rates by occupation and by industry were reversed and then converted into Z-scores scores. For the indicator on occupational incidence (D5C1), 2013 SWA data on serious claims per 1000 employees by occupational group was matched using the HILDA respondent IDs and 2-digit ANZSCO variable. The incidence rates were transformed into Z-scores, reversed and then multiplied to obtain a score ranged from 0 to 100. Similarly, for the indicator of industry incidence (D5C2), 2013 SWA data on serious claims per 1000 employees by industry was matched to HILDA IDs and 2-digit ANZSIC 2006[17] variable. The industry incidence rates were then transformed into Z-scores, reversed and then multiplied to obtain a score ranged from 0 to 100.

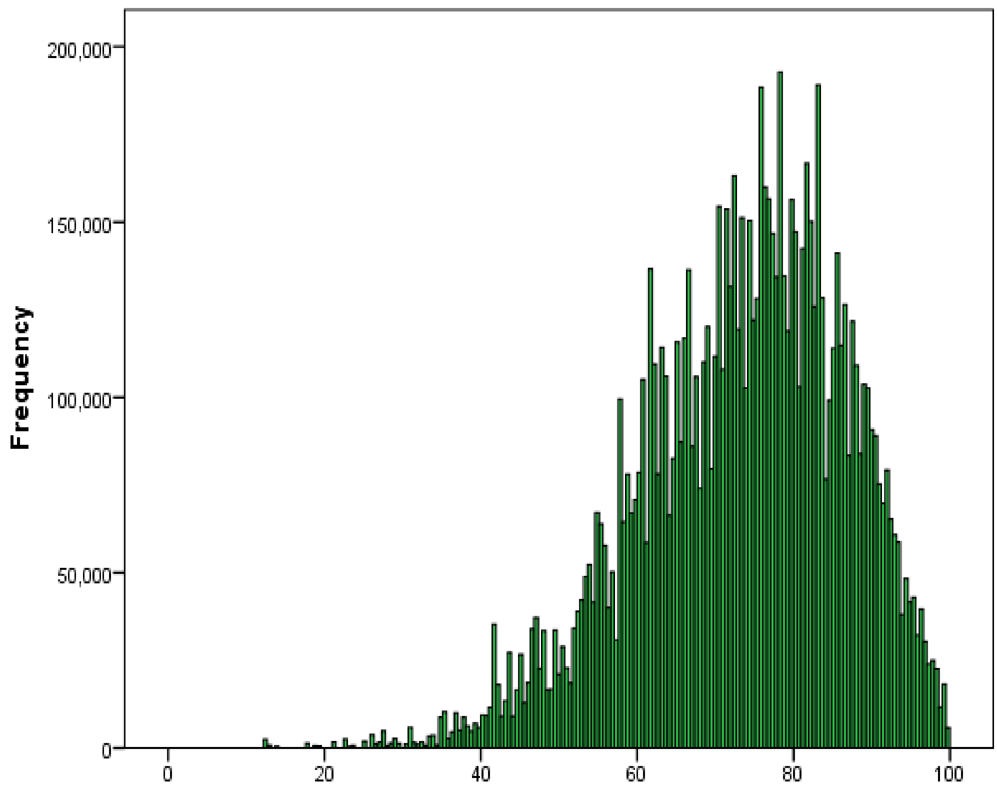
[17] ANZSIC 2006 is the abbreviation for the Australian and New Zealand Standard Industrial Classification, 2006, Revision 2.0. All occupations are assigned to one of five skill levels (ABS, 2013).

The two scores were then combined to produce a single score for risk of work-related injury (D5C). The pairwise correlation for the indicators was reasonably strong (r=0.40) so the two scores were averaged using a simple arithmetic mean.

Once aggregated to the dimension-level, the three sub-dimensions were all positively correlated to the overall dimension, where the sub-dimension of physical risk had a correlation coefficient of r=0.70, the sub-dimension of psychosocial risk had a correlation coefficient of r=0.60 and the sub-dimension of OHS risk had a correlation coefficient of r=0.60 (all significant at the 0.01 level, 2-tailed). Table 11.4.5 in Appendix 11.4 sets out the final correlation matrix for the dimension of health and safety.

Figure 4.8.5.1 plots the histogram showing the distribution for the health and safety dimension. From Figure 4.8.5.1 it can be seen that the distribution for the dimension of health and safety is moderately skewed (skewness of -0.58) and light-tailed (kurtosis of 0.20).

Figure 4.8.5.1: Histogram for Health and Safety (D5)



The HILDA data does not contain variables similar to the battery of questions on exposure to risk contained in the EWC (Eurofound 2010).[18] Furthermore, while the HILDA dataset contains variables about psychosocial risk, the nature of the questions in the HILDA dataset is different to those in the EWCS. The questions in HILDA are more 'subjective' whereas the EWCS

[18] The EWCS contains a battery of questions on workplace exposure to risk: vibrations, noise, high/low temperatures, fumes/vapours, handling chemicals, infectious waste, tiring positions, lifting or moving people and carrying or moving heavy loads.

questions are more 'objective' in nature.[19] By building in external SWA OHS risk data, coverage of the dimension in the AJQI was improved.

4.8.6. Dimension 6: Voice and Collective Interest Representation (D6)

Three indicators (two objective & one subjective) were used to construct the dimension for voice and collective representation (D6). Scores from the two sub-dimensions (voice and collective interest representation) were aggregated with equal weighting, i.e. 50 percent each (see Text Box 4.8.6.1 below).

Text box 4.8.6.1: Structure and composition of Dimension 6

Dimension 6 Voice and Collective Interest Representation (100.0%)

- D6A Voice (50.0%)
  - 'I have a lot of say about what happens on my job' [7-point ordinal scale, scored 1 (0.0), 2(16.7), 3 (33.3), 4 (50.0), 5 (66.7), 6 (83.3) and 7 (100.0)] (50.0%) [Subj] {*}
- D6B Collective Interest Representation (50.0%)
  - D6B1: Member of trade union, other union or trade association (2-point scoring no (0.0), yes (100.0)] (25.0%) [Obj]
  - D6B2: Pay set by a collective agreement [2-point scoring no (0.0), yes (100.0)] (25.0%) [Obj]

* Also included in D3B Autonomy.

One subjective indicator capturing voice (D6A1) was included in the AJQI. The indicator captures the notion of voice by way of whether an employee feels like they have the opportunity to influence what happens in their job. Two equally weighted indicators captured collective interest representation, covering trade union membership (D6B1) and collectively-bargained pay arrangements (D6B2).

In addition to a variable on trade union membership, the HILDA dataset contains an additional question on whether a worker is a member of another union or trade association. While other unions or trade associations do not usually play an industrial role, they do offer some form of collective interest representation. Responses from the two questions were combined to create a combined variable for membership of a trade union, other union or trade association (D6B1). The new derived variable for union membership (trade union membership & other union or trade association membership) showed a positive, yet weak correlation (r=.1) with the

[19] In the EWCS contains four questions asking respondents whether, in the past 12 months, they have been personally subjected at work to threats of physical violence, physical violence from people from your workplace; physical violence from other people or bullying/harassment. Scoring for the EJQI takes the highest level of exposure to risks as the value that determines the score of each individual, rather than averaging the responses across questions.

indicator on collective agreement coverage (D6B2). The two indicators were combined to capture the sub-dimension of collective interest representation (D6B).

The sub-dimensions of voice (D6A) and collective interest representation (D6B) are negatively correlated with one another (r=-0.10). This negative correlation makes sense, as employees in more senior roles are more likely to feel like they have a say in their workplace yet less likely to be union members or to be covered by collective agreements. Once aggregated to the dimension-level, the two sub-dimensions were both positively correlated to the overall dimension, where the sub-dimension of voice had a correlation co-efficient of r=0.54 and the sub-dimension of collective interest representation had a correlation co-efficient of r=0.78 (both significant at the 0.01 level, 2-tailed).). (Table 11.4.6 in in Appendix 11.4 sets out the final correlation matrix for the dimension of voice and collective representation).

Figure 4.8.6.1: Histogram for Voice & Collective Interest Representation (D6)

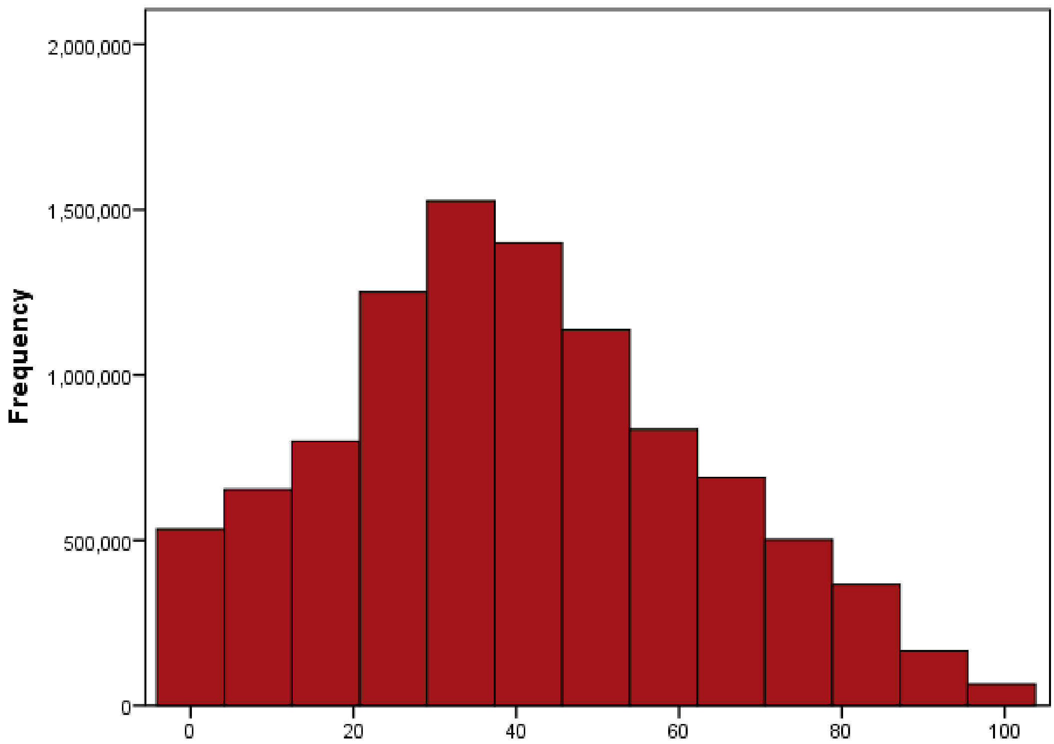


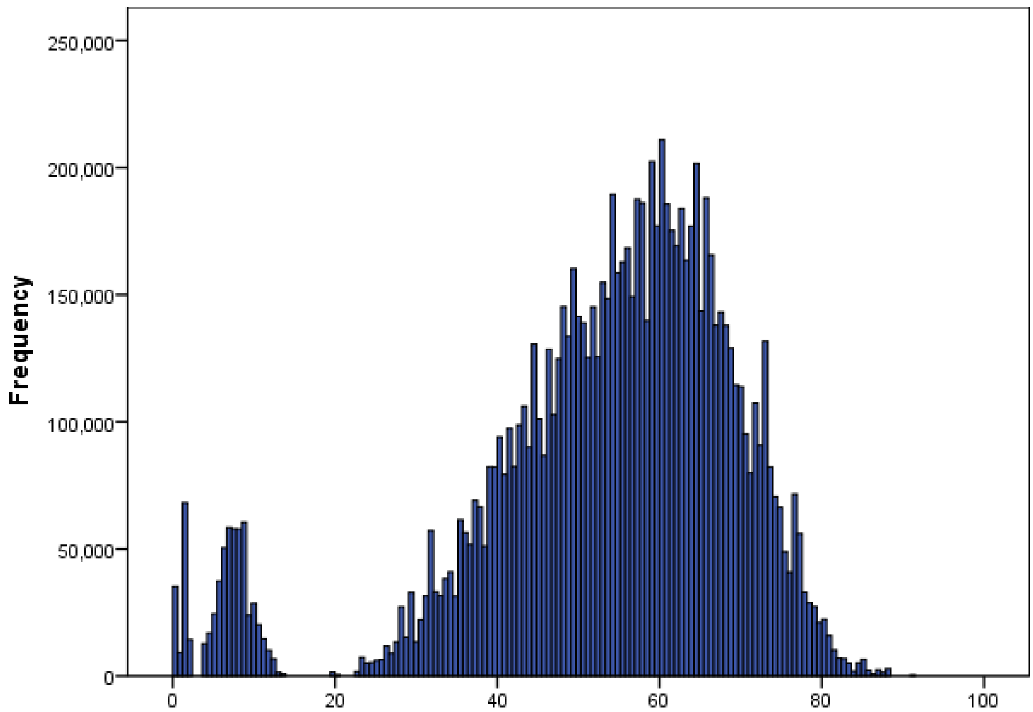
Figure 4.8.6.1, above, plots the distribution for the dimension of voice and collective interest representation. From Figure 4.8.6.1 it can be seen that scores for voice and collective interest representation lean to the left-hand side because both the mean (40.38) and median (41.65) are below fifty.

4.8.7. Highest level aggregation (AJQI)

In addition to the process for weighting and aggregation outlined in section 4.7.7, exploratory Principal Components Analysis (PCA) was then used as a backwards check to compare the theoretically-driven structure with the statistical properties of the index. The internal consistency of grouped indicators was checked and the relative contribution of indicators was explored, whereby an iterative process was used to progressively refine the nested structure of the AJQI. A series of checks for robustness was undertaken to check/revise scoring, the nested structure, weights and aggregation method (see Technical Report in Appendix 11.5).

Figure 4.8.7.1 plots the distribution of the AJQI as a histogram. It can be seen that the distribution is bi-modal, with the left part ranging from the lowest score of 0.15 up to 13.54 (6.1% of the sample), a break in scores between 13.54 and 19.46, then the second side of scores ranging from 19.46 up to the highest score of 91.13 (the remaining 93.9% of the sample). Overall, the AJQI scores lean slightly to the right-hand side of the chart because both the mean (53.30) and the median (56.25) are above fifty. The AJQI is highly negatively skewed (-1.19)[20] meaning that the left-hand tail is longer than the right-hand tail with kurtosis of 1.57[21], meaning the index has lighter tails than a normal distribution.

Figure 4.8.7.1: Histogram showing distribution of AJQI



4.9. Gaps in the AJQI when compared to the conceptual framework

While no Australian dataset exists containing an exhaustive set of indicators that could fully capture all six dimensions of job quality, the HILDA survey includes a variety of work

[20] If skewness is less than -1 or greater than 1, the distribution is highly skewed. If skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed. If skewness is between -0.5 and 0.5, the distribution is approximately symmetric.

[21] A standard (bell curve) distribution has kurtosis of 3. So kurtosis of less than 3 is light-tailed and higher than 3 is heavy tailed.

characteristics that provide a reasonably comprehensive picture of job quality in Australia. A number of gaps exist, however, and these gaps are reiterated below.

For the first dimension, while monetary remuneration is captured, it was not possible to capture non-monetary aspects of remuneration. While the HILDA dataset contains a large number of variables on non-monetary aspects of remuneration, there were very high numbers of missing values as well as responses of 'don't know'. The complexity of the Australian taxation and welfare systems come into play here. With future iterations of the AJQI, it may be possible to try to incorporate non-monetary aspects, however, other than an initial investigation of the variables, it remained beyond the scope of this thesis.

For the second dimension of quality of employment, the sub-dimension of career development opportunities only captures the element of work-related training along with satisfaction with employment opportunities (as opposed to prospects for career advancement in the current job). There are many other ways that a workers' career development in their current job can be supported, however the HILDA survey does not contain indicators for these aspects. In particular, the HILDA dataset does not contain a question about prospects of career advancement in their current job, which results in an empirical gap vis-a-vis the conceptual framework.

For the third dimension (intrinsic characteristics of work), the HILDA survey does not contain relevant variables for meaningfulness, social support or self-fulfilment however these aspects are highly subjective to the job-holder, so given the primary focus of the AJQI on the 'job' as opposed to the 'job-holder', it is not considered a major weakness that these aspects were not included in the AJQI. In terms of the aspect of powerfulness, this is picked up in the sixth dimension of voice and collective interest representation.

There are no major gaps in the dimension (work-life balance) vis-à-vis the conceptual framework.

As briefly mentioned, for the fifth dimension of health and safety, the HILDA survey does not contain a similar battery of questions to the EWCS on exposure to risk. While a number of variables were used to construct variables around excessive and irregular working patterns, this was not deemed sufficient. As a consequence, the HILDA survey was supplemented with external data from Safe Work Australia (SWA) data on the incidence of serious claims by occupation and industry.

For the sixth dimension of voice and collective interest representation, limited variables were available in the HILDA dataset to fully capture this aspect of job quality. Nevertheless, the three indicators that were incorporated into the AJQI go some way towards capturing the dimension of voice and collective interest representation. Leschke and her colleagues (2008) note that capturing a sense of worker 'voice' is difficult to operationalise.

4.10. Robustness

Constructing the AJQI involved making many decisions including on the selection of variables, treatment of missing variables, normalisation, scoring, aggregation, and weighting procedures. For this reason, a series of tests for robustness were undertaken to check whether the AJQI is sensitive to changes in the methodology and whether the results seem plausible.

While there are many ways to check robustness of an index. In this instance, the statistical properties of the AJQI were scrutinised, and a series of seven tests were conducted. The precise details on how the index was tested and adjusted following a series of tests for robustness are set out in the Technical Report found in Appendix 11.5. Below is a summary of what the tests revealed.

The first test checked correlations to see whether the dimensions were adequately correlated so as to justify their inclusion in the overall index. It was established that all of the dimensions are positively correlated to the overall AJQI; and the vast majority of indicators included in each sub-dimension are more strongly correlated with one another than with either the AJQI overall or with indicators found in other parts of the nested structure. Furthermore, it was established that based on existing theoretical knowledge about the multi-dimensional construct of job quality, the pattern of correlations are plausible. Correlations for the AJQI were also compared to correlations for the EJQI, where it was found that the pattern of correlations for the two indexes was reasonably similar, providing a degree of external validity to the AJQI.

When the indicators for each of the 13 sub-dimensions in the conceptual framework were subjected to a backwards looking PCA, the statistical properties of the index did not fit neatly with the nested structure of the AJQI. These results are not surprising, though, because a data-driven approach to assigning weights relies on multi-variate statistical models where, for example, PCA is used to choose weights that maximise (or minimise) the variance of the index, rather than support theoretical foundations (Parulo Saisana and Saltelli 2013). Finding that the statistical structure of the AJQI does not align very well with theory is not surprising; as this reiterates the point made Brandolini (2007), where he cautions against entrusting a mathematical algorithm with a fundamentally normative task.

Having checked average scores for a sample of five categories of jobs in the AJQI, the results seemed plausible. It was also found that if the final stage of aggregation was changed from a geometric mean to a simple arithmetic mean, this did not result in any drastic change to the pattern of results for overall job quality. AJQI Versions 1 and 2 are highly correlated, and while the strength of the pair-wise correlations for AJQI Version 2 are stronger than for AJQI Version 1, the order from highest to lowest correlation is the same for both versions of the AJQI. While the mean and median score for AJQI Version 2 are both higher than in AJQI Version 1, the rank of a set of five categories of jobs remains the same regardless of the method of final aggregation. The impact of the geometric method of final aggregation is most evident when a comparison is made between the proportions of jobs at different levels of quality. When the simple arithmetic mean is used, a smaller number of jobs are found in the two categories of *'very poor'* and *'poor quality'* (just over 5 percent for AJQI Version 2 compared to nearly 16 percent for AJQI Version 1). When all of the sub-dimensions are assigned equal weights (AJQI Version 3), the two versions are highly correlated and there is little change to the overall results, indicating the role played by unbalanced scores. Even when a more drastic change is introduced that fundamentally alters the structure of the index (AJQI Version 4), the two versions remain highly correlated and the pattern of scores holds.

The methodological literature on constructing indexes commonly recommends checking the impact of removing each dimension, one-by-one. Given the plausibility of results from the main version of the AJQI, it was not considered necessary or feasible to check the impact of removing each and every dimension, one-by-one. However, when the dimension of voice and collective interest representation was dropped from the index (AJQI Version 5), the two versions of the index (AJQI Version 1 and AJQI Version 5) remained highly. However, when the dimension of voice and collective interest is dropped from the index, correlations among all dimensions are positive, whereas when six dimensions are included in the index, pay and work-life balance; and quality of employment and work-life balance; are negatively correlated. While the mean and median for AJQI Version 5 are both higher than for AJQI Version 1, the rank of five categories of jobs remains the same. Slightly fewer jobs are found in the bottom three categories of quality (i.e. *'very poor'*, *'poor'*, *'middling quality'* jobs) when the dimension of voice and collective representation is removed.

Having provided details about a series of checks for robustness, taken all together, it emerged that plausible shifts in the weighting methodology did not lead to fundamentally different rankings at the dimension-level. It was established that the index is adequately fit-for-purpose as a tool for measuring job quality in Australia. In addition, a backwards thinking approach was used to assess whether the conceptual framework of job quality provided a good fit to the Australian data. This overarching assessment is set out in the concluding chapter of this thesis.

4.11. Ethical research and data security

All research undertaken by students at the University of Warwick must conform to the University's ethical guidelines and is governed by the University Research Code of Conduct and Guidelines on Ethical practice. All requirements related to research ethics were complied with. The AJQI was built from secondary data from the HILDA Survey. HILDA participants are promised anonymity and confidentiality when they give informed consent. In terms of data storage and security, the University's information security policies and relevant legislation were complied with. All electronic data was stored safely and securely. Further to this, all data files including anonymised files were held securely and, in accordance with the terms of the HILDA deed of license. All files including those that contained identifiable data were encrypted, password protected and only accessible by my supervisors and myself.

4.12. Conclusion

This chapter set out details on the major steps that were taken to construct the AJQI. While hundreds of small decisions were taken and a very iterative process was followed, the chapter described noteworthy practical challenges that were encountered and how these challenges were addressed. While it was not possible to detail every single decision, when a decision was taken that saw the method deviate from the way that has been recommended by experts, these situations were flagged and a justification was provided for the decisions that were ultimately adopted.

The chapter began with a brief overview of method and techniques that were used to construct the AJQI. A composite indicator should be used to measure multi-dimensional concepts which cannot be captured by a single indicator (OECD, 2008). The technique of constructing a composite index was deemed appropriate given that job quality is a complex, multi-dimensional construct that cannot adequately be captured by a single indicator.

After establishing that the technique of creating a multi-dimensional composite index was fit-for-purpose, the chapter then proceeded to explain, in detail, how the index was constructed. As part of this explanation, the theoretically-grounded conceptual framework that was used as the basis for operationalising the concept of job quality was outlined. Information about the HILDA dataset and sample were provided as justification for the decision to use this particular Australian dataset in preference to alternative existing data. While the HILDA dataset was not specifically designed to measure job quality, it was the best available dataset to measure job quality in Australia at the time of conducting this doctoral research. Where possible, gaps in the dataset were supplemented by external data, such as in the case of the health and safety dimension.

With the aim of being as transparent as possible, six general principles concerning the logic behind the construction of the AJQI were then articulated including crucial information about indicators were selected and standardised, as well as the processes that was used to weight and aggregate the constituent components of the AJQI. For each of the six dimensions, particulars including the number and type of indicators as well as the way the indicators were aggregation and the relative weights assigned to the various components were specified.

Arguably, the AJQI is more comprehensive than other indexes that have been constructed using Australian data. In part, this is because the AJQI captures, albeit sometimes to a limited extent, all six of the main dimensions of job quality identified in the literature. Of particular importance, as the AJQI was found to be robust, it can be replicated for other waves of HILDA data.

Although methodologically challenging – construction of a relatively comprehensive index of job quality of Australia has been achieved. Constructing the AJQI only provides a starting point. The next chapter (chapter five) is the first of three chapters to report on the empirical findings.

5. Overall job quality in Australia

5.1. Introduction

Having described details about how the AJQI was constructed and then how its robustness was checked, this chapter sets out overall results for the index. Jobs come with different bundles of positive and negative attributes and the main idea behind constructing the AJQI was to be able to determine how many 'good' and 'bad' jobs there are in Australia.

After this introduction, the remainder of the chapter is divided into six main sections. In section 5.2 the overall results for job quality in Australia are discussed. It is here that, for the first time in this thesis, a score is put on the overall level of job quality for Australian employees. The results for overall job quality for employees are then broken down and categorised into five groups taken to represent the distribution of '*very poor'; 'poor*'; '*middling*'; '*good*'; and '*very good*' quality jobs in Australia. In the third section (section 5.3), results for the six dimensions are outlined, including reporting on the share of jobs in each of the five categories by dimension. In the last part of section 5.3, the question of 'bundling' of different aspects of job quality is considered.

In the fourth section (section 5.4), results from the AJQI are compared to findings arising from a number of other (partial) Australian indexes of job quality. This analysis not only sheds light on whether the results from the AJQI seem plausible, but it also provides some general insights into whether some of the problematic aspects of job quality identified via examining the results from the AJQI are entrenched problems or more likely to be a product of recent changes in the Australian labour market and national employment regime.

In the fifth section (section 5.5), the results from the AJQI are checked against three types of outcome: job satisfaction; life satisfaction/self-assessed health; and socio-economic status. In this respect, results for the inputs for jobs (i.e. the characteristics of jobs) are compared with a number of outputs relating to wellbeing of job-holders. This analysis provides important insights into the potential impact of the quality of jobs on the wellbeing of jo-holders; and society more broadly. Relevantly, the reporting in this chapter is largely descriptive in nature. That is, no attempt has been made to link the findings back to theory. This will be undertaken in the next two chapters (chapter six and chapter seven).

In the conclusion (section 5.6), a summary of key findings about overall job quality in Australia is presented along with an assessment about whether the results seem plausible, given other existing empirical evidence.

5.2. Overall level of job quality in Australia

Before presenting the overall results for the AJQI, it useful to reiterate that the final score for the AJQI is meant to capture the bundle or combination of different attributes of job quality – both good and bad – representing the quality of a job. Theoretically, as a result of the scoring logic that was used, a job with the worst possible combination of attributes will score zero whereas a job with the best possible combination of attributes will score 100. By averaging all of the individual scores for the AJQI, a final score is produced as a method to '*put a number on*' the overall quality of jobs held by employees in Australia.

So, what can be said about the overall quality of jobs held by Australian employees? The **headline figure is 53.30**. This overall average score means very little on its own, other than telling us that if a score of fifty is taken to represent neither a good nor bad average level of job quality, then a score of 53.30 undoubtedly means there is considerable room for improvement in the overall quality of jobs held by employees in Australia.

As a next step in obtaining a better understanding of overall quality of employees' jobs in Australia, it is necessary to consider the distribution of scores. As already mentioned, the mean for the AJQI is 53.30; the standard deviation is 16.73; the minimum score is 0.15; and the maximum score is 91.13 (where the minimum and maximum scores represent the *very worst* and *very best* job, respectively). Another way to further understand overall job quality is to rank the AJQI scores from lowest to highest; and then divide the ranked scores into five equal groups (i.e. quintiles where each quintile contains 20% of the total distribution).

From Table 5.2.1 it can be seen that scores in the lowest 20 percent of the distribution start at the lowest score (i.e. very worst score of 0.15) and goes up to the top cut-off point of 42.74. The average score for quintile 1 is 27.35 (CI: 27.33 to 27.37) and the standard deviation is by far the largest standard deviation from among the quintiles (14.58). This large standard deviation is due to some jobs being assigned scores of zero for one or more dimensions of job quality. Scores in quintile 2 start at 42.75 and go up to the cut-off point of 52.58. The average score for quintile 3 is 47.97 (CI: 47.96 to 47.97) and the standard deviation is small (2.76), meaning that scores for jobs in this quintile are more clustered. Scores in the third quintile start at 52.59 and goes up to the cut-off point of 59.74. The average score for quintile three is 56.22 (CI: 56.22 to 56.22) and the standard deviation is once again small (2.07). Scores in quintile 4 start at 59.75 to go up to the cut-off point of 66.40. The average score for quintile 4 is 63.00 (CI: 62.99 to 63.00) and the standard deviation is the smallest from among the quintiles (1.95). Scores for the top 20 percent of the distribution (i.e. the fifth quintile) start at 66.41 and extend to the highest score found in index (91.13). The average score for quintile 5 is 71.97 (CI: 71.97 to 71.98) and the standard deviation is 4.15.

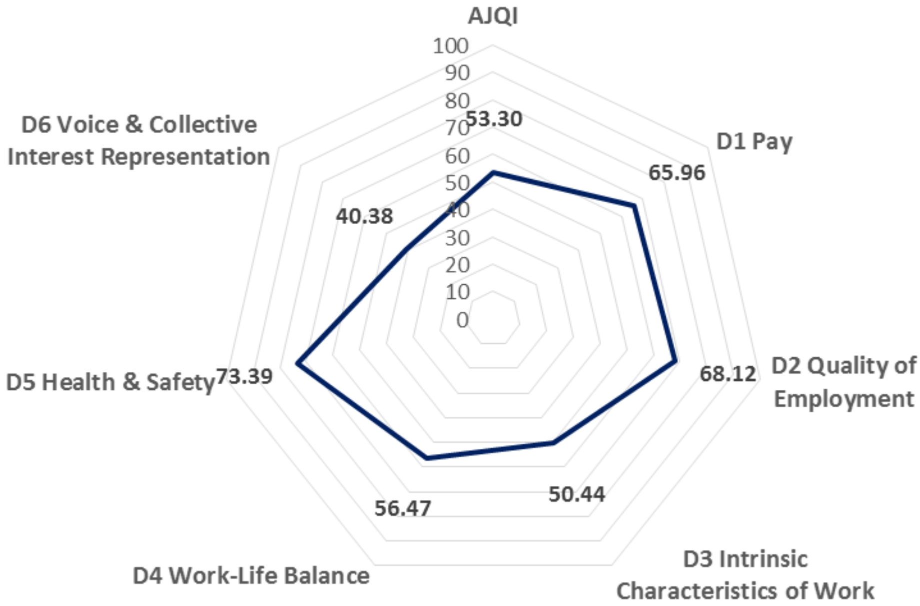
Table 5.2.1: Job quality by quintile, means

Quintile	N	Mean	S.D.	Std. Error	95% Confidence Interval for mean		Min.	Max.
					Lower bound	Upper bound		
1	1,984,045	27.35	14.58	.01	27.33	27.67	0.15	42.74
2	1,984,305	47.97	2.76	.00	47.96	47.97	42.75	52.58
3	1,984,250	56.22	2.07	.00	56.22	56.23	52.59	59.74
4	1,984,272	63.00	1.95	.00	62.99	63.00	59.75	66.40
5	1,983,934	71.97	4.15	.00	71.97	71.98	66.41	91.13
All	9,920,806	53.30	16.73	.01	53.29	53.31	0.15	91.13

Having provided information about the overall scores for job quality, it is also necessary to compare how the overall score compares to the scores for each of the six underlying dimensions. This is because the overall score for job quality is derived from aggregation of scores for each of the six dimensions. It is, therefore, important to consider the contribution of each of the dimensions to the overall score.

The radar chart found in Figure 5.2.1, below, plots the average score for the **AJQI** along with the average score for each dimension. When ordered from highest to lowest, the dimension with the highest average score is **health and safety** (D5) (M: 73.39; SD: 13.31; CI: 73.38 to 73.39); followed by **quality of employment** (D2) (M: 68.12; SD: 15.93; CI: 68.11 to 68.13); **pay** (D1) (M: 65.96; SD: 23.80; CI: 65.94 to 65.97); **work-life balance** (D4) (M: 56.47; SD: 14.46; CI: 56.46 to 56.48); where the average score for each of these four dimensions is higher than the overall average. For the dimensions of **intrinsic characteristics of work** (D3) (M: 50.44; SD: 21.33; CI: 50.43 to 50.45), and **voice and collective interest representation** (D6) (M: 40.38; SD: 22.80; CI: 40.36 to 40.39), the average scores are below the overall average for job quality (M: 53.30; SD: CI:53.29 to 53.31); providing a first signal of where policy-makers may need to focus their initial attention, should they aim to improve the overall level of job quality in Australia.

Figure 5.2.1: Radar Plot showing job quality for the AJQI and its six dimensions, mean



While analysing the distributional properties of the scores for the index is interesting, it does not answer the important question of how many Australian employees are working in 'good' and 'bad' jobs. While cut-off points are necessarily arbitrary in nature, in order to obtain an estimate of the number of good and bad jobs, the AJQI scores were divided into five, unequally-sized categories taken to represent: jobs with '***very poor quality'*** (AJQI scores of up and including 20.00); jobs with '***poor quality'*** (AJQI scores of greater than 20.00 and up and including 40.00), *jobs with* '***middling quality'*** (AJQI scores of greater than 40.00 and up to and including 60.00), jobs with '***good quality'*** (jobs with AJQI scores of greater than 60.00 and up to and including 80.00), and jobs with '***very good quality***' (jobs with AJQI scores of greater than 80.00 and up to and including 100.00). Applying the above cut-off points and weighting the sample, it is estimated that the number of jobs in Australia at each level of overall job quality is:

- 611,641 jobs with '***very poor quality'*** – equating to 6.17 percent of all jobs;
- 962,505 jobs with '***poor quality'*** – equating to 9.70 percent of all jobs;
- 4,463,713 jobs with '***middling quality'*** – equating to 44.99 percent of all jobs;
- 3,792,025 jobs with '***good quality'*** – equating to 38.22 percent of all jobs; and
- 90,922 jobs with '***very good quality'*** – equating to less than one percent (0.92%) of all jobs (see Figure 5.2.2).

Figure 5.2.2: Share of jobs by quality category, percent

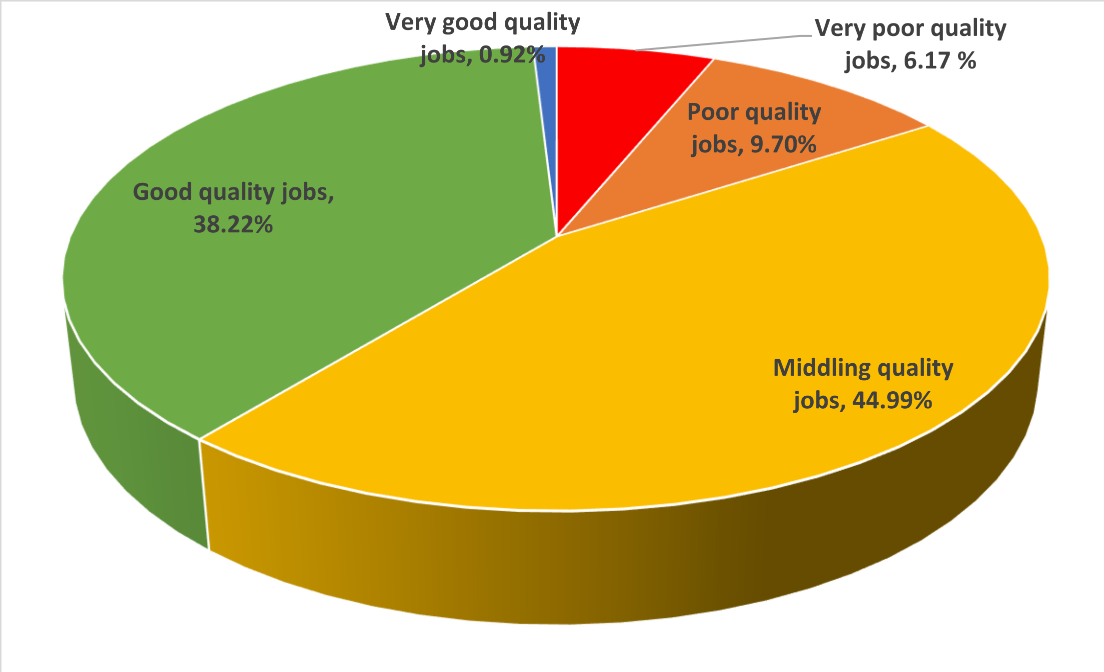


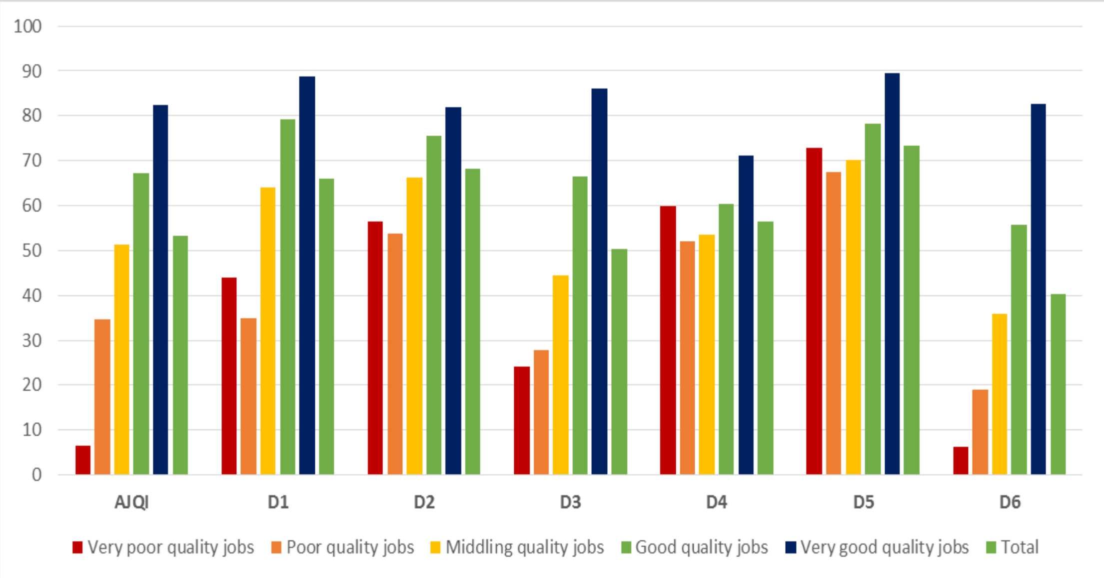
Figure 5.2.3, below, plots the average scores for the AJQI and its six dimensions for the five categories of job quality. Comparing the average AJQI score for overall job quality with average scores for the six dimensions assists in better understanding the bundling of amenities and disamenities at play for jobs of varying levels of quality. Figure 5.2.3 shows that:

- While the range is fixed at 0.00 to 20.00, the average score for jobs with '***very poor quality***' is 6.45 (SD: 3.26). For jobs in this category, the highest average score among dimensions is for the **health and safety dimension** (M: 72.95, SD: 14.89); followed by **work-life balance** (M: 59.84; SD: 19.67); **quality of employment** (M: 56.41; SD: 18.96); **pay** (M: 43.86; SD: 31.90); **intrinsic characteristics of work** (M: 24.15; SD: 24.47); where the lowest score is for **voice and collective interest representation** (M: 6.26; SD: 18.61).
- For jobs with '***poor quality***', while the range is fixed at 20.01 to 40.00, the average score for the AJQI is 34.64 (SD: 4.06). The highest average score is for the dimension of **health and safety** (M: 67.53; SD: 13.61); followed by **quality of employment** (M: 53.83; SD: 16.89); **work-life balance** (M: 52.05; SD: 15.25); **pay** (M: 34.96; SD: 24.33); **intrinsic characteristics of work** (M: 27.79; SD: 12.53) and the lowest score is for the dimension of **voice and collective interest representation** (M: 19.04; SD: 12.41).
- For jobs with '***middling quality***', while the range is fixed at 40.01 to 60.00, the average score is 51.26 (SD: 5.61). The highest score is for the dimension of **health and safety** (70.16; SD: 13.33), followed by **quality of employment** (M: 66.29; SD: 14.96); pay (M: 63.93; SD: 20.94); **work-life balance** (M: 53.44; SD: 14.31); **intrinsic characteristics of**

work (M: 44.57; SD: 15.30); and **voice and collective interest representation** (M: 35.85; SD: 17.16).

- For jobs with '***good quality'***, the range is set at 60.01 to 80.00 and the average score is 67.29 (SD: 5.02). The highest score is for the dimension of **health and safety** (M: 78.36; SD: 10.87); followed by **quality of employment** (M: 75.48; SD: 11.44); **pay** (M: 79.23; SD: 11.55); **intrinsic characteristics of work** (M: 66.51; SD: 14.30); **work-life balance** (M: 60.27; SD: 12.05); where **voice and collective interest representation** is once again lowest (M: 55.65; SD: 17.58). Unlike the previous three categories, the average score for work-life balance is lower than the average score for overall job quality.
- For jobs with '***very good quality'***, the range is set at 80.01 to 100 and the average score is 82.52 (SD: 2.92). The highest score is for the dimension of **health and safety** (89.40; SD: 6.21); followed **intrinsic characteristics of work** (M: 86.00; SD: 7.88); **voice and collective interest representation** (M: 82.68; SD: 14.98); **quality of employment** (M: 82.01; SD: 9.20); where the lowest average score is for **work-life balance** (M: 71.23; SD: 8.79). This ordering of highest to lowest scores by dimension is a departure to order for the other categories of jobs, reflecting the different mix of accumulation and compensation for jobs at the highest level of quality.

Figure 5.2.3: Job quality for the AJQI and its six dimensions, mean



5.3. Results by dimension

Having provided a summary of overall results for the AJQI, the subsequent sections present results for each dimension of the AJQI, one-by-one, along with a discussion of whether, and if so, how the pattern of results for each dimension differs from those of the overall index.

Table 5.3.1, below, sets out the overall mean and mean by quintile, standard deviation and 95% confidence intervals for the mean for each of the six dimensions. In this instance, the quintiles are separately calculated for each dimension, rather than using the quintiles for overall job quality (as was reported earlier in Figure 5.2.3).

In order from highest to lowest based on the mean are:

- **health and safety** (D5) (M: 73.39; SD: 13.31);
- **quality of employment** (D2) (M: 68.13; SD:15.93);
- **pay** (D1) (M: 65.96; SD: 23.80);
- **work-life balance** (D4) (M: 56.47; SD: 14.46**);**
- **intrinsic characteristics of work** (D3) (M: 50.44; SD: 21.33); and
- **voice and collective interest representation** (D6) (M: 40.39; SD: 22.80).

How many good and bad jobs for each dimension are there?

Table 5.3.2 and Table 5.3.3, below, set out the share and number of jobs (respectively) at each of the five quality levels, i.e. '***very poor'***, '***poor***', '***middling***'; '***good***'; and '***very good'***. The same method is used as reported in section 5.2, however, in this instance, the cut-off points are based on scores for each dimension and sub-dimension. For instance, for pay (D1), the cut-off points are based on the scores for pay, not cut-off points for the AJQI. Figure 5.3.1 presents the same information graphically, where the difference in the spread of jobs across the five categories is more obvious to the eye.

Large variation is observed in the share of jobs at each level of quality by dimension and sub-dimension. For instance, for the health and safety dimension, less than one percent of all jobs (0.06% or 6,117 jobs) are categorised as '***very poor'*** while for the dimension of voice and collective interest representation, just over one-quarter of all jobs (20.01% or 1,986,470 jobs) are rated '***very poor'***. The rate of '***very poor'*** jobs for pay is 7.92 percent, for intrinsic characteristics of work is 7.91 percent; for quality of employment is less than one percent (0.42%); and for work-life balance it is also less than 1 percent (0.92%).

Table 5.3.1: Job quality by quintile for dimensions, mean

Quintile	N	Mean	S.D.	Std Error	95% Confidence Interval for mean		Min.	Max.
					Lower bound	Upper bound		
AJQI								
1	1984045	27.35	14.58	0.01	27.33	27.37	0.15	42.74
2	1984305	47.97	2.76	0.00	47.96	47.97	42.75	52.58
3	1984250	56.22	2.07	0.00	56.22	56.22	52.58	59.74
4	1984272	63.00	1.95	0.00	62.99	63.00	59.74	66.40
5	1983934	71.97	4.15	0.00	71.97	71.98	66.40	91.13
All	9920806	53.30	16.73	0.01	53.29	53.31	0.15	91.13
D1 Pay								
1	1941638	25.38	16.31	0.01	25.36	25.41	0.00	52.93
2	2022382	60.61	3.80	0.00	60.61	60.62	53.33	65.43
3	1926763	70.96	2.65	0.00	70.96	70.97	65.83	75.83
4	2144580	80.60	3.01	0.00	80.59	80.60	76.25	84.58
5	1885444	91.70	3.93	0.00	91.69	91.70	85.00	100.00
All	9920806	65.96	23.80	0.01	65.94	65.97	0.00	100.00
D2 Quality of Employment								
1	1985665	43.23	9.77	0.01	43.21	43.24	0.00	55.31
2	1983849	61.01	3.03	0.00	61.00	61.01	55.31	66.10
3	1988826	70.88	2.64	0.00	70.88	70.89	66.10	75.15
4	1981864	78.63	1.98	0.00	78.62	78.63	75.15	82.14
5	1984873	86.88	3.59	0.00	86.88	86.89	82.18	99.06
All	9925076	68.12	15.93	0.01	68.11	68.13	0.00	99.06
D3 Intrinsic Characteristics of Work								
1	1984467	20.18	8.23	0.01	20.16	20.19	0.00	30.73
2	1985848	38.01	3.87	0.00	38.01	38.02	30.73	44.79
3	1990777	50.52	3.53	0.00	50.51	50.52	44.79	56.77
4	1980199	63.67	3.84	0.00	63.66	63.67	56.77	70.31
5	1983786	79.88	7.38	0.01	79.87	79.89	70.31	100.00
All	9925076	50.44	21.33	0.01	50.43	50.45	0.00	100.00
D4 Work Life Balance								
1	1986667	35.29	7.42	0.01	35.28	35.30	0.83	44.44
2	1984441	49.51	2.60	0.00	49.51	49.51	44.44	53.68
3	1983651	57.37	2.08	0.00	57.37	57.37	53.68	60.90
4	1983811	64.44	2.09	0.00	64.44	64.44	60.97	68.12
5	1986507	75.75	6.43	0.00	75.74	75.76	68.12	100.00
All	9925076	56.47	14.46	0.00	56.46	56.48	0.83	100.00
D5 Health & Safety								
1	1985030	53.37	7.87	0.01	53.36	53.38	12.43	62.15
2	1984883	66.96	2.72	0.00	66.96	66.97	62.15	71.38
3	1980046	74.81	1.94	0.00	74.81	74.81	71.39	78.16
4	1993933	81.50	2.02	0.00	81.49	81.50	78.17	85.26
5	1981184	90.29	3.62	0.00	90.29	90.30	85.27	100.00
All	9925076	73.39	13.31	0.00	73.38	73.39	12.43	100.00
D6 Voice and Collective Interest Representation								
1	1986470	9.45	6.73	0.00	9.44	9.46	0.00	16.65
2	1250411	25.00	0.00	0.00	25.00	25.00	25.00	25.00
3	2926620	37.32	4.15	0.00	37.31	37.32	33.35	41.65
4	1972110	53.54	4.13	0.00	53.53	53.54	50.00	58.35
5	1789465	75.95	9.42	0.01	75.93	75.96	66.65	100.00
All	9925076	40.38	22.80	0.01	40.36	40.39	0.00	100.00

At the other end of the spectrum, for the category of ‘***very good’*** quality jobs, less than 5 percent of jobs (4.49% or 445,299 jobs) have ‘***very good’*** quality of work-life balance. The rate of ‘***very good***’ quality jobs for voice and representation is around 6 percent (6.02% or 597,764 jobs); for intrinsic characteristics of work it approaches ten percent (8.20% or 814,207 jobs); for pay almost one-third of jobs are '***very good'*** (31.28% or 3.1 million jobs) and around one-quarter of jobs are rated '***very good'*** for the dimension of quality of employment (26.21% or 2.6 million jobs). The highest rate of jobs with '***very good'*** quality is for the dimension of health and safety, where just over one-third of all jobs (34.24% or 3.4 million jobs) are rated '***very good'*** for this aspect of job quality.

Table 5.3.2: Share of jobs by quality category by dimension, sub-dimension and overall, percent

	Very poor	Poor	Middling	Good	Very good	Total
D1 Pay	7.92	6.33	12.87	41.59	31.28	100.00
D1A Objective pay	14.18	0.00	13.02	37.24	35.56	100.00
D1B Subjective pay	11.64	12.06	17.75	23.25	35.30	100.00
D2 Quality of Employment	0.42	6.12	21.11	46.14	26.21	100.00
D2A Contractual stability	0.61	5.68	13.24	28.08	52.40	100.00
D2B Development opportunities	6.50	47.76	32.47	9.79	3.49	100.00
D3 Intrinsic characteristics of work	7.91	24.89	31.67	27.33	8.20	100.00
D3A Skills	11.30	26.21	19.78	16.83	25.88	100.00
D3B Autonomy	14.20	24.06	31.00	20.61	10.14	100.00
D4 Work-Life Balance	0.92	12.44	43.87	38.27	4.49	100.00
D4A Working time	1.30	10.06	32.34	45.78	10.52	100.00
D4B Work intensity	17.87	26.67	34.82	16.06	4.58	100.00
D5 Health and Safety	0.06	1.19	14.61	49.90	34.24	100.00
D5A Physical risk	0.79	3.20	11.23	35.60	49.18	100.00
D5B Psychosocial risk	4.45	7.53	23.88	22.41	41.73	100.00
D5C OHS risk of injury	1.84	5.35	16.87	26.18	49.76	100.00
D6 Voice and Collective Interest Representation	20.01	27.98	33.97	12.01	6.02	100.00
D6A Voice	21.20	15.89	20.30	20.87	21.75	100.00
D6B Collective Interest Representation	54.67	0.00	29.21	0.00	16.12	100.00

When you drill down into the nested structure, the sub-dimensions found to have the highest levels of '***very poor'*** quality jobs are: **collective interest representation** (D6B) (54.67% or 5.4 million jobs); **voice** (D6A) (21.20% or 2,050,435 jobs); **work intensity** (D4B) (17.87% or 1.7 million jobs); and **autonomy** (D3B) (14.20% or 1.37 million jobs). While the sub-dimensions with the highest levels of '*very good'* quality jobs are **OHS injury risk** (D5C) (49.76% or 4.9 million jobs); **physical risk** (D5A) (49.18% or 4.9 million jobs); **psychosocial risk** (D5B) (41.73% or 4 million jobs); and **contractual stability** (D2A) (52.40% or 5.2 million jobs).

Table 5.3.3: Number of jobs by quality category by sub-dimension, dimension and overall jobs

	Very poor	Poor	Middling	Good	Very good	Total
D1	**785,749**	**628,618**	**1,277,789**	**4,128,145**	**3,104,775**	**9,925,076**
D1A	1,405,396	0	1,290,311	3,690,598	3,524,066	9,910,371
D1B	1,125,914	1,167,266	1,717,786	2,249,787	3,415,233	9,675,987
D2	**41,701**	**607,529**	**2,094,881**	**4,579,909**	**2,601,055**	**9,925,076**
D2A	60,581	563,640	1,313,614	2,786,687	5,200,553	9,925,076
D2B	644,647	4,740,092	3,222,644	971,437	346,257	9,925,076
D3	**784,941**	**2,470,287**	**3,143,474**	**2,712,166**	**814,207**	**9,925,076**
D3A	1,120,588	2,598,855	1,961,138	1,668,386	2,566,168	9,915,135
D3B	1,374,083	2,328,249	3,000,247	1,994,691	981,196	9,678,465
D4	**91,548**	**1,234,933**	**4,354,526**	**3,798,770**	**445,299**	**9,925,076**
D4A	129,058	998,585	3,209,792	4,543,333	1,044,308	9,925,076
D4B	1,729,665	2,580,284	3,369,415	1,553,934	443,285	9,676,583
D5	**6,117**	**117,772**	**1,450,252**	**4,952,467**	**3,398,468**	**9,925,076**
D5A	77,969	317,799	1,114,257	3,533,490	4,880,789	9,924,305
D5B	430,901	728,745	2,310,640	2,168,290	4,038,565	9,677,141
D5C	182,879	531,188	1,674,191	2,598,336	4,938,482	9,925,076
D6	**1,986,470**	**2,777,526**	**3,371,614**	**1,191,701**	**597,764**	**9,925,076**
D6A	2,050,435	1,536,653	1,963,425	2,018,354	2,103,993	9,672,860
D6B	5,426,106	0	2,898,818	0	1,600,152	9,925,076
AJQI	**611,641**	**962,505**	**4,463,713**	**3,792,025**	**90,922**	**9,920,806**

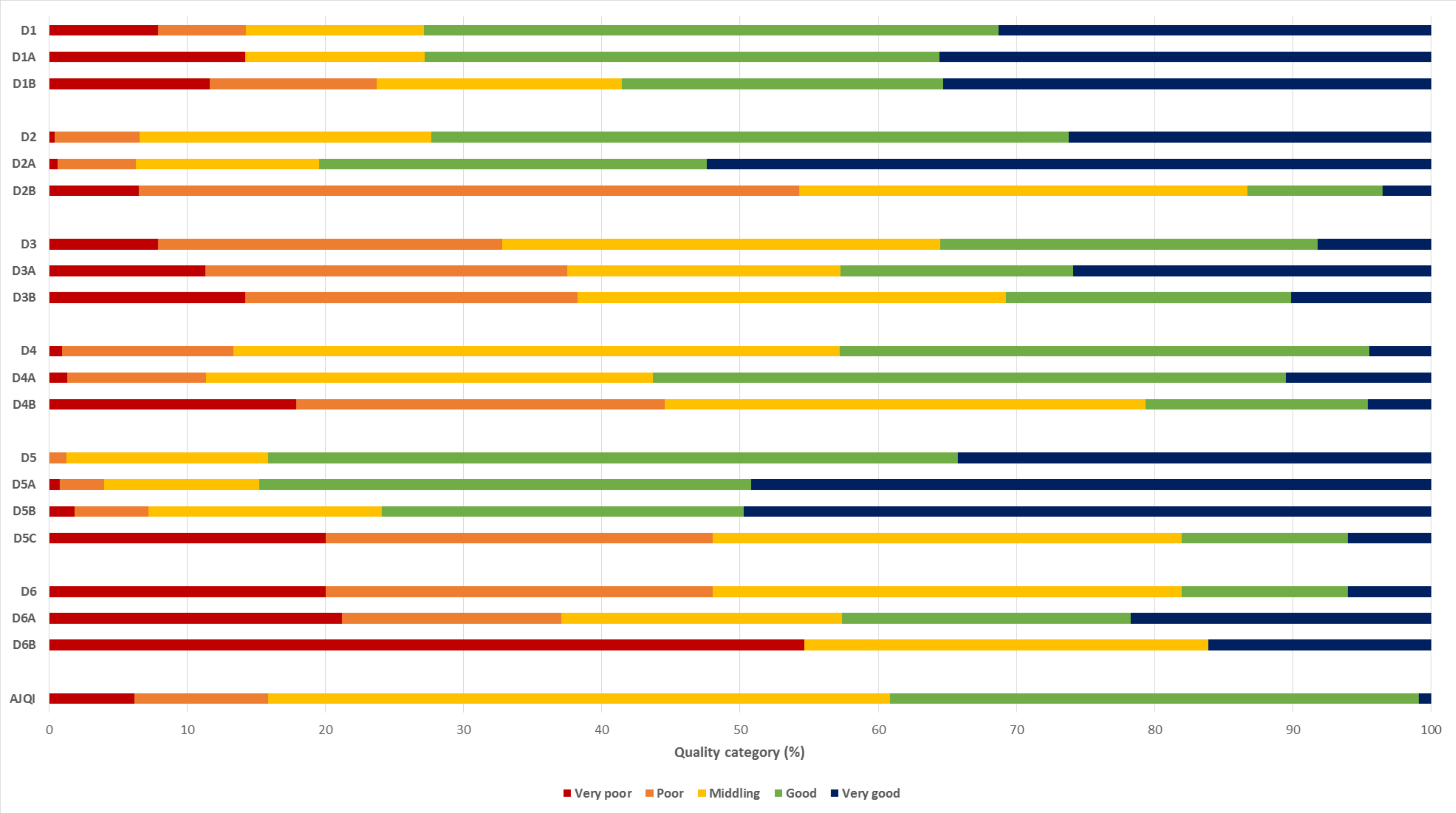
As one way to assess the 'bundling' of good and bad jobs, a count was undertaken to see who many jobs were found with no, one, two, three, four, five or six of each of the five categories of '***very poor***', '***poor***', '***middling***', '***poor***' **or** '***very poor***' jobs (see Table 5.3.4). Crucially, no jobs are '***very po****or'* for all of the six dimensions, and furthermore no jobs are '***very poor'*** for five out of the six dimensions. At the end other end of the spectrum, no jobs are '***very good'*** on all six dimensions, while less than one percent (0.23%) of jobs are '***very good***' on five out of the six dimensions. In fact, the bulk of jobs have a combination of both better, and worse, aspects of job quality. While just over one-in-seven jobs (71.80%) have no dimensions that are '***very poor',*** one-third of all jobs (33.47%) do not have any aspects of the job that are ***'very good'.***

Table 5.3.4: Counts by quality category across dimensions of job, percent

Number of dimensions	Very poor	Poor	Middling	Good	Very good
0	71.80	42.74	14.55	6.25	33.47
1	20.60	39.08	35.51	21.84	35.43
2	6.22	15.00	31.25	35.64	20.77
3	1.35	2.84	15.11	25.07	8.09
4	0.03	0.32	3.16	9.25	2.02
5	0.00	0.01	0.42	1.81	0.23
6	0.00	0.00	0.01	0.14	0.00
Total	100.00	100.00	100.00	100.00	100.00

In summary, quality of health and safety (D5); employment (D2); pay (D1); and work-life balance (D4) are better, on average, than quality of intrinsic characteristics of work (D3); and voice and collective interest representation (D6). The share of '***very poor***' and '***poor***' quality jobs differs considerably across dimensions. When the bundling of different aspects of job quality is taken into consideration, there is typically a mixture of both better and worse aspects of job quality.

Figure 5.3.1: Share of jobs by quality category, percent



5.4. Comparison of the AJQI results with other Australian research

Having presented new empirical findings on the quality of jobs in Australia in the previous sections of this chapter, it is interesting to compare the findings to other available information. While the AJQI is, to best knowledge, the first holistic index of job quality for Australia, as mentioned in the chapter three, there have been a number of other attempts – albeit partial – to create indexes of job quality for Australia. The question then is, how do the results for the AJQI compare with the results from these partial indexes?

This section compares findings from the AJQI to results from four other Australian studies on job quality (see section 3.4 in chapter three for a discussion on the methodological aspects for the four studies). While it is difficult to make direct comparisons, the results from the AJQI seem very plausible when compared to estimates from other – more limited - indexes for job quality. For instance, aspects of job quality that were found to be particularly problematic in the AJQI have also been low-scoring in the other Australian indexes of job quality.

Prior to availability of the large-scale HILDA Survey, Considine and Callus (2001) used data from a survey of 1,001 employees to produce a quality of working life index for Australian employees (AQoWL Index). Their index, based on a survey intended to gauge workers' feelings about 14 items, resulted in an aggregate score of 7.1 on a ten-point scale for overall quality of working life in Australia. Unlike the AJQI, which is based on a combination of objective and subjective items, all of the items in the AQoWL index were subjective, and not all of the items are directly comparable to the indicators in the AJQI. Nevertheless, and despite the fact that the survey was conducted 17 years ago, a number of their findings align with the findings for the AJQI.

Three similarities are noteworthy. First, in the AJQI, the dimension with the highest average score is health and safety risk, where more than four-fifths of all jobs (84.14%) have either *good/very good* quality of health and safety. Relevantly, Considine and Callus found that over 70 percent of workers indicated they were either '*satisfied/very satisfied'* with the occupational health and safety standards at work (Considine & Callus, 2001: 4). Secondly, the sub-dimension of contractual security in the AJQI was constructed by combining both objective and subjective measures of contractual stability, where around four-fifths of jobs (80.48%) are either good/*very good* for quality of contractual stability. Pertinently, Considine and Callus found that 74 percent of workers were positive about their level of job security. In the AJQI, based on the aggregation of scores for five indicators of subjective job security, a slightly higher proportion of jobs (80.88%) were rated as either *good/very good* in terms of subjective contractual stability (i.e. perceived job security). Third, Considine and Callus (2001) found that just over one-fifth of workers were dissatisfied with their career prospects for the coming two years. Related, for the sub-dimension of development opportunities (D2B) in the AJQI, over half of all jobs (54.26%) are either *poor/very poo*r quality in terms of development opportunities; where the vast majority of jobs (90.49%) are either *poo*r/*very poor* quality in terms of provision of work-related training. In contrast, as low as around eight percent of jobs are either *poor/very poor* for the subjective aspect of satisfaction with employment opportunities (D2B2).

It is also important to note some differences. For instance, for the dimension of pay, Considine and Callus (2001) found that one-in-five workers (20%) felt that their pay was not fair and reasonable. In the AJQI, just under one-quarter of jobs (23.70%) have either *poor/very poor* subjective pay. However after aggregating both objective and subjective indicators, 14.25 percent of jobs have either *poor/very poor* quality of pay in the AJQI.

In terms of the intrinsic characteristics of work, Considine and Callus (2001) found that just over one-in-five workers (22%) indicated that the work they did was not interesting or satisfying. In the AJQI, the sub-dimension of skills includes a number of indicators related to the content of work. While just over three-in-ten jobs (32.80%) have *poor/very poor* quality of intrinsic characteristics of work, a lower level of jobs are either *poor/very poor* in terms of task variety/interesting work (13.29%) than the level of jobs with either *poor/very poor* quality in terms of complexity/skill-use (24.11%). However, it is concerning that more than one-half of all jobs (58.67%) are either *poor/very poor* in quality vis-à-vis task monotony.

Furthermore, in terms of work-life balance, Considine and Callus (2001) found that one-in-four workers (24%) expressed dissatisfaction with the balance between the time they spent working and the time they spent with family and friends. Rather than one item on work-life balance, the dimension of work-life balance in the AJQI is constructed using 4 items on duration; 4 items on scheduling; 4 items on flexibility; and 3 items on work intensity. Overall, more than one-in-seven jobs (13.36%) in the AJQI have either *poor/very poor* quality of work-life balance, however almost one-third of jobs (32.01%) have either *poor/very poor* quality in terms of flexibility. In terms of psychosocial aspects of work, they found that around three-in-ten workers (29%) were dissatisfied with the level of stress experienced at work. In the AJQI, just over one-in-eight jobs (11.98%) are have either *poor/very poor* psychosocial risk, where almost one-quarter of jobs (24.11%) are either *poor/very poor* quality in terms of the level of perceived stress.

Also prior to the HILDA Survey, Burgess (2003) developed a simple aggregate-level index of job quality based on published national data with five indicators: proportion of employees who are employed under permanent conditions; proportion of employees who work very long hours

(45 hours per week or more); proportion of employees who do not desire additional hours of work; proportion of employees who belong to a trade union; and proportion of employees who are managerial and professional women. The index does not include many of the aspects included in the AJQI including pay and training. The index base was set at 100 for 1996, with annual readings through until 2001, i.e. a five year period. Burgess found a slight yet consistent decline in the job quality index for the 1996 to 2001 period, whereby an increase in the proportion of women managerial and professional jobs was offset by a persistent decline in trade union density. The largest decline in the index was caused by an increase in both long hours of employment and in under-employment.

All of the five indicators included in Burgess' index are incorporated into the AJQI, making it possible to compare the 2001 findings with the 2014 data used to construct the AJQI:

- While 72.8 percent of employees were permanent in 2001, this figure is 75.68 percent in the AJQI sample (where paid leave is used as a proxy for permanent employment);
- While 82.4 percent of employees did not work very long hours in 2001 (defined as 45 hours or more per week) this figure is 86.74 percent in the AJQI sample (defined as 50 hours or more per week in main job in the AJQI);
- While 93.5 percent of employees were not under-employed in 2001, this figure is 80.89 percent in the AJQI sample;
- While 24.5 percent of employees were trade union members in 2001, this figure is 24.80 percent in the AJQI sample; and
- While 11.5 percent of women held managerial/professional roles in 2001, this figure is 33.01 percent in the AJQI sample.

So, the two aspects of job quality that have witnessed the largest change are under-employment (which appears to have increased since 2001) and women in managerial/professional roles (which has also increased since 2001). However, the AJQI contains many additional indicators, making it possible to undertake a much more detailed analysis of job quality than was possible in 2001.

As outlined in chapter three, Leach and her colleagues used HILDA data to construct an index of psychosocial characteristics of work (Leach et al., 2010; Butterworth et al., 2011). As it was their aim to compare mental health of unemployed people to those in poor quality jobs, it is difficult to compare their findings from their index with those from the AJQI. However, in developing an overall scale of psychosocial job quality, they calculated four categories of jobs, ranging from optimal jobs (with no psychosocial adversities) to poorest quality jobs (with three or more psychosocial adversities), where the four adversities were identified as: high job demands and complexity; low job control; job insecurity; and unfair pay. Overall, they found a small proportion (7.3%) of jobs of the poorest quality (i.e. three or more psychosocial adversities), 20.2 percent of jobs (i.e. two adversities), around four-in-five jobs (38.9%) in the next category (i.e. 1 adversity) and around one-third of jobs (33.7%) in the optimal category (i.e. no psychosocial adversities).[22]

As outlined in chapter three, Charlesworth and her colleagues (2014) constructed the VicWAL JQI in order to estimate the extent of poor jobs. Despite differences in how the index was constructed and which aspects of job quality are included, it is possible to make some high-level comparisons between findings from the VicWAL JQI and the AJQI. Almost one-fifth (17.8%) of respondents in the VicWAL survey were categorised as being in very poor quality jobs (defined as two or more deficits out of six components), just under one-half (46.1%) of respondents were categorised as having poor job quality (defined as one deficit out of six); and just over one-third (36.2%) have better job quality (no deficits). While not directly comparable, for the AJQI 15.87 percent of jobs were categorised as *very poor/poor* quality; 44.99 percent were categorised as *middling* in quality; and 39.12 percent were categorised as *good/very good* quality.

In terms of individual aspects of job quality, it possible to drill down to compare findings around work intensity, skill development, job security. While almost half of the VicWAL sample (46.7%) had poor quality of workload, 44.54 percent of the AJQI sample have either *poor/very poor* quality in work intensity, where 40.06 percent have *poor/very poor* quality in terms of not having enough time to do everything in the job. It was estimated that 13.2 percent of the VicWAL sample had poor quality of skill development, whereas 54.76 percent of jobs in the AJQI sample have either *poor/very poor* quality of development opportunities, and 37.51 percent of jobs have either *poor/very poor* quality of skills. While 8.3 percent of the VicWAL sample had poor quality of job security, 7.29 percent of the AJQI sample have either *poor/very* poor job security, where 4.09 percent have either *poor/very poor* quality in terms of likelihood of job loss in the next 12 months, but objectively, 24.32 percent of jobs have no entitlement to paid leave and 21.17 percent of jobs do not meet the test qualifying for unfair dismissal protection. Furthermore in the VicWal sample, 12.4 percent had poor quality of job control and 3.2 percent had poor quality of working time autonomy. In comparison, in the AJQI a much higher proportion (38.26%) have *poor/very poor* autonomy, where more than half (53.79%) have *poor/very poor* quality in terms of freedom in deciding when work is done.

[22] Proportions different from those reported by authors (Table 2 on page 809) as authors' figures include unemployed and those not participating in the labour force (NILF) in the totals. The proportions reported in this thesis were re-calculated by restricting the calculation to those in employment.

In summary, none of the other Australian indexes for job quality are as comprehensive as the AJQI and how you determine cut-off points will necessarily influence estimates on the overall number of jobs at different levels of quality. At the broadest level, however, there seems to exist a number of persistent problems with certain aspects of jobs in Australia, particularly in terms of workloads/work intensity; lack of training, skills and career development opportunities; job insecurity; and problems with lack of autonomy and flexibility.

5.5. Job quality and outcomes

In this thesis, job quality is broadly defined as the extent to which a set of job attributes contributes to, or detracts from, workers' wellbeing (as introduced in chapter 2). Further to this, it is widely held that poor job quality negatively impact on individuals, their families, as well as the communities where workers live (as discussed in chapter 1). One strength of the HILDA dataset is that it contains a range of variables that make it possible to examine whether there are links between 'good' and 'bad' jobs and various outcomes related to wellbeing. So after having reported on the number of 'good' and 'bad' jobs in Australia, this section examines whether there are links between 'good' and 'bad' jobs and **three aspects of wellbeing: job satisfaction, self-reported health and wellbeing**; and **relative socio-economic disadvantage/advantage**.

5.5.1. Job satisfaction levels

Job satisfaction has been found to be a significant predictor of lower voluntary quits (Akerlof et al., 1988; Clark, 2001; Clark et al., 1998; Freeman, 1978; McEvoy & Cascio, 1985); negatively correlated with absenteeism (Clegg, 1983); and positively correlated with productivity (Patterson et al., 1997). Further, dissatisfying jobs are thought to discourage labour force participation (Clark, 1997) (i.e. a bad job is worse than no job at all). However, problems related to using job satisfaction as a proxy measure for job quality (that is, an input measure) have already been discussed in chapters two and three of this thesis. Yet while it is methodologically problematic to use job satisfaction as a proxy for job quality, it is informative to see whether job satisfaction is higher (or lower) among those job-holders who also have better (or poorer) job quality.

In the first instance, average scores for job quality are considered here in relation to three measures of job satisfaction: **satisfaction with hours; satisfaction with the job itself**; and **overall job satisfaction**[23]. The aim of this analysis is to answer the question of whether people

[23] While the HILDA dataset contains variables for four additional measures of job satisfaction (satisfaction with pay; with job security; flexibility to balance work/non-work commitments; and with employment opportunities), as these measures were incorporated into three dimensions of the AJQI

in better quality jobs are also more likely to be satisfied with their jobs than those who with poorer quality jobs, and vice versa. The AJQI is positively correlated with the three measures of job satisfaction (the correlations are set out in Appendix 11.5). When average scores for job quality are mapped to levels of job satisfaction, in general, those in poorer quality jobs tend to also be less satisfied with their jobs. The reverse also applies, where those in better quality jobs tend to also be more satisfied with their jobs.

In terms of the three measures of job satisfaction, there are notable and, in some instances, expected, differences. In almost all cases and for all of the three measures of job satisfaction, the average score for job quality is lower among those who are more dissatisfied than it is among those who are more satisfied with various aspects of their job. Table 11.6.1 in Appendix 11.6 sets out average scores for the AJQI for each of the three measures of job satisfaction.

The average score for overall job quality among those who are '***totally dissatisfied***' with **the work itself** is 21.90 (SD: 21.29) compared to 55.33 (SD: 18.64) for those who are '***totally satisfied'*** with the **work itself**. Results from a one-way analysis of variance, ANOVA, to explore the impact of satisfaction with the work itself on job quality revealed a statistically significant difference in mean scores for job quality for the 11 groups (i.e. from totally dissatisfied to totally satisfied with hours worked) (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for job quality for all comparisons (all at the p=.05 level). The mean difference in scores for between the group of job-holders who are 'totally dissatisfied' and the group of job-holders who are 'totally satisfied' is -22.83 (CI: -23.16 to -22.51).

The average score for overall job quality among those who are '***totally dissatisfied***' with **hours worked** is 32.35 (SD: 19.88) compared to 55.19 (SD: 18.36) for those who are '***totally satisfied'*** with hours worked. Results from a one-way analysis of variance, ANOVA, to explore the impact of satisfaction with hours worked on job quality revealed a statistically significant difference in mean scores for job quality for the 11 groups (i.e. from totally dissatisfied to totally satisfied with hours worked) (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for job quality for all comparisons (all at p=.05 level). The mean difference in scores is between the group of job-holders who are 'totally dissatisfied' and the group of job-holders who 'totally satisfied' with hours worked is -33.43 (CI: -33.80 to -33.05).

The average score for overall job quality among those who are '***totally dissatisfied***' with **overall job satisfaction** is 33.18 (SD: 22.86) compared to 56.59 (SD: 18.28) for those who are

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(pay; quality of employment; and work-life balance), they have been excluded from the analysis in this section.

'***totally satisfied'*** with overall job satisfaction. Results from a one-way analysis of variance, ANOVA, to explore the impact of overall job satisfaction on job quality revealed a statistically significant difference in mean scores for job quality for the 11 groups (i.e. from totally dissatisfied to totally satisfied for overall job satisfaction) (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant difference in mean scores for job quality for all comparisons (at p=.05 level), except for the comparison between the groups of employees who rated their overall job satisfaction at 3 and 5, respectively, on the 11-point scale, where the difference in mean scores was not statistically significant. The mean difference in scores is between the group of job-holders who are '*totally dissatisfied*' and the group of job-holders who '*totally satisfied'* is -23.41 (CI: -23.75 to -23.08).

Building on the analysis presented above, the proportion of job-holders at five levels of quality (using the same cut-off points outlined in section 5.2) for each of the three measures of job satisfaction is next reported. In this respect, it provides different information than the information presented in the previous section. Rather than providing an indication of whether job-holders in poorer quality jobs are also likely to be less satisfied with their jobs, it tells us how many workers are found at each level of quality according to their level of satisfaction with the various aspects of their jobs.

Generally, higher proportions of those who are '***totally dissatisfied*'** with the various aspects of their job are found in jobs with the lowest levels of quality (i.e. '*very poor*' and '*poor*' quality jobs). For example, among those who report being '***totally dissatisfied*'** with the **hours they work** are more likely to be in '***very poor'*** quality jobs; this can be between three and seven times higher than the rate found in this category among those who are '*totally satisfied'* with that aspect of their job. Conversely, individuals who are '*totally satisfied*' with various aspects of their jobs are more likely to be in '***very good'*** jobs (i.e. the highest quality of jobs). These findings suggest that, by and large, those employees with extremely negative feelings about their job probably have good reason for their negative feelings, because for many of them, their jobs are generally poor in terms of quality. Table 11.6.2 in Appendix 11.6 contains supplementary tables with the data used to report on jobs by the five quality levels for the AJQI for each of the three measures of job satisfaction.

5.5.2. Health and wellbeing

There is a growing body of literature on the deleterious effects of poor working conditions on worker health and wellbeing (see for example, Bardasi & Francesconi, 2004; Bohle et al., 2001; Butterworth, Leach, Strazdins, Oleson, Rodgers & Broom, 2011; De Witte, 1999, 2005; Dennis & Baker, 2012; Dooley, 2003; Friedland & Price, 2003; Grün, Hauser & Rhein, 2010; Harrington, 2001; Hassell, Muller & Hassall, 2004; OECD, 2013; Warr, 1999). So in order to explore links between job quality and worker health and wellbeing, average scores for job quality are checked against employee self-reports for life satisfaction, general health, and presence of a long term health condition.

The variable of **self-reported satisfaction with life** is positively correlated with overall job quality, although the correlation is small (r=0.10; p<001, two-tailed). This said, job quality for the group who report being '*totally dissatisfied'* with life have by far the lowest score for job quality (M: 27.35; SD: 20.45). Results from a one-way analysis of variance, ANOVA, to explore the impact of satisfaction with life on job quality revealed a statistically significant difference in the mean scores for all 11 groups (i.e. totally dissatisfied to totally satisfied with life) (at the p=.000 leve)l. Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at the p=.05 level), except for the comparison between the group of employees who rated their satisfaction with life at 8 and 9, respectively, where the difference in mean scores was not statistically significant. The mean difference in scores is between the group of job-holders who are '*totally dissatisfied*' with life and the group of job-holders who '*totally satisfied'* with life is -24.50 (CI: -25.22 to -23.77).

The variable of **self-reported general health** (once reversed) is positively correlated with overall job quality, although the correlation is small (r=0.08; p<.001, two-tailed). For those job-holders who rate their general health as '*poor*', the average score for overall job quality is 14.57 points lower (M: 39.05; SD:24.72) than for the group who rate their general health as '*excellent*' (M: 53.62; SD: 17.88) or **'***very good'* (M: 54.71; SD: 16.42). Results from a one-way analysis of variance, ANOVA, to explore the impact of self-assessed general health on job quality revealed a statistically significant difference among the mean differences for job quality for the 5 groups (i.e. excellent, very good, good, fair and poor general health) (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at p=.05 level). The mean difference between scores for the group of job-holders who rate their general health as '*poor*'and those who rate their general health as 'excellent*'* is 14.57 (CI: -14.72 to -14.43). And the mean difference in scores is between the group of job-holders who rate their general health as '*poor*'and those who rate their general health as 'very good*'* is -15.66 (CI: -15.80 to -15.52).

On the basis of this preliminary assessment, these empirical findings seem to confirm the previous evidence in support of a link between job quality and health/wellbeing.

The AJQI is also positively correlated with the variable of whether a job-holder has a **long-term health condition**, although the correlation is small (r=0.06; p<.001, two-tailed). An independent-samples t-test was conducted to compare the scores for those who report having a **long-term health condition** and those who do not. There was a statistically significant difference in mean scores for job quality between these two groups (at the p=.000 level, two-tailed), where the average score for overall job quality for those employees who say they have a **long-term health condition** is 50.47 (SD: 18.89) and is 53.80 (SD: 16.27) for **do not report having a long-term health condition** ,where the magnitude of the difference in the means is -3.34 (CI: -3.37 to -3.30).

In summary, those employees who rate their **general health as '*poo*r'** appear to have, on average, lower levels of job quality. At a glance, the group of job-holders who assess their own health as '***poor***' represent just over one percent of all employees in the sample (equating to 108,769 jobs). Among this group, there are noticeable over-representations of jobs held by men; where job-holders are aged between 45 and 54 years; those working part-time hours; and those with casual contracts. Those employed in very small workplaces (i.e. sole operators and workplaces with 2 to 19 workers) and in the private sector are also over-represented in this group. Additionally, there is an over-representation of managers; professionals; and machinery operators and drivers. These findings deserve closer attention and should be explored via multi-variate analysis (see section 8.5 in chapter eight).

Table 11.6.3 in Appendix 11.6 contains supplementary tables with the data used to report on average scores for the AJQI by self-reported life satisfaction, general health and presence of a long-term health condition.

Building on the analysis presented above, the proportion of job-holders at five levels of quality according to **self-reported satisfaction with life**, **self-reported general health** and **self-reported presence of a long-term health condition** are considered next. The idea is to see whether a larger share of those who are either dissatisfied with life and/or who are in poor general health are also more likely to have poor quality jobs, and vice versa.

Among those employees who report being '***totally dissatisfied*' with life**, almost half of them (49.78%) are found in jobs of '*very poor'* quality*.* This rate is almost five times higher than the rate found in this category among those employees who are ***'totally satisfied'*** **with life** (10.37%). Plus, among those employees who rate their health as '*poor*', almost one-third (32.17%) are found in '*very poor quality*' jobs. This is more than four times higher than the rate of those employees who rate their **health as '*excellent*'** (7.63%). Furthermore, among those employees who report having a **long-term health condition**, almost one-in-ten (9.67%) are in '*very poor quality*' jobs. This is almost 1.75 times higher than the rate in this category among those employees who do not have a long-term health problem (5.56%). Conversely, among those employees who are '***totally satisfied*' with life** and among those employees who report that they are in '**excellent health'**, there is an over-representation of jobs at the two highest levels of quality (i.e. '*very good qualit*y' and '*good quality'* jobs).

The above findings suggest that those employees who are dissatisfied with life; those who rate their own health as '*poor*' and/or those who have a long-term health condition are much more likely to be found in low quality jobs than those employees who are more satisfied with life and/or those who generally feel healthier.

Table 11.6.4 in Appendix 11.6 contains supplementary tables with the data used to report on jobs by quality level for self-reported satisfaction with life; general health and presence/absence of a long-term health problem.

5.5.3. Socio-economic status

The HILDA dataset contains variables for three Socio-Economic Indexes for Areas (SEIFA) based on the 2011 Census. The SEIFA indexes were developed by the Australian Bureau of Statistics (ABS) that rank areas in Australia according to **relative socio-economic advantage and disadvantage** and are based on information from the five-yearly Australian Census, and are widely used measures of relative socio-economic status, where some common uses of SEIFA include determining areas that require funding and services and assisting research into the relationship between socio-economic disadvantage and various social outcomes (ABS, 2007; Pink, 2013).[24] For the purposes of SEIFA, the ABS broadly defines relative socio-economic advantage and disadvantage in terms of 'people's access to material and social resources, and their ability to participate in society' (Pink, 2013: 3). Popular conceptualisations of disadvantage include poverty, deprivation, and social exclusion. Concepts that also capture indicators of advantage include human capital, social capital, and socio-economic position. A key thread through the literature is the move towards multi-dimensional frameworks to capture a person's ability to participate in society in many aspects of life, for example, economic, social, and political aspects (Pink, 2013: 6). The three SEIFA indexes based on 2011 Census data used in the analysis below are:

- SEIFA 2011 Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD);
- SEIFA 2011 Index of Economic Resources (IER); and
- SEIFA 2011 Index of Education and Occupation (IEO).

In this thesis, the SEIFA indexes are used as one way to examine whether employees who live in areas of Australia where there is relatively high socio-economic disadvantage (or advantage) are also more likely to be found in poorer (or better) quality jobs.[25]

[24] The SEIFA indexes are assigned to areas, not individuals. So within any area there will be individuals and sub-populations with very different characteristics to the overall population of the area, however it is interesting to consider the question of whether people with lower job quality are more highly concentrated in areas of high relative socio-economic disadvantage.
[25] Because the SEIFA 2011 IRSAD measures both advantage and disadvantage, results are not reported for this index (although as was the case with the three other indexes, the index was found to be positively correlated with the AJQI and the average level of job quality generally increased by decile).

In order, the **SEIFA 2011 IRSAD** 'summarises variables that indicate relative disadvantage' while the **SEIFA 2011 IER** index 'summarises variables relating to the financial aspects of relative socioeconomic advantage and disadvantage', where indicators of high and low income, as well as variables that correlate with high and low wealth, are included in the index (Pink, 2013: 8). The **SEIFA 2011 IEO** 'summarises variables relating to the educational and occupational aspects of relative socio-economic advantage and disadvantage', where the SEIFA 2011 IEO index 'focuses on the skills of the people in an area, both formal qualifications and the skills required to perform different occupations' (Pink, 2013: 7-8).

Average scores for job quality are considered for SEIFA 2011 IRSAD, IER and IEO, where the variables from the HILDA dataset that were used deciles of the respective SEIFA index.

The **SEIFA 2011 IRSAD** variable (i.e. IRSAD deciles for relative socio-economic advantage/disadvantage) is positively correlated with the AJQI, although the strength of the correlation is weak ($r=0.16$; $p <.000$, two-tailed). On balance, the average score for overall job quality increases by decile, where the average score for job quality at the lowest decile is 48.49 (SD: 18.00), at the 6^{th} decile it is 52.89 (SD: 16.82) (which is slightly lower than average for the 5^{th} decile of 54.22; SD: 15.19), and the mean for job quality is highest at the highest decile of the IRSD (M: 58.47; SD: 14.27). Results from a one-way analysis of variance, ANOVA, to explore the impact of relative socio-economic advantage/disadvantage on job quality revealed a statistically significant difference in mean scores for job quality for the 10 groups (i.e. deciles) (at the $p=.000$ level, two-tailed). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at $p=.05$ level). The mean difference in scores is between the group of job-holders in the lowest SEIFA 2011 IRSAD decile and the group of job-holders in the highest decile is -9.98 (CI: -10.06 to -9.90).

The **SEIFA 2011 IER** variable (economic resources) is also positively correlated with the AJQI, although again the strength of the correlation is weak ($r=0.11$; $p<.000$, two-tailed). Generally, the mean score for overall job quality gets progressively higher by decile. For example, the average score for job quality is lowest at the lowest decile (M: 49.27; SD: 16.57); where the average score increases to 53.51 (SD: 17.53) at the 5^{th} decile; and job quality is highest at the highest decile of the IER (M: 56.49; SD: 15.29). Results from a one-way analysis of variance, ANOVA, to explore the impact of economic resources on job quality revealed a statistically significant difference in mean scores for job quality for the 10 groups (i.e. deciles) (at the $p=.000$ level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at $p=.05$ level), except for the difference in means for the groups of employees found in the 3^{rd} and 4^{th} deciles, where the difference was not statistically significant. The mean difference in scores is between the group of job-holders in the lowest SEIFA 2011 IER decile and the group of job-holders in the highest decile is -7.21 (CI: -7.29 to -7.14).

The **SEIFA 2011 IEO** variable (education and occupation) is also positively correlated with the AJQI, although the strength of the correlation is weak (r=0.16; p<.000, two-tailed). Results from a one-way analysis of variance, ANOVA, to explore the impact of education and occupation (using SEIFA 2011 IEO**)** on job quality revealed a statistically significant difference in mean scores for job quality for the 10 groups (i.e. deciles) (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at p=.05 level), except for the difference in means for the groups of employees found in the 5th and 7th deciles, where the difference was not statistically significant. The average score for overall job quality is lowest at the lowest SEIFA IEO decile (M: 47.86; SD: 17.87), where, on balance, the average score gets progressively higher by decile, where it increases to 53.66 (SD: 17.50) at the 4th decile, and job quality is highest at the highest decile of SEIFA IEO (M: 57.40; SD: 15.01). The mean difference in scores is between the group of job-holders in the lowest SEIFA 2011 IEO decile and the group of job-holders in the highest decile is -79.54 (CI: -9.62 to -9.46).

Table 11.6.5 in Appendix 11.6 contains supplementary tables with the data used to report average scores for the AJQI for the three SEIFA 2011 indexes.

Building on the analysis presented above, the share of jobs for the five levels of quality (using the same cut-off points outlined in section 5.2 above) for the three variables for SEIFA 2011 IRSAD, IER and IEO indexes (i.e. deciles of the respective indexes) are reported here.

Around four times as many job-holders (10.55%) in the lowest decile for **the SEIFA 2011 IRSAD** index are in '*very poor'* quality jobs compared to those in the highest decile of the index (2.67%). Conversely, six and one half times as many job-holders (2.00%) in the highest decile of the IRSD index are in '*very good'* quality jobs compared to those in the lowest decile of the IRSD index (0.14%).

Two times as many job-holders (7.59%) in the lowest decile for **SEIFA 2011 IER** index are in '*very poor*' quality jobs compared to those in the highest decile of the index (3.79%). Conversely, more than 11 times as many job-holder (1.82%) in the highest decile of the IER index are in '*very good'* quality jobs compared to those in the lowest decile of the IER index (0.16%).

Plus, nearly three times as many jobs holders (10.20%) in the lowest decile for the index of the **SEIFA 2011 IEO** index are in '*very poor'* quality jobs compared to those in the highest decile of the index (3.66%). Conversely, while 2.087 percent of those in the highest decile for the IEO index are in '*very good'* quality jobs, none of those in the lowest decile of the index are in '*very good'* quality jobs (0.00%).

While preliminary in nature, the above findings suggest that job quality is, on average, lower for sub-groups of the Australian population of employees who live in areas with higher levels of relative socio-economic disadvantage. While a more detailed multi-variate analysis is required, these results point to important policy implications in terms of strategies aimed at reducing in-work poverty and improving social inclusion.

Table 11.6.6 in Appendix 11.6 contains supplementary tables with the data used to report on jobs by quality level for the three variables of the SEIFA 2011 indexes by decile.

5.6. Conclusion

At the beginning of this chapter, the statistical properties of the AJQI were outlined. This was followed by the reporting of the headline results for job quality for Australian employees.

If the AJQI is taken as an approximate indicator, then based on data from 2014, the average score for job quality for jobs held by Australian employees was 53.30 out of a possible 100. The very worst job was assigned a score approaching the minimum possible score of zero (0.15) and the very best job was assigned a score approaching the maximum possible score of 100 (91.13). Because both the mean and median for overall job quality were above 50, this means that in 2014, there were slightly more employees in '*good*' as opposed to '*bad*' jobs in Australia.

Upon grouping the scores for overall job quality into five categories for quality, it is estimated that there is around 6 percent of jobs (more than 600,000) of ***'very poor'*** quality; around 10 percent of jobs (almost one million) of ***'poor'*** quality and around half of all jobs (close to 4.5 million) are of ***'middling'*** quality. Around one-third of jobs (around 3.8 million) are of ***'good'*** quality and less than one percent of jobs (around 90,000) are of ***'very goo****d'* quality.

As the overall score for job quality for employees was derived from aggregation of scores for six dimensions of job quality, the second section of the chapter set out the results for each individual dimension of the six dimensions of job quality. The dimension with the highest average score was **health and safety**; followed by **quality of employment**; **pay; work-life balance; intrinsic characteristics of work**; and with a much lower average for the dimension of **voice and collective interest representation**. The overall results point to *accumulation* for the dimensions of pay; quality of employment; intrinsic characteristics of work; and voice and collective interest representation yet *compensation* for the dimensions of work-life balance; and health and safety. Yet the extent of accumulation and compensation varies, reinforcing the complexity of the multi-disciplinary construct of job quality.

Reinforcing how complex the multi-disciplinary construct of job quality is, the interrelations between overall job quality and its six dimensions is not always linear. Neither are these interrelations straightforward to interpret. Large variation is observed in quality among dimensions. For instance, for the **health and safety** dimension, less than one percent of all jobs (around 6,000) are categorised as '***very poor'*** while for the dimension of **voice and collective interest representation**, just over one-quarter of all jobs (close to 2 million) are rated '***very poor***'. The rate of '***very poor'*** jobs for pay is close to 8 percent, for **intrinsic characteristics of work** it is around 8 percent, for **quality of employment** is just over 6 percent; and for **work-life balance** it is less than 1 percent.

At the other end of the spectrum, for the best category of '***very good'*** quality jobs, less than 5 percent of jobs (almost 450,000) have '***very good'*** quality of **work-life balance**. The rate of '***very good*'** quality jobs for **voice and collective interest representation** is around 6 percent, for **intrinsic characteristics of work** it approaches 10 percent, for pay almost one-quarter of jobs are '***very good***' and around one-quarter of jobs are rated '***very good'*** for the dimension of **quality of employment**. The highest rate of jobs with '***very good'*** quality is for the dimension of **health and safety**, where just over one-third of all jobs (3.4 million) are rated '***very good'*** for this aspect of job quality.

When you drill down into the nested structure, the sub-dimensions found to have the highest levels of '***very poor'*** quality jobs are: **collective interest representation** (around 55%); **voice** (21%); **work intensity** (18%) and **autonomy** (around 14%). While the sub-dimensions with the highest levels of '***very good'*** quality jobs are **contractual stability** (52%), **risk of OHS injury** (50%), **physical risk** (49%) and **psychosocial risk** (42%).

While it is difficult to make direct comparisons, the results from the AJQI seem very plausible when they are compared to estimates from other – more limited – indexes for job quality. For instance, aspects of job quality that have been found to particularly low in other Australian indexes of job quality were confirmed as low in the AJQI.

The new empirical findings presented in this chapter point to the importance of job quality in terms of its potentially beneficial – or harmful – impact on individuals, firms and Australian society, in general. While not attributing causality, it appears that there are links in Australia between poor job quality and poor general health and wellbeing, and low socio-economic status. Consequently, improving job quality could help in addressing policy issues such as worker health, in-work poverty and social inclusion.

Undoubtedly, the headline results outlined in this chapter confirm that there is substantial room for improvement in job quality at the national level. However informative, putting a number on the overall quality of jobs among Australian employees does not help explain why differences may exist. As foreshadowed in the introduction for this chapter, the data presented in this chapter are descriptive in nature. That is, no attempt has been made to explain why variations might exist. The index results need to be further unpacked so as to obtain an understanding of the mechanisms that must exist for variations in job quality to occur. In the next chapter (chapter six), the results will be decomposed according to a range of job-holders' personal and household characteristics as one way to help explain why differences in job quality.

6. Job-holder personal and household characteristics

6.1. Introduction

In addition to reporting national patterns for Australian employees, it is important to decompose the results because similar overall levels in job quality between women and men, for example, can derive from very different profiles with regard to the various dimensions (Leschke, Watt & Finn, 2012).

With this in mind, the results reported in this chapter build on the overall findings presented in chapter five by examining job quality for employees according to a range of job-holders' personal and household characteristics. In essence, this chapter answers the question of who occupies the good and bad jobs in Australia. Crucially, the chapter explores the 'bundling' of different aspects of job quality for women, in comparison to men, as well as by a number of further characteristics.

Crucially, having constructed the AJQI, it is possible to cut and analyse the results for job quality in a multitude of different ways. The aim of this chapter is to provide an initial picture of the types of personal and household characteristics that might be helpful in understanding why disparities in job quality exist. Sex differences in job quality will be reported and to a lesser extent, and consistent with the broader concept of inequality regimes, job quality is also examined according to a number of other known sources of disadvantage. In this respect, it is not the intention to be exhaustive, but rather illustrative.

After the introduction, the chapter is divided into three main sections. Section 6.2 sets out results for the average level of job quality according to a range of personal characteristics. In the first instance, a comparison is made between women and men, to establish whether the level of overall job quality is better or worse for women. Results for each of the six dimensions of the AJQI are also considered according to the sex of job-holders. This is followed by reporting whether job quality differs according to the sex and age of the job-holder. Whether a job-holder's highest level of education has a bearing on job quality is discussed in the next part of the chapter, where once again any sex differences are highlighted. Findings on whether job quality varies depending on tenure with current employer is then reported. Next, characteristics related to life course and family formation are considered. Job quality is examined according to job-holders' marital status, parental status, household relationship type, and whether job quality differs among those with and without carer responsibilities. Section 6.2 concludes with an analysis of whether either job-holder's nationality/citizenship or their ability to speak English-language is linked to variations in job quality.

In section 6.3, provides a comparison between women and men on the 'bundling' of different aspects of jobs according to five levels of quality: '*very poor'*, '*poo*r', '*middling*', '*good*' and '*very good'*. In the final section (section 6.4), the main findings from this chapter are summarised and pointers to potentially relevant policy implications are identified.

6.2. Personal characteristics

A broad conclusion from existing international research is that job quality is shaped by factors at different levels of analysis, from the individual to the macro level (Esser & Olsen, 2012; Eurofound, 2015; Findlay et al., 2013; Green 2006; Kalleberg, 2011). Relevant individual factors are thought to include characteristics of the employee, such as gender, age and education (Eurofound, 2015).

The first part of this section examines job quality by looking at the average scores according to sex, age and highest educational qualification of the job-holder, beginning with sex.

6.2.1. Sex, age and highest educational qualification

At the aggregate level of the AJQI, there is very little difference between the scores for overall job quality between **men** and **women**. An independent-samples t-test revealed a statistically significant difference in mean scores for job quality between the sexes (p=.000 level, two-tailed), where the average score for overall job quality for men is 53.92 (SD: 16.18) and for women it is 52.65 (SD: 17.25), where the magnitude of difference in the means is small, at 1.27(at the p=.000 level, two-tailed; CI: 1.25 TO 1.29).

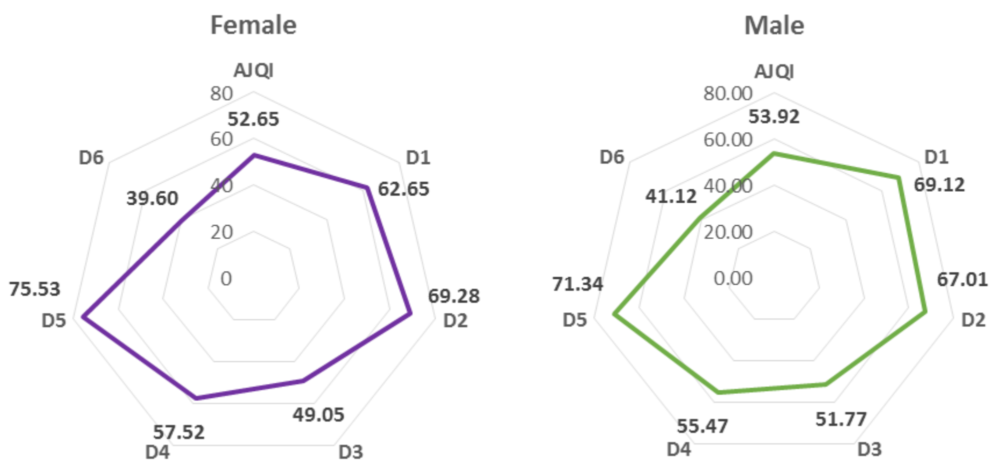
When average scores for each of the six dimensions of job quality are taken into consideration, women have higher average scores for three of the dimensions (quality of employment; work-life balance; and health and safety) while men have higher scores for the other three dimensions (pay; intrinsic characteristics of work; and voice and collective interest representation). A summary of descriptive statistics is set out below.

For the dimension of **pay** (D1), the mean score for **men** is 69.12 (SD: 23.51) and for **women** it is 62.65 (SD: 23.65). The difference in means of 6.47 is the largest among the six dimensions (at the p=.000 level, two-tailed; CI: 6.44 to 6.50). For **quality of employment** (D2), the mean score for **men** is 67.01 (SD: 15.84) and for **women** it is 69.28 (SD: 15.94). The magnitude of the mean difference is small at -2.27 (at the p=.000 level, two-tailed, CI: -2.70 to -2.75). For the dimension of **intrinsic characteristics of work** (D3), the mean score for **men** is 51.77 (SD: 21.40) and for **women** it is 49.05 (SD: 21.17). The mean difference is 2.72 (at the p=.000 level, two-tailed; CI: 2.70 to 2.75).

For the dimension of **work-life balance** (D4), the mean score for **men** is 55.47 (SD: 14.15) and for **women** it is 57.52 (SD: 14.70). Again, the mean difference is small, at -2.05 (at the p=.000 level, two-tailed; CI: -2.07 to -2.03). For the **health and safety dimension** (D5), the mean score for **men** is 71.34 (SD: 13.59;) and for **women** it is 75.53 (SD: 12.66). The difference in means is second largest among the six dimensions, at -4.19 (at the p=.000 level, two-tailed; CI: -4.21 to -4.17). For the dimension of **voice and collective interest representation** (D6), the mean score for **men** is 41.12 (SD: 22.43) and for **women** it is 39.60 (SD: 23.17). The difference in means is 1.52 (at the p=.000 level, two-tailed; CI: 1.49 to 1.55).

Despite the one-way between-groups analysis of variance being statistically significant for scores between men and women for all dimensions, the actual difference in the mean scores between the groups are quite small. Calculated using eta-squared, the largest effect sizes are found for the dimensions of pay (D1) and health and safety (D5), where eta-squared is .02 in both cases. The two radar charts in Figure 6.2.1.1, below, provide for a visual representation of average scores by dimension for men and women.

Figure 6.2.1.1: Radar charts for job quality and its six dimensions by sex, mean



Moving beyond the dimension-level may reveal further information about whether jobs occupied by women are bundled differently to jobs held by men. Figure 6.2.1.2 sets out a series of radar plots diagrammatically illustrating average scores for each of the six dimensions plus the respective sub-dimensions, for both women and men. Visual inspection shows the most obvious sex difference in scores for pay, health and safety; and voice and collective interest representation.

With **pay** (D1), **men** have a higher average score for **objective pay** (D1A) (M: 71.85, SD: 28.75;) than **women** (M: 63.56, SD: 29.26). An independent-samples t-test revealed that the mean difference is 8.29 (at the p=.000 level, two-tailed; CI: 8.25 to 8.33). However, there is a small difference (yet statistically significant) in mean scores for **subjective pay** (D1B) between **men**

(M: 61.27; SD: 25.31) and **women** (M: 60.22; SD: 28.09). An independent-samples t-test revealed that the mean difference is just 1.05 (at the p=.000 level; two-tailed; CI: 1.02 to 1.08). On this, other research has found that women tend to have higher satisfaction levels than men (Clark, 1997). Furthermore, most people have been found to be satisfied with their current working arrangement, regardless of how objectively 'good' or 'bad' their working arrangements actually are (see Fagan, 2001).

For **quality of employment** (D2), men have a slightly lower average score for **contractual stability** (D2A) where the mean for **men** is 75.21 (SD: 19.62) and is 77.63 for **women** (SD: 19.18). An independent-samples t-test revealed that the mean difference is -2.42 (at the p=.000 level, two-tailed; CI: -2.44 to -2.39). The same goes for **development opportunities** (D2B) where the mean for **men** is 42.40 (SD: 15.26) is slightly lower than it is for **women** it is 44.23 (SD: 16.97). An independent-samples t-test revealed that the mean difference is -1.82 (at the p=.000 level, two-tailed; CI: -1.84 to -1.80). While statistically significant, these findings are inconsistent with previous research, where casualisation is higher among women, and they are typically afforded less training and other development opportunities than men (Markey, 2018). As these findings are contrary to expectation, it is necessary to check for explanations to explain this apparent anomaly. See the break-out analysis on contractual stability in text box 6.2.1.1, below.

For **intrinsic characteristics of work** (D3), the radar chart (see Figure 6.2.1.2, below) clearly shows that the pattern of average scores for women is lower than for men, and that it is low scoring for women in terms of **quality of autonomy** (D3B) that contributes to the quality deficit for this dimension, as there is little difference in scores for **skill** (D3A). To this end, the average score for **skill** (D3A) for **men** is 54.35 (SD: 26.20) and for **women** it is 53.15 (SD: 27.59). An independent-samples t-test revealed that the mean difference is small, at 1.21 (at the p=.000 level; two-tailed; CI: 1.17 to 1.24). Whereas the average score for **quality of autonomy** (D3B) for **men** is 49.69 (SD: 23.96) and for **women** it is 45.13 (SD: 24.34). An independent-samples t-test revealed that the mean difference is 4.56 (at the p=.000 level, two-tailed; CI: 4.55 to 4.60).

For the dimension of **work-life balance** (D4), **women** have slightly better **working time quality** (D4A) than **men**, where the mean for men is 59.48 (SD: 16.59) while for **women** it is 62.63 (SD: 16.31). An independent-samples t-test revealed that the mean difference is -3.15 (at the p=.000 level, two-tailed; CI: -3.17 to -3.13). Future analysis will need to drill down to see if there are any important sex differences for the three aspects of working time arrangements: duration (D4AA), scheduling (D4AB) and flexibility (D4AC). However, both **women** and **men** have poor **quality of work intensity** (D4B), where the average score for **men** is 42.75 (SD:

21.44) and for **women** it is 41.38 (SD: 23.13). An independent-samples t-test revealed that the mean difference is 1.36 (at the p=.000 level, two-tailed; CI: 1.34 to 1.39).

While scores for **health and safety** (D5) are generally very high, men score lower than women for all three sub-dimensions of physical risk (D5A), psychosocial risk (D5B) and risk of serious work-related accident or injury (D5C). For **physical risk** (D5A), the mean score for **men** is 77.16 (SD: 20.08) while for **women** it is 80.14 (SD: 16.96). An independent samples t-test revealed that the mean difference is -2.99 (at the p=.000 level, two-tailed; CI: -3.01 to -2.96). For **psychosocial risk** (D5B), the mean score for **men** is 68.33 (SD: 23.48) and for **women** it is 69.23 (SD: 24.93). An independent-samples t-test revealed that the mean difference is -0.90 (at the p=.000 level, two-tailed; CI: -.93 to -.87).

It is for the last sub-dimension of **risk of serious work-related accident or injury** (D5C) where men score considerably lower than women, where for **men** the mean is 68.49 (SD: 21.75) and for **women** it is 76.91 (SD: 16.65). An independent-samples t-test revealed that the mean difference is relatively large, at -8.41 (at the p=.000 level, two-tailed; CI: -8.44 to -8.39). This is because men are more likely to work in occupations and industries with relatively high rates of industrial accidents.

Scores for **voice and representation** (D6) are generally very low but men have higher quality of **voice** (D6A) while women have slightly higher **collective interest representation** (D6B). In both sub-dimensions, however, the standard deviations are high, demonstrating the large range for scores for these two sub-dimensions of the AJQI. For **voice** (D6A), for **men** the mean is 53.16 (SD: 27.12) and for **women** it is 48.42 (SD: 27.86). An independent-samples t-test revealed that the mean difference is 4.74 (at the p=.000 level, two-tailed; CI: 4.71 to 4.78). For **collective interest representation** (D6B), the mean score for **men** is 30.03 (SD: 37.35) and slightly higher for **women** at 31.46 (SD: 37.43). An independent-samples t-test revealed that the mean difference is -1.43 (at the p=.000 level, two-tailed; CI: -1.48 to -1.38).

Figure 6.2.1.2: Radar charts showing quality by dimension by sex, mean

Text box 6.2.1.1: Contractual stability scores in the AJQI

Scores in the AJQI for quality of employment are slightly higher for women than men. This seems contrary to other evidence, where you may expect men to have better quality of employment than women.

Section 4.8.2 in Chapter Four sets out details about the composition of indicators found in the dimension of quality of employment. Relevantly, the two indicators used to construct the objective component of the sub-dimension of contractual stability are based on *minimum* standards: entitlement to paid holiday and paid sick leave and access to unfair dismissal protection.

Entitlement to paid sick and annual leave is based on contractual status, so casuals, by definition, are defined as those employees who are not entitled to paid holiday or paid sick leave. Casuals may, however, be entitled to paid parental leave, but this indicator was not included in the AJQI as it was not possible to accurately determine eligibility, because information about continuity of service was not available.

In addition to tenure with current employer, employer size is used to determine whether an employee qualifies for unfair dismissal protection. So for employees in workplace with 15 or more employees, the qualifying period for unfair dismissal is 6 months. In workplaces with less than 15 employees, the qualifying period is 12 months. A check of the AJQI sample reveals men are more likely than women to be employed in workplaces with fewer than 20 employees (55.1 versus 44.9%).

A high income threshold is also set where employees earning over the threshold are not entitled to make an unfair dismissal claim (the threshold was AUD$133,000 per annum at the time of the HILDA wave 14 survey). While 76,948 women earned at or above the threshold (13.41%), the much higher number of 496,960 men did so (86.59%).

Taken all together, the combination of differences in where women and men work, tenure patterns, as well as the fact that more men are high wage earners, explain why scores for contractual stability are higher for women.

This example demonstrates how just focussing on pay does not provide a full picture of the interactions between the different aspects of job quality. Men score higher for pay quality, but lower for quality of employment. However, it is important to keep in mind that being entitled to paid leave and qualifying for unfair dismissal are not the same thing as taking paid leave or successfully challenging an unfair dismissal.

Consistent with the notion of human capital accumulation, **age** is cited in the literature as one additional explanatory factor for differences in job quality (see for example, Charlesworth et al., 2014; Callus & Considine, 2001). For instance, Charlesworth and her colleagues (2014) found prime-age workers were more likely to be found in better quality jobs than either younger or older workers. The results from the AJQI are consistent with this earlier Australian research, where **overall job quality tends to improve in line with age, that is, up until quality drops off for job-holders aged 65 or older**. The lowest average score for job quality is found in the group **aged 15 to 19**, where the mean is 36.60 (SD: 17.82). The mean for the group **aged 20 to 24** is 44.92 (SD: 16.62), for those in the group **aged 25 to 34** the mean is 44.92 (SD: 14.99); and the mean for the group **aged 35 to 44** is 56.07 (SD: 14.99). Similar to the next youngest age group, the mean score for the group

aged 45 to 54 is 56.02 (SD: 15.89). The mean score the group **aged 55 to 64** is highest, at 57.62 (SD: 14.55) while job quality falls off for the group **aged 65 years or older**, where the mean score is 54.62 (SD: 20.41). Relevantly, results from a one-way analysis of variance (ANOVA) to explore the impact of age group and sex on job quality revealed a statistically significant difference in mean scores for job quality for the seven ABS age group categories (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at the p=.05 level). The largest mean difference in scores is between the group aged 15 to 19 and the group aged 55 to 64, at -21.02 (CI: -21.09 to -20.96).

Results from a one-way ANOVA to explore the relationship between age group and job quality **for women** show a statistically significant difference between mean scores for the seven age groups of women (significant at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons (all at the p=.05 level). The largest mean difference in scores is between the **group of women aged 15 to 19 and the group of women aged 65 or older** is -21.15 (CI: -21.31 to -20.99). These findings may point to the impact of women taking time out of the workforce to care for children. This will be explored in further detail later in this section.

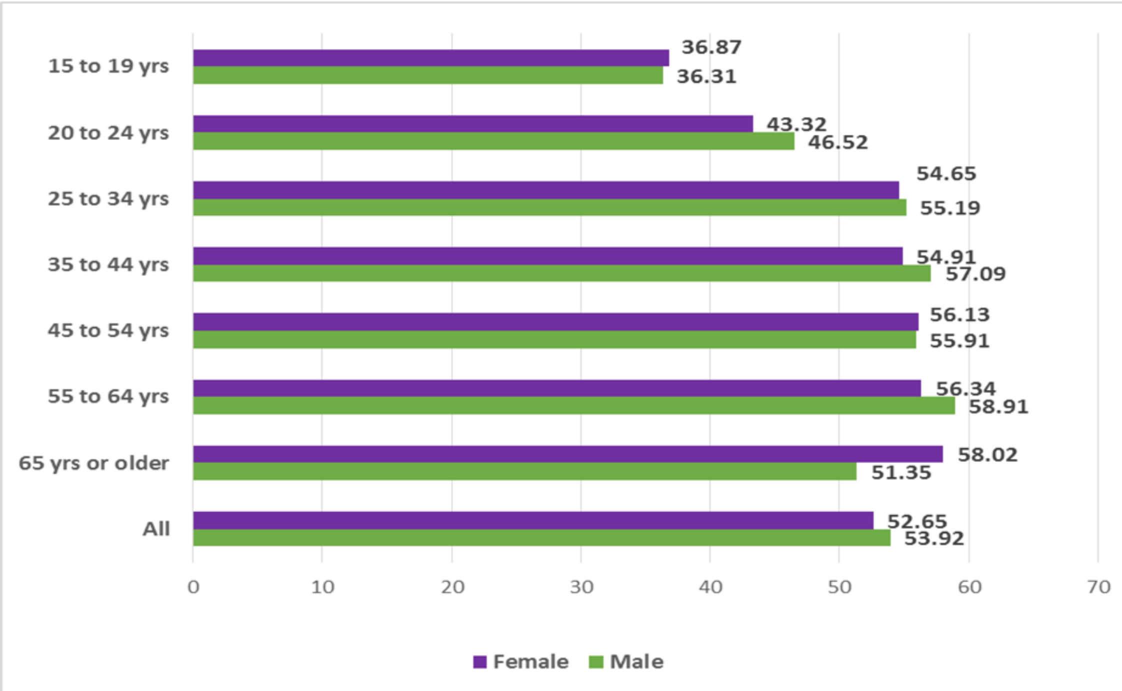
And results from a one-way ANOVA to explore the relationship between age group and job quality **for men** show a statistically significant difference between mean scores for the seven age groups of men (significant at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for job quality for all comparisons(all at the p=.05 level). The largest mean difference in scores is between the **group of men aged 15 to 19 and the group of men aged 55 to 64** is -22.29 (CI: -22.69 to -22.50).

For the group of employees **aged 15 to 19**, there is little difference in average job quality between men and women, where the average for **men** in this age group is 36.32 (SD: 17.98) while for **women** it is 36.87 (SD: 17.67). However, for the group **aged 20 to 24**, the mean for **men** is 46.52 (SD: 16.18) and for **women** it is 43.32 (SD: 16.92), while for the group **aged 25 to 34**, the mean score for job quality for **men** is 55.19 (SD: 14.22) and for **women** it is 54.65 (SD: 15.79). For the group **aged 35 to 44**, the mean for **men** is 57.09 (SD: 13.74) and for **women** the average score for job quality is 54.91 (SD: 16.21) and for the group **aged 55 to 64,** job quality is, on average, lower for women, where the mean for **men is** 58.91 (SD: 13.71) and for **women** it is 56.34 (SD: 15.23).

For those **aged 45 to 54 years**, the difference between women and men is only 0.2 points, where the mean for **men** is 55.91 (SD: 15.84) and for **women** it is 56.13 (SD: 15.94), while for those **65 years or older**, job quality is, on average, higher for women, where the mean for **men** is 51.35 (SD: 22.14) and for **women** it is 58.02 (SD: 17.82).

Also interesting, as shown in Figure 6.2.1.3 above, job quality is higher for women in the age group of 65 years or older than for all younger groups of women. The reverse is the case for men, where job quality for men aged 65 or older is much lower than for the next younger category of men aged 55 to 64 years (see Figure 6.2.1.3, below) Reasons for why this might be so are explored below.

Figure 6.2.1.3: Job quality by age group and sex, mean



A series of two-way ANOVA tests were run to explore whether sex moderates the relationship between age group and each of the six respective dimensions of job quality. For three respective tests for **pay** (D1), **quality of employment** (D2), and **quality of work-life balance** (D4), there is a statistically significant difference in the respective mean scores for the seven age groups (at the p=.000 level). A statistically significant interaction effect between sex and age group was found, as well as a statistically significant main effect for age group and sex (all at the p=.05 level). So mean scores for men and women differ significantly for pay, quality of employment and quality of work-life balance, as well as there being a difference in mean scores for these three dimensions for each age group comparison.

Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant mean scores for pay, quality of employment, and work-life balance for all age group comparisons (all at the p=.05 level). **For pay**, the largest mean difference is between **job-holders aged 15 to 19 and job-holders aged 34 to 44**, at -28.99 (CI: -29.07 to -28.90). **For quality of employment**, the largest mean difference is between **job-holders aged 15 to 19 and job-holders aged 55 to 64**, at -15.54 (CI: 1=-15.61 to -15.47). **For quality of work-life balance**, the largest mean difference is between **job-holders aged 45 to 54 and job-holders aged 65 or older**, at -10.59 (CI: -10.68 to -10.49).

Results from the two-way ANOVA for the dimension for **intrinsic characteristics of work** (D3) revealed a statistically significant difference in mean scores for the seven age groups (at the p=.000 level). The post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for intrinsic characteristics of work for all age group comparisons (all at the p=.05 level), except for the comparison between the groups aged 35 to 44 years and 65 years or older, where the mean difference was not statistically significant. The largest mean difference is between **job-holders aged 15 to 19** and **job-holders aged 25 to 34**, at -23.92 (CI: -24.00 to -23.84).

While results from the two-way ANOVA for the **quality of health and safety** (D5) revealed a statistically significant difference in mean scores among the average scores for the seven age groups (at the p=.000 level). The post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in scores for quality of health and safety for all age group comparisons(all at p=.05 level), except for the comparison between the groups aged 35 to 44 years and 55 to 54 years, where the difference was not statistically significant. The largest mean difference is between **job-holders aged 15 to 19 and job-holders aged 45 to 54**, at 3.99 (CI: 3.94 to 4.05).

Results from a two-way ANOVA, to explore whether sex moderates the relationship between age group and **quality of voice and collective interest representation** (D6) revealed a statistically significant difference in average scores for the seven age groups (at the p=.000 level). The post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in scores for quality of voice and collective interest representation for all age group comparisons (all at p=.05 level), except for the comparison between the groups of employees aged 35 to 44 years and 65 years or older, where the difference was not statistically significant. The largest mean difference is between **job-holders aged 15 to 19 and job-holders aged 55 to 64**, at -24.42 (CI: -24.52 to -24.33). Possible interplay between job quality and institutional arrangements is explored further in chapter seven.

The above findings raise concerns in relation to both ends of the age spectrum. Although there may be many other factors at play, lower job quality both among young and older workers may be linked to age discrimination.

The figures for older workers suggest that the age of retirement may have come into play. An ageing workforce has important implications for the quality of jobs. In Australia, as in many other countries, there is concern about the fiscal implications of an ageing population. On this topic, Weller (2007) observes that while policies have been introduced to incentivise older workers to remain in the labour force,[26] many mature workers are disadvantaged in the Australian labour market. Factors including involuntary redundancy, ill-health or caring responsibilities see many exit the labour force before the nominal retirement age of 65 years[27], with redundancy identified as one of the main reasons for exit (Weller, 2007).

While there is no compulsory age for retirement in Australia, as the age for eligibility to the pension is progressively being increased, and the means testing for eligibility is tightened, many older workers are likely to have to continue working past age 65 in the future.

Also of concern is the poor quality of work-life balance for prime-aged job-holders. This finding is consistent with AWALI findings, where the best work-life relationship was reported by those in the youngest and oldest age groups (Pocock, Skinner & Lichi, 2009).

Turning to **educational qualifications**, previous studies have found education level to be an important factor in explaining differences in job quality. For instance, results from the VicWAL revealed differences in the quality of jobs according to education level, where those with higher educational qualifications were more likely to be found in better quality jobs (Charlesworth et al., 2014). The results from the AJQI generally support this finding, where the average score for job quality is highest among the group of job-holders with **graduate diplomas/graduate certificates** (M: 62.29; SD: 11.47); followed by job-holders with **post-graduate degrees** (M: 61.16; SD: 13.06); **bachelors or honours degrees** (M: 58.95; SD: 15.21); **advanced diplomas/diplomas** (M: 54.87; SD: 15.26); **certificate III/IV** (M: 52.35; SD:15.67); **schooling to Year 12** (M: 49.28; SD: 16.28); with job quality lowest, on average, among the group with **schooling to Year 11 or below** (M: 45.07; SD: 18.53) (see Figure 6.2.1.5, below).

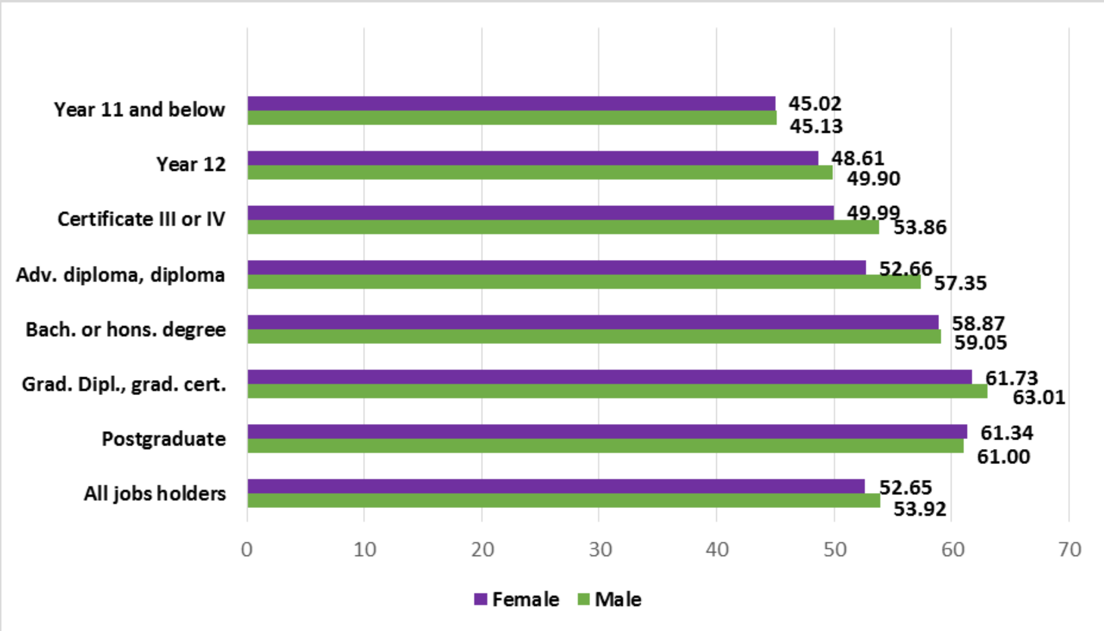
A two-way between-groups analysis of variance was conducted to explore the impact of **highest education level and age on job quality**. There is a small but significant interaction effect between highest education level and age (p=.000; partial eta squared = .006). There is a statistically significant effect for highest education level (p=.000; partial eta squared = .016) and a statistically significant effect for age group (p=.000; partial eta squared = .013). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for job quality was significantly different for all comparisons (all at the p=.05 level). The largest difference in means is for the **group with graduate diplomas or graduate certificates and the group with**

[26] For example, the Work Bonus provides an incentive for pensioners over the age pension age to participate in the workforce (see https://www.dss.gov.au/seniors/benefits-payments/age-pension).
[27] There is no longer a compulsory retirement age in Australia, with eligibility for the Age Pension currently at 65.5 for both women and men, and where it will be gradually increased to 67 by 2023 (see https://www.humanservices.gov.au/individuals/services/centrelink/age-pension/eligibility-payment-rates/age-rules).

schooling to Year 11 or below, at 17.23 (CI: 17.16 to 17.29). The second largest difference in means is for the group with post-graduate qualifications and the group with schooling to Year 11 or below, at 16.09 (CI: 16.03 to 16.15).

The fact that job quality is higher for those with graduate diplomas/graduate certificates than it is for those with a master's degrees/doctorates might, in part, be explained by differences in the age and/or occupational experience of these two groups. Relevantly, on average, job-holders with master's degrees or doctorates are younger than job-holders who have graduate diplomas/graduate certificates (40.38 yrs & 44.17 yrs). They also have fewer years of occupational experience (8.11 yrs & 11.93 yrs).

Figure 6.2.1.4: Job quality by highest educational qualification by sex, mean



Job quality is lower for women with the same level of qualification as men, except among those with post-graduate qualifications, where job quality is slightly higher for women (see Figure 6.2.1.5 above). Crucially, it is for **vocational education and training (VET) qualifications** where the largest disparity in job quality between women and men is evident. For instance, among job-holders with **certificate III or IV qualifications**, the average score for job quality is higher for **men** (M: 53.86; SD: 14.81) than it is for **women** (M: 49.99; SD: 16.66).

Similarly, among those with either an **advanced diploma or diploma**, average job quality among **women** (M: 52.66; SD: 15.78) is lower than it is for **men** (M: 57.35; SD: 14.24). Relevantly, VET courses are highly segregated in Australia, where female students tend to study higher level qualifications, for instance data from 2015 show that around one-quarter of all females undertaking training were enrolled in a diploma or higher qualification compared with only 12.9 percent of males. Furthermore, there is a gender divide in course choice, where females tend to enrol in management and commerce-related course, while males tend to enrol in engineering and related technologies. Females are also much less likely than males to undertake apprenticeships or traineeships in the technician and trade occupations; and when females do complete a trade apprenticeship, they are almost wholly concentrated in the lower-paid trades of hairdressing and food (NCVER, 2017).

Radar charts for **job quality by highest educational qualification** are depicted in Figure 6.2.1.6, below. Job-holders with Year 12 or below schooling have been combined into one group; those with VET qualifications (i.e. certificate III, certificate IV; advanced diplomas and diplomas) have been combined into a second group, while those with degree-level or higher qualifications have been combined into a third category.

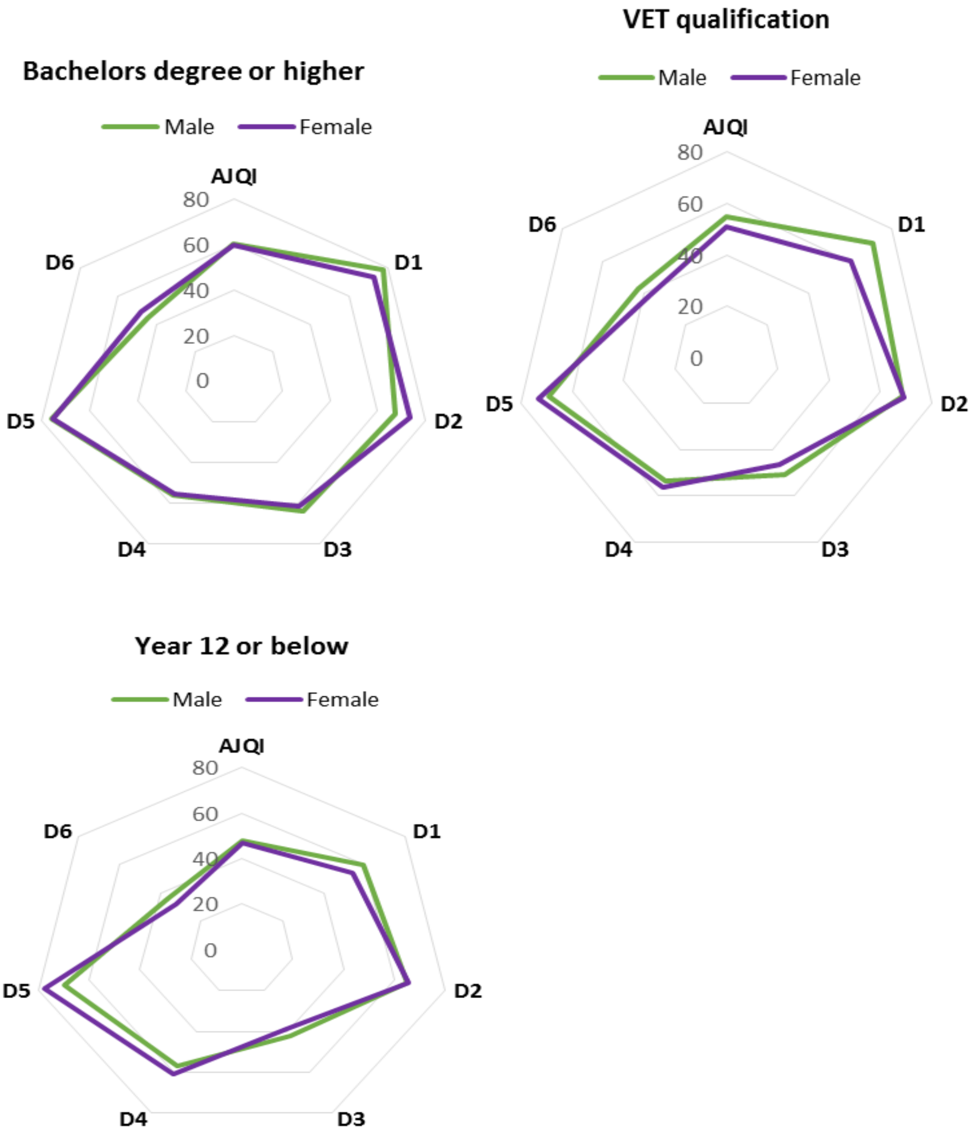
For the **group with Year 12 or below education**, women have worse quality of pay (men: M: 59.45; SD: 25.80; women: M: 54.36; SD: 24.75); quality of instrinic characteristics of work (men: M: 42.09; SD: 19.88; women: M: 38.72; SD: 19.35); and quality of voice and representation (men: 36.22; SD: 22.43; women: M: 32.34; SD: 21.01), but better quality of work-life balance (men: M: 56.72; SD: 14.66; women: M: 60.66; SD: 14.10), and health and safety (men: M: 69.88; SD: 13.30; women: M: 77.33; SD: 11.81). There is little difference between men and women with Year 12 or below education in terms of quality of employment (men: M: 65.03; SD: 16.24; women: M: 65.33; SD: 15.99).

For the **group with VET qualifications**, for a number of dimensions, the difference in quality between men and women is quite stark. For instance, quality of pay is more than 11 points lower for women compared to men in this group (men: M: 71.34; SD: 21.30; women: M: 60.16; SD: 21.95). Quality of intrinsic characteristics of work is around 4.5 points lower for women (men: M: 50.98; SD: 19.35; women: M: 46.53; SD: 18.96). In reverse, quality of work-life balance (men: M: 53.70; SD: 14.26; women: M: 56.08; SD: 14.67) and quality of health and safety are better for women (men: M: 69.11; SD: 13.93; women: M: 73.35; SD: 13.24). These differences are more likely due to people with trade qualifications (certificate III and certificate IV) working in different kinds of occupations, as well as in different industries. The role of occupation and industry is explored in chapter seven.

For the **group with degree or higher qualifications**, it is a mixed picture across the six dimensions. **Quality of pay** is worse for women (men: M: 77.95; SD: 18.53; women: M: 73.14; SD: 19.54); **quality of employment** is better for women (men: M: 67.43; SD: 16.07; women: M: 73.23; SD: 14.64); **quality of intrinsic characteristics of work** is worse for women (men: M: 64.32; SD: 19.12; women: M: 61.67; SD: 17.93); **quality of work-life balance** is similar for men and women (men: M: 56.14; SD: 13.17; women: M: 55.46; SD: 14.79); **quality of health and safety** is also similar for men and women (men: M: 75.80; SD: 12.42; women: M: 75.44; SD:

12.73); and **quality of voice and collective interest representation** is better for women (men: M: 44.41; SD: 21.64; women: M: 48.40; SD: 23.25).

Figure 6.2.1.5: Radar charts showing job quality and its six dimensions by highest educational qualification by sex, mean



One would expect to find job quality improve in line with time in the workforce, where internal and external career ladders should mean that workers move from lower to higher quality jobs as they acquire more skills and experience. In the next part of this section, job quality is examined according to tenure with current employer.

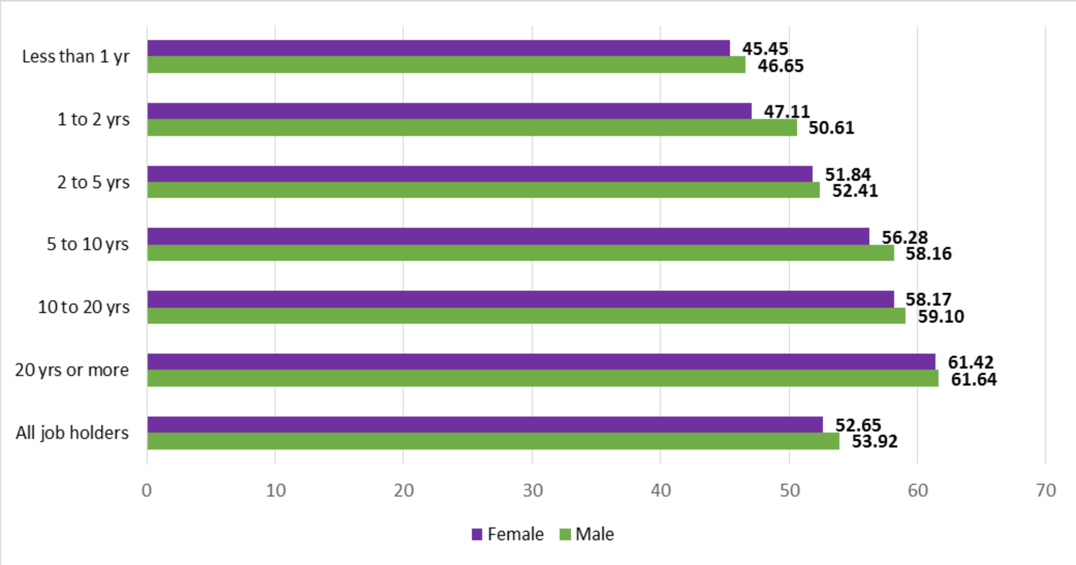
6.2.2. Tenure

It is reasonable to expect that as workers acquire additional work experience, they will tend to progress into better quality jobs; and when they find a good quality job, they may be more inclined to stay in it. When job quality is examined according to six groups of **tenure with current employer**, it can be seen that job quality increases in line with how long a job-holder has been employed with their current employer. The average score for the group with tenure of **20 years or longer** in their current job is 61.54 (SD: 13.26) compared to 46.08 (SD: 17.79) for the group with **less than one year**. Results from a one-way analysis of variance, ANOVA, to explore the **impact of tenure with current employer on job quality** revealed a statistically significant difference among the average scores for job quality for the six tenure groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in scores for job quality for all comparisons (all at p=.05 level). The largest mean difference is between the group with tenure with less than 1 year and the group with tenure 20 years or longer, at -15.46 (CI: -15.40 to -15.52).

From Figure 6.2.2.1, below, it can be seen **for all tenure groupings, job quality is higher, on average, for men than women**, with the largest gaps in favour of men are for the group one to two years, and five to 10 years of tenure with their current employer. For the **group with one to two years tenure with their current employer**, the mean score for job quality for men is 50.61 (SD: 17.13) and for women the mean is 47.11 (SD: 17.93). For the **group with five to 10 years tenure with their current employer**, the mean score for job quality for men is 58.16 (SD: 13.41) and for women the mean is 56.28 (SD: 14.89).

A two-way between-groups analysis of variance was conducted to explore the impact of **tenure with current employer and sex on job quality**. There is a small but significant interaction effect between tenure and sex (p=.000; partial eta squared = .001). There is a statistically significant effect for tenure (p=.000; partial eta squared = .093) and a statistically significant effect for sex (p=.000; partial eta squared = .002). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for job quality was significantly different for all comparisons (all at the p=.05 level). The largest difference in means is for the **group with tenure of less than one year and the group with tenure of 20 years or more,** at -15.46 (CI: -15.52 to -15.40).

Figure 6.2.2.1: Job quality by tenure in current job by sex, mean



As foreshadowed in the introduction to this chapter, many women experience interruptions to their work experience, so it is helpful to look at the average age of women and men for each tenure group. Interestingly, the average age of women is slightly younger than it is for men in the tenure groups of less than one year (31.41 yrs for men; 30.62 yrs for women); one to two years (33.82 yrs for men; 32.88 yrs for women) and two to five years (men: 35.31 yrs; women: 35.25 yrs). However, the average age of women is slightly older than it is for men in the tenure groups of five to ten years (men: 40.84 yrs; women: 41.35 yrs); 10 to 20 years (men: 47.39 yrs; women: 48.03 yrs); and for those with tenure of 20 years or more (men: 53.03; women: 53.97 yrs). The age differences are not very large, so age on its own does not appear to fully explain any sex differences in job quality by tenure with current employer. Further investigation is necessary to unpack the impact of women taking time out from work to have children.

A series of one-way analysis of variance, ANOVA, tests were performed to explore the impact of **tenure with current employer on each of the dimensions of job quality** was performed.

For the dimension of **pay** (D1), there is a statistically significant difference among the average scores for the six tenure groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for pay for all comparisons (all at p=.05 level). The largest difference in means for quality of pay is for the **group with less than one year of tenure and the group with 20 years of tenure or more with their current employer**, at -18.41 (CI: -18.50 to -18.32). The mean for for the group with 20 years of tenure or more is 76.60 (SD:18.63) and for the group with less than one year of tenure it is 58.19 (SD: 25.70). Quality of pay is worse for women in all of the six tenure groups. The largest difference in mean scores for pay between sexes is for the group with 10 to 20 years of tenure, where the average for men is 76.48 (SD: 18.25) and for women it is 68.31 (SD: 20.24).

For **quality of employment** (D2) there is a statistically significant difference among the average scores for the six tenure groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for quality of employment for all comparisons (all at p=.05 level). The large difference in means is for the **group with less than one year of tenure and the group with 20 years of tenure or more with their current employer**, at -21.70 (CI: -21.75 to -21.64). Quality of employment (D2) is better for women in all of the six tenure groups. The largest difference in mean scores for quality of employment between sexes is for the group with 20 years or more in tenure, where the average for men is 72.62 (SD: 11.45) and for women it is 78.13 (SD: 10.67).

For **quality of intrinsic characteristics of work** (D3), there is a statistically significant difference among the average scores for the six tenure groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for intrinsic characteristics of work for all comparisons (all at p=.05 level). The largest difference in means is for the group with one to two years of tenure and the group with 20 years of tenure or more, at -10.68 (CI: -10.77 to -10.59). Quality of intrinsic characteristics of work is worse for women in five of the six tenure groups. For the group with tenure of 20 years or more, there is a neglible difference between scores for men (mean: 56.39; SD: 21.34) and women (mean: 56.49; SD: 19.04)The largest difference in mean scores for intrinsic characteristics of work between sexes is for the group with one to two years of tenure, where the average score for men is 49.55 (SD: 22.40) and for women it is 41.75 (SD: 21.63).

For **quality of work-life balance** (D4), there is a statistically significant difference among the average scores for the six tenure groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for quality of work-life balance for all comparisons (all at p=.05 level), except for the groups with tenure of less than one year and one to two years, where the means did not differ significantly. While small, the largest difference in means is for the group with less than one year of tenure and the group with 20 years or more tenure, at 4.28 (CI: 4.23 to 4.34). Quality of work-life balance is better for women in all of the six tenure groups. The largest difference in mean scores for quality of work-life balance between sexes is for the group with 10 to 20 years of tenure, where the average score for men is 54.45 (SD: 14.52) and for women it is 57.62 (SD: 14.35).

For **quality of health and safety** (D5), there is a statistically significant difference among the average scores for the six tenure groups (at the .000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for quality of health and safety for all comparisons (all at p=.05 level), with the exception of three comparisons where statistical significance was not achieved: tenure of less than one year and two to five years; tenure of less than one year and five to ten years; and tenure of two to five years and five to ten years. While quite small, the largest difference in means is for the group with less than one year of tenure and the group with 20 years or more tenure, at 1.22 (CI: 1.17 to 1.27). Quality of health and safety is better for women in all of the six tenure groups. The largest difference in mean scores between sexes is for the group with less than one year of tenure, where the average score for men is 70.77 (SD: 14.26) and for women it is 76.80 (SD: 12.40).

For **quality of voice and collective interest representation** (D6), there is a statistically significant difference among the average scores for the six tenure groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for quality of voice and collective interest representation for all comparisons (all at p=.05 level). The largest difference in means is for the group with less than one year of tenure and the group with 20 years or more tenure, at -25.35 (CI: -25.43 to -25.27). Quality of voice and collective interest representation is worse for women in all of the six tenure groups. The largest difference in mean scores between sexes is for the group with one to two years of tenure, where the average score for men is 38.04 (SD: 21.68) and for women it is 30.43 (SD: 20.57). Radar charts for job quality for the six groups of tenure with current employer are shown in Figure 6.2.2.2, above.

Further exploration about the interaction of tenure with current employer and occupational tenure is required to unpack how in-work experience is connected to job quality.

In addition to sex, age, highest educational qualification and tenure, other factors are also likely to shape job quality. In the next part of this chapter, results for job quality are examined according to a range of characteristics related to life course and family formation.

Figure 6.2.2.2: Radar charts showing job quality and its six dimensions by tenure with current employer by sex, mean

6.2.3. Life course and family formation

As many workers, particularly women, combine work with family responsibilities, it is likely to be of particular relevance to policy-makers whether job quality differs by household living arrangement. Issues connected to life course and family formation are explored below.

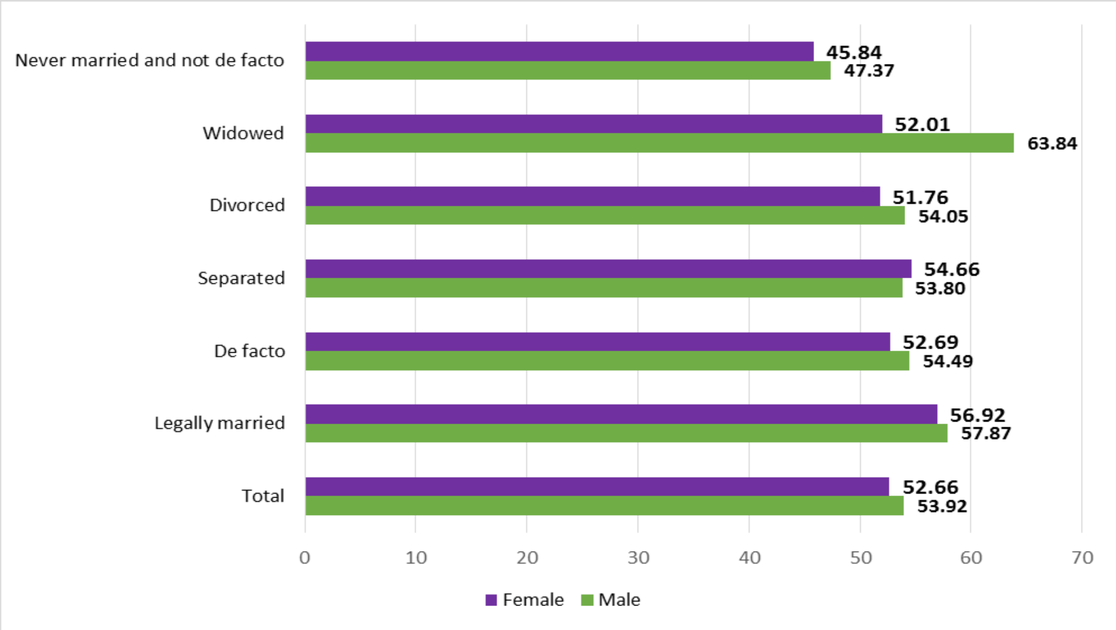
The first characteristic considered in this section is **marital status**, where job quality is best for the group of job-holders who are **legally married** (M: 57.42; SD: 14.39) and worst for those have **never been married and not in a de facto relationship** (M: 46.66; SD: 18.05). There is a statistically significant difference among the average scores for the six groups (i.e. legally married; de facto; separated; divorced; widowed; and never married and not in a de facto relationship) (at the p= .000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (all at p=.05 level). The mean difference between legally married job-holders and job-holders who have never married and who are not in a de facto relationship is 10.77 (CI: 10.73 to 10.80). Perhaps more interesting, the mean difference between legally married job-holders and those who are divorced is 4.90 (CI: 4.83 to 4.98).

For **women**, there is a statistically significant difference among the average scores for the six groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (all at p=.05 level). For women, job quality is best for **legally married women** (M: 56.92; SD: 15.18) and worst for the group who have **never been married and who are not in a de facto relationship** (M: 45.84; SD: 18.03).

For **men**, there is also a statistically significant difference among the average scores for the six groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (all at p=.05 level). For men, job quality is best for **widowers**[28] (M: 63.84; SD: 5.20) and worst for **job-holders who have never married and are not in a de facto relationship** (M: 47.37; SD: 18.03). Interestingly, job quality is noticeably better for widowers than it is for widows (men: M: 63.84; SD: 5.20; women: M: 52.01; SD: 16.82) (see Figure 6.2.3.1, below).

[28] The number of widowed in the sample is very small (1.07% of women and 0.33% of men) and so are the numbers of individuals who are separated (3.24% of women; and 1.66% of men are separated) or divorced (5.99% of women and 2.83% of men).

Figure 6.2.3.1: Job quality by marital status by sex, mean

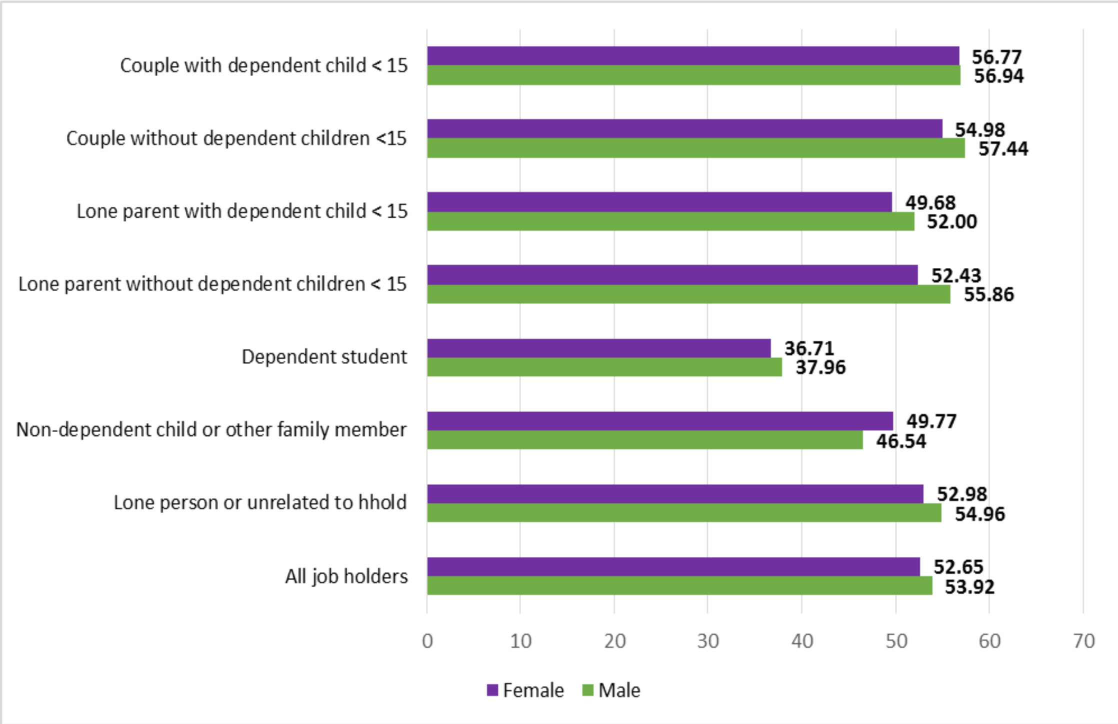


When we take a broad focus by considering **household living arrangements**, there is a statistically significant difference among the average scores for the seven groups of household relationship status (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (all at p=.05 level). Job quality is lowest among **dependent students** (M: 37.27; SD: 18.46), where many students in Australia work in casual jobs with part-time hours; often in the retail and hospitality sector (see Figure 6.2.3.2, below).

From a gender perspective, the fact that **job quality is higher for coupled individuals than for lone-parents is pertinent**. For instance, the mean score for job quality for **female lone-parents with dependent children** (M: 49.68; SD: 17.30) is more than seven points lower than for **coupled females with dependent children** (M: 56.77; SD: 15.62).[29] An independent samples t-test revealed that the mean difference is 7.09 (p=.000 two-tailed; CI: 7.01 to 7.16). Related, for single mothers, the 'motherhood penalty' has been found to contribute to the gap in poverty rates between households headed by a single women and those containing an adult male (McLanahan & Kelly, 1999 cited in Budig & England, 2001).

[29] It should be noted that lone-parents account for a very small share of male job-holders (0.69% of all male job-holders for male lone-parents with dependent children and a further 0.89 percent for those without dependent children), so results for these two groups should be treated with some caution. In contrast, female lone-parents with dependent children account for 4.64 percent of female job-holders and female lone-parents without dependent children account for an additional 4.25 percent.

Figure 6.2.3.2: Job quality by household type by sex, mean



Below is a series of radar charts depicting average scores for job quality and its six dimensions for four different **household living arrangements: couple with/without dependent children and lone parent with/without dependent children by sex**. The categories of dependent student, non-dependent child or other family member and lone person or unrelated to household have been excluded from this particular analysis. (Figure 6.2.3.3, below).

A series of one-way analysis of variance, ANOVA, tests were performed to explore the impact of **sex by household living arrangement on each of the dimensions of job quality.** There is a statistically significant difference among the average scores for all groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (all at p=.05 level) with the exception of 6 group comparisons[30] where the mean differences for these group comparisons were not statistically significant.

Those two dimensions with the largest variations in mean differences between groups are **pay** (D1) and **voice and collective interest representation** (D6). For **pay** (D1), the mean for female lone parents with dependent children under 15 is lowest, at 66.01 (SD: 21.74) and highest for

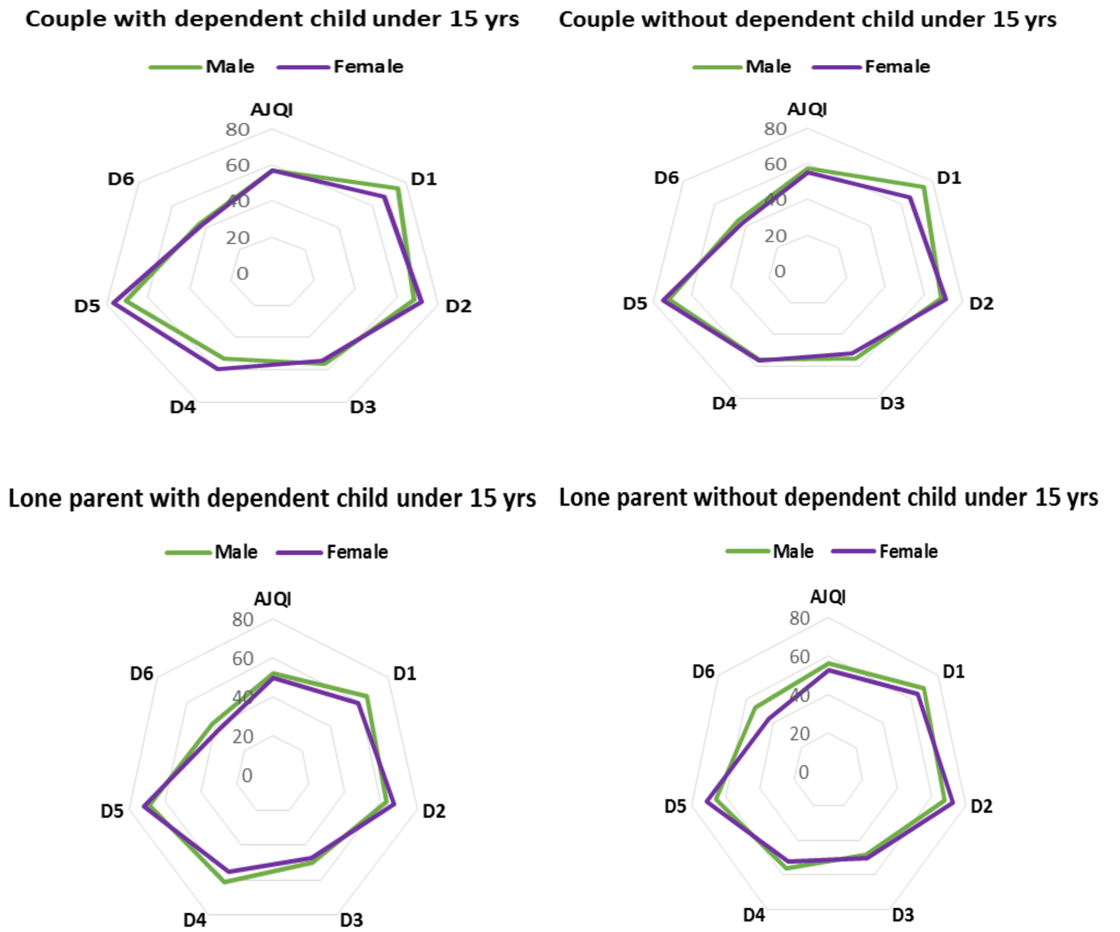
[30] Quality of Pay: male lone parents with dependent children under 15 and female lone parents with no dependent children; Quality of employment: female lone parents with dependent children under 15 and male lone parents with no dependent children under 15; Quality of intrinsic characteristics of work: female lone parents with no dependent children under 15 and male lone parents with dependent children under 15; coupled females with no dependent children under 15 and male lone parents with no dependent children under 15; coupled males with dependent children under 15 and coupled males with no dependent children under 15; Quality of voice and collective interest representation: coupled females with no dependent childrenand male lone parents with dependent children.

coupled males with dependent children under 15, at 75.43 (SD: 19.96), where the mean difference for the two groups is -16.20 (CI: -16.34 to -16.06). The mean difference between female lone parents with dependent children under 15 and coupled females with dependent children under 15 is -8.32 (CI: -8.46 to -8.17). The mean difference between coupled females and coupled males with dependent kids is -7.89 (CI: 7.81 to 7.96).

For **quality of voice and collective interest representation** (D6), the mean for female lone parents with dependent children under 15 is lowest, at 37.36 (SD: 21.75) and highest for male lone parents with no dependent children under 15, at 53.11 (SD: 20.68), where the mean difference for the two groups is -15.74 (CI: -16.09 to -15.39). Also of interest, are the results for the dimension of **quality of work-life balance** (D4), where the mean for coupled males with dependent children under 15 is lowest, at 52.77 (SD: 13.54) and highest for coupled females with dependent children under 15, at 59.14 (SD: 14.75), where the mean difference for the two groups is -6.37 (CI: -6.42 to -6.32).

As outlined in chapter two, not only are women paid less than men, women with children have been found to earn less than women without children, even after controlling for factors such as experience and qualifications. This phenomenon is known as the 'motherhood penalty'. Extensive research has been undertaken on this topic, however, Budig and England (2001) contend the causes of the motherhood penalty are not well understood. Two of the five possible explanations put forward by Budig and England (2001) for the association between motherhood and lower wages are considered, in this instance, for job quality rather than wages alone. First, many women spend time at home caring for children, interrupting their work experience. Second, women with lower educational qualifications are more likely to have children early because they know their career prospects are not good. There are also suggestions that because women are largely responsible for household and caring tasks, their career trajectories are also related to their family situations, including changes occasioned by the birth of a child. For instance, research shows that motherhood hinders moves to jobs with higher occupational status and prompts shifts to jobs with fewer advancement prospects (Dex, Ward & Joshi, 2008). Both the number and age of children have been found important in explaining differences in the gap between the wages of mothers compared to women without children (Hook & Pettit, 2016).

Figure 6.2.3.3: Radar charts showing job quality and its six dimensions by household living arrangements by sex, mean



As outlined in chapter two, there is little empirical evidence to support the argument that occupations chosen by mothers are more compatible with parenthood, nor that firms offering more mother-friendly policies pay less. Furthermore, research has found little difference between the job characteristics of mothers and non-mothers (Yu & Kua, 2017). Despite the lack of evidence, these arguments prevail in some quarters.

Based on case study research, and in response to critiques of Hakim's theory of lifestyle preferences (1991, 2002, 2006), where she argues that women make free choices about the relative importance they place on either paid work or the home, James (2008) suggests that there are important class-based differences in women's attitudes and that apparently similar work orientations may have very different causes and labour market consequences. That is, women do not *prefer* to work in lower status, poorer paid jobs, they are *forced* to do because of their circumstances, i.e. constrained choice.

The idea that (either voluntarily or involuntarily) women 'shift' (down) to jobs that are more 'family-friendly' when they have children is briefly explored next. Arguably, rather than only focussing on wages, consideration of the multi-dimensional construct of job quality may shed additional light on the 'bundling' of jobs between women with and without children. So for the next part, the sample is restricted to women who are not studying full-time.

A preliminary exploration of job quality and its six dimensions for **female employees based on the age of their youngest children** reveals interesting results. Results from a one-way analysis of variance, ANOVA, indicate a statistically significant difference among the average scores for job quality for six groups (i.e. five groups of women classified according to age of youngest child and the group of women without (resident) children) (at the p= .000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (all at p=.05 level), except for two group comparisons[31], where where the mean differences were not statistically significant. Job quality is lowest for the group of **females without children** (M: 53.42: SD: 16.05). Again, this is likely due to this group being, on average, younger than the groups with children. For those females with children, job quality is lowest for the group of women whose **youngest children are aged 15 to 17** (M: 54.76; SD: 16.60). Next lowest is the group of women whose youngest children are aged 5 to 12, i.e. primary-school aged (M:54.86; SD: 15.81). However, mean differences are relatively small for all group comparisons, where the largest mean difference is between the group of women without children and the group of women whose youngest children are aged under 5, at -3.96 (CI: -4.03 to -3.89).

Leaving aside females without children, the mean score for pay is highest for the group of women whose youngest children are aged under 5 (mean: 69.72; SD: 21.08) and lowest for the group of women whose youngest children are aged 5 to 12 (mean: 64.14; SD: 22.63), where the mean difference is 5.58 (CI: 5.46 to 5.70). The same pattern where the mean score is highest for women whose children are aged under 5 holds for all of the dimensions except quality of voice and collective interest representation, where females whose youngest children are aged 18 or older have the highest score (M: 45.37; SD: 24.05). This is likely related to the fact that older women are more likely to be trade union members. Also, there is little difference in scores for the other groups, and as a consequence, a number of the mean differences by group do not reach statistical significance.

England (2010) contends that women from lower socio-economic groups and/or who are low-paid are more likely to exit the labour force to raise their children, while women from higher socio-economic groups and/or who are higher-paid are more likely to remain working. This is because the potential earnings of less-educated women may be so low that they cannot afford the cost of child care. In contrast, well-educated women will have more economic incentive for

[31] Comparisons groups where the youngest child is aged 5 to 12 and the youngest child is 15 to 17; and groups where the youngest child is aged 12 to 14 and the youngest child is aged 15 to 17.

employment because they can earn more (England, 2010: 151). Citing findings based on data from 16 affluent countries, in all countries, it was found that women with more education were more likely to be employed, but women whose male partners were at middle income levels were more likely to be employed than those women whose partners have very low or no earnings (England, 2010: 153). On this basis, it may be that job quality in the AJQI is higher among mothers with very young children because this group is over-represented by well-educated women. Or put another way, less educated women may be more likely to exit the workforce to care for their children.

While this topic would be better explored through multi-variate and longitudinal analyses, and the results should be treated with caution, the simple cross-sectional analysis reported above does not lend initial support to the idea what women shift to more 'family-friendly' jobs after having children. While women may 'shift down' to jobs with lower occupational status (or more likely to reduced hours, and hence reduced pay), there is no guarantee that such jobs will necessarily be more 'family-friendly' (Budig & England, 2001).

While many Australian mothers take maternity leave and some extend their absence from the workforce for a number of years to care for their children in their early years, for those who do combine work with parent responsibilities, child care centres often provide longer hours of care than schools. Relevantly, previous research has found that the majority of Australian women with children under one year old work part-time hours, with employment rates rising in line with the age of the youngest child (Pocock, 2003 cited in van Gellecum , Baxter & Western, 2008; Baird & Charlesworth, 2007). Furthermore, in 2005 *Family Provisions Test Case* (2005), the Australian Industrial Relations Commission (AIRC) introduced a provision permitting an employee to return from parental leave on a part-time basis until the child reaches school-age (Baird, 2011). This may help explain why job quality is better for women whose youngest children are under the age of five. This will be explored further in chapter seven, when working time arrangements are taken into consideration.

There is also a growing number of workers who juggle work with caring responsibilities (ABS, 2016b) so it is informative to check whether job quality differs between **carers and non-carers**. Just over three percent of job-holders (3.68%, or almost 329,000) actively care for a household member who has a long-term health condition, who is elderly or who has a disability. A further group of workers actively care for someone who does not live with them but who has a long-term health condition, is elderly or has a disability (2.63%, around 261,000 individuals).

Job quality is lower for the group of workers who **actively care for a household member who has a long-term health condition, is elderly or has a disability** than for those who do not. An independent-samples t-test revealed a statistically significant difference in mean scores between these two groups (at the p=.000 level, two-tailed), where the average score for overall job quality for those who actively care for a household member who has a long-term health problem, is elderly or has a disability is 51.34 (SD: 19.51) and for those who do not, the mean is 53.20 (SD:16.80). Despite reaching statistical significance, the magnitude of the difference in means is small, at -2.07 (CI: -2.13 to -1.20). Relevantly, the average age of carers of household members is markedly older than the average age of other job-holders (carers: 45.58 years; not carers: 38.29 years), where female carers of household members are, on average, older than male carers of household members (female carer: 46.80 yrs; male carer: 43.84 yrs).

An independent-samples t-test revealed a very small, yet statistically significant difference in mean scores between **female job-holders who actively care for a household member who has a long-term health condition, is elderly or has a disability** (M: 52.95; SD: 18.06) and **female job-holders who do not actively care for a household member who has a long-term health condition, is elderly or has a disability** (M: 52.48; SD: 17.38), where the magnitude of the mean difference is 0.47 (at the p=.000 level, two-tailed; CI: 0.38 to 0.55). The reverse is found for male employees, where an independent-samples t-test revealed a very small, yet statistically significant difference in mean scores between **male job-holders who actively care for a household member who has a long-term health condition, is elderly or has a disability** (M: 48.57; SD: 21.13) and **male job-holders who do not** (M: 53.91; SD: 16.19), where the magnitude of the mean difference is -5.43 (at the p=.000 level, two-tailed; CI: -5.45 to -5.23).

The burden of care for a household member is may be higher than caring for someone who lives at another location. This may, in part, help in understanding why job quality is higher for the group of workers who **actively care for a non-resident of their household who has a long-term health condition, is elderly or has a disability** than for those who do not. An independent-samples t-test revealed a statistically significant difference in mean scores between these two groups (at the p=.000 level, two-tailed), where the average score for overall job quality for those who actively care for a non-resident who has a long-term health condition, is elderly or has a disability is 56.40 (SD: 16.64) and for those who do not, the mean is 53.22 (SD:16.72), where the magnitude of the difference in means is 3.19 (at the p=.000 level; two-tailed; CI: 3.12 to 3.25).

For **female employees**, job quality is better for carers of non-household members **who has a long-term health condition, is elderly or has a disability** (M: 56.23; SD: 17.46) than for those without this type of caring responsibilities (M: 52.52; SD: 17.23), where the mean difference is 3.19 (at the p=.000 level; two-tailed; CI: 3.12 to 3.25). The same is the case for **male employees**, where job quality is better for carers of non-household members **who has a long-**

term health condition, is elderly or has a disability quality (M: 56.75; SD: 14.88) than those men without this type of caring responsibility (M: 53.87; SD: 16.20), where the mean difference is 2.88 (at the p=.000 level, two-tailed; CI: 2.78 to 2.98). Again, the average age of **carers of non-residents** is markedly older than other job-holders (carers: 49.09 years; not carers: 38.39 years), where female carers of household members are, on average, older than male carers of household members (female carers: 49.78 yrs; male carers: 47.72 yrs).

As with family formation, the above exploration of the interplay between job quality and caring responsibilities is preliminary only. This topic would be better explored through longitudinal, multi-variate analysis, which is beyond the scope of this thesis, but is yet another interesting aspect to examine post-thesis.

As briefly outlined in chapter one, intersectionality theory contends that there are often multiple sources of disadvantage, such as a person's gender, race, class, gender identity, sexual orientation and/or religion (see for example, Acker, 2006; Hancock, 2007; Walby, Armstrong & Strid, 2012). While it is not possible to examine all of the possible sources of disadvantage, in the next part of this section job quality is considered in relation to a number of additional characteristics potentially connected with inequality.

6.2.4. Nationality, citizenship and residency status

As outlined in chapter two, there are many other known sources of disadvantage in the labour market, including race and ethnicity (Acker, 2006; Durbin & Conley, 2010; Hancock, 2007; Walby, Armstrong & Strid, 2012). In this section, issues connected to ethnicity and race are explored. Regrettably, the number of respondents in the AJQI sample who identify as an Indigenous Australian (Aboriginal or Torres Strait Islander) is not of sufficient size to separately report on their job quality.[32]

Of particular relevance to the study of job quality in Australia, recent immigrants have a higher rate of unemployment, lower rate of labour force participation, and higher levels of education than either Australian-born or long-standing migrants, where recent immigrants are more likely to work in either managerial/professional occupations or become labourers or related workers (Watson, 2006).

The HILDA survey ask respondents whether they were **born in Australia, and if not, details about their nationality and migration status**. Australia is a multicultural nation, where almost one-in-ten (9.50%) in the sample were born in New Zealand and the almost three-in-ten

[32] In part, this is because the original sample selected in 2001 did not include people living in remote parts of Australia due to costs and difficulties involved in selecting and interviewing them (Watson 2006). Many Indigenous Australians live in remote locations so this helps to explain the small sample for this group.

(27.69%) were born in one of 20 other countries. Of those job-holders who were not born in Australia, just over one-quarter are **Australian citizens** (26.45%) and three-quarters are not (73.55%). For those who are not Australian citizens, almost one-fifth are **permanent residents of Australia** (19.16%) and four-fifths are **not permanent residents** (80.84%). Hugo (2004) found international migration to be one of the major sources of social change in the 1996 to 2001 period (cited in Watson 2006). It is more than likely this is still the case.

With these contextual factors in mind, we find that overall job quality is lower for **those who were born in Australia** (M: 52.78: 16.98) compared to **foreign-born Australian citizens** (M: 55.27; SD: 16.44) and **foreign-born permanent residents** (M: 55.56; SD: 14.57). For **foreign-born Australian citizens**, the average score for job quality is higher for men (M: 56.38; SD: 15.37) than women (M: 54.09; SD: 17.43). For **foreign-born permanent residents**, the average score for job quality is higher for men (M: 56.50; SD: 13.00) than women (M: 54.51; SD: 16.08). Job quality is noticeably lower, though, for **foreign-born job-holders who are neither Australian citizens nor permanent residents** (i.e. temporary residents) where the mean score for job quality is 48.93 (SD: 16.07). For this group of job-holders who are foreign-born but neither citizens for residents, job quality is lower for women (M: 47.28; SD: 16.95) than men (M: 50.23; SD: 15.20).[33] Results from a one-way analysis of variance, ANOVA, indicate a statistically significant difference among the average scores for job quality by group according to **status of Australian nationality/citizenship (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (at the p=.05 level). The largest mean difference is between the group of job-holders who are foreign-born Australian citizens and the group who are foreign-born but neither an Australian citizen nor permanent resident, where the mean difference is 6.34 (CI: 6.26 to 6.43).

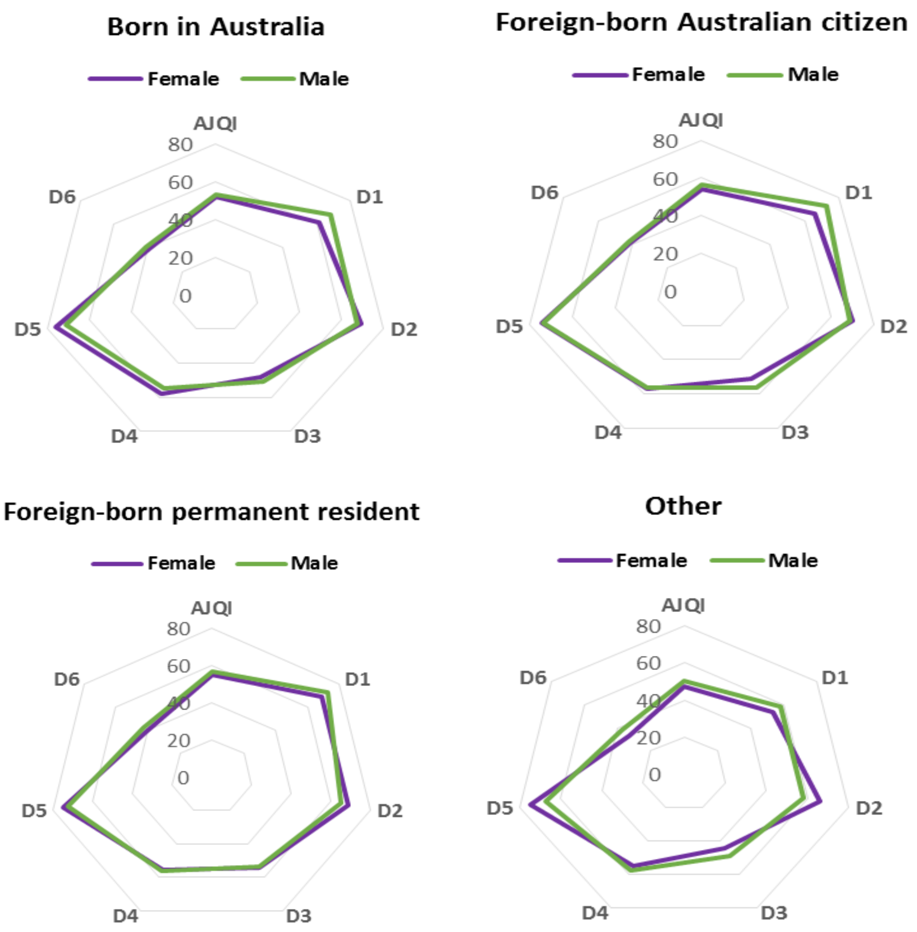
In terms of the dimensions of job quality, Figure 6.2.4.1, below, sets out a series of radar charts showing average scores for overall job quality and its six dimensions for the four groups: born in Australia; foreign-born Australian citizens; foreign-born permanent residents; and *temporary residents*. For all dimensions bar quality of work-life balance, the mean is lowest for the group who are foreign-born but neither an Australian citizen nor permanent resident (i.e. temporary residents). In particular, the **quality of pay** is very poor for this group (M: 56.45; SD: 27.69), as is their **quality of employment** (M: 61.61; SD: 18.40) and **quality of voice and collective interest representation** (M: 35.69; SD: 18.77). Results from a series of one-way

[33] While HILDA survey documentation does not specify, this group is most likely quite diverse in its composition, comprised of temporary residents including those on temporary skilled work visas, international students combining study with work, people holding temporary protection visas, and foreign short stay seasonal workers.

analysis of variance, ANOVA, indicate a statistically significant difference among the average scores for each of the dimensions of job quality by group according to **status of Australian nationality/citizenship (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all comparisons (at the p=.05 level), with the one exception for the dimension of work-life balance (D4), namely, the group born in Australia and the group of foreign-born who are neither Australian citizens or permanent residents; where the difference in means is not statistically significant.

For **pay** (D1), the largest mean difference is between the group of job-holders who are foreign-born permanent residents and the group who are foreign-born but neither an Australian citizen nor permanent resident, at 14.51 (CI: 14.38 to 14.63). For **quality of employment** (D2), the largest mean difference is between the group who are foreign-born Australian citizens and the group who are foreign-born but neither an Australian citizen nor permanent resident, at 7.72 (CI: -7.80 to -7.65).

Figure 6.2.4.1: Radar charts of job quality by citizenship/residency status by sex, mean



For the group that are **foreign-born but neither permanent residents nor Australian citizens** (other), the bundling of different aspects of their respective jobs seems to vary considerably between women and men. The extent of variation in quality by dimension is high, and requires further investigation in terms of the possible differences in the composition of this group.

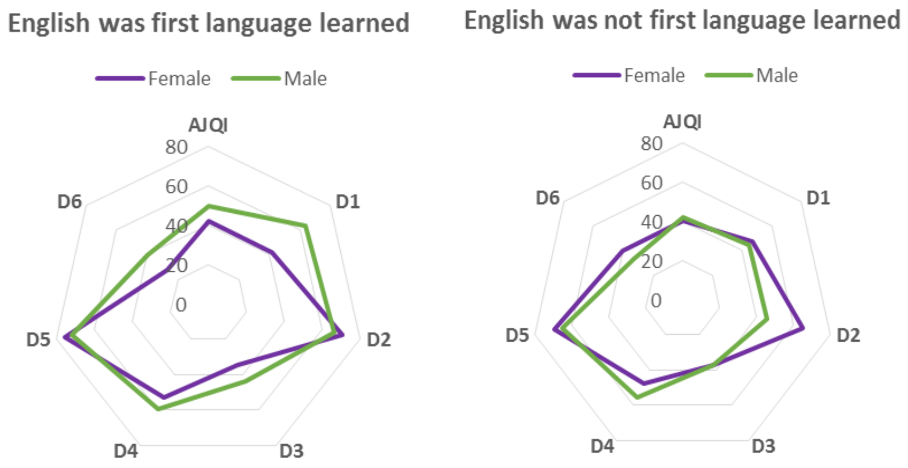
While Australia is multi-cultural, it is also mono-lingual. While around one-fifth of the Australian population speaks a language other than English (with around 250 languages spoken in Australian homes) (Adoniou, 2015), English is typically the language used in Australian workplaces, with the probable exception of some family-run businesses. So proficiency in spoken and/or written English language is a prerequisite for most jobs. Of relevance, around a decade ago, English ability was incorporated into the application process for immigration, resulting in fewer immigrants being unable to speak English (Watson, 2006).

Relevantly, **foreign-born job-holders** are asked a series of questions about their English ability. For the group of foreign-born job-holders, job quality is lower for those for whom **English was not the first language learnt (NESB)**[34] (M: 41.37; SD: 17.21) than for those foreign-born but for whom **English was the first language learnt** (M: 46.06; SD: 17.22) (see Figure 6.2.4.2). An independent-sample t-test indicates the mean difference between groups of 4.69 is statistically significant (at the p=.000 level, two-tailed; CI: 4.54 to 4.85).

Furthermore, with five of the six dimensions (the exception being quality of voice and collective interest representation) quality is much lower for the group of foreign-born job-holders for whom English was not their first language learnt than it is for the group of foreign-born where English was the first language learnt (mean differences are all statistically significant, at the p=.000 level, two-tailed). The largest mean difference exists for **quality of employment** (D2; mean difference: 13.27; CI: 13.11 to 13.43); followed by **pay** (D1; mean difference: 7.59; CI: 7.33 to 7.85); and **quality of health and safety** (D5; mean difference: 6.41; CI: 6.29 to 6.53).

[34] In Australia, coming from a Non-English Speaking Background (NESB) is commonly used as one way to identify membership of a potentially vulnerable group due to their ethnicity or national origin.

Figure 6.2.4.2: Radar charts of job quality by language first learned and sex, mean



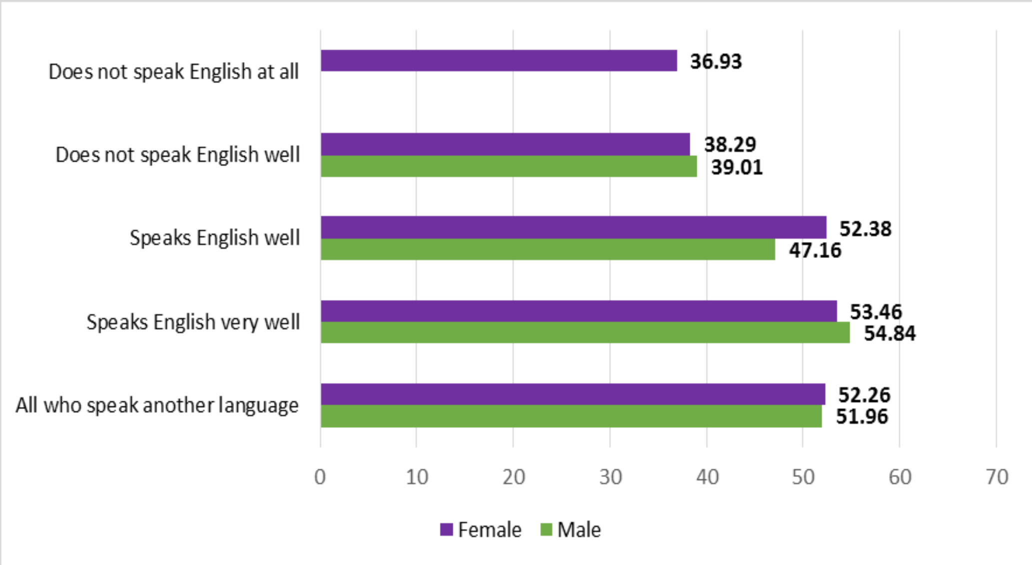
Note: Sample restricted to foreign-born

Those who say that English was not the first language learnt are asked about the level of their English language proficiency. Almost two-thirds (65.41%) say they speak English '*very well*'; one-in-three (30.25%) say they speak English '*well*'; 4.07 percent '*not very well*'; and less than one percent (0.26%) said '*not at all'.* Those who speak English '*very well*' have higher job quality (54.40) than the three other ratings of speaking English '*well*' (49.49); '*not well*'; (38.58); and '*not at all*' (36.93).

For the **group of foreign-born employees**, results from a one-way analysis of variance, ANOVA, indicate a statistically significant difference among the average scores for job quality according to **how well English is spoken (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in mean scores for all group comparisons (at the p=.05 level). The **average score for job quality increases in line with English language proficiency**, ranging from a mean for those speak English '*not at all*' of 36.93 (SD: 15.01) up to a mean for those who speak English '*very well*' of 54.20 (SD: 16.37). The mean difference for these two groups is -17.28 (CI: -16.65 to 17.90).

While there are no male foreign-born job-holders who do not speak English at all, job quality is lowest for women who do not speak English at all (as reported above). For those who speak English '*not well*', job quality is higher for men; for those who speak English '*well*', it is higher for women, and for those who speak English '*very well*', job quality is higher among men (see Figure 6.2.4.3, below).

Figure 6.2.4.3: Job quality for those who speak language other than English by sex, mean



Note: Sample restricted to foreign-born where English was not the first language learnt as a child.

A small proportion of individuals in the HILDA sample of employees came to Australia as **refugees or under humanitarian migration programs** (1.44% or around 143,000 job-holders). A closer inspection reveals the earliest year of arrival in Australia was 1946 (i.e. post- Second World War) and the most recent arrival was in 2014, so there is likely to be considerable heterogeneity in this group. With this contextual information in mind, job quality is lower for the group of job-holders who came to Australia under the **migration category of refugee or under a humanitarian migration program** (M: 52.34; SD: 3.82) than those who came under the category of **skilled migrant** (M: 55.20; SD: 14.36). The mean difference in these two groups is -5.63 (at the p=.000 level, two-tailed; CI: -5.49 to -5.76) (figure not shown).

In summary, a complicated picture emerges when trying to understand variations in job quality in relation to country of birth, migration status, citizenship and residency status. Relevantly, both the level and categories for immigration have received a great deal of attention from Australian politicians, policy-makers and the media in recent years, where some have called for restrictions on the intake of refugees and further tightening in criteria for skilled, semi-skilled and seasonal work visas (Campbell & Tham, 2013; Fozdar & Hartley, 2013; Wright, Groutsis & van den Broek, 2017). Given the controversial and politically-charged nature of these issues, this subject deserves its own separate, and more detailed, analysis in order to better unpack the nature of potential inequalities in the Australian workforce and how these inequalities might play out for the quality of jobs for those migrate to Australia.

6.3. Quality across jobs

Table 6.3.1 provides an overall breakdown of the share of jobs with no, one, two, three, four, five or six of each of the five categories of jobs, as well as separate breakdowns for women and men. What this table conveys is that around one-in-seven of all jobs have no severe deficits, where a severe deficit is defined as a score of 20 or less out of a possible 100 for a particular dimension (i.e. the cut-off point used to represent '*very poor'* in quality).

Men are slightly more likely than women to have a job with no severe deficits (73.76% & 69.75%). While around one-fifth of all jobs have one severe deficit, women are slightly more likely than men to be in a job with one severe deficit (21.07% & 20.15%). It is somewhat reassuring that no jobs – for either women or men – have five or six severe deficits, and less than half of one-percent of all jobs have three severe deficits. Women are more likely than men to have a job with either one or two severe deficits (21.07% & 7.94% of women compared to 20.15% & 4.58% of men, respectively). On the other hand, **men are more likely than women to be in jobs with three or four severe deficits** (1.23% & 0.02% of women compared to 1.47% & 0.04% of men, respectively).

Table 6.3.1: **Count by quality category across dimensions of job by sex, percent**

Number of dimensions	0	1	2	3	4	5	6	Total
Very poor								
Female	69.75	21.07	7.94	1.23	0.02	0.00	0.00	100.00
Male	73.76	20.15	4.58	1.47	0.04	0.00	0.00	100.00
All	71.80	20.60	6.22	1.35	0.03	0.00	0.00	100.00
Poor								
Female	42.58	40.15	14.29	2.46	0.50	0.02	0.00	100.00
Male	42.90	38.06	15.68	3.21	0.16	0.00	0.00	100.00
All	42.74	39.08	15.00	2.84	0.32	0.01	0.00	100.00
Middling								
Female	15.53	36.23	30.47	14.38	2.92	0.47	0.00	100.00
Male	13.60	34.81	32.00	15.81	3.39	0.37	0.02	100.00
All	14.55	35.51	31.25	15.11	3.16	0.42	0.01	100.00
Good								
Female	6.08	22.96	35.55	24.32	9.60	1.33	0.15	100.00
Male	6.41	20.76	35.73	25.78	8.91	2.27	0.14	100.00
All	6.25	21.84	35.64	25.07	9.25	1.81	0.14	100.00
Very good								
Female	31.61	36.13	21.93	7.80	2.33	0.20	0.00	100.00
Male	35.25	34.75	19.65	8.37	1.72	0.25	0.00	100.00
All	33.47	35.43	20.77	8.09	2.02	0.23	0.00	100.00

6.4. Conclusion

In this chapter, findings for job quality were reported for a range on job-holder characteristics. The intention was to obtain a preliminary picture on the types of personal and household characteristics that may be of interest for further exploration. This being so, results at the aggregate-level of the AJQI showed a small but statistically significant difference in average job quality between women and men. After delving deeper, women were found to have slightly better jobs in terms of their quality of employment; work-life balance; and health and safety, whereas men were found to have slightly better jobs in terms their pay; intrinsic characteristics of work; and voice and collective interest representation.

For the first set of characteristics looked at, age (eta-squared = 0.12), highest educational qualification (eta-squared = 0.12), and job tenure (eta-squared = .09) all appeared to be important factors in helping explain variations in job quality.

Results from the AJQI indicated that job quality tended to improve with age, until it dropped off again for the group aged 65 years or older. When the sex and age of job-holders were co-examined, female job-holders of prime working age were found to have slightly lower job quality than their male colleagues in the same age cohort.

Consistent with other empirical research, job quality varied considerably depending on the type and level of highest educational qualification. Average job quality was highest for the group with either graduate diplomas or graduate certificates; followed by job-holders with post-graduate degrees. While job quality was lowest among job-holders without any post-school qualifications. It is the group with vocational education and training (VET) qualifications where the largest sex difference in job quality was found, where women with either a certificate III or IV level qualification were more likely than men with the same level of qualification to occupy a job of lower quality. Similarly, women with either an advanced diploma or diploma were more likely than men with the same level of qualification to occupy a lower quality job. This is likely explained by the difference in the types of vocational courses studied by women and men.

Not surprisingly, job-holders who have longer job tenure also tended to have higher job quality than those with shorter job tenure. For all tenure groupings, job quality tended to be better for men than women, with the largest differentials found for the groups with one to two years and 5 to 10 years of tenure with their current employer.

A second set of characteristics related to life course and family formation revealed some interesting findings that require careful further exploration. In terms of marital status, job quality was higher for the group who are married job-holders and lowest for group that has never been married and who are not in a de facto relationship, which is likely due to them being younger in age. Based on household type, quality was higher for coupled individuals than it was for lone-parents, where average job quality among female lone-parents with dependent children was much lower than it was for coupled females with dependent children. Again, this result is, in part, influenced by the age of the job-holder.

For women, who continue to bear a larger share of caring responsibilities, when the age of the youngest child was considered, job quality was highest for women where their youngest child is aged under five. Here, caution is required, as there remains a need to carefully unpack interaction of age and parenting responsibilities. Longitudinal analysis is required to track job quality across the life course, including for those (mainly female employees) who move in and out of paid employment during family formation. Nevertheless, the preliminary findings highlight the importance of improving job quality as one possible lever to help mothers in reconciling their paid work with their responsibilities and activities outside work. The findings also point to the relevance of childcare policies that help parents to share care-giving and breadwinner responsibilities, so that women do not face the constrained choice of switching to lower status, part-time employment to accommodate their parenting responsibilities.

In addition to combining paid work with caring for children, there is a small yet growing number of workers who combine work with other caring responsibilities. While a relatively small proportion of the AJQI sample are active carers, other research suggests this group is likely to grow in the future as the population ages, government budgets for publicly-funded care continue to face pressure, and the age at which a person can access either a government-funded pension or their personal superannuation savings are raised. With these demographic and contextual factors in mind, possible impacts of the burden of actively caring for someone on paid work merits attention from policy-makers. Job quality varies between carers and non-carers and between types of carers, where the age and sex of the job-holder both appear to play mediating roles. Once again, longitudinal analysis is required to track job quality across the life course, including for those who move in and out of active caring and/or in and out of paid employment.

The third set of characteristics looked at were related to nationality, citizenship and residency. When country of birth was taken into account, job quality was generally found to be higher for foreign-born Australian citizens and foreign-born residents than it was for those born in Australia. However it was by far the lowest for those foreign-born job-holders who are neither Australian citizens nor permanent residents (i.e. temporary residents). Job quality was much lower than the national average for the group of foreign-born job-holders where English was not the first language they learned as a child, and where they were not proficient in speaking

English. Although they represented a small part of the sample, job quality was particularly low for refugees or people who came to Australia under a humanitarian migration program.

In summary, a complicated picture emerges when trying to understand variations in job quality in relation to country of birth, citizenship and residency status, and migration category. Given that immigration is a controversial policy issue in Australia, this subject deserves its own separate, and more detailed, analysis, which will form part of the post-doctoral research programme. Such an analysis will be possible in the future, although it may require pulling in additional variables from other HILDA questionnaires.

In this chapter, the lens of gender (and to a much lesser extent, intersectionality) was used to help interpret the findings. Focussing only on personal and household characteristics is not sufficient though, because the type of workplace, occupation and sector of employment, as well as other institutional arrangements, are known to be important. As signalled at various points throughout this chapter, and while it is outside the scope of this thesis, multiple regression analysis is required to help better identify and explain the differences in job quality according to personal and household characteristics. While areas identified for further research are discussed in the final chapter (chapter 8, conclusion), the analysis reported in this chapter begins the task of identifying which job-holder characteristics appear to play a greater role in explaining variance in job quality. In this respect, age, educational qualifications and job tenure emerge as those job-holder characteristics of particular interest in explaining variation in overall job quality.

In the next chapter, the analysis moves on to consider job quality in light of job, workplace, institutional and sectoral characteristics. It is not feasible in this thesis to carry forward all of the analytical groups used to report findings in this chapter. For this reason, only the characteristics of gender, age, highest education level, job tenure and some aspects of family formation will be brought forward.

7. Job and workplace characteristics

7.1. Introduction

This chapter reports on job quality according to a range of job and workplace characteristics that have been found important to job quality in the international literature. As the final chapter among three to report the empirical results, it draws together aspects about the characteristics about the job and workplace, as well a limited number of characteristics about job-holders. As was the case in the previous two chapters, the aim of this chapter is to provide an initial picture of the types of job and workplace characteristics that might be helpful in understanding why disparities in job quality exist. In this respect, it is not the intention to be exhaustive, but rather illustrative. After this introduction, the chapter is comprised of five sections.

Before proceeding to the findings, key aspects of the Australian employment relations system are briefly outlined in the second section (section 7.2). Additional information about the Australian employment relations system, however, is progressively incorporated into the commentary throughout the chapter. In the third section, job quality is reported against three types of characteristics (section 7.3). The first set of results focus on contract type and working time arrangements. The second part focuses on job quality in relation to a set of institutional characteristics. The third part provides an account of job quality according to sectoral and industry characteristics.

In the fourth section (section 7.4), a short break-out analysis, explores job quality for working mothers. This section builds on the findings presented in chapter six. In the fifth section of this chapter (section 7.5), results for six of the sub-dimensions of the AJQI are explored in further detail. The sub-dimensions selected for closer attention are: development opportunities; autonomy; work intensity; voice; and collective interest and representation. These sub-dimensions were chosen on their basis of their relatively low quality levels compared to other sub-dimensions in the AJQI.

In the final section of this chapter (section 7.6), the results are summarised and a number of pointers are provided for the conclusion chapter.

7.2. Key features of the Australian employment regime

This section provides a brief overview of a number of key aspects of the employment relations system in Australia.

Development of the Australian industrial relations system, with its federal and State conciliation and arbitration systems, was strongly influenced by the evolution of trade unions.

One peculiar feature of the Australian system is the body of legally binding industrial 'awards' that prescribe minimum (and in some cases, actual) wages and employment conditions. Awards contain job structures (called classification structures) linked to skills and qualifications, and they are tailored to particular sectors, occupations and in some cases, enterprises (Murray & Stewart, 2015). Historically, awards paid premiums for dangerous or dirty work and for unsociable hours of work (such as weekend, night and shift work).

While the award system in Australia has been described as privileging a normative model of employment (i.e. the male 'breadwinner' model), the highly centralised industrial relations system that prevailed until around three decades ago provided protection - via awards - to more vulnerable workers. In particular, the wage rates specified in awards enshrined the principle known as 'comparative wage justice' – the idea that work involving the same requirements should be paid the same wage (Isaac, 1967 cited in Murray & Stewart, 2015: 43). The pay rates in awards maintained relativity to a benchmark award (the metal industry award), so from its inception, the system itself entrenched (and legitimised) the historical undervaluation of female-dominated work.

A second important feature of the Australian employment relations system is that a significant proportion of the workforce is employed in non-standard work including fixed-term contracts, labour hire, independent contracting and casual work. In addition, the proportion of Australians working unsociable hours is growing, with casual workers more likely to work unsociable hours (Pocock & Charlesworth, 2015).

Pressure for economic change and improved productivity during the 1980s resulted in a radical change to the Australian industrial relations system, where centralised wage-fixing was abandoned in favour of enterprise-level collective bargaining. A series of reforms by successive governments have weakened the underpinning safety net of the award system, allowed employers to enter into collective or individual agreements that can lower working conditions below award standards; and restricted bargaining to a reduced set of statutory minima covering basic wage rates, maximum working hours and three types of leave (Murray & Stewart, 2015). Restrictions on access to remedies for unfair dismissal were also introduced in the *Work Choices Act* [Cth] 2005. The current federal legislation - the *Fair Work Act [Cth] 2009* - wound back some of the changes introduced during the *Work Choices* era as well as introduced an expanded set of ten minimum standards (known as the National Employment Standards, or NES) for those not otherwise covered by awards (Murray & Stewart, 2015). In addition, some of the restrictions imposed on trade unions under '*Work Choices'* were removed and restrictions on access to remedies for unfair dismissal were also rolled back (Murray & Stewart, 2015).

The current award system continues to provide an occupation-based structure for minimum wages and premiums for unsocial hours of work in some industries, however the gap between minimum rates of pay in awards and those found in collective agreements has widened (Murray & Stewart, 2015: 56). Nevertheless, in comparison to most OECD countries, Australia has a relatively small proportion of low-paid[35] workers amongst its full-time workforce (at 16.55% in 2014, which is lower than in the US and UK) and a comparatively narrow gap in median earnings between women and men (15.40% in 2014, which is also narrower than in the US and the UK) (OECD.stat).

Despite an attachment to the historical notion of a 'fair go', the Australian employment relations system has increasingly become characterised by diversity in employment regulation, where outcomes are less favourable for vulnerable groups including women, young workers, older workers, and workers from different ethnic backgrounds. Strong bargaining power for workers is associated with good jobs, and weak bargaining power is associated with bad jobs (Pocock & Skinner, 2012: 63).

Taken in their entirety, cumulative recent changes in the Australian employment relations system have resulted in primacy placed on individual workers (and individual negotiations), so those without the power or skills to negotiate improvements in their job quality are left to the mercy of the market. While women, young workers and those with lower skills are more likely to have their pay and conditions set by awards, powerful employer groups have lobbied successive governments for further deregulation, including calls for removal of penalty rates for unsociable hours of work.

As support for this positioning, Pockock and Skinner (2012) characterise the employment regime in Australia as one where with three tiers. The first tier is comprised of around two-fifths of workers who remain well protected by union-influenced regulation of working conditions by virtue of being covered by union-bargained collective agreements. The second tier of workers are those who are covered by minimal conditions (basic minima contained in either awards or the Australian Fair Pay & Conditions Standard, or AFPC&S). The third tier of workers – because of their precarious employment status, recent job entry, low unionisation, immigrant status or other personal, job or geographic characteristics, or because their employment standards are not actually enforced – do not enjoy many of the minimal standards of labour regulation.

Based on the above information, Australia is best situated somewhere between the dualist and market-oriented systems in Gallie's typology, having moved away from a more inclusive

[35] The OECD defines 'low paid' as the incidence of workers defined as the share of full-time workers earning less than two thirds of the gross median earnings of all full-time workers (www.stat.oecd.org).

character to more market influences during the past few decades (Pocock & Skinner, 2012: 63). In light of the above information about the Australian employment relations system, the following section outlines results for job quality according to a range of job, workplace, institutional and sectoral characteristics.

7.3. Building on the picture about factors affecting job quality

In this section, scores for job quality are reported according to three types of characteristics: **contract type and working time arrangements**; **institutional characteristics**; and **sectoral and industry characteristics**. Some of the information obtained from the analysis that was reported in chapter six about job-holders is brought forward to tie together the analysis on job and workplace characteristics.

7.3.1. Contract type and working time arrangements

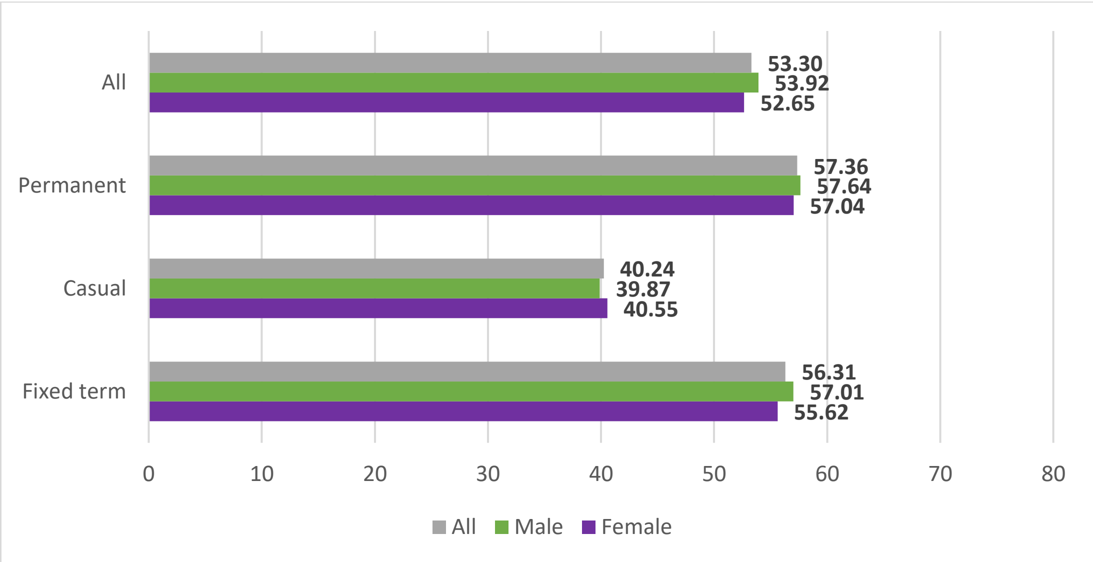
Around one-quarter of employees in Australia have casual jobs. Casual employment is peculiar to Australia, whereby this type of employment contract has little right to protection against unfair dismissal, no right of notice or severance pay in case of dismissal, no entitlement to annual leave, sick leave or holiday pay, regardless of the length of tenure with the employer (see Campbell, Whitehouse & Baxter, 2009; Markey & McIvor, 2018; Watson, 2013). Furthermore, there are no restrictions on the ability of employers to define a job as 'casual' (Markey & McIvor, 2018).

While the number of male casuals remains considerably lower than for women, male casual employment has grown at twice the rate of females over the past twenty years, albeit from a low base (Kryger, 2015). Younger people are also more likely to work as casuals. Problems associated with casual employment are well documented, including lack of access to in-work training and failure to provide 'stepping stones' to regular employment (see for example, Watson, 2013). The majority of casual workers are found in fairly low-skilled occupations and three industries account for almost half of all casual employment: retail trade; accommodation and food services; and health care and social assistance. Cumulatively, this means that the type of employment contract a job-holder has is fundamental to the quality of their job. With this important contextual information in mind, the results for job quality by contract type are set out below.

Overall job quality for the group of **casuals** (M: 40.24; SD: 17.70) is much lower than it is for the groups with either **fixed-term contracts** (M: 56.31; SD: 15.04) or **permanent contracts** (M: 57.36; SD: 14.12). Results from a one-way analysis of variance, ANOVA, to explore the impact of **contract type** on **job quality** revealed a statistically significant difference in mean scores for job quality for the three groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for job quality for all comparisons (all at p=.05 level), where the mean difference for job quality between casual and permanent contracts is -17.11 (CI: -17.14 to -17.09), between casual and fixed term contracts is -16.06 (CI: -16.11 to -16.02); and between fixed-term and permanent contracts is -1.05 (CI:-1.09 to -1.01).

There is very little difference in job quality between women and men within each contract type, but, crucially, a higher share of women than men have casual contracts of employments (25.78% & 20.62%) and fixed-term contracts (9.63% & 8.95%). Conversely, a lower share of women than men have permanent contracts of employment (64.59% & 70.43%) (see Figure 7.3.1.1).

Figure 7.3.1.1: Job quality by contract status by sex, mean



Importantly, a caveat is necessary when interpreting the above results. As set out in section 4.8.2 in chapter four, the dimension of quality of employment (D2) in the AJQI draws on information about paid leave entitlements to construct the sub-dimension of contractual stability (D2A). However, while related, entitlement to paid leave entitlements is not clear-cut, where the category of employees on fixed-term contracts can have contracts with or without paid leave entitlements. However, while re-codified scoring was used to construct the index and the dimension of quality of employment includes many other indicators, contract type is highly correlated with both the overall index (r=.409) and not surprisingly, the sub-dimension of contractual stability (r=.670).

Given the above caveat, results by contract type for the other dimensions (where contract type was not used in constructing the underlying indicators) reveal noticeable differences between quality by contract type. While the **quality of health and safety** is very similar for all three groups, the **quality of pay; intrinsic characteristics of work**; and **voice and collective interest representation** are considerably lower for the group of **casuals** compared to the groups with the two other types of employment contracts (see Figure 7.3.1.2, below).

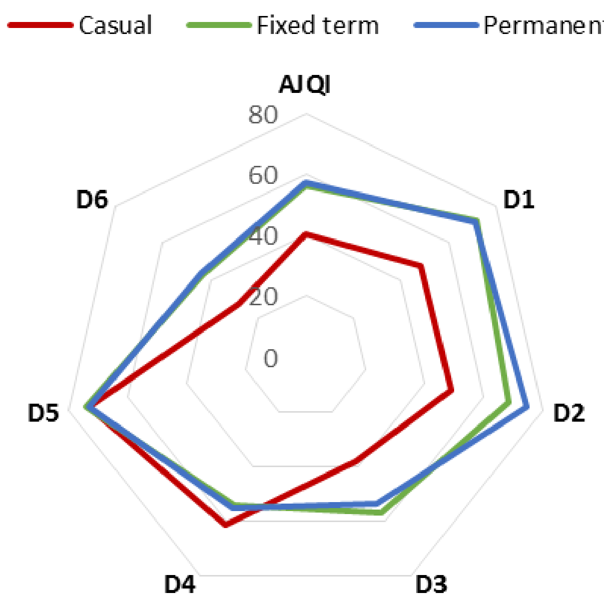
The mean score for **quality of pay (D1)** for the group with casual contracts is 48.24 (SD: 28.29) compared to the mean score for permanent contracts of 71.16 (SD: 19.39). Results from a one-way analysis of variance, ANOVA, to explore the impact of **contract type on pay** revealed a statistically significant difference in mean scores for the three groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference for quality of pay between groups with casual and permanent contracts is -22.91 (CI: -22.96 to -22.88) and between casual and fixed term contracts is -23.94 (CI: -24.00 to -23.88).

In the case of **quality of intrinsic characteristics of work (D3)**, the mean for the group with casual contracts is 38.13 (SD: 20.39) and the mean for the group with permanent contracts is 53.75 (SD: 20.16). Results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for the three groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons(all at p=.05 level), where the mean difference for quality of intrinsic characteristics of work between groups with **casual contracts and permanent contracts** is -15.62 (CI: -15.66 to -15.59); and **between casual contracts and fixed term contracts** is -18.90 (CI: -18.96 to -18.84).

The mean for the group with casual contracts is 28.36 (SD: 20.52) and for the group with permanent contracts is 44.07 (SD: 22.15). Results from a one-way analysis of variance, ANOVA, to explore the impact of **contract type on quality of voice and collective interest representation** revealed a statistically significant difference in mean scores for the three groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference for quality of voice and collective interest representation between groups with casual and permanent contracts is -15.71 (CI: -15.75 to -15.67) and between casual and fixed term contracts is -15.09 (CI: -15.15 to -15.03).

As illustrated in the radar chart below, it is only for the dimension of work-life balance (D4) where quality is higher for those with casual contract. The mean score for quality of work-life balance for the group with **casual contracts** is 61.33 (SD: 14.85), for those with **fixed-term contracts the mean** is 54.15 (SD: 15.23) and for those with **permanent contracts** the mean is 55.13 (SD: 13.84). Results from a one-way analysis of variance, ANOVA, to explore the impact of **contract type** on **work-life balance** revealed a statistically significant difference in mean scores for the three groups (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference for quality of work-life balance between casual and permanent contracts is 6.20 (CI: 6.17 to 6.22) and between casual and fixed term contracts is 7.18 (CI: 7.13 to 7.22).

Figure 7.3.1.2: Radar chart showing job quality by contract status, mean



As previously identified in chapter six, age is one of job-holder characteristics that appears plays an important role in explaining variance in job quality, and as outlined above, many younger workers are employed on casual contracts, so the above results are likely to be, in part, related to the shares of different age groups found in the three different types of contract. For instance, around three-quarters of those aged 15 to 19 (74.02%) and around two-fifths of those aged 20 to 24 (42.35%) are in casual jobs.

Bearing this in mind, **for every age group**, the average score for job quality is lower for the group with casual contracts than for the groups with either permanent or fixed-term contracts (figure not shown). The smallest mean difference in scores for job quality by contract type is in the youngest group of workers (i.e. aged 15 to 19), where results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for each of the three contract types (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference in scores between those with casual contracts and permanent contracts is -8.54 (CI: -8.65 to -8.42). The largest mean difference in scores for job quality by contract type is for the group aged 35 to 44, where results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for each of the three contract types (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference in scores between those with casual contracts and permanent contracts is -17.43 (CI: -17.50 to -17.37).

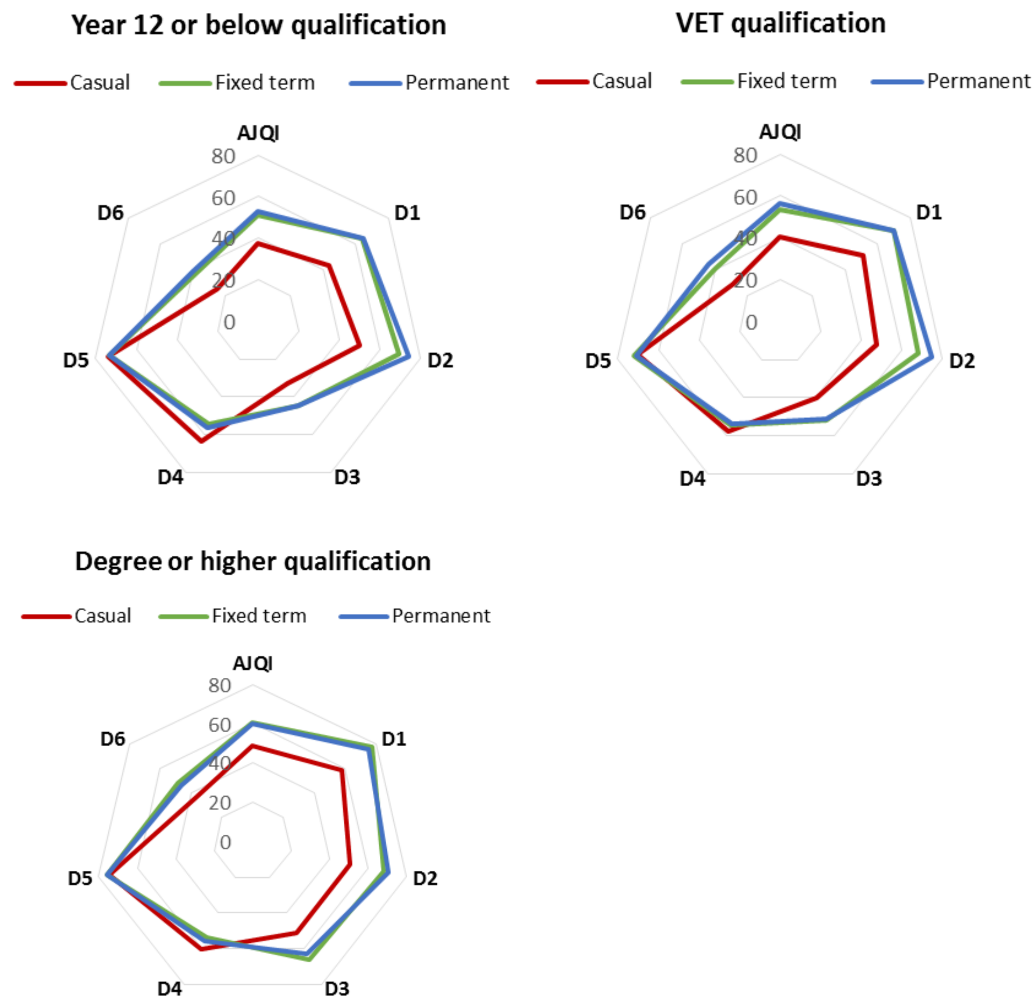
Regardless of level of **educational qualification**, job quality is much lower for casuals than for either those with fixed-term or permanent contracts. For instance, for the group with **Year 12 or below qualifications**, job quality is lowest for jobs with casual contracts, where results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for each of the three contract types (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference in scores between those with casual contracts and permanent contracts is -15.67 (CI: -15.71 to -15.62).

For the group with **VET qualifications**, the same pattern in scores exists. The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for each of the three contract types (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference in scores between those with casual contracts and permanent contracts is -16.09 (CI: -16.14 to -16.04).

For the group with **degree or higher qualifications**, job quality is again lowest for jobs with casual contracts, followed by jobs with fixed-term contracts, and it is highest for jobs with permanent contracts. The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for each of the three contract types (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference in scores between those with casual contracts and permanent contracts is -13.49 (CI: -13.54 to -13.44).

The radar charts in Figure 7.3.1.3, below, depict average scores for job quality and its six dimensions by contract status and highest educational qualifications.

Figure 7.3.1.3: Radar chart showing job quality by contract status and highest educational qualification, mean



In addition to looking at contract type, it is also informative to consider job quality in relation to **working time arrangements**. Over the past few decades, there has been a breakdown in the traditional male 'breadwinner' model, where the share of males working full-time jobs as a proportion of total employment in Australia has steadily declined. The reduction in the share of men working full-time hours has been almost entirely offset by an increase in the share of part-time work[36]. For instance, the share of females working part-time jobs as a proportion of total employment increased ten percentage points from 11.9 percent in 1978 to 21.8 per in 2016. During the same period, the share of males working part-time more than tripled (albeit

[36] In the Australian Bureau of Statistics (ABS) Labour Force Survey people are defined as employed part-time if they usually work less than 35 hours per week, and actually did so in the reference week for the survey, or usually work less than 35 hours per week and were away from work. Those people usually or actually working 35 hours or more per week are defined as employed full-time. Part-time employment is defined solely on the basis of hours worked, and does not depend on employee or employer perception of whether the person is full-time or part-time (see http://www.abs.gov.au/ausstats/abs@.nsf/products/08B16CB4B2E7F152CA2575E70019CA3B?OpenDocument)

from a low base), up from only 3.3 percent to 10.2 percent during the same period (ABS, 2016a).

Prior to reporting the findings for job quality by working time arrangements, an caveat is once again required when interpreting the results. As set out in section 4.8.4 in chapter four, the dimension of quality of work-life balance (D4) in the AJQI draws on information about hours of work. In particular, the sub-dimension of working time arrangements (D4A) draws on information about usual weekly hours and the number of hours usually worked in a four-week period. While different scoring is used, the same underlying information is incorporated into the sub-dimension of physical risk in the dimension of health and safety (D5). However, while re-codified scoring was used to construct the index and the dimension of quality of work-life includes many other indicators, part-time/full-time hours status is correlated with the overall index (r=.268), the dimension of work-life balance (D4) (r=-.309) and the sub-dimension of working time (D4A) (r=-.287). Part-time/full-time hours status is also correlated with the dimension of health and safety (D5) (r=-.105) and the sub-dimension of physical risk (D5A) (r=-.030).

Bearing the above caveat in mind, the **group working part-time hours has lower job quality than the group working full-time hours** (graph not shown). An independent-samples t-test comparing mean scores for those working **part-time and full-time hours** revealed a statistically significant difference in mean scores for job quality between the two groups (at the p=.000 level, two-tailed), where the average score for overall job quality for the group working part-time hours is 47.31 (SD: 18.88) and for the group working full-time hours it is 56.65 (SD: 14.34), where the magnitude of the difference in the means is -9.34 (CI: -9.36 to -9.32).

Salient here, is the fact that jobs with part-time hours comprise around one-third of the AJQI sample (35.92%), yet **part-time work is dominated by women**. Of relevance, some studies have found that the nature of part-time work in Australia is different (i.e. better quality) than part-time jobs in other countries (see Jefferson & Yu, 2015, for a review of the literature).[37] Furthermore, **casual contracts and part-time hours go hand-in-hand for many Australian workers**, in particular for women, where three-quarters of job-holders in the AJQI sample who work 1 to 15 hours per week (75.51%); and almost two-fifths (37.31%) of job-holders who work 16 to 34 hours per week are employed on casual contracts.

[37] For example, Abhayaratna and colleagues (2008) found that almost half of those working part-time hours in Australia worked short hours of less than 20 hours per week and that there is a high share of younger part-timers (15 to 24 years) and a slightly lower share of older part-timers (55 years or older) compared to a number of other countries. They also found a strong link between part-time working time arrangements and casual contracts of employment, that the group of part-time workers are more likely to work in low-skilled jobs, and that there is considerable movement into and out of part-time work.

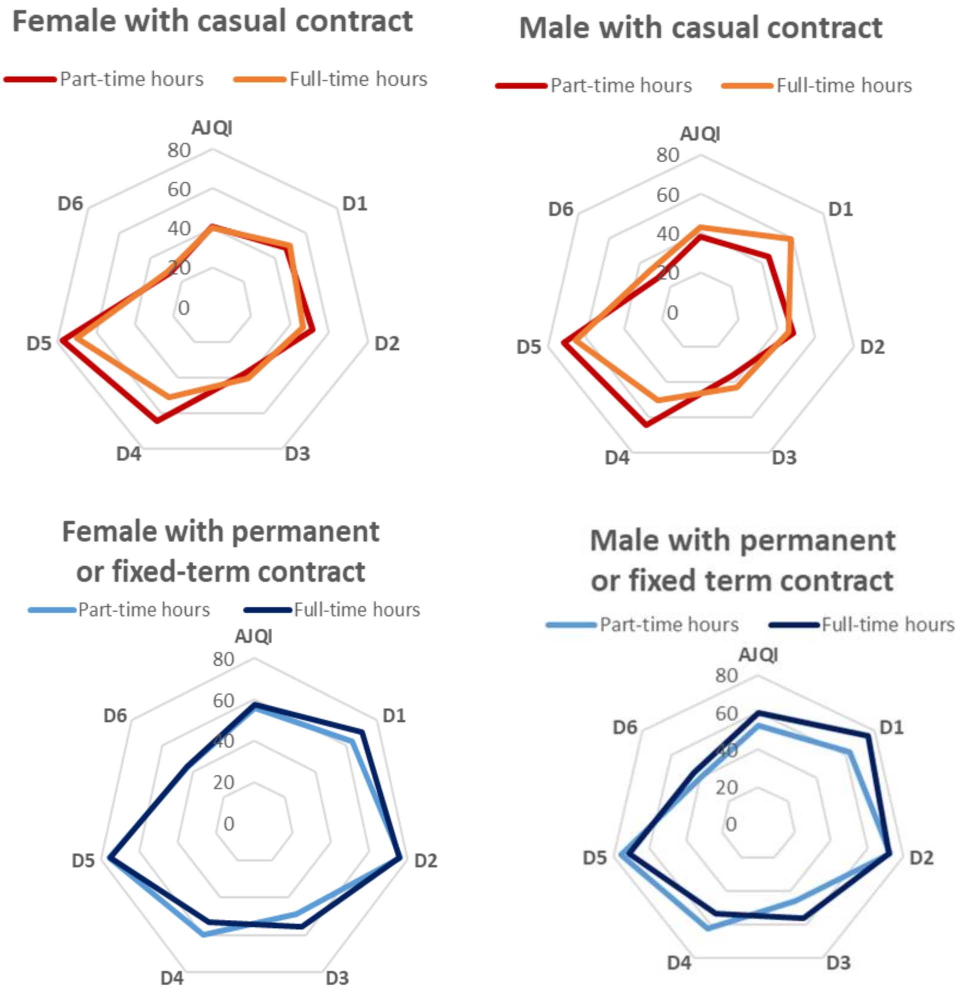
Bringing together the two aspects of **contract type and working time arrangements** helps in illustrating how contract status, more so than working time arrangements, appears to play an important role in influencing job quality in Australia. When compared to other configurations of contract type/working time arrangements, the group with **casual contracts and part-hours** have the lowest job quality and the group with **permanent or fixed-term contracts and full-time hours** have the highest job quality. The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in scores for each comparison for contract type and part-time/full-time hours status (at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level). Particularly large, the mean difference in scores between the **group with casual contracts and part-time hours** and the group with **permanent or fixed term contracts and full-time hours** is -18.10 (CI: -18.14 to -18.07).

Building on the picture about structural features of the Australian labour market, the radar chart in Figure 7.3.1.4 illustrates job quality by configuration of contract type and hours status by gender. **Males employed on casual contracts and who work part-time hours** have the lowest overall job quality and **males with permanent or fixed-term contracts and who work full-time hours have the highest level of job quality**. The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for job quality by **gender, contract type and part-time/full-time hours status**, at the p=.000 level. Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level). The mean difference in scores between **men with casual contracts and part-time hours** and **men with permanent contracts and full-time hours** is -18.10 (CI: -18.14 to -18.07). In addition, the mean difference in scores between **women with casual contracts and part-time hours** and **women with permanent or fixed-term contracts and full-time hours** is -16.95 (CI: -17.00 and -16.90).

In terms of differences at the dimension-level, while there are statistically significant differences between scores for all dimensions by gender/contract type/part-time and full-time hours status (all at the p=.000 level) and mean differences are statistically significant for almost all comparisons (at the p=.05 level), a number of findings particularly stand out.

Post-hoc multiple comparisons using the Tukey HSD test indicated that the mean difference in scores for **quality of pay** (D1) were statistically significant for all comparisons, all at p=.05 level. The largest mean difference in pay scores exists for **females with casual contracts and part-time hours** and men with permanent contracts and full-time hours is -28.05 (CI: -28.12 to -27.98). Furthermore, post-hoc multiple comparisons using the Tukey HSD test indicated that the mean difference in scores for **quality of intrinsic characteristics of work** (D3) were statistically significant for all comparisons, all at p=.05 level. The largest mean difference in scores for intrinsic characteristics of work exists for **females with casual contracts and part-time hours** and **males with permanent contracts and full-time hours** at -18.70 (CI: -18.76 to -18.63). A similarly large gap exists between mean difference in scores for intrinsic characteristics of work for **females with casual contracts and part-time hours** and **females with permanent contracts and full-time hours** is -17.95 (CI: -18.02 to -17.88).

Figure 7.3.1.4: Radar chart showing job quality by contract status, hours status and sex, mean



Another form of non-standard work is where a worker is **employed via a labour hire firm** (also called temporary agency work), rather than being employed directly by the employer. Employment of workers through labour hire firms expanded rapidly in the early 1990s. Concerns about the implication for this type of employment are well-documented (see for example, Hall, 2000, 2002; Laplagne, Glover & Fry, 2005). As Laplagne and colleagues (2005) explain, it is sometimes argued employers use labour hire firms to renege on their responsibilities by substituting directly hired workers with labour hire workers.

While only 2.5 percent of the sample is employed through a labour hire firm, an independent-samples t-test was conducted to compare job quality scores for those who are **employed**

through a labour hire firm and those who are **directly employed**. There was statistically significant difference in scores, where the mean difference of -7.43 (at the p=.000 level, two-tailed, CI: -7.50 to -7.37) is statistically significant, at the p=.000 level. The mean for those employed through a labour hire company is 46.06 (SD: 16.72) and for the directly employed it is 53.50 (SD: 16.67). Relevantly, a much higher proportion of those employed through a labour hire firm are engaged on fixed-term contracts (23.6%) compared to the directly employed (8.9%); and the rate of casual employment among this group is much higher (53.3%) than it is for the directly employed (23.3%).

7.3.2. Institutional arrangements

Historically, the Australian trade union movement could be characterised as playing a strong role in decision-making, however a raft of recent legislative changes has curbed union power, including restricting their ability to enter workplaces to visit members and recruit, making it illegal to take industrial action during the life of a collective agreement, making 'sympathy' strikes unlawful (i.e. secondary boycotts); and reducing their ability to use the industrial tribunals to mount test cases.

Like the employment relations system itself, the Australian union movement was 'highly masculinised', and as such, in the past it has been accused of relegating women's issues to a lower place on the bargaining agenda (Baird, 2005). With feminisation of the labour force, the Australian union movement has reoriented its focus to broaden its appeal to women, immigrants, and younger workers. However, union power is highly contingent on the political orientation of the government in power, where that landscape – particularly during the period 1996 to 2007 – presented significant challenges to unions, at the same time as they attempted to respond to an increasingly fragmented, and precarious, workforce.

While unions continue to play an important role in protecting and negotiating pay and working conditions, density is much lower now than it was thirty years ago. For instance, in 2013 overall trade union density was at 17.0 percent, compared to 40.5 percent in 1990. During the period from 1990 to 2013, union density in the private sector more than halved (down from 30.8% to 12.0%) while density in the public sector fell by 25.1 percentage points (from 66.8% to 41.7%) (ABS, 2016c). In 2013, male trade union density was slightly lower than female union density (16.3% compared to 17.8%). The three industries with the highest trade union density in 2013 were education and training (37.0%), public administration and safety (33.7%) and electricity, gas, water and waste services (28.5%) (ABS, 2016c). While density was highest among the occupations of machinery operators and drivers (26.4%), professionals (23.7%) and community and personal service workers (21.8%) (ABS, 2016c).

Of particular relevance to this thesis (because the scores for quality of voice and collective interest representation in the AJQI are particularly low), the notion of individual voice is not a feature of the Australian system. Unlike in many European countries, there are typically no channels beside union representation for voice and representation, such as works councils (Murray & Stewart, 2015).

Reporting the findings for job quality by union membership presents a challenge. As set out in section 4.8.6 in chapter four, the sub-dimension of collective interest representation (D6B) in the AJQI draws on information about union membership of trade unions and other employee associations. Relevantly, the original HILDA variable used in D6B of the index captures a broader notion of collective representation than strict (ABS-defined) union membership, as it also includes membership of other types of employee associations, such as professional bodies. Re-codified of scoring for this broader notion of collective interest representation scoring was used to construct the index and two further indicators (voice and coverage of a collectively-bargained agreement) were incorporated into the dimension (D6). Nevertheless, the narrower, strict (ABS-defined) trade union membership variable (used to report results below) is correlated with the overall index (r=-.215), the dimension of voice an collective interest representation (D6) (r=-.568), and the sub-dimension of collective interest representation (D6B) (r=-.732). For this reason, difference in job quality by union membership must be interpreted with caution.

With the above caveat in mind, the mean for the group of ABS-defined trade union members is 60.35 (SD: 12.39) and the mean for the group who are not trade union members is 51.46 (SD: 17.22). An independent-samples t-test indicates a statistically significant difference in job quality scores for **trade union members and those who are not**, where the mean difference is 8.89 (at the p=.000 level, two-tailed, CI: 8.87 to 8.91). When looking at those dimensions in the index that do not draw on information about union membership, several observations are made.

For **quality of pay (D1)**, the mean is higher for union members at 73.00 (SD: 18.86) than it is for non-union members, at 64.12 (SD: 24.60). An independent-samples t-test indicates a statistically significant difference in pay scores for trade union members and those who are not, where the mean difference is 8.88 (at the p=.000 level, two-tailed, CI:8.85 to 8.91).

For **quality of employment (D2)**, The mean for union members is 74.61 (SD: 13.40) and for non-union members the mean is 66.43 (SD: 16.10). An independent-samples t-test indicates a statistically significant difference in quality of employment scores for trade union members and those who are not, where the mean difference is 8.18 (at the p=.000 level, two-tailed, CI: 8.16 to 8.20).

Conversely, **quality of work-life balance** (D4) is lower for trade union members (M: 50.11; SD: 20.29) than for non-union members (M: 58.13; SD: 14.10). An independent-samples t-test indicates a statistically significant difference in work-life balance scores for trade union members and those who are not, where the mean difference is -8.02 (p=.000, two-tailed, CI:-8.04 to -8.00). And **quality of health and safety** (D5) is also lower for union members (M: 68.32; SD: 13.29) compared to non-union members (M: 74.71; SD: 12.99). An independent-samples t-test indicates a statistically significant difference in health and safety scores for trade union members and those who are not, where the mean difference is -6.40 (at the p=.000 level, two-tailed, CI:-6.42 to -6.37). The scores for **quality of intrinsic characteristics of work** (D3) were similar for the two groups.

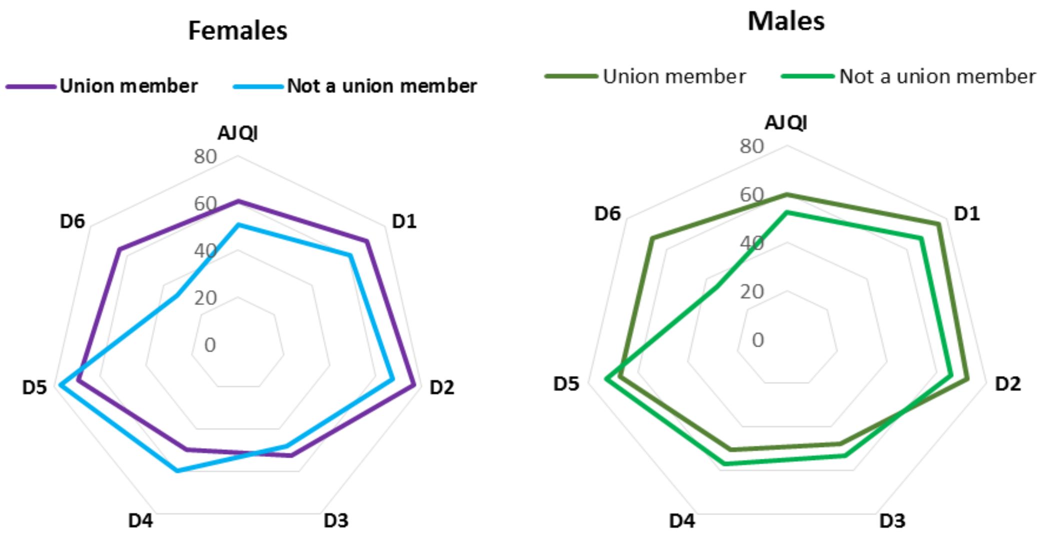
Relevantly, while just over one-fifth of job-holders (20.73%) are trade union members, the level of membership is higher for women than men (21.69% & 19.76%) and it is considerably higher in the public compared to the private and not for profit (NFP) sectors (43.08%; 13.02% & 22.65%, respectively).

The radar charts shown in Figure 7.3.2.1, below, show job quality by union membership status for women and men. From the charts it can be seen that job quality for the group of females and the group of males who belong to a union are similar to one another.

For **women**, job quality is higher for trade union members (M: 60.65; SD: 11.74) compared to those women who are not union members (M: 50.44; SD: 17.86). An independent-samples t-test indicates a statistically significant difference in job quality scores for male trade union members and those men who are not union members, where the mean difference is 10.21 (at the p=.000 level, two-tailed, CI:10.18 to 10.24).

Similarly, **for men**, job quality is higher for the group of trade union members (M: 60.03; SD: 13.03) than for the group of men who are not union members (M: 52.42; SD: 16.53). An independent-samples t-test indicates a statistically significant difference in job quality scores for male trade union members and those men who are not union members, where the mean difference is 7.62 (at the p=.000 level, two-tailed, CI:7.59 to 7.65).

Figure 7.3.2.1: Radar charts for job quality by union membership by sex, mean



In the next part, job quality by **pay-setting arrangement** is reported. It must be said, that pay-setting arrangements in Australia are complicated. There is a myriad of different types of pay-setting arrangements, and because of the complexity, many employees are unsure about how their pay and working conditions are set. Furthermore, unlike in some European countries where industry-wide agreements are negotiated, in Australia, collective agreements are typically now negotiated at the enterprise or workplace level. Further to this, the historically influential role played by unions in negotiating industry-wide improvements in pay and working conditions via a highly centralised award system has been dismantled in favour of a more decentralised approach, where primacy is placed on direct negotiations at the enterprise level, often without union-involvement. As a consequence, a growing number of Australian employees are not covered by either a collectively-bargained agreement, or an award. In 2014 (at the time wave 14 of the HILDA survey was administered), employees who were not covered by either an enterprise agreement or an award were reliant on a set of five statutory minimum standards known as the Australian Fair Pay and Conditions Standard (AFP&CS, since replaced by 10 National Employment Standards, the NES).

The weakening in some of the protective features of the Australian employment relations system has seen the gap between the minimum rates of pay in awards and the pay rates in collective agreements widen (Johnstone & Stewart, 2015). Premia for unsocial hours of work are under attack, particularly in the low wage industries of hospitality, entertainment, retailing, restaurant and cafes sectors (Forsyth, 2016).[38]

[38] In July 2017, the federal employment tribunal, Fair Work Australia handed down a decision as part of its four year review of awards, affecting penalty rates for some permanent and casual employees working on Sundays, public holidays, evenings or after midnight. This decision has also set precedent for

From an institutional perspective, the findings reported below are important, because they provide a clue as to whether the reforms that have been introduced in the Australian employment regime (prior to 2014) have flowed on to influence the quality of jobs. Without undertaking an analysis of change over time, they remain, however, only indicative.

In light of the complexity of the system, the HILDA survey distinguishes between four main types of pay-setting arrangement: collective agreement; combination of collective agreement and individual contract; individual contract; and the minimum rate of pay that is specified in an award or AFPC&S. Hereafter, for simplicity, the category of pay set at exactly the award rate or AFPC&S will be referred to as pay set at minimum rate[39] and the two categories of collective agreement, and collective agreement with an individual contract have been combined. Given the complexity of the system, it is not surprising to find that many employees, particularly younger workers and those not born in Australia, do not understand how their pay is determined. Nevertheless, for the purposes of studying job quality (i.e. a multi-dimensional construct comprised of more than merely pay), the way a person's pay is set also serves as a reasonably good indication as to how their working conditions are set. [40]

As was the case in reporting findings for job quality by union membership, findings for job quality by pay-setting arrangement need to be interpreted with caution. As set out in section 4.8.6 in chapter four, the sub-dimension of collective interest representation (D6B) in the AJQI draws on information about method of pay-setting. Re-codified of scoring for the indicator of collective interest representation (D6B2) was used to construct the index and two further indicators (voice and membership of a union or employee association) were incorporated into the dimension (D6). Nevertheless, the original HILDA variable for pay-setting (used to report results below) is correlated with the overall index (r=-.343), the dimension of voice an collective interest representation (D6) (r=-.462), and the sub-dimension of collective interest representation (D6B) (r=-.495).

Setting aside the group who do not know how their pay is set, job quality is highest for the group where pay is set by a **collective agreement** (M: 60.22; SD: 12.48) and lowest for the group where **pay is set at the minimum rate** (M: 44.53; SD: 17.84). Job quality for the group

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removal of penalty rates from other awards (see https://www.fairwork.gov.au/pay/penalty-rates-and-allowances/penalty-rates-changes-2017).

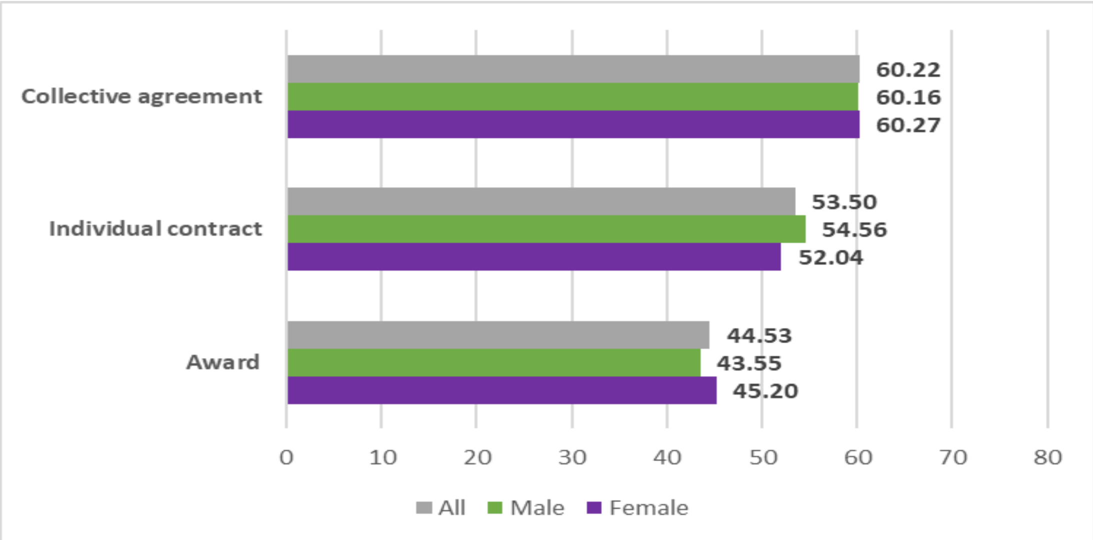
[39] Keeping in mind there is not one minimum rate, but thousands, as there are 122 federal awards, each containing a hierarchy of pay rates based on skill/experience/qualifications. In addition, there are hundreds of state-based awards, also containing multiple rates of pay.

[40] In order to reduce some of the ambiguity, the HILDA survey question deliberately asks employees about how their pay is set (as opposed asking them about their pay and working conditions). This is because employees can be covered by more than one type of arrangement. For example, an employee might have an individual common law contract specifying their rate of pay alongside a collective agreement that serves as the basis for setting their working conditions. Also because many Australians (incorrectly) use the terms award and agreement interchangeably.

with **individual contracts** falls in between the two other groups (M: 53.50; SD: 15.91) (see Figure 7.3.2.2 below). The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for job quality by **method of pay-setting (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level), where the mean difference in scores between the group who have their **pay set by an award** and the group who have their **pay set by a collective agreement** is -15.68 (CI: -15.71 to -15.66). In addition, the mean difference in scores between the group who have their pay set by an **individual contract** and the group who have their pay set by a **collective agreement** is -6.71 (CI: -6.74 to -6.68).

In addition, there is a statistically significant difference in mean scores for job quality by **method of pay-setting by sex (**at the p=.000 level, two-tailed). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level). The mean difference in scores between **men and women who have their pay set by an award** is small, yet statistically significant, at -1.65 (CI: -1.71 to -1.60). This finding is consistent with previous research that suggests the award system is protective for women. The mean difference in scores between **men and women who have their pay set by an individual contact** is very small (yet statistically significant), at -.12 (CI: 2.47 to 2.56), while the mean difference in scores between **men and women who have their pay set by a collective agreemen**t is (CI: to -.16 to -.07).

Figure 7.3.2.2: Job quality by pay-setting method by sex, mean



Comparing the difference in job quality for women and men according to the different pay-setting arrangements does not provide the full picture because women and men do not tend to have their pay set in the same way. While a similar share of women and men have their pay set by a collective agreement (36.4% & 36.5% of men); a much lower proportion of women have their pay set by an individual contract (30.7% & 40.8%); a much higher proportion of women are paid at the minimum rate (29.1% & 19.0%).

When the AJQI's dimension of quality of pay (i.e. D1) is examined by **pay-setting arrangement**, the group where pay is set by a collective agreement have the highest quality of pay (M: 71.03; SD: 20.32) and the group who are paid at the minimum rate have the lowest quality of pay (M: 55.16; SD: 25.27) (figure not shown). The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for pay by **method of pay-setting, (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level). The mean difference in scores between **the group who have their pay set by an award** and **those who have their pay set by a collective agreement** is -15.87 (CI: -15.91 to -15.82). Relevantly, Wright and Buchanan (2013) found award-reliance to be high among larger private sector organisations and that lower-skilled occupational groups, apprentices, and those employment on a casual basis were the most common categories of employees paid award rates.

For **quality of intrinsic characteristics of work** (D3), scores are higher for those **on individual contracts** (M: 56.67; SD: 20.72) than for those on **collective agreements** (mean: 50.70; SD: 20.71) and award rates (M: 42.38; SD: 19.99). The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for intrinsic characteristics of work by **method of pay-setting (**at the p=.000 level, two-tailed). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level). The mean difference in scores between **the group who have their pay set by an individual contract** and **the group who are paid minimum rates** is 14.29 (CI: 14.25 to 14.33).

As the policy emphasis at the national level has shifted from centralised fixing of pay and conditions to decentralised enterprise-based bargaining, conditions can now be traded off against wage increases (Murray & Stewart, 2015: 49). Van Gellecum and Baxter (2008) argue that the neoliberal philosophies that increasingly inform Australian employment policies are likely to disadvantage vulnerable workers and further entrench the under-valuation of feminised work. Related, collectively bargaining is uncommon in small firms, where employers tend to either pay the minimum (award) rate or, for more skilled workers, they typically use individual contracts. It is not surprising to find that there is mixed evidence at the international-level about whether job quality should vary with firm size (Bryson, Erhel & Salibekyan, 2017).

7.3.3. Occupation

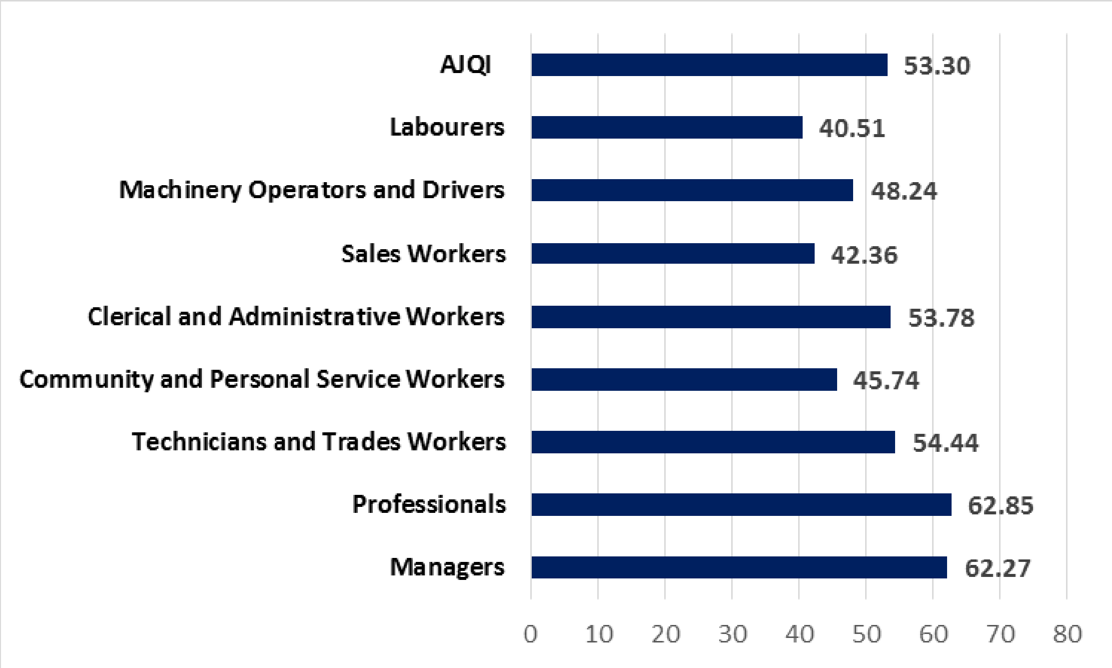
Turning to job quality by major occupational group, ANZSCO classifies jobs into eight major occupational groupings: managers; professionals; technicians and trades workers; community and personal service workers; clerical and administrative workers; sales workers; machinery operators and drivers; and labourers (ABS, 2006a).

Importantly, as set out in section 4.8.3 in chapter four, the quality of intrinsic characteristics of work (D3) in the AJQI draws on information about the skill level of jobs. Scoring for objective skill (D3AObj) mapped the eight major occupational groups in ANZSCO back to five skill levels. The five levels are defined by reference to formal education, experience and on-the-job training for any given occupation, where skill level 1 is the highest (managers and professionals) and skill level 5 is the lowest (labourers) (ANZSCO, 2006a). While the sub-dimension of skills (D3A) in the AJQI also incorporates indicators for subjective skills (D3ASub), the variable for ANZSCO major occupational group is correlated with the overall index (r=-.422), the dimension of voice an intrinsic characteristics of work (D3) (r=-.662), and the sub-dimension of skills (D3A) (r=-.823). So the results for job quality by major occupational group need to interpreted with caution.

This being so, skill level alone does not explain all of the variation in scores. The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for **job quality by occupation (**at the p=.000 level, two-tailed). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at p=.05 level). The largest mean difference in scores is between **professionals and labourers** is 22.34 (CI:22.28 to 22.39). This is followed by a mean difference in scores between **professionals and sales workers** of 20.48 (CI: 20.43 to 20.54) and **professionals and community and personal service workers** of 17.10 (CI: 17.05 to 17.15).

The highest score for job quality is for **professionals** (M: 62.85; SD: 11.72); followed by **managers** (M: 62.27; SD: 12.42); **technicians and trades workers** (M: 54.44; SD: 13.63); **clerical and administrative wor**kers (M: 53.78; SD: 15.80); **machinery operators and drivers** (M: 48.24; SD: 14.36); **community and personal service workers** (M: 45.74; SD: 16.12); **sales workers** (M: 42.36; SD: 15.99); while **labourer jobs** have the lowest job quality (M: 40.51; SD: 17.28) (see Figure 7.3.3.1).

Figure 7.3.3.1: Job quality by ANZSCO Major Occupation Group, mean



As many occupations are highly gendered, a more fine-grained analysis is required to unpack potential within and between group differences in job quality and its six dimensions by occupation.

7.3.4. Sector, workplace size and industry of employment

The sector of employment has been found to be linked to the quality of jobs (Considine & Callus, 2001; Eurofound, 2014). Relevantly, women are more likely than men to work in the public sector and the not for profit (NFP) sector while men are more likely than women to work in the private sector.

In terms of the role of the public sector, while Australia was one of the few OECD countries where employment levels in the public sector experienced a moderate growth between 2008 and 2014, the share of public sector employment as a percentage of total employment (18.4% in 2013) remains below the OECD average (OECD, 2015). During the 1970s and 1980s, the Australian public sector was considered to be a 'model' employer, however from the 1980s onwards, the ethos of 'New Public Management' gained pace so its role as a model employer has progressively decreased as services have been outsourced and budgets cut (Williamson, 2016). While public sector pay and conditions are generally good, gains have been made via collective bargaining, rather than via government policy.

Overall quality of jobs for the AJQI is highest for the **public sector** (M: 60.65; SD: 13.90); followed by the **not for profit sector** (M: 57.66; SD: 13.85); and where it is lowest for the **private sector** (M: 50.37; SD: 16.98) (figure not shown). The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for job quality by sector (at the p=.000 level, two-tailed). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at the p=.05 level). The largest mean difference in scores is between the **private sector and public sector**, at -10.28 (CI:-10.31 to -10.25). The mean difference is scores between the **private sector and not for profit sector** is -7.29 (CI: -7.33 to -7.24).

At the level of individual dimensions, tests show statistically significant differences in means for all dimensions, at the p=.000 level). For **quality of pay** (D1), post-hoc tests indicate statistically significant differences in means for all comparisons for all dimensions. The mean difference between jobs in the private sector and jobs in the public sector is -10.99 (CI: -11.03 to -10.95). For **quality of voice and collective interest representation** (D6), the mean difference between jobs in the private sector and jobs in the public sector is -19.09 (CI: -19.13 to -19.06).

Public sector workplaces are typically large, which brings the discussion to the factor of whether job quality varies by **size of the workplace**. Results from the AJQI indicate that the **quality of jobs in Australia generally increases as the size of the workplace increases**, where it is highest for **workplaces with 500 or more workers** (M: 59.95: SD: 13.74) followed by workplace with **100 to 499 workers** (M: 56.60; SD: 14.81) then workplaces with **20 to 99 workers** (M: 52.82; SD: 16.61). Job quality is lowest for workplaces where there is **only one worker**[41,42] (M: 48.81; SD: 18.42) and workplaces with **2 to 19 workers** (M: 49.38; SD: 17.67) (figure not shown). The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for **job quality by workplace size (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at the p=.05 level). The mean difference is scores between the workplaces with **500 or more workers** and **one person is 11.15** (CI: 11.02 to 11.28) while the mean difference is scores between the **workplaces with 500 or more workers** and 2 to 19 workers is 10.57 (CI: 10.53 to 10.62).

Linkages between job quality and the **industrial composition** have also been found. As mentioned earlier in this thesis, the Australian workforce is highly gendered, both in terms of

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[41] Inspection of the characteristics of workers in one-person workplaces reveals around two-fifths are female (57.58%); one-in-three are not pay-as-you-earn (PAYE) taxpayers; one-quarter describe themselves as independent contractors (despite responses to other questions indicating otherwise); and they are spread across most industries and occupational groups. Interestingly, there is little difference in the proportions of women and men that are employed in firms according to workplace size.

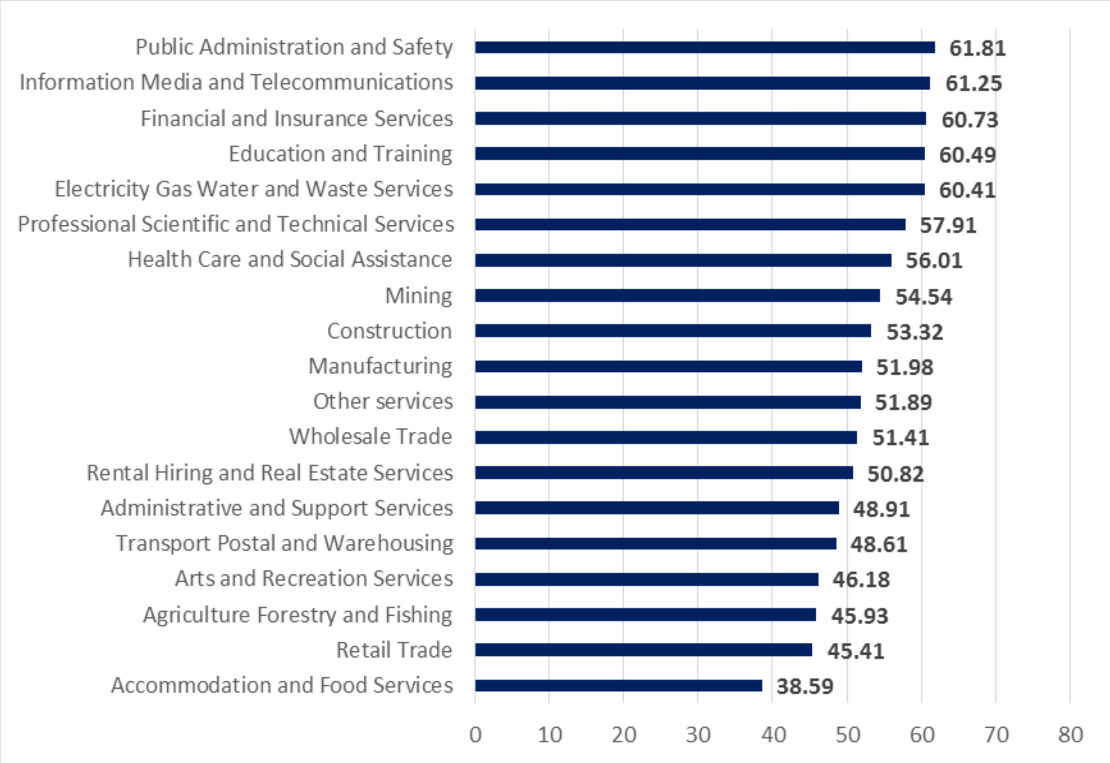
[42] In Australia, PAYE is deducted from pay by the employer and is remitted to the government. It is one indicator of whether a worker is genuinely self-employed or an employee, where self-employed typically submit business income activity standards rather than PAYE.

which industries women and men tend to work in, as well as the actual number of jobs held by the different sexes. In Appendix 11.7, Figure 11.7.1 shows the share of total employment by industry, Figure 11.7.2 shows the female share of total female employment by industry and Figure 11.7.3 shows the male share of total male employment by industry.

Figure 7.3.4.1, below, shows job quality ranked from highest to lowest by **ANZSIC major industry group** where it can be seen that overall job quality is highest in **public administration and safety** (M: 61.81; SD: 14.10); closely followed by **information, media and telecommunications** (M: 61.25; SD: 13.40); **financial and insurance services** (M: 60.73; SD: 13.10); **education and training** (M: 60.49; SD: 14.29); and **electricity, gas, water and waste services** (M: 60.41; 13.25). While job quality is lowest, on average, in **accommodation and food services** (M: 38.59; SD: 17.86); followed by **retail trade** (M: 45.41; SD: 17.30); **agriculture, forestry and fishing** (M: 45.93; SD: 19.30); **arts and recreation services** (M: 46.18; SD: 20.69); and **transport, postal and warehousing** (M: 48.61; SD: 16.36).

The results from a one-way analysis of variance, ANOVA revealed a statistically significant difference in mean scores for job quality by **ANZSIC major industry group (**at the p=.000 level). Post-hoc multiple comparisons using the Tukey HSD test indicated statistically significant differences in means for all comparisons (all at the p=.05 level), except for the group comparison between manufacturing and other services, and between electricity, gas, water and waste services and education and training (where neither mean difference for these comparisons are not statistically significant). Mean difference in scores between the jobs in **accommodation and food services** and many of the other industries are considerable, where the largest mean difference for this industry is with **public administration and safety**, at 23.22 (CI: -23.32 to -23.12).

Figure 7.3.4.1: Job quality by ANZSIC Industry Division, mean



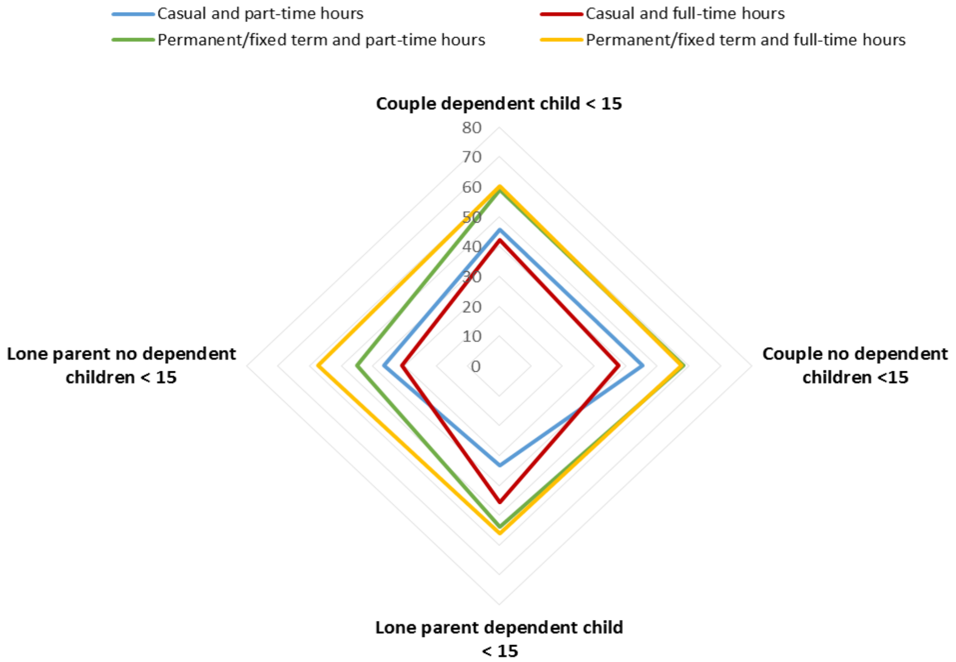
7.4. Further exploring the gendered nature of work

Many aspects of the Australian employment regime are inter-related. For example, part-time work is associated with casual contracts of employment; where both part-time and casual work are more likely to be undertaken by women; and low pay is prevalent in the service sector, and in particular, in occupations and industries where females have a high share of employment. In this section, findings initially reported in chapter six are extended from a focus on personal and household characteristics to incorporate additional characteristics about the job and workplace. The findings reported in this break-out analysis are restricted to the group of working mothers.

The Australian employment relations system has been variously characterised as gender blind, highly masculinised, operating under the paradigm of the male breadwinner model, and having a lack of gender sensitivity (see for example, Baird, 2005; Baird, Frino & Williamson, 2009). For instance, the principle of 'comparative wage justice' that was enshrined in the award system at inception, is based on the male breadwinner model (Isaac, 1967 cited in Murray & Stewart, 2015: 43). On the one hand, and as mentioned earlier in section 7.2, the applying of wage relativities across all industry awards has enshrined under-valuation of feminised work. On the other hand, it has, to a certain extent, shielded women against the possible harsh effects of an unregulated labour market.

When household living arrangements and contract type are simultaneously taken into consideration, overall job quality is lowest for the group of **working mothers who are lone parents with casual contracts and who work part-time hours** (M: 34.80; SD: 18.44). Job quality is highest for **coupled working mothers who have permanent/fixed-term contracts and who work full-time hours** (M: 60.03; SD: 14.21). For each of the four configurations of contract type/working time arrangement, job quality is higher for working mothers in coupled households when compared to lone parents (see Figure 7.4.1.1).

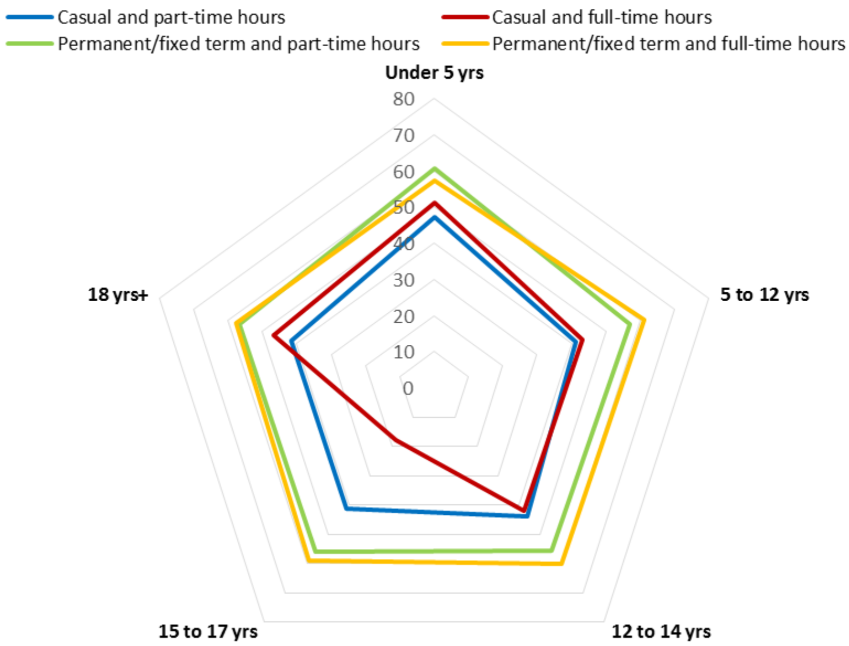
Figure 7.3.4.1: Overall job quality for working mothers by household relationship status, contract status and hours status, mean



Second, the nexus between **contract type and working time arrangements** is explored in relation to job quality among working mothers based on the age of their youngest child.[43] Overall job quality is lowest for the group of **working mothers who have casual contracts, part-time hours, and where their youngest child is aged 5 to 12** (i.e. primary-school aged, M: 39.71; SD: 18.18) and highest for **working mothers who have permanent or fixed-term contracts, full-time hours, and where their youngest child is aged 5 to 12 years** (M: 60.85; SD: 12.21). Noteworthy, for the group of working mothers where their youngest child is aged under 5, job quality is higher for mothers who have permanent contracts/part-time hours than it is for the other configurations of contract type/working time arrangements (see Figure 7.4.1.2).

[43] The sample of females with casual contracts and who work full-time hours is small (3.33%) so disaggregation to consider job quality according to the age of their youngest child is not reliable.

Figure 7.3.4.2: Overall job quality for working mothers by contract status, hours status and age of youngest child, mean



A topic of particular interest is the ability (or otherwise) of working mothers to balance their work and family responsibilities. On this, Baird (2011) argues that unlike the UK and most European countries, the state in Australia has not been particularly active in the area of work and family policy. Until quite recently, this was considered a matter for direct negotiation and agreement between individual employers and individual employees. Connected to the previous point, until very recently (i.e. 2011), at the national level Australian employees had no statutory rights to request flexible work arrangements and there was no mandated paid maternity or paternity leave. Then in 2011, the Australian Government (finally) introduced a paid parental scheme, where eligible working mothers are now entitled to 18 weeks leave paid at the national minimum wage. In addition, eligible working fathers and partners (including same sex partners) are entitled to two weeks leave paid at the national minimum wage. In addition, the strengthened NES includes a right to request part-time hours for parents with children under school-age.

When **quality of work-life balance** (D4) is considered by household living arrangement (see Figure 7.4.1.3, below), it is lowest for the group of working mothers who are **lone parents with dependent children under the age of 15, who have permanent or fixed-term contracts, and who work full-time hours** (M: 48.41; SD: 13.33). While quality of work-life balance is highest for working mothers in **coupled households with dependent children under the age of 15 who have casual contracts and who work part-time hours** (M: 63.16; SD: 13.56).

Figure 7.3.4.3: Quality of work-life balance for females by household living arrangement, contract status and hours status, mean

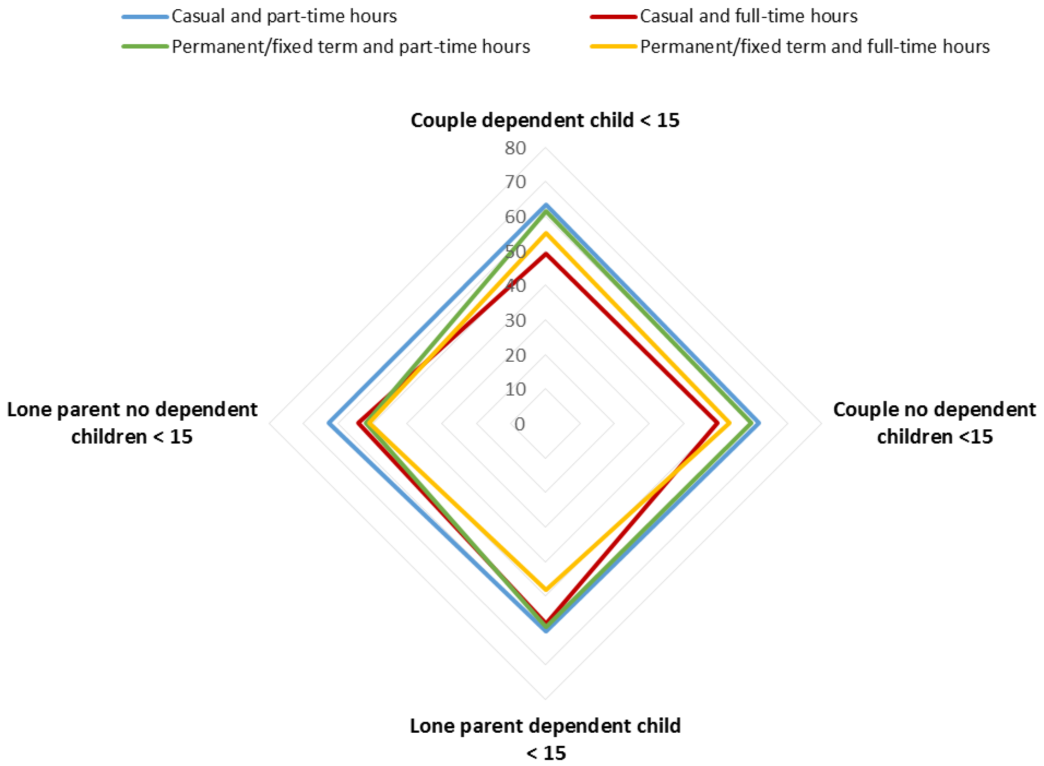
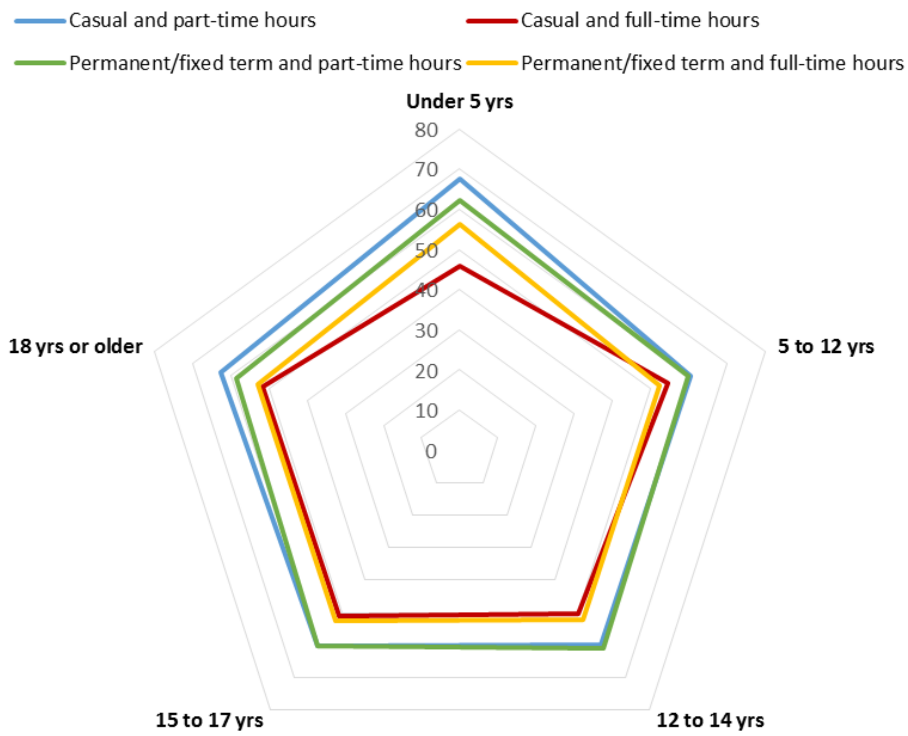


Figure 7.4.1.4, below, shows scores for quality of work-life balance for working mothers, where quality of work-life balance is lowest for the group of **working mothers with casual contracts, full-time hours and where their youngest child is aged under 5** (i.e. below school-age) (M: 46.43; SD: 13.96). Quality of work-life balance is highest for the group of working mothers who have **casual contracts, who work part-time hours and where their youngest child is aged 18 or older** (M: 63.92; SD:17.95).

Figure 7.3.4.4: Quality of work-life balance for working mothers by contract status, hours status and age of youngest child, mean



To progress towards a more comprehensive picture about job quality in Australia, it is necessary to undertake multi-variate analysis. While this is beyond the scope of this thesis, the preliminary analysis reported in the above sections, as well as in the previous chapter, provide initial insights into those job and workplace characteristics that, along with certain job-holder characteristics, appear to be important factors affecting job quality.

7.5. Sub-dimensions in focus

In this section, five particular sub-dimensions of the AJQI are picked out for closer inspection: **development opportunities; autonomy; work intensity; voice; and collective interest representation**. As foreshadowed in the introduction, the reason for choosing these five aspects is because they were identified in chapter five as having relatively low quality in comparison to other sub-dimensions in the AJQI. As such, they merit a closer look.

7.5.1. Development opportunities

The first aspect that was selected for a more fine-grained analysis is the sub-dimension of **development opportunities**. In the nested structure of the AJQI, it is one of the two aspects in the dimension of quality of employment, where the second sub-dimension is contractual stability. The mean score for development opportunities (D2B) is 43.29 (SD: 16.15) which is much lower than the mean for contractual stability (D2A) of 76.40 (SD: 19.44), and where the mean for the dimension (D2) is 68.12 (SD: 15.93).

The sub-dimension of development opportunities is comprised of indicators for incidence and duration of work-related training, with the extremely low mean of 14.54 (SD: 23.91) as well as satisfaction with employment opportunities, which has a much higher mean of 72.57 (SD: 18.75). The divergence in scores between these two elements begs the question of why workers seem to be so satisfied with their employment opportunities when their employers do appear to provide them with training. It must be acknowledged though, that workers self-reported on whether they actually attended training. This is not the same as whether training opportunities are available to them. Second, on-the-job training is sometimes provided. The indicator only captured whether a worker had attended training courses, so it does not capture informal, on-the-job training.

While space does not permit results from significance testing, categories with over-representations of high scores for development opportunities[44] are found for: jobs at the highest skill level, in particular professionals; in the public sector in education and training; and health care and social assistance; job-holders with relatively high educational qualifications; jobs with full-time and long hours; larger workplaces; and union members. In contrast, categories with over-representations of relatively low scores for development opportunities are found for: jobs in the private sector; jobs with casual employment contracts; labourers; jobs with working arrangements of 1 to 15 hours a week; job-holders with relatively low educational qualifications; in small workplaces; and those who are not union members.

In summary, a lifelong or career-long 'training culture' does not seem to be evenly spread across all Australian firms. Given the rapid rate of technological change and scenarios about a future where workers will be replaced by automation and robotisation, work-related training is an important aspect of job quality. The findings from the AJQI suggest that formal, work-related training is largely undertaken by highly skilled workers who are employed in large, and public sector workplaces. Of course, formal training is not the only pathway to promotion, however these findings do not bode well in terms of national ambitions to improve skills and productivity.

7.5.2. Autonomy

The second aspect that was selected for closer inspection is the sub-dimension of autonomy (D3B). In the nested structure of the AJQI, it forms one half of the dimension of intrinsic characteristics of work, where the other sub-dimension is skills. As reported in chapter four, in comparison to other sub-dimensions, the mean score for autonomy is low at 47.46 (SD: 24.25) compared to the mean for skills (D3A) of 53.76 (SD: 26.90). The sub-dimension of autonomy is

[44] Categories may overlap.

comprised of indicators about decision-latitude, i.e. ability to influence what, when and how work is done. While autonomy is subjective in nature, whether a worker feels able to influence their own work is arguably just as important as whether, in reality, they actually can.

While space does not permit results from significance testing, categories with over-representations of relatively high scores for autonomy[45] tend to be found for: jobs held by men; managers; jobs where pay is set by an individual contract; jobs with full-time hours; jobs in the information, media and telecommunications industry; job-holders with relatively high educational qualifications; jobs in one-person workplaces; and jobs where the job-holders are not trade union members. While categories with over-representations of relatively low scores for autonomy are found for; jobs where the job-holder is paid exactly the award rate; casual jobs; jobs where the job-holder works 1 to 15 hours per week; sales jobs; community and personal service jobs; jobs in retail trade or accommodation and food services industries; jobs in workplaces with 20 to 99 workers; and where the job-holder is a trade union member.

Autonomy has been linked to motivation, initiative, learning new skills, taking on new responsibilities, and worker well-being, so it problematical that a large proportion of Australian workers, particularly those employed in the fast growing service sector feel like they have very little autonomy in their jobs.

7.5.3. Work intensity

The third aspect that was selected for a more disaggregated analysis is the sub-dimension of work intensity (D4B). In the nested structure of the AJQI, work intensity sits in the dimension of work-life balance (D4), along with the other sub-dimension of working time (D4A). As reported in chapter four, the sub-dimension of work intensity has a relatively low overall average score when compared to other components of the AJQI, where the mean is 42.08 (SD: 22.29) compared to a mean of 61.02 (SD: 16.53) for working time and 56.47 (SD: 14.46) for overall work-life balance. The sub-dimension of work intensity was constructed with indicators aimed at capturing aspects concerning the pace and workload pressure of jobs.

While space does not permit results from significance testing, categories with over-representations of high scores for work intensity (i.e. less work intensification)[46] are found amongst those in lower skilled jobs; jobs where the job-holder works 1 to 15 hours a week; jobs where the job-holder has lower educational qualifications; jobs with casual contracts; jobs in the transport, postal and warehousing industry; machinery operators and driver jobs; and jobs in one-person workplaces. While categories with over-representations of low scores for

[45] Categories may overlap.
[46] Categories may overlap.

work intensity (i.e. higher work intensification) are found for the following groups: jobs with fixed-term contracts; higher skilled jobs, particularly managerial jobs; where the job-holder works longer hours, particularly those in jobs where they work 50 or more hours a week; jobs in larger workplaces; jobs in the public sector; and jobs in the financial and insurance services industry.

Excessive workloads can result in more workplace accidents and work-related deaths, higher absenteeism and higher sickness levels, all of which result in costs for individuals, companies and/or the government (Felstead, Gallie, Green & Inanc, 2012). One driver of work intensification is thought to be technological change, much of which is said to be 'effort-biased', that is, the new technologies enable work to be done more intensively. Other drivers are thought to include increased competitiveness, rising levels of unemployment, and shifts in the balance of power between employers and employees (Felstead et al., 2012). In Australia, it seems that some groups of workers, and certain parts of the economy, feel the pressures of work intensification more than others.

7.5.4. Voice

Employee involvement and participation are thought to be linked to autonomy (Felstead et al., 2012). Relevantly, the fourth and fifth aspects selected for closer inspection are the sub-dimensions of voice (D6A) and collective interest representation (D6B). As already reported in chapter four, the dimension of voice and collective interest representation has the lowest average score among the six dimensions of job quality, at 40.38 (SD: 22.80). This dimension is comprised of two sub-dimensions of voice ('I have a lot of say about what happens in my job') and collective representation (based on indicators for union membership and presence/absence of collectively-bargained pay-setting arrangements). There is a noticeable difference between the average scores for these two sub-dimensions, the average score for voice (M: 50.84; SD: 27.59) is around twenty percentage points higher than the average score for collective representation (M: 30.73; SD: 37.39).

While space does not permit results from significance testing, categories with over-representations of high scores for voice[47] are found for the following groups: jobs held by men; jobs at the highest skill level; in particular those in managerial jobs; job-holders with relatively higher educational qualifications; jobs in a number of male-dominated industries (agriculture, forestry and fishing; construction; wholesale trade; and information, media and telecommunications); jobs with individual contracts of employment; jobs with full-time hours; jobs with permanent or fixed-term contracts; and jobs in small workplaces. While categories

[47] Categories may overlap.

with over-representations of relatively low scores for voice are found for the following groups: jobs with part-time hours; jobs at the lowest skill level; sales jobs and labouring jobs; those in jobs paid at exactly the minimum rate of pay; jobs with casual contracts; jobs in two of the female-dominated industries of accommodation and food services and retail trade; and jobs in large workplaces.

As mentioned in section 7.3.2 above, channels for voice do not form part of the institutional arrangements in Australia. For example, there is no legislation requiring firms to establish works councils. Absence of regulation does not prevent firms from developing their own internal consultation and communication channels.

7.5.5. Collective interest representation

As already reported above, the average score for collective representation is very low at 30.73 (SD: 37.39), While space does not permit results from significance testing, categories with over-representations of relatively high scores scores for collective interest representation are found for: jobs where the job-holder is a union member[48]; jobs at the highest skill level, jobs in the public sector; jobs with collectively-bargained pay-setting arrangements; and jobs in the industries of education and training; public administration and safety; and electricity, gas, water and waste services.

While categories with over-representations of relatively low scores for collective representation[49] are found for: jobs with casual contracts; managerial and sales jobs; jobs requiring relatively low educational qualifications; jobs in the industries of wholesale trade; accommodation and food services; professional, scientific and technical services; rental, hiring and real estate services; jobs in the private sector; and jobs in small workplaces.

In summary, the groups of workers who tend to experience lower autonomy appear to also have lower levels of voice. The much lower level of collective interest representation can be attributed to a weakening in the power of the Australian trade union movement. As outlined in chapter one, recent legislation has made collective bargaining more difficult, in part because of restrictions being placed on unions, but also because employers have increasingly pursued more direct – and individualised – forms of negotiation. While around two-fifths of Australian

[48] This may seem obvious but union membership does not automatically mean that the worker is covered by a collective agreement, and vice versa. For instance, individuals can work in unionised workplaces that have award-based pay and working conditions, and individuals can choose not to become a union member despite the relevant union acting as the bargaining agent for the making of collective-agreements in their workplace (these workers are sometimes referred to as ‘free riders’. Furthermore, employers are not obliged to collectively-bargain, even if the workplace is unionised and workers want to negotiate an agreement.

[49] Categories may overlap.

employees remain covered by collective agreements, workers in large portions of the economy are shut out of collective bargaining. These workers, many of whom belong to vulnerable groups, typically lack the power to negotiate on an individual basis, which leaves them reliant on minimum standards, and subject to what Polanyi described as the 'vagaries' of the market (2014).

In addition to scoring low in terms of quality, the above-mentioned sub-dimensions are all aspects that fall within the realms of firm-level policy rather than being contingent on national institutional arrangements. That is, policy levers that could be developed to address shortfalls in these aspects of job quality rest squarely in the hands of owners, managers and HR management, rather than government.

7.6. Conclusion

In this chapter, new empirical evidence on job quality - and its six dimensions – was reported for a range of job; workplace; institutional and sectoral characteristics. Contextual information about the Australian national employment relations system, as well as data on the structure of the Australian labour market (which is highly gender segregated), were used to help explain why the quality of some jobs in Australia are better than others.

Based on the material presented in the chapter, key findings are reiterated along with a brief discussion about their implications. As first mentioned in chapter six, at first glance, the story about job quality in Australia does not appear to be about gender. Where large differences in scores for job quality are evident, the differences are smaller between women and men, than they are between groups of workers with different job, workplace, or institutional characteristics. However, women and men tend to work in jobs with different contractual and working time arrangements; in different types of occupations; and in different types of industries. Along similar lines, younger workers are over-represented in jobs with casual contracts and part-time hours, and their employment is highly concentrated in the service sector. It is necessary to decompose the results by a range of factors in order to reveal the nature of job quality in Australia.

There is polarising of job quality along many lines. In particular, those in non-standard employment (those with casual contracts, those working part-time hours and/or who are employed through labour hire firms) do not enjoy the same level of job quality as those in 'standard' employment. While this finding will not be surprising, it should be cause for concern, because there are no signs to indicate that precarious work will abate at any time in the near future. To the contrary, recent changes to the Australian employment relations system, including decentralisation, de-collectivisation; and de-unionisation of employment relations, all point to the likelihood of persistent and widespread precariousness of jobs. Employers in Australia already have a great deal of latitude when it comes to deciding on the type of contract, working time arrangements, and pay-setting method they use. Yet, industry lobby groups continue to call for further de-regulation of labour law[50] (aka increased employer-centred flexibility).

Overall job quality for the group with casual contracts is much lower than it for the groups with either fixed-term or permanent contracts. There is little difference in job quality for women and men who have the same type of employment contract, but because women are more likely than men to be found in jobs with casual and fixed-term contracts; and in part-time work; these findings are important in the context of an increasingly feminised workforce and the breaking down of the male breadwinner model of employment.

While job quality is lower for the group who work part-time hours (where females predominate) than it is for the group who work full-time hours, it is when the two factors of contract type and working time arrangements are considered simultaneously, that it becomes apparent how the type of contract plays - more so than working time arrangements - a critical part in influencing job quality.

From an institutional perspective, job quality varies considerably according to union membership, type of pay-setting arrangement, and the size of the workplace; where job quality is generally better for the groups who are union members; who have their pay set by a collective agreement; and who work in larger workplaces. When occupational group is considered, job quality is highest for the group of professionals and lowest for the group of labourers, where the gap between job quality in the best and worst quality occupational group is substantial.

When the occupational and industrial structure is considered, job quality is lowest in the accommodation and food services industry - where there are relatively high shares of younger workers and women; casual contracts; award-reliance; part-time hours; lower skilled jobs; small workplaces; and low trade union density. Gaps between these best and worst group of industries is substantial, and similar in magnitude to the gap found between the best and worst quality by occupation. Job quality is highest in the public administration and safety industry – where there are relatively high shares of male employment; permanent contracts; high-skilled jobs, such as professionals; public sector employers, large workplaces; collectively-bargained pay and working conditions; and relatively high trade union density.

[50] While the term deregulation has been used to describe changes in labour law, there is more – not less – regulation than in the past. It is just that the regulation is different. So it should more correctly be termed as re-regulation.

As has already been pointed out, the traditional male breadwinner model is breaking down (or has already broken). There is a large number of both female and male workers who are employed in pockets of the Australian economy where job quality is poor. While older and more highly qualified workers tend to have relatively good job quality, many of these workers have poor quality of work-life balance. In contrast, younger and/or less-skilled workers are more likely to occupy poor quality jobs, with work-life balance being the only dimension where they fare better than their older and/or more skilled colleagues.

Prime-aged workers have lower quality of work-life balance than either the younger or older groups of workers. Among working mothers, the group with school-aged dependent children were found to have lower job quality and lower quality of work-life balance than the groups of working mothers with either dependent children below school-age or 18 years or older. In addition, the group of female lone parent workers have lower job quality than the group of working women who live in a coupled-household.

While it has already been noted that the empircal findings presented in this chapter are largely headline in nature, the analysis has revealed that certain work and workplace characteristics appear to play more important roles in shaping job quality than do others. The job and workplace characteristics that have the largest effect size (based on calculating the eta-squared) are occupation (eta-squared = 0.24), pay-setting method (eta-squared = 0.18), industry (eta-squared = 0.15), contract type (eta-squared = 0.14) and to a lesser extent, sector (eta-squared = 0.07) and working time arrangements (eta-squared = 0.07). However, as already highlighted at several points during this thesis, a number of these characteristics have also been used to construct indicators that were included in the AJQI. So, in order to progress with multi-variate regression analysis, careful consideration must be given to the independent variables used in any modelling.

Taken in their entirety, recent changes in the Australian employment relations system have resulted in primacy placed on individual workers (and individual negotiations), so those without the power or skills to negotiate improvements are left to the mercy of the market. While women, young workers and those with lower skills are more likely to have their pay and conditions set by awards, powerful employer groups have lobbied successive governments for further deregulation, including calls for removal of penalty rates for unsociable hours of work. The direction of change does not augur well for the quality of jobs for traditionally vulnerable or disadvantaged groups.

As work becomes increasingly precarious, it remains to be seen whether younger and lower-skilled workers transition into better quality jobs across the life course. At the other end of the spectrum, as the government increases the age for pension entitlement, the quality of jobs for older workers is likely to grow in prominence. Processes of deregulation, de-unionisation and de-industrialisation of the Australian employment relations system mean that workers who are less able to bargain for improved pay and working conditions are more likely to be found in the poorest quality of jobs. While the incidence of insecure or precarious work has not halted, the business community continues to push for further deregulation – particularly for additional 'flexibility' and the leaving behind of penalty rates for unsociable hours of work. Antagonism between business community and the trade union movement is likely to see job quality remain – albeit under another name – an important issue in contemporary Australia.

As outlined in the introduction, according to Gallie's typology, Australia is best situated somewhere between the dualist and market-oriented systems. The findings presented in this chapter point to the importance of institutional and sectoral characteristics in explaining variations in job quality in Australia. Australian government policy places primacy on work over welfare. While a number of 'family-friendly' policies have been recently introduced (including, for the first time, a statutory paid parental leave scheme and a right to request flexible work for parents with children under school-age), little has been done to assist parents with school-aged children or to help older workers, who are increasingly likely to have elder care responsibilities.

In section 7.5, headline results for quality for five of the sub-dimensions contained in the AJQI were reported. Noteworthy, policy responses for these aspects sit largely within the realm of firms. This calls into question the effectiveness of the employment regimes approach in explaining why variations in job quality may exist. In the next and final chapter, an assessment will be made about whether the research questions established at the beginning of this thesis have been addressed. Contributions to the body of knowledge, limitations encountered during the research process, and potential areas for future research, will also be identified.

8. Conclusion

8.1. Introduction

The central problem addressed in this thesis is that, despite being an important topic, there was a lack of understanding of what comprises job quality, and so, how it was measured. As a corollary, there was no comprehensive account of the state of job quality in Australia.

In the sections to follow it is clearly demonstrated that by achieving its stated aims, this thesis has made three significant, and timely, contributions to the body of knowledge.

There are four main sections to this chapter. Following on from this introduction, section 8.2 details how the aims and objective of the thesis were met by answering the main research questions set out in chapter one. In section 8.3, the main contributions of this thesis to the body of knowledge are set out. First, it is shown how this thesis has made an important conceptual contribution. In the second instance, how this thesis has made a novel and significant methodological contribution is demonstrated. Finally, a description of how this thesis has made a timely empirical contribution to the body of knowledge is provided.

After establishing how the main aims of the thesis have been realised, the fourth section (section 8.4) identifies a number of limitations encountered during the research process.

In the final section (section 8.5), a number of suggestions for future research arising from the thesis are offered. A short final summary is set out in the last section of this final chapter (section 8.6).

8.2. Meeting the aims and objectives

Three research questions, linked to gaps that were identified in the body of knowledge, were addressed by this thesis (see Table 8.2.1, below).

By collating and reconciling existing literature on job quality, the first research question of what constitutes the core or essential dimensions of job quality was answered. An assessment of existing Australian datasets answered the second research question on whether it was possible to operationalise a comprehensive and robust multi-dimensional concept of job quality for Australia. Finally, analysis and reporting of new empirical findings answered the third question about the current state of play of job quality for Australian employees.

Table 8.2.1: Research contributions

Research question	Gaps in the body of knowledge	Research objectives
What constitutes the core or essential dimensions of job quality?	No commonly agreed concept of job quality. Multiple concepts and measures disables holistic research and policy development on job quality.	Collate and reconcile existing literature to identify the core or essential dimensions that comprise the concept of job quality.
Can a comprehensive and robust multi-dimensional concept of job quality be operationalised using existing Australian data?	No comprehensive multi-dimensional measure of job quality has been operationalised using Australian data.	Assess the viability of creating a comprehensive and robust multi-dimensional measure of job quality using existing Australian data.
What is the current state of job quality for Australian employees?	No existing empirical research for Australia that is comprehensive in terms of coverage of all of the core dimensions of job quality. No information available on the overall level of job quality for Australian employees.	Analyse and report new empirical findings for the overall level of job quality for Australian employees.

In answering the three research questions, a number of important gaps in the body of knowledge were addressed. This is the focus of the next section.

8.3. Contributions of this thesis to the body of knowledge

It has been clearly demonstrated that this thesis has made important contributions to the body of knowledge in three domains: conceptual, methodological and empirical. Table 8.3.1 groups together the three types of contribution, which are then explained in detail in the remainder of this section.

Table 8.3.1: Research contributions

Contributions to the body of knowledge	Type of contribution
Identification of the core or essential dimensions of job quality	Conceptual
Development of a theoretically-grounded conceptual framework of job quality	Conceptual
Assessment of the feasibility of operationalising a comprehensive and robust multi-dimensional index of job quality using an existing Australian dataset	Methodological
Operationalisation of a comprehensive and robust multi-dimensional index of job quality for Australian employees	Methodological
Generation of new data on job quality for Australian employees	Empirical
Reporting of new empirical findings on the level of overall job quality for employees in Australia, and to a lesser extent, new empirical findings about the underlying dimensions of job quality and the links to job-holders, their families, employers and institutions in Australia.	Empirical

The following three sub-sections summarise how this thesis has contributed to the body of knowledge.

8.3.1. Conceptual contribution

The first contribution of this thesis to the body of knowledge is conceptual. While there is no general theory of job quality, and it was beyond the scope of this thesis to build a new theory, an important contribution to the body of knowledge was made by undertaking an extensive review of the literature on the theorisation and conceptualisation of job quality. The thesis identified that, despite a growing body of research on job quality, researchers have tended to approach the topic from very different perspectives, largely based on their disciplinary traditions.

Moreover, many of the previous studies on job quality were either silent on what they meant by the concept of job quality or there was no agreement on which, or how many, aspects comprise the construct. By unpacking some of the related concepts and establishing that a great deal of overlap existed in the types of aspects used by the various researchers, this thesis generated new understandings of, and well-needed clarity about, the concept of job quality.

Furthermore, by reconciling the vast, and diverse, literature on job quality this thesis brought together aspects of job quality that have traditionally been studied in isolation. It was established that central to common notions of job quality is the idea that it impacts on workers' wellbeing and that good job quality is one that meets workers' needs.

By taking a holistic approach to conceptualising job quality, this thesis was able to draw from a broad range of disciplinary traditions to identify the core, or essential, dimensions of job quality. The concept of job quality was then used as the basis for developing a theoretically-grounded conceptual framework for operationalising a multi-dimension index of job quality for Australia (the AJQI).

In summary, while there remains further conceptual work to be done, this thesis has furthered our understanding on the concept of job quality.

8.3.2. Methodological contribution

The second, and major, type of contribution of this thesis to the body of knowledge is methodological.

Having gained important methodological insights about the strengths and weaknesses of other indexes (both indexes of job quality as well as indexes that have been constructed for other purposes), an assessment was undertaken regarding the feasibility of operationalising a comprehensive and robust multi-dimensional index of job quality for Australia. A mapping exercise established that the HILDA survey had a sufficiently large sample size to allow for micro-level analysis of job quality. Crucially, the HILDA dataset contained sufficient variables to enable the operationalisation of the conceptual framework of job quality that was developed in this thesis.

In establishing that HILDA was the best available Australian dataset to achieve this aim, the thesis applied the newly acquired conceptual and methodological understanding on job quality, as well as general methodological insight on the construction of composite indexes, to the operationalising of a comprehensive, multi-dimensional index of job quality (the AJQI). The newly identified six core dimensions of job quality identified in the theoretical and other literature were then used to develop a conceptual framework for operationalising the AJQI. The index was constructed using nationally-representative, micro-level data for Australia. Because there were a large number of missing values for the self-employed, the AJQI was constructed for employees only (see discussion in section 8.3, below).

The AJQI was constructed using a nested structure comprised of six dimensions (constructed as sub-indexes), thirteen sub-dimensions and a total of 50 underlying indicators. The indicators used to populate the conceptual framework were selected on the basis of relevance to the worker-focused concept of job quality. While remaining authentic to the conceptual framework, the AJQI was customised to take into account the historical and socio-political context of the case study country of Australia. In particular, a number of indicators included in the index were tailored to take into account four unique aspects concerning: pay-setting mechanisms; the nature and type of employment contracts; the Australian labour law regime for protection from unfair dismissal; and Australian data on risk of work-related injury or illness (that last drawing on external data, discussed in further detail in section 8.3, below).

One of the methodological strengths of the index is the ability to disaggregate the findings down to every level of the index, i.e. down to single indicators. This means that the empirical data that were generated by this thesis has vast potential. Wave 14 of HILDA data were used to construct the AJQI but because of the way the AJQI was constructed, including the scoring logic that was adopted, it would be reasonably straight-forward to replicate the index using future waves of the HILDA data.

A series of quasi-sensitivity checks were carried out that established the robustness of the index as a methodological and analytical tool that is fit-for-purpose in measuring job quality in This included establishing that all of the dimensions were positively correlated to the overall AJQI; and the vast majority of indicators included in each sub-dimension were more strongly correlated with one another than with either the AJQI overall, or with indicators found in other parts of the nested structure. Furthermore, it was established that the pattern of correlations seemed plausible. As an external type of robustness check, comparisons were made between the pair-wise correlations for the AJQI and a leading index (the EJQI), where it was found that the pattern of correlations for the two indexes was reasonably similar, providing a degree of external validity to the AJQI. Further robustness checks included checking the impact of changes in the method of aggregation, changes in the weighting of the different dimensions, as well as a change in the number of dimensions.

None of the other quantitative measures of job quality for Australia have been comprehensive in terms of geographic coverage or coverage of all of the aspects of job quality. So this thesis furthered methodological understanding about how to measure job quality in Australia.

In summary, this thesis contributed to the body of knowledge by applying a theoretically-grounded conceptual model to operationalise, for the first time, a comprehensive and robust multi-dimensional index of job quality for Australia. The methodology that was used is novel and the data that were generated has significant potential.

8.3.3. Empirical contribution

The third type of contribution of this thesis to the body of knowledge is empirical.

Having constructed the AJQI, and after establishing its robustness, the thesis moved on to provide the first holistic account of job quality in Australia. Importantly, the review of Australian literature on job quality that was completed at the beginning of this thesis established that while a number of other accounts of job quality in Australia have been published in the academic literature, and they have undeniably resulted in some useful information on various aspects of job quality, to date, no Australian empirical research has operationalised a comprehensive, multi-dimensional measure of job quality in Australia. As a consequence, little was known about the overall quality of jobs in Australia; and even less about the interaction between the different dimensions influencing overall job quality.

This thesis addressed the lack of empirical evidence, where three chapters set out headline results generated from the new empirical data created. While it was not possible to report on the role played by all of the individual indicators incorporated into the AJQI, chapter five of the thesis reported the average scores for overall job quality (section 5.2), as well as results for each of the six dimensions (section 5.3). In addition to putting an overall number on job quality, an estimation of the number of jobs in five categories constructed post-hoc representing: '*very poor*'; '*poor'*; '*middling*'; '*good*'; and '*very good*' quality jobs was reported (section 5.2). The same process was used to report on the share of jobs at each of the five quality levels by dimension (section 5.3). The presence of conditions were also counted so jobs could range from none of the six dimensions at '*very poor*' through to all six dimensions at '*very good*' (section 5.3).

Although not directly comparable, section 5.4 compared findings from the AJQI with published findings from four other job quality indexes, namely: QOWL index (Considine & Callus, 2001); Burgess' index of job quality (Burgess, 2003); JQIP (Leach et al., 2010); and VicWAL JQI (Charlesworth et al., 2014). At the broad level, a number of persistent problems with certain aspects of job quality were confirmed in the thesis.

The thesis explored the importance of job quality in terms of its potential benefit – or harmful – impact on individuals, firms and Australian society, by checking the AJQI results against: outcomes for job satisfaction; health and wellbeing; and relative socio-economic disadvantage (see section 5.5). While initial only, the findings suggest a link between job quality and low job satisfaction, poor general health and wellbeing, and low relative socio-economic disadvantage.

In chapter six, headline results for job quality were disaggregated by gender; as well as for a range of job-holders' personal and household characteristics. While chapter seven explored headline results for job quality decomposed by a range of job and workplace characteristics.

While it is recognised that further work remains to be done conceptually, methodologically and empirically, this thesis has made significant contributions to body of knowledge by improving the understanding of job quality. The thesis provided the first holistic account of job quality in Australia, and to a lesser extent, generated new understandings on interrelations between job quality and a range of job-holder, job and workplace characteristics. These new understandings, however, have to be considered in the context of limitations to the study.

8.4. Limitations of the thesis

The thesis has undertaken three important tasks: conceptualising job quality; operationalising a measure for job quality; and providing an empirical account of job quality. The ambition was to tackle all three within the confines of the one thesis and numerous challenges were associated with each task. While important contributions to the body of knowledge have been made, there are a number of limitations to this thesis, as set out below.

8.4.1. Conceptual limitations

While the thesis draws on theories and the literature on job quality, it was beyond the scope of the thesis to develop a theory of job quality. Such a theory is needed, and as signalled next, this should be one focus of future research.

A second, and related, conceptual limitation of this thesis is that, by focusing on employees, it did not tackle the challenge of ensuring that any conceptualisation of job quality is applicable to all workers, not only employees. As highlighted in the discussion set out in section 2.4.1 in chapter two, there is blurring between different categories of workers which has important implications for the study of job quality. For instance, in 2014, there were almost 2 million self-employed (i.e. owner managers with and without employees), where they comprised almost 17 percent of all employed persons (ABS, 2014). Furthermore, there were approximately 1 million persons who were independent contractors in their main job in August 2014, where they could be found in both the employee or self-employed groups in the national statistics, depending on who they answered a series of questions about their work and remuneration arrangements (ABS, 2014).

As outlined in section 2.4.1, there is an assumption that the self-employed enjoy more autonomy or decision latitude than employees (Muñoz de Bustillo et al., 2011b) which could lead to speculating that job quality might vary between the different categories of workers. Yet, there is evidence to suggest the self-employed, contractors and 'gig' workers can equally experience job or employment insecurity, and some share many of the characteristics of employees (Johnstone McCrystal, Nossar, et al., 2012:59). Further theorisation is required to ensure the concept of job quality adequately captures all categories of workers.

8.4.2. Methodological limitations

There were a number of limitations beyond my control that presented challenges in terms of constructing a robust, multi-dimensional index of job quality using existing Australian data.

The first methodological limitation is concerned with the sample used to construct the AJQI, where a decision was made to restrict the sample to employees. This decision resulted in a small, yet important, segment of the Australian workforce being excluded from the index (as also mentioned in the previous section). As set out in section 1.5.2, there were two main reasons why the self-employed were not included in the sample used to construct the AJQI. As already outlined in section 8.4.1, further theorisation is required to ensure the concept of job quality adequately captures all categories of workers. Secondly, because most analysis of job quality focuses on employees and also because the HILDA survey does not ask the full range of questions relevant to job quality to the self-employed.

This data issue raises a wider question about the analysis of job quality, and data limitations. As yet, neither in Australia nor elsewhere, is there a dedicated large-scale survey of job quality. Given the importance that job quality now has in the academic and policy-making communities, this omission is something that needs to be addressed. If such data become available, there would be scope to refine the AJQI developed in this thesis.

There is further scope to use the HILDA data to create a truncated index of job quality for all workers, i.e. including independent contractors and the self-employed. Reporting of job quality for all workers would be a useful task given the debate about the quality of work that some self-employed and contractors have. In the meantime, what this thesis has provided is a robust methodological approach to analysis of job quality of employees.

8.4.3. Empirical limitations

Given that that this thesis had three main objectives – conceptualising, measuring and reporting on job quality, the last task, the empirical analysis is necessarily limited to headline scores. In a thesis with a singular focus on discerning the empirics of Australian job quality, undertaking more detailed analysis would have been possible – and appropriate. Because the scope of this thesis is necessarily wider, the constraints of the thesis thereby limited the scope of the empirical analysis. For this reason, reporting of findings were limited to descriptive statistics, accompanied by a series of one-way tests of statistical significance in mean differences. Graphical bar and radar charts were used to illustrate results.

With the concept, measures and index now developed, using methods such as multi-variate regression analysis to gain a better picture of the main factors that contribute to variations in job quality will be appropriate (see section 8.5.3 below about suggestions for further research). In the meantime, one of the strengths of this thesis is its provision, for the first time, of national headline findings on the level and nature of job quality in Australia using a comprehensive index.

8.5. Suggested future research

The limitations outlined above signal a number of areas for future research that are beyond the scope of this thesis – for example the need for an integrated theory and analysis that might cover all workers. Within the thesis there are another set of areas for future research that emerge from the analysis already undertaken, that is, issues that merit further analysis.

8.5.1. Future conceptual work

First, building theory was not an aim of this thesis. As signalled above, what is missing from the literature is an integrated theory of job quality. It is not an easy task to build theory, particularly in a cross-disciplinary topic area such as this.

As a next step after identifying the core set of dimensions for job quality, there would be merit in developing a model of job quality. As already discussed in section 1.6.3, a framework is less closely related to theory, while a conceptual model aims to show causation, that is, the direction of relationships.

8.5.2. Future methodological work

The AJQI was constructed using one wave of the HILDA data. It will be possible to replicate the index with future and/or earlier waves of the data. Replicating the AJQI was beyond the scope of this thesis, however the benefit of the HILDA survey is that it has guaranteed funding for at least the next five years.

As mentioned earlier, it would beneficial to construct a truncated version of the AJQI so that all workers are included in the analysis. This would enable the results to be generalised for all workers in Australia, as well as reporting on similarities and differences between employees, contractors and the self-employed.

8.5.3. Future empirical research

Because of the way the AJQI was constructed, there is enormous potential for further cross-sectional and longitudinal analysis, on a range of topics. To further empirical understanding of job quality, however, it is necessary to move beyond the use of descriptive statistics to methods that are better able to explain variations in scores for job quality.

Given the distributional properties of the AJQI, an initial starting point for future research would be to use an ordered probit model to predict the probability of having a '*very poor'* job in comparison to the four other categories of '*poor*', '*middling*', '*good*' or '*very good'* jobs. Given that the bundling of amenities and disamenties appear to differ by sex, it would also be sensible to run separate analysis for women and men.

As foreshadowed in chapter seven, however, in order to progress with multi-variate regression analysis, careful consideration must be given to the independent variables used in any modelling, because a number of variables common to labour market analysis were incorporated into the index. Nevertheless, the method used to construct the index means that it is possible to drill down into its nested structure. Once again, multi-variate regression analysis could be used to gain a better understanding of the relationship between overall job quality and its constituent dimensions. Connected to this, it was identified in section 7.3 that scores were particularly low in the case of five of the 13 sub-dimensions of the AJQI (i.e. development opportunities; autonomy; work intensity; voice; and collective interest representation). So, this is another area where there is scope for in-depth analysis.

As shown in this thesis, it is possible to use the index to explore job quality for specific groups of job-holders. Should the index be replicated, it would be interesting to explore, longitudinally, some of the factors that were found in this thesis to be important. For instance, analysis could be undertaken to consider job quality for groups of workers who transition in, and out, of jobs, such as before and after spells of unemployment; during different stages of the life course, including motherhood or at completion of full-time study.

In addition, the dimension of work-life balance contains indicators measuring three aspects of working time (duration, scheduling, and flexibility). Work and family policy is very topical in Australia, as well as internationally, so it would be interesting to drill down into the work-life balance dimension to get a better understanding of how these three aspects of the work-life balance dimension interact with one another, and what this means for different groups of job-holders.

An initial check of job quality scores against outcome measures for job satisfaction, health and well-being and relative socio-economic disadvantage also point to being potentially interesting lines of further inquiry.

There is also the possibility of using the index to undertake comparative empirical analysis. While the review of the literature in this thesis considers international evidence about job quality, the empirical research is restricted to one country, i.e. Australia. Because a number of multi-dimensional indexes have been constructed using data for other countries or groups of countries (i.e. EU countries), it may be possible, in the future, to compare the results of job quality for Australia with those for other countries. This type of comparison might provide important information about whether the patterns and trends evident for job quality in Australia are idiosyncratic, or such patterns and trends also feature in other national systems.

In summary, having produced a robust index of job quality for Australian the potential utility extends well beyond this thesis.

8.6. Conclusion

This thesis investigated a key research problem of understanding the level and nature of job quality, using the case of jobs in Australia as an empirical focus.

The first chapter set out details of the research problem, including the aims and objectives of the research. The second chapter provided a synthesis of the literature on current understandings of the literature. The third chapter provided a synthesis of the literature on measuring job quality. Chapter four set out, in detail, the method and data that were used to construct the AJQI, as well detailed information about how the index was checked for robustness. The technical report found in Appendix 11 provides supplementary information about the properties of the index and results from the series of robustness tests. Chapters five through seven reported headline empirical findings. In this final chapter, an assessment was presented on whether the main research questions have been answered, details on the three main contributions to the body of knowledge were specified. The limitations to the research were articulated, and a number of suggestions for future research were provided.

By collating and reconciling existing literature on job quality, six core or essential dimensions that comprise the concept of job quality were identified and then used as the basis for developing a theoretically-grounded conceptual framework. The assessment of the feasibility of operationalising a comprehensive index of job quality led to using HILDA data to operationalise the AJQI. To best knowledge, the index constructed in this thesis is the first comprehensive composite index constructed to measure job quality in Australia. Robustness of the index was established via a series of checks and the results were found plausible.

The index is novel, timely and customised for the Australian context. It can also be replicated in the future to study trends in job quality. In this respect, the AJQI has utility beyond this thesis. The thesis also generated new empirical evidence of the nature of job quality in Australia, offering a baseline from which new research agendas and policy debates about job quality in Australia will be stimulated.

Taken all together, the material presented clearly demonstrates that this thesis has made three significant, and timely, contributions to the body of knowledge.

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11. Appendices

11.1. Mapping of dimensions and aspects of job quality in different studies

Table 11.1.1: Mapping dimensions and aspects of job quality in different studies

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
Wage and payment	Wage level	37	Anton et al. (2012); Brown et al. (2006); Brown et al. (2007); Burgess et al. (2013); Centra & Gualtieri (2014); Clark (20005a&b); Cloutier-Villenueve (2012); Considine & Callus (2001); Crespo & Pinto (2013); Crespo et al. (2013); Curtarelli et al. (2014); Davoine et al. (2008a & b); Erhel & Guergoat-Larivière (2010); Erhel et al. (2012); Goos & Manning (2007); Holman (2013a, 2013b); Holman & McClelland (2011); Hurley et al. (2012); Kalleberg (2011); Keep & James (2012); Knox et al. (2015); Leschke, Watt & Finn (2008, 2012); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Okay-Sommerville & Scholarios (2013); Osterman (2008, 2012); Pocock & Skinner (2012); Rose (2003); Schmitt & Jones (2012); Stier & Yash (2014); Sutherland (2011); Tangian (2009); Vidal (2013); Vieiri et al. (2005)	✓
	Type of payment (e.g. fixed salary, performance pay)	2	Holman (2013b); Tangian (2009)	
	Pay satisfaction/fairness	6	Brown et al. (2006); Brown et al. (2007); Butterworth et al. (2011); Handel (2005); Leach et al. (2010); Sutherland (2011)	✓
	Other benefits (e.g. employer-funded pension, health insurance)	5	Burgess et al. (2013); Kalleberg (2011); Pocock & Skinner (2012); Schmitt & Jones (2012); Sutherland (2011)	
	Type of contract/employment status	14	Anton et al. (2012); Brisbois (2003); Clark (2005a&b); Davoine et al. (2008a & b); Drobnic et al. (2010); Erhel et al. (2012); Goos et al. (2010); Holman (2013b); Hurley et al. (2012); Leschke,	✓

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
	(permanent/temporary/non-standard)		Watt & Finn (2008, 2012); Loughlin & Murray (2013); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010)	
Contractual status and stability	(Perceived) job (in)security	32	Brown et al. (2006); Brown et al. (2007); Butterworth et al. (2011); Charlesworth et al. (2014); Cloutier-Villenueve (2012); Considine & Callus (2001); Crespo & Pinto (2013); Crespo et al. (2013); Curtarelli et al. (2014); Drobnic et al. (2010); Erhel et al. (2012); Esser & Olgen (2011); Gallie (2007); Gallie et al. (2014); Green (2006); Handel (2005); Holman (2013a, 2013b); Holman & McClelland (2011); Hurley et al. (2012); Kalleberg (2011); Leach et al. (2010); Leschke & Watt (2008); Loughlin & Murray (2013); Muñoz de Bustillo et al. (2011a); Okay-Sommerville & Scholarios (2013); Pocock & Skinner (2012); Rose (2003); Stier & Yash (2014); Strazdins et al. (2010); Tangian (2009); Vidal (2013)	✓
	Career & Employment security	5	Brisbois (2003); Burgess et al. (2013); Drobnic et al. (2010); Erhel & Guergoat-Larivière (2010); Eurofound (2012)	
Working conditions	Physical effort/demands (e.g. carrying or moving heavy loads)	14	Anton et al. (2012); Clark (2005a & b); Crespo & Pinto (2013); Drobnic et al. (2010); Erhel & Guergoat-Larivière (2010); Greenan et al. (2010); Handel (2005); Holman (2013b); Hurley et al. (2012); Leschke, Watt & Finn (2008, 2012); Olsen et al. (2010); Smith et al. (2008); Sutherland (2011); Tangian (2009)	
	Ambient demands (e.g. noise)	8	Anton et al. (2012); Clark (2005a & b); Holman (2013b); Leschke, Watt & Finn (2008, 2012); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Smith et al. (2008); Tangian (2009)	
	Workload/time pressure	12	Charlesworth et al. (2014); Clark (2005a & b); Considine & Callus (2001); Drobnic et al. (2010); Green (2006); Handel (2005); Hurley et al. (2012); Leschke & Watt (2008); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Sutherland (2011); Tangian (2009)	✓
	Work intensity (high speed, tight deadlines)	16	Anton et al. (2012); Brisbois (2003); Clark (2005a & b); Crespo & Pinto (2013); Curtarelli et al. (2014); Davoine et al. (2008a & b); Erhel & Guergoat-Larivière (2010); Green (2006); Holman	✓

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
			(2013b); Hurley et al. (2012); Leschke, Watt & Finn (2008, 2012); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Tangian (2009); Vidal (2013)	
Job content (work organisation)	Clear formulation of tasks and requirements	7	Considine & Callus (2001); Holman (2013a); Holman & McClelland (2011); Loughlin & Murray (2013); Okay-Sommerville & Scholarios (2013); Stier & Yash (2014); Tangian (2009)	
	Variety (non-monotonous work, interesting job), complexity	16	Anton et al. (2012); Bustillo et al. (2011a); Butterworth et al. (2011); Centra & Gualtieri (2014); Clark (2005a & b); Drobnic et al. (2010); Greenan et al. (2010); Handel (2005); Holman (2013b); Kalleberg (2011); Leach et al. (2010); Muñoz de Olsen et al. (2010); Rose (2003); Smith et al. (2008); Sutherland (2011); Tangian (2009)	✓
	Intellectual demand/work effort	10	Berglund (2013); Brown et al. (2006); Brown et al. (2007); Brown et al. (2007); Butterworth et al. (2011); Greenan et al. (2010); Holman (2013b); Leach et al. (2010); Leschke, Watt & Finn (2008, 2012); Smith et al. (2008)	✓
	Emotional demands	7	Butterworth et al. (2011); Green (2006); Holman (2013b); Leach et al. (2010); Leschke, Watt & Finn (2008, 2012); Smith et al. (2008)	
	Contact with others (colleagues, customers)	5	Crespo & Pinto (2013); Holman (2013b); Leschke, Watt & Finn (2008, 2012); Smith et al. (2008)	
	Meaningfulness (useful to society; self-worth)	6	Clark (2005a & b); Kalleberg (2011); Loughlin & Murray (2013); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Tangian (2009)	
	Intrinsic rewards	6	Anton et al. (2012); Crespo & Pinto (2013); Crespo et al. (2013); Hurley et al. (2012); Muñoz de Bustillo et al. (2011a); Sutherland (2011)	
	Work organisation	3	Centra & Gualtieri (2014); Holman & McClelland (2011); Knox, et al (2015)	
Skills and development	Training/Learning/Skills development (opportunities)	18	Brisbois (2003); Bustillo et al. (2011a); Crespo & Pinto (2013); Crespo et al. (2013); Davoine et al. (2008a & b); Drobnic et al. (2010); Erhel & Guergoat-Larivière (2010); Gallie (2007); Gallie et al. (2014); Keep & James (2012); Knox et al. (2015); Leschke, Watt & Finn (2008, 2012);	✓

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
			Muñoz de Holman (2013b); Pocock & Skinner (2012); Sutherland (2011); Tangian (2009); Vidal (2013)	
	Development/advancement opportunities	27	Anton et al. (2012); Burgess et al. (2013); Charlesworth et al. (2014); Clark (2005a & b); Considine & Callus (2001); Crespo et al. (2013); Davoine et al. (2008a & b); Drobnic et al. (2010); Erhel et al. (2012); Eurofound (2012); Handel (2005); Holman (2013a, 2013b); Holman & McClelland (2011); Hurley et al. (2012); Kalleberg (2011); Keep & James (2012); Knox et al. (2015); Leschke, Watt & Finn (2008, 2012); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Pocock & Skinner (2012); Rose (2003); Sutherland (2011); Tangian (2009); Vidal (2013)	✓
	Skill level/Skill utilisation (under/over-qualification, person-job fit)	18	Brisbois (2003); Cloutier-Villenueve (2012); Drobnic et al. (2010); Erhel & Guergoat-Larivière (2010); Erhel et al. (2012); Eurofound (2012); Gallie et al. (2014); Green (2006); Holman (2013a, 2013b); Holman & McClelland (2011); Keep & James (2012); Knox et al. (2015); Loughlin & Murray (2013); Muñoz de Bustillo et al. (2011a); Okay-Sommerville & Scholarios (2013); Rose (2003); Tangian (2009)	✓
Autonomy, control and involvement	Autonomy (e.g. ability to change order of tasks, methods of work, take initiative)	34	Anton et al. (2012); Berglund (2013); Brown et al. (2006); Brown et al. (2007); Burgess et al. (2013); Bustillo et al. (2011a); Butterworth et al. (2011); Centra & Gualtieri (2014); Charlesworth et al. (2014); Clark (2005a & b); Considine & Callus (2001); Crespo & Pinto (2013); Crespo et al. (2013); Drobnic et al. (2010); Esser & Olgen (2011); Gallie (2007); Gallie et al. (2014); Green (2006); Handel (2005); Hurley et al. (2012); Kalleberg (2011); Leach et al. (2010); Leschke, Watt & Finn (2008, 2012); Loughlin & Murray (2013); Muñoz de Holman (2013b); Olsen et al. (2010); Pocock & Skinner (2012); Rose (2003); Smith et al. (2008); Stier & Yash (2014); Strazdins et al. (2010); Sutherland (2011); Tangian (2009)	✓
	Intensity/Dependency (e.g. pace of work depends on colleagues, machines)	9	Anton et al. (2012); Burgess et al. (2013); Crespo et al. (2013); Holman (2013a); Hurley et al. (2012); Gallie et al. (2014); Greenan et al. (2010); Olsen et al. (2010); Tangian (2009)	✓

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
	Involvement/influence (e.g. employees are consulted about changes in work organisation)	7	Brown et al. (2006); Brown et al. (2007); Davoine et al. (2008a & b); Holman (2013b); Leschke, Watt & Finn (2008, 2012); Tangian 2009)	✓
Working time and work-life balance	Full time vs part time hours (voluntary or involuntary)	11	Brisbois (2003); Cloutier-Villenueve (2012); Curtarelli et al. (2014); Davoine et al. (2008a & b); Erhel et al. (2012); Holman (2013b); Leschke, Watt & Finn (2008, 2012); Loughlin & Murray (2013); Pocock & Skinner (2012); Tangian (2009)	✓
	Duration (paid/unpaid) (excessive long hours)	18	Anton et al. (2012); Brisbois (2003); Burgess et al. (2013); Clark (2005a & b); Cloutier-Villenueve (2012); Curtarelli et al. (2014); Davoine et al. (2008a & b); Drobnic et al. (2010); Erhel & Guergoat-Larivière, (2010); Erhel et al. (2012); Goos et al. (2010); Holman (2013b); Hurley et al. (2012); Leschke, Watt & Finn (2008); Muñoz de Bustillo et al. (2011a); Pocock & Skinner (2012); Skinner & Pocock (2014); Tangian (2009)	✓
	Scheduling (work at night, weekend)	14	Anton et al. (2012); Cloutier-Villenueve (2012); Curtarelli et al. (2014); Davoine et al. (2008a & b); Holman (2013b); Hurley et al. (2012); Kalleberg (2011); Leschke, Watt & Finn (2008, 2012); Muñoz de Bustillo et al. (2011a); Pocock & Skinner (2012); Skinner & Pocock (2014); Sutherland (2011); Tangian (2009)	✓
	Flexibility (possibility to adapt working hours, to take an hour off or to take breaks)	13	Charlesworth et al. (2014); Holman (2013a, 2013b); Holman & McClelland (2011); Hurley et al. (2012); Kalleberg (2011); Muñoz de Bustillo et al. (2011a); Pocock & Skinner (2012); Skinner & Pocock (2014); Smith et al. (2008); Strazdins et al. (2010); Sutherland (2011); Tangian (2009)	✓
	Work-life balance/boundaries	18	Anton et al. (2012); Brisbois (2003); Cloutier-Villenueve (2012); Charlesworth et al. (2014); Considine & Callus(2001); Crespo & Pinto (2013); Crespo et al. (2013); Drobnic et al. (2010); Erhel & Guergoat-Larivière, (2010); Erhel et al. (2012); Eurofound (2012); Holman (2013b); Hurley et al. (2012); Leschke, Watt & Finn (2008, 2012); Kalleberg (2011); Skinner & Pocock (2014); Tangian (2009)	✓

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
Social relations/workplace climate	Relation to/support from management, supervisory responsibilities	17	Brown et al. (2006); Brown et al. (2007); Burgess et al. (2013); Clark (2005a & b); Considine & Callus (2001); Crespo et al. (2013); Drobnic et al. (2010); Greenan et al. (2010); Handel (2005); Holman (2013b); Loughlin & Murray (2013); Olsen et al. (2010); Pocock & Skinner (2012); Rose (2003); Stier & Yash (2014); Sutherland (2011); Tangian (2009)	
	Relations to/support from colleagues	10	Brown et al. (2007); Clark (2005a & b); Considine & Callus (2001); Crespo et al. (2013); Handel (2005); Holman (2013b); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Sutherland (2011); Tangian (2009)	
Voice and collective interest	Voice, influence, involvement, collective bargaining coverage, union density	9	Brown et al. (2007); Davoine et al. (2008a & b); Erhel et al. (2012); Holman & McClelland (2011); Holman & McClelland (2011); Leschke, Watt & Finn (2008; 2012); Loughlin & Murray (2013); Pocock & Skinner (2012)	✓
Fairness	Physical violence	11	Anton et al. (2012); Clark (2005a & b); Davoine et al. (2008a & B); Gallie (2007); Holman (2013b); Leschke, Watt & Finn (2008, 2012); Muñoz de Bustillo et al. (2011a); Olsen et al. (2010); Smith et al. (2008); Tangian (2009)	
	Bullying/harassment	4	Anton et al. (2012); Curtarelli et al. (2014); Muñoz de Bustillo et al. (2011a); Tangian (2009)	
	Discrimination	6	Anton et al. (2012); Considine & Callus (2001); Curtarelli et al. (2014); Davoine et al. (2008a & b); Smith et al. (2008); Tangian (2009)	
Health, safety and well-being	Health, safety and well-being	11	Anton et al. (2012); Brisbois (2003); Burgess et al. (2013); Considine & Callus (2001); Drobnic et al. (2010); Eurofound (2012); Handel (2005); Hurley et al. (2012); Muñoz de Bustillo et al. (2011a); Okay-Sommerville & Scholarios (2013); Rose (2003)	✓
	Physical well-being	11	Anton et al. (2012); Burgess et al. (2013); Crespo & Pinto (2013); Crespo et al. (2013); Davoine et al. (2008a & b); Drobnic et al. (2010); Green (2006); Holman (2013b); Muñoz de Bustillo et al. (2011a); Stier & Yash (2014); Tangian (2009)	✓

Dimensions of job quality	Aspects	Number of studies	Studies	Captured in AJQI
	Psychological/psychosocial well-being	9	Anton et al. (2012); Curtarelli et al. (2014); Crespo & Pinto (2013); Crespo et al. (2013); Green (2006); Holman (2013b); Muñoz de Bustillo et al. (2011a); Stier & Yash (2014); Tangian (2009)	✓
	Stress/stressful work	5	Brown et al. (2006); Brown et al. (2007); Callus & Considine (2001); Drobnic et al. (2010); Handel (2005)	✓
	Job satisfaction/sense of achievement/'happiness at work'	14	Brisbois (2003); Brown et al. (2006); Brown et al. (2007); Davoine et al. (2008a & b); Drobnic et al. (2010); Holman (2013b); Green & Tsitsianis (2005); Handel (2005); Layard (2004); Olsen et al. (2010); Okay-Sommerville & Scholarios (2013); Rose (2003); Tangian (2009); Vieiri et al. (2005)	
	Engagement, commitment, absenteeism	5	Holman (2013a); Holman & McClelland (2011); Loughlin & Murray (2013); Okay-Sommerville & Scholarios (2013); Tangian (2009)	
Miscellaneous	Life satisfaction	1	Drobnic et al. (2010)	
	Gender equality, equity/fairness	2	Burgess et al. (2013); Erhel & Guergoat-Larivière (2010)	

Source: Hauff and Kirchner (2014), Table 1, p. 4, authors' own adaptations to include additional, and more recent, studies.

11.2. Mapping indicators in other indexes to the AJQI

Table 11.2.1: Mapping of indicators in Index of Psychosocial Job Quality to the AJQI

Aspects	Item	AJQI
Job demands and complexity	My job is more stressful than I had ever imagined	Health and safety, sub-dimension of psychosocial risk
	I fear the amount of stress in my job will make me physically ill	As above
	My job is complex and difficult	Intrinsic characteristics of work dimension, sub-dimension of skill
	My job often requires me to learn new skills	As above
	I use many of my skills and abilities in my current job	As above
Job security	I get paid fairly for the things I do in my job	Pay dimension, sub-dimension of subjective pay
	I have a secure future in my job	Quality of employment dimension, sub-dimension of contractual stability
	The company I work for will still be in business in 5 years from now	As above
	I worry about the future of my job	As above
Job control	I have a lot of freedom to decide how I do my own work	Intrinsic characteristics of work, sub-dimension of autonomy
	I have a lot of say about what happens in my job	Intrinsic characteristics of work, sub-dimension of autonomy; and voice and collective interest representation, sub-dimension of voice
	I have a lot of freedom to decide when I do my work	Intrinsic characteristics of work, sub-dimension of autonomy; and Work-life balance dimension, sub-dimension of flexibility

Source: Leach et al., 2010; Butterworth et al., 2011; Author's own mapping to AJQI.

Table 11.2.2: Mapping of indicators in VicWAL JQI to AJQI

Aspects	Item	AJQI
Working time autonomy	Work hour mismatch	Work-life balance dimension, sub-dimension of working time (duration)
	How work schedule is set	Work-life balance dimension, sub-dimension of working time (scheduling)
	Asked to change schedule at short notice	No directly equivalent question in HILDA ('irregular schedule' included in work-life balance dimension, sub-dimension of working time - duration)
	If needed, have access to flexible hours	Work-life balance dimension, sub-dimension of working time (flexibility)
	How likely to lose job in next 12 months	Quality of employment dimension, sub-dimension of contractual stability
Job security	How easy or difficult would be to find a new job as good as the current one	Equivalent question in HILDA but not included in AJQI because about labour market conditions not job quality
	I have freedom to decide how I do my work	Intrinsic characteristics of work, sub-dimension of autonomy
Job control	I have been consulted about changes in work or job	No directly equivalent question in HILDA ('say about what happens in job' included in sub-dimension of voice)
	I never have enough time to do everything in my job	Work-life balance dimension, sub-dimension of work intensity
	Opportunities for learning and skill development in job	No directly equivalent question in HILDA ('job often requires me to learn new skills' included in sub-dimension of skills in dimension of intrinsic characteristics of work)
Skill development	Part-time or reduced hours	Work-life balance dimension, sub-dimension of working time (duration)
Access to work-life provisions if needed	Paid parental or carers leave	No directly equivalent question in HILDA
	Unpaid parental or carers leave	No directly equivalent question in HILDA
	Annual leave at time of choosing	No directly equivalent question in HILDA
	Work from home	Questions in HILDA about working from home, but not included in AJQI as difficult to establish whether usual or additional hours worked from home

Source: Charlesworth et al., 2014; Author's own mapping to AJQI.

11.3. Raw and weighted sample for the AJQI

Table 11.3.1: Raw and weighted sample for the AJQI

	raw number of cases with score (*n*)	raw number of cases with missing value (*n*)	Weighted number of cases with score (*N*)	Weighted number of cases with missing value (*N*)
AJQI (geometric mean)	**8294**	**5**	**9920806**	**4270**
Dimension 1: Pay	**8294**	**5**	**9920806**	**4270**
D1A Objective pay	8284	15	9910371	14705
D1A1 FTE Gross weekly wage in main job by decile	8284	15	9910371	14705
D1A2 Gross weekly wage in main job above or below FMW	8210	89	9830091	94984
D1B Subjective pay	8095	204	9675987	249089
Dimension 2: Quality of employment	**8299**	**0**	**9925076**	**0**
D2A Contractual stability	8299	0	9925076	0
D2A Objective contractual stability	8299	0	9925076	0
D2AObj1 Paid leave entitlement	8299	0	9925076	0
D2AObj2 Unfair dismissal qualification	8298	1	9924385	691
D2A Subjective contractual stability	8299	0	9925076	0
D2Asub1 Worry about future of my job (reversed)	8087	212	9667115	257961
D2Asub2 Percent chance of losing job in next twelve months	8232	67	9834030	91046
D2Asub3 Company I work for will still be in business in 5 years	8093	206	9663111	261965
D2Asub4 Security	8299	0	9925076	0
D2Asub4a	8076	223	9648915	276161
D2Asub4b	8293	6	9919310	5766
D2B Development opportunities	8299	0	9925076	0
D2Ba Work-relating training	8299	0	9925076	0
D2B1 Work-related training	8299	0	9925076	0
D2B1a Work-relating training in paid work time	8299	0	9925076	0
D2B1b Amount of work-relating training past 12 months	8299	0	9925076	0
D2B1c Extent would use new skills	8299	0	9925076	0

	raw number of cases with score (*n*)	raw number of cases with missing value (*n*)	Weighted number of cases with score (*N*)	Weighted number of cases with missing value (*N*)
D2B2 Employer contributed to cost of training	8299	0	9925076	0
D2Bb Satisfaction with employment opportunities score	8223	76	9843630	81446
Dimension 3: Intrinsic characteristics of work	**8299**	**0**	**9925076**	**0**
D3A Skills	8292	7	9915135	9941
D3A Objective skill	8292	7	9915135	9941
D3A Subjective skill	8100	199	9679735	245341
D3ASubA Complexity	8100	199	9679735	245341
D3ASubA1 Job is complex and difficult	8091	208	9671049	254027
D3ASubA2 Job often requires me to learn new skills	8091	208	9672955	252121
D3ASubA Variety	8100	199	9679735	245341
D3Asubb1 Initiative	8079	220	9647179	277897
D3Asubb2 Skill use	8088	211	9664948	260128
D3Asubb3 Variety of interesting things	8087	212	9661936	263140
D3Asubb4 Monotonous tasks	8079	220	9654813	270263
D3B Autonomy	8099	200	9678465	246611
D3B1 Choice in deciding what to do	8090	209	9671257	253819
D3B2 Freedom in how work is done	8090	209	9663867	261209
D3B3 Freedom in when work is done	8080	219	9650047	275029
D3B4 Say about what happens in job	8093	206	9672860	252216
Dimension 4: Work-life balance	**8299**	**0**	**9925076**	**0**
D4A Working time	8299	0	9925076	0
D4AA Duration	8294	5	9919031	6045
D4AA1 Usual weekly hours	8286	13	9911888	13188
D4AA2 Days worked in 4 week period	8278	21	9900078	24998
D4AA3 Satisfaction with hours	8295	4	9920884	4192
D4AA4 Working time preference	8299	0	9925076	0
D4AB Scheduling	8299	0	9925076	0
D4AB1 Weekend work	8295	4	9920881	4195
D4AB2 Can decide when to take a break	*8079*	*220*	*9652293*	*272783*

	raw number of cases with score (*n*)	raw number of cases with missing value (*n*)	Weighted number of cases with score (*N*)	Weighted number of cases with missing value (*N*)
D4AB3 Unpredictable/unsociable	8298	1	9924471	605
D4AB3a Predictability	8298	1	9924471	605
D4AB3b Unsociable schedule	8298	1	9924471	605
D4AC Flexibility	8299	0	9925076	0
D4AC1 Flexibility to balance work/non-work	8286	13	9906512	18564
D4AC2 Flexible start/finish	7422	877	8838400	1086676
D4AC3 Flexible working time	8097	202	9666962	258114
D4AC3a Freedom when do work	8080	219	9650047	275029
D4AC3b Flexible working time	8091	208	9659140	265936
D4B Work intensity	8097	202	9676583	248492
D4B1 Speed/Intensity	8097	202	9676583	248492
D4B1a Work speed	8087	212	9642013	283062
D4B1b Work intensity	8093	206	9673249	251826
D4B2 Not enough time to everything in job	8094	205	9673664	251412
Dimension 5: Health and safety	**8299**	**0**	**9925076**	**0**
D5A Physical risk	8298	1	9924305	771
D5A1 Excessive hours (50 hrs or more per week)	8286	13	9911888	13188
D5A2 Rest days in 4 week period	8278	21	9900078	24998
D5A3 Shift work	8282	17	9901726	23350
D5A4 Can decide when to take a break	8079	220	9652293	272783
D5B Psychosocial risk	8097	202	9677141	247935
D5B1 Fear stress in my job will make me physically ill	8087	212	9664348	260728
D5B2 Job more stressful than I ever imagined	8095	204	9672221	252855
D5C OHS incidence risk	8299	0	9925076	0
D5C1 OHS risk by occupation	8292	7	9915135	9941
D5C2 OHS risk by industry	7972	327	9503980	421096
Dimension 6: Voice and collective representation	**8299**	**0**	**9925076**	**0**
D6A Voice	8093	206	9672860	252216
D6B Collective representation	8299	0	9925076	0

	raw number of cases with score (*n*)	raw number of cases with missing value (*n*)	Weighted number of cases with score (*N*)	Weighted number of cases with missing value (*N*)
D6B1 Union membership	8299	0	9925076	0
D6B1a Trade union membership	8299	0	9925076	0
D6B1B Other union or trade association membership	6553	1746	7870209	2054867
D6B2 Collective agreement	8090	209	9652524	272552

11.4. Correlations for the six dimensions of the AJQI

Table 11.4.1: Correlation matrix for Dimension 1: Pay

	AJQI	**D1**	**D1A**	D1A1	D1A2	**D1B**
AJQI	1					
D1 Pay	.581**	1				
D1A Objective pay main job	.552**	.958**	1			
D1A1 FTE Gross weekly wage main job	.515**	.847**	.869**	1		
D1A2 Pay below or above FMW	.441**	.830**	.884**	.534**	1	
D1B Subjective pay	.228**	.365**	.074**	.124**	.013	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.4.2: Correlation matrix for Dimension 2: Quality of employment

	AJQI	**D2**	***D2A***	D2AObj	D2ASub	***D2B***	D2BA	D2BB
AJQI	1							
D2 Quality of employment	.435**	1						
D2A	.407**	.968**	1					
D2AObj	.381**	.826**	.879**	1				
D2ASub	.190**	.591**	.567**	.105**	1			
D2B	.248**	.459**	.220**	.100**	.286**	1		
D2BA	.149**	.341**	.174**	.167**	.074**	.705**	1	
D2BB	.239**	.379**	.240**	.034**	.440**	.638**	.100**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.4.3: Correlation matrix for Dimension 3: Intrinsic characteristics of work

	AJQI	**D3**	***D3A***	D3AObj	D3ASub	***D3B***	D3B1	D3B2	D3B3	D3B4
AJQI	1									
D3 Intrinsic characteristics of work	.738**	1								
D3A Skill	.559**	.844**	1							
D3A objective	.516**	.774**	.944**	1						
D3A subjective	.444**	.657**	.748**	.492**	1					
D3 Autonomy	.651**	.800**	.333**	.286**	.308**	1				
D3B1 (What)	.532**	.700**	.297**	.257**	.271**	.870**	1			
D3B2 (How)	.570**	.695**	.308**	.260**	.294**	.850**	.631**	1		
D3B3 (When)	.436**	.593**	.183**	.172**	.137**	.812**	.650**	.544**	1	
D3B4 (Say)	.674**	.723**	.349**	.287**	.350**	.853**	.660**	.719**	.524**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.4.4: Correlation matrix for Dimension 4: Work-life balance

	AJQI	**D4**	***D4A***	D4AA	D4AB	D4AC	***D4B***	D4B1	D4B2
AJQI	1								
D4 Work-life balance	.144**	1							
D4A Working time sub-dimension	.235**	.922**	1						
D4AA Duration	-.216**	.524**	.494**	1					
D4AB Scheduling	.335**	.609**	.719**	0.001	1				
D4AC Flexibility	.294**	.692**	.754**	.081**	.360**	1			
D4B Work Intensity sub-dimension	-.079**	.520**	.145**	.240**	-.032**	.101**	1		
D4B1 Speed of work	-.009	.437**	.135**	163**	.037**	.080**	.810**	1	
D4B2 Time pressure	-.112**	.456**	.117**	.241**	-.076**	.093**	.900**	.474**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.4.5: Correlation matrix for Dimension 5: Health and safety

	AJQI	**D5**	**D5A**	**D5B**	**D5C**
AJQI	1				
D5 Health and safety	.253**	1			
D5A Physical risk	.282**	.664**	1		
D5B Psychosocial risk	.031**	.642**	.094**	1	
D5C OHS WSA score	.223**	.597**	.251**	-.032**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.4.6: Correlation matrix for Dimension 6: Voice and collective representation

	AJQI	**D6**	**D6A**	**D6B**	D6B1	D6B2
AJQI	1					
D6 Voice and collective representation	.702**	1				
D6A Voice sub-dimension	.674**	.545**	1			
D6B Collective representation sub-dimension	.344**	.786**	-.092**	1		
D6B1 Union membership	.255**	.632**	-.064**	.798**	1	
D6B2 Collective agreement	.300**	.653**	-.092*	.838**	.336**	1

** Correlation is significant at the 0.01 level (2-tailed).

11.5. Technical report: Robustness analysis

11.5.1. Introduction

This technical appendix provides supporting information about a series of tests that checks conducted to check the robustness of the AJQI. In each case, the purpose of conducting the test is initially explained, followed by a discussion regarding what the check revealed about the robustness (or otherwise) of the index.

The technical appendix is set out as follows. Firstly, a justification is provided for using a combination of items that are not normally distributed (11.5.2). This is followed by a justification for using parametric tests on data that is not normally distributed (11.5.3). Information about the statistical properties of the AJQI (referred to in technical appendix as AJQI Version 1) is then presented in section 11.5.4. A check to see if the dimensions are adequately correlated so as to justify their inclusion in the overall index is reported in section 11.5.5 accompanied by comparisons for the AJQI to another index, the European Job Quality Index (EJQI). Tests to check plausibility of the results of the AJQI are reported in section 11.5.6 and results from a backwards-looking principal component analysis (PCA) to check whether the theoretically-derived conceptual framework is supported by the statistical properties of the index is set out in section 11.5.7. The impact on results if, at the final stage of aggregation, a simple arithmetic mean is used instead of a geometric mean is the focus of section 11.5.8. While a check on the impact on results if changes are made to the weights assigned to different levels in the nested structure of the index is documented in section 11.5.9. A check on the effect of changing the weights assigned to the different dimensions is provided in section 11.5.10. Checking the effect of changing the number of dimensions in the index is reported in section 11.5.11. Specifically, the dimension of voice and collective interest representation was dropped from the index to consider the impact this has on overall results. Section 11.5.12 sets out findings from a comparison of the AJQI results with three outcome measures of job satisfaction. Finally, an assessment is made about whether the index is deemed adequately fit-for-purpose as a tool for measuring job quality in Australia.

11.5.2. Using variables that are not normally distributed

Recommended methods for constructing composite indexes either assume that the variables included in the index are continuous and normally distributed or, if not, that the variables should be normalised prior to incorporation into the index (for example, OECD 2005). Deviating from this methodology, a combination of categorical, ordinal and scaled items were used to construct the AJQI. With the exception of two synthetic indicators derived from external data, the original HILDA variables used to construct the AJQI were standardised by converting them into scores ranging from 0 (i.e. poorest quality) to 100 (i.e. best quality), and where necessary, reversed, no other transformation was undertaken.

Translating points on an ordinal scale, such as a Likert scale, has potentially important implications for the interpretation of the results. The natural instinct of an economist or statistician would be to conceive the ordered nature of the Likert scale as simply a ranking (for example, 5 is better than 4, 4 is better than 3, etc.) and as a consequence, would use ordered probit or ordered logit techniques. However it is clear that the Likert methodology attempts to impose a linearity in the way it sets out the categories (for example, from 'totally dissatisfied' to 'totally satisfied').

What the AJQI measures is the quality of jobs and in some cases, the subjective 'fit' of these jobs with the desired working, leisure and lifestyle of the job-holders. This 'fit' impacts on the workers' utility, but what the index measures is the degree of compatibility between the job and the workers' desired working, leisure and lifestyle, not utility itself. However this has to be the case as an arithmetic average of two micro-level indices for a given person (or for the same index for two individuals), one reporting 2 (25) and the other reporting 4 (75) will give an average score of 3 (50). In levels of the index, the average of 50 for the two indices or people is taken to be the same level of job quality as another index or person who actually has a score of 50. This is not the same as saying that they have the same utility or disutility. If it were possible to measure their utility/disutility associated with their job quality (a cardinal measure) any result might prevail.

Different Likert scales

The linearity that underlies the translation of the Likert scale to the 'standardised score' (0 to 100) which is used in the aggregation is shown for a 7-point scale. For example, the AJQI includes a variable from the HILDA dataset based on a 7-point scale for the question: 'My job is complex and difficult' where a rating of 1 equated to 'strongly disagree' and a rating of 7 equated to 'strongly agree' with the translation into scoring as follows:

Likert	1	2	3	4	5	6	7
Score	0.0	16.7	33.3	50.0	66.7	83.3	100.0

The use of different Likert scales might pose problems in aggregation, for example, the AJQI includes a number of HILDA variables based on 11-point scales, such as for job security satisfaction, where 0 equates to 'totally dissatisfied' and 10 equates to 'totally satisfied' with the translation into scoring as follows:

Likert	0	1	2	3	4	5	6	7	8	9	10
Score	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0

If a given respondent scored 4 in the Likert scales for two questions, this gives scores of 50.0/100.0 and 40.0/100.0, respectively.

Suppose both Likert scales were applied to the same question and to the same respondent and the respondent wants to give a score of exactly 5 on the 7-point scale, we would expect they may want to give a score of 66.7 on the 11-point scale, bearing in mind the assumed linearity. So across respondents, some would likely give a score 6 and others would likely give a score of 7 on the 11-point scale, which on aggregation would yield a score of close to 66.7.

The 11-point scale (i.e. 0 to 10) has several advantages over a 10-point scale (i.e. 1 to 10). In particular, there is no Likert value mid-way between the minimum and maximum, where the 10-point scale would translate into scoring as follows:

Likert	1	2	3	4	5	6	7	8	9	10
Score	0.0	11.1	22.2	33.3	44.4	55.6	66.7	77.8	88.9	100.0

11.5.3. Using parametric tests on data that is not normally distributed

It is frequently claimed that parametric methods such as analysis of variance, correlation and Principal Components Analysis (PCA) are not suitable for non-continuous data nor are they suitable for data that is not normally distributed. However, Norman (2010), one of the world's leaders in medical education research methodology, provides compelling evidence, with actual examples using real and simulated data, that parametric tests not only can be used with ordinal data, such as data with Likert-type scales, but also that parametric tests are generally more robust than nonparametric tests. That is, parametric tests tend to give 'the right answer' even when statistical assumptions – such as normal distribution of the data – are violated, even to the extreme degree. Norman argues that many studies consistently show that parametric statistics are robust with respect to violations of both continuous data and normal distribution. Norman (2010, p. 626) states:

> *… [T]he various distributional assumptions or the use of parametric statistics with ordinal data, may be strictly true, but fail to account for the robustness of parametric tests, and ignore a substantial literature suggesting that parametric statistics are perfectly appropriate …. One of the beauties of statistical methods is that, although they often involve heroic assumptions about the data, it seems to matter very little even when these are violated…*

More specifically on the matter of normal distribution, Norman (2010, p. 628) states that 'both theory and data converge on the conclusion that parametric methods examining differences between means, for sample sizes greater than five do not require the assumption of normality, and will yield nearly correct answers even for manifestly non-normal and asymmetric distributions like exponentials'. Moreover, on the matter of using parametric tests like Pearson correlations when the data is ordinal, Norman (2010, p. 629) cites a number of studies (namely Pearson 1931; 1932a & b; Dunlap 1931 and Havlicek and Peterson 1976 cited in Norman 2010) that have all shown that 'using theoretical distributions, that the Pearson correlation is robust with respect to skewness and non-normality'.

The simple comparison below using one dimension-level and two sub-dimension indicators from the AJQI highlight little difference in the strength, direction or level of statistical significance between correlations when using the Pearson (i.e. parametric, Example A) compared to the Spearman tests (i.e. nonparametric, Example B).

Example A: Parametric (Pearson correlation)

	D2	D2A	D2B
D2	1		
D2A	.968**	1	
D2B	.459**	.220**	1

**Correlation is significant at the 0.01 level (2-tailed).

Example B: Non-parametric (Spearman Rho)

	D2	D2A	D2B
D2	1		
D2A	.958**	1	
D2B	.486**	.255**	1

**Correlation is significant at the 0.01 level (2-tailed).

While both parametric and nonparametric tests were conducted as part of constructing the AJQI, and the results were checked for discrepancies, only results from the parametric tests (i.e. Pearson correlations) have been reported in this thesis.

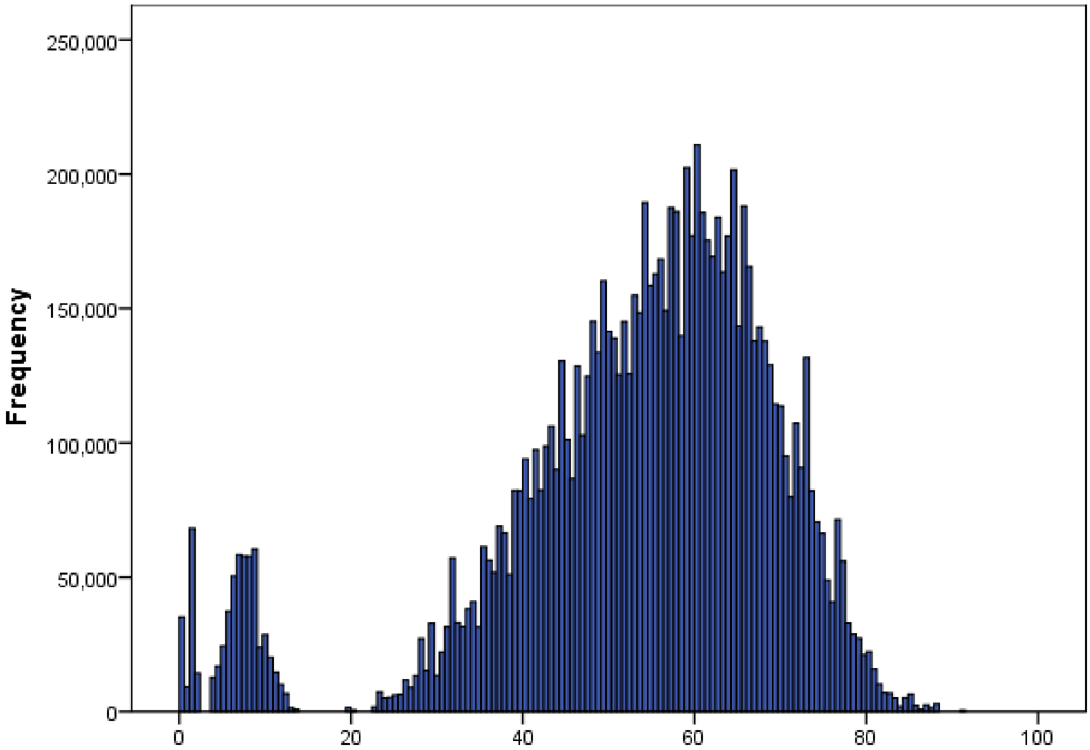
11.5.4. The statistical properties of the AJQI

Figure 11.5.4.1 plots the individual scores for job quality (i.e. AJQI scores) against the cumulative percentage of individuals ranked by job quality. Known as Pen's parade (1971); and also sometimes referred to as the 'parade of dwarfs and giants'; this type of graph was originally used to illustrate income inequality. In this instance, the display provides a visual inspection how scores for job quality (plotted on the vertical axis) grow across the distribution (plotted on the horizontal axis). From the graph, it can be seen that the individual scores for overall job quality do not steadily increase across the distribution; rather the scores for job quality increase sharply at the beginning, gradually increase during the middle of the distribution, and then grow sharply again at the very top end of the distribution.

Figure 11.5.4.1: Pen's Parade distribution of the AJQI

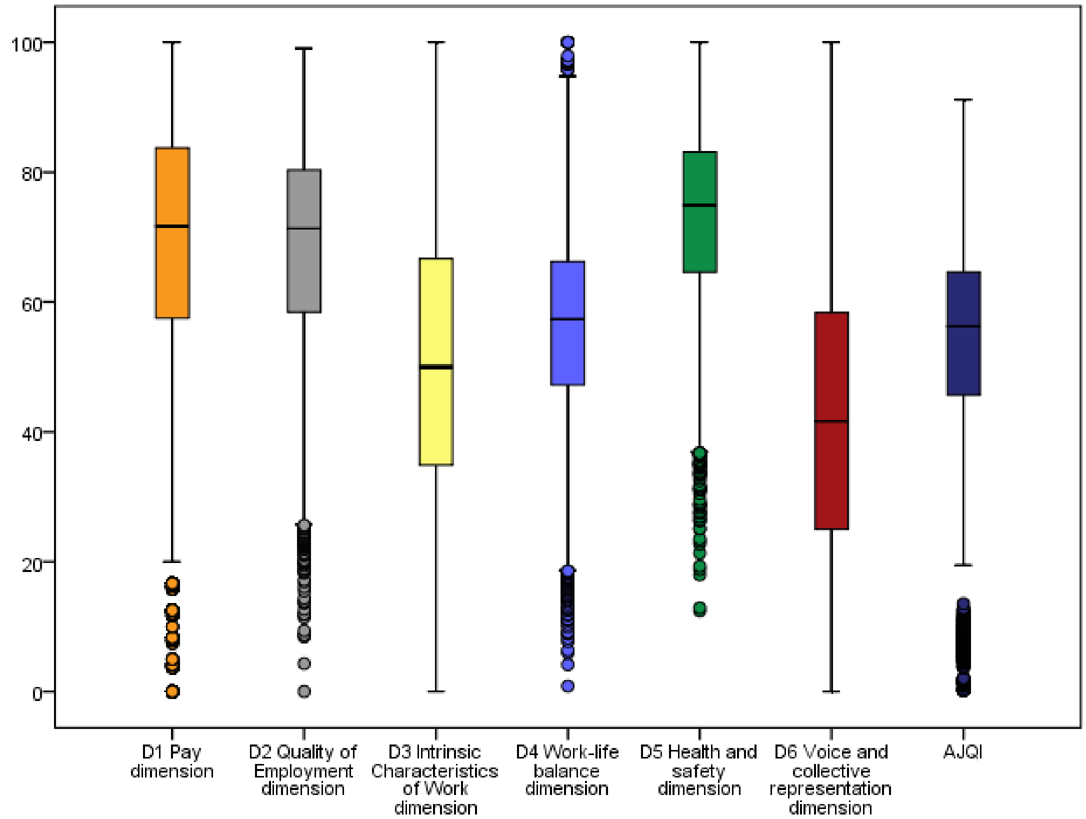
Inspection of the histogram shown in Figure 11.5.4.2 shows that the distribution of scores is not continuous, where a gap in scores occurs between 13.5 and 19.5 in the range from 0 to 100. For the most part, extremely low scores in the AJQI occur due to jobs being assigned the lowest possible score of zero for two or more dimensions. Zero-scoring occurs for voice and collective interest representation; pay; and intrinsic characteristics of work, but none of the jobs were assigned a score of zero for work-life balance (D4) or health and safety (D5). The presence of missing values is another explanatory factor for low scores. As explained in the method chapter (chapter four), only those jobs with a score for all six of the dimensions are included in the final AJQI. Relevant, though, because of the scoring logic used to construct the AJQI, a score of zero is valid, as it represents the lowest quality level for the particular aspect of job quality that is being captured. As long as there is at least one other indicator in a particular dimension with a score, it is possible to have a missing score for a whole sub-dimension. For instance, around two-fifths of Australian employers are covered by a collective agreement and around one-quarter are members of a trade union. Consequently, more than half of all jobs (54.7% or close to 700,000 jobs) were assigned a score of zero for collective interest representation (D6B).

Figure 11.5.4.2: Histogram showing distribution of the AJQI



Illustrating the distribution for each of the six dimensions and for the overall AJQI, Figure 11.5.4.3 provides side-by-side box plots where – for each dimension and for the AJQI – the thick line in the middle of each box represents the average; the box around it represents the interquartile range (25th to 75th percentile); and the vertical lines represent the distance between the values of the 5th and 95th percentiles. Because the geometric method was used in the last stage of aggregation from the dimension-level up to the overall AJQI, the relatively higher means for three dimensions (pay; quality of employment; and health and safety) are offset by the relatively lower means for the other three dimensions (intrinsic characteristics of work; work-life balance; and voice and collective representation), resulting in the lower mean, shorter interquartile range and shorter distance between the values of the 5th and 95th percentiles for the overall AJQI. The small circles at or just above the horizontal axis and below the boxes for pay (D1), quality of employment (D2), work-life balance (D4), health and safety (D5) and for the AJQI itself represent outliers (i.e. extreme values that are 1.5 times the inter-quartile range). For work-life balance, outliers are present at the top end of the distribution.

Figure 11.5.4.3: Side-by-side box plots for each dimension and the AJQI (overall index)



As the dimension of voice and collective representation was constructed using only three dichotomous variables (i.e. yes/no), after aggregation, its distribution is 'lumpy' in nature, that is the scores step up across the cumulative distribution. Additionally, the general shape of the distribution curve for the dimension of intrinsic characteristics of work differs to the shape of the distributional curves for the AJQI, where it crosses the curves for AJQI and work-life balance at around three-quarters of the way up the cumulative distribution. This means that overall job quality is higher than overall intrinsic characteristics of work below the point where it crosses the AJQI curve; and conversely, the overall level of job quality is lower than the overall intrinsic quality of work after it crosses the AJQI (this relationship is further explored by examining average scores by quintile. The effect of the geometric mean results in the situation where the AJQI lies below all of the six dimensions at the top end of the distribution.

Table 11.5.4.1 sets out details on details on the mean, standard deviation, range, measures of skewness and kurtosis, and inter-quartile range for all of the constituent dimensions, sub-dimensions and indicators found in the AJQI.

Table 11.5.4.1: Descriptive statistics of the AJQI

	Mean	Standard deviation	Variance	Min.	Max.	Range	Skewness	Kurtosis	Percentile		
									25th	50th	75th
AJQI (Version 1)	**53.30**	**16.73**	**279.74**	**0.15**	**91.13**	**90.98**	**-1.19**	**1.57**	**45.65**	**56.25**	**64.62**
Dimension 1: Pay	**65.96**	**23.80**	**566.36**	**0.00**	**100.00**	**100.00**	**-1.05**	**0.52**	**58.33**	**72.07**	**83.75**
D1A objective pay	67.80	29.29	858.13	0.00	100.00	100.00	-1.28	0.63	60.00	75.00	90.00
D1A1 FTE Gross weekly wage in main job by decile	49.78	31.53	994.46	0.00	100.00	100.00	0.01	-1.22	20.00	50.00	80.00
D1A2 Gross weekly wage in main job above or below FMW	86.52	34.15	1166.31	0.00	100.00	100.00	-2.14	2.57	100.00	100.00	100.00
D1B subjective pay	60.75	26.71	713.41	0.00	100.00	100.00	-0.51	-0.50	50.00	66.70	83.30
Dimension 2: Quality of employment	**68.12**	**15.93**	**253.76**	**0.00**	**99.06**	**99.06**	**-0.76**	**0.22**	**58.44**	**71.30**	**80.32**
D2A Contractual stability	76.40	19.44	378.00	0.00	100.00	100.00	-0.91	0.24	64.37	81.67	92.49
D2A Objective contractual stability	77.54	31.96	1021.33	0.00	100.00	100.00	-1.12	0.11	50.00	100.00	100.00
D2AObj1 Paid leave entitlement	75.68	42.90	1840.67	0.00	100.00	100.00	-1.20	-0.57	100.00	100.00	100.00
D2AObj2 Unfair dismissal qualification	78.82	40.87	1670.28	0.00	100.00	100.00	-1.41	-0.01	100.00	100.00	100.00
D2A Subjective contractual stability	75.25	18.33	335.99	0.00	100.00	100.00	-0.87	0.71	64.59	77.51	89.56
D2Asub1 Worry about future of my job (reversed)	63.43	30.26	915.60	0.00	100.00	100.00	-0.49	-0.90	33.33	66.70	83.30
D2Asub2 Percent chance of losing job in next twelve months	88.01	21.02	441.98	0.00	100.00	100.00	-2.24	4.81	90.00	100.00	100.00
D2Asub3 Company I work for will still be in business in 5 years	79.18	25.41	645.82	0.00	100.00	100.00	-1.28	1.01	66.70	83.30	100.00
D2Asub4 Security	70.43	21.73	472.35	0.00	100.00	100.00	-0.83	0.41	56.65	73.35	86.65
D2Asub4a	63.29	27.42	752.08	0.00	100.00	100.00	-0.60	-0.40	50.00	66.70	83.30
D2Asub4b	77.39	20.92	437.48	0.00	100.00	100.00	-1.28	1.61	70.00	80.00	90.00
D2B Development opportunities	43.29	16.15	260.70	0.00	99.17	99.17	0.51	0.84	35.00	40.00	50.42
D2BA Work-relating training	14.54	23.91	571.46	0.00	100.00	100.00	1.72	2.18	0.00	0.00	28.33

	Mean	Standard deviation	Variance	Min.	Max.	Range	Skewness	Kurtosis	Percentile		
									25th	**50th**	**75th**
D2BA1 Work-related training	21.04	30.12	907.13	0.00	100.00	100.00	0.85	-1.03	0.00	0.00	53.33
D2BA1a Work-relating training in paid work time	32.26	45.66	2084.53	0.00	100.00	100.00	0.76	-1.37	0.00	0.00	100.00
D2BA1b Amount of work-relating training past 12 mths	8.89	16.59	275.09	0.00	100.00	100.00	2.58	7.98	0.00	0.00	10.00
D2BA1c Extent would use new skills	21.98	34.44	1186.22	0.00	100.00	100.00	1.19	-0.17	0.00	0.00	50.00
D2BA1d Employer contributed to cost of training	8.03	27.17	738.36	0.00	100.00	100.00	3.09	7.54	0.00	0.00	0.00
D2BB Satisfaction with employment opportunities	72.57	18.75	351.73	0.00	100.00	100.00	-0.94	1.11	60.00	80.00	80.00
Dimension 3: Intrinsic characteristics of work	**50.44**	**21.33**	**455.04**	**0.00**	**100.00**	**100.00**	**-0.07**	**-0.62**	**34.89**	**50.00**	**66.67**
D3A Skills	53.76	26.90	723.57	0.00	100.00	100.00	-0.02	-1.25	31.25	51.04	80.21
D3A Objective skill	50.33	40.35	1628.01	0.00	100.00	100.00	0.09	-1.62	25.00	50.00	100.00
D3A Subjective skill	57.79	19.48	379.44	0.00	100.00	100.00	-0.40	-0.22	45.83	60.42	72.92
D3ASubA Complexity	55.28	25.29	639.66	0.00	100.00	100.00	-0.33	-0.54	41.67	58.34	75.00
D3ASubA1 Job is complex and difficult	50.20	29.77	886.22	0.00	100.00	100.00	-0.14	-1.03	33.33	50.00	66.67
D3ASubA2 Job often requires me to learn new skills	60.38	28.10	789.44	0.00	100.00	100.00	-0.52	-0.60	50.00	66.67	83.33
D3ASubB Variety	60.29	18.44	340.03	0.00	100.00	100.00	-0.53	0.31	50.00	62.50	75.00
D3Asubb1 Initiative	72.85	23.57	555.34	0.00	100.00	100.00	-1.02	0.72	66.67	83.33	83.33
D3Asubb2 Skill use	70.69	24.65	607.57	0.00	100.00	100.00	-0.99	0.54	66.67	83.33	83.33
D3Asubb3 Variety of interesting things	59.93	26.30	691.43	0.00	100.00	100.00	-0.47	-0.49	50.00	66.67	83.33
D3Asubb4 Monotonous tasks	37.64	26.75	715.67	0.00	100.00	100.00	0.43	-0.56	16.67	33.33	50.00
D3B Autonomy	47.46	24.25	588.28	0.00	100.00	100.00	0.08	-0.64	29.17	50.00	66.67
D3B1 Choice in deciding what to do	41.15	28.83	831.04	0.00	100.00	100.00	0.28	-0.94	16.67	33.33	66.67

	Mean	Standard deviation	Variance	Min.	Max.	Range	Skewness	Kurtosis	Percentile		
									25th	50th	75th
D3B2 Freedom in how work is done	57.37	27.89	778.04	0.00	100.00	100.00	-0.37	-0.78	33.33	66.67	83.33
D3B3 Freedom in when work is done	40.47	30.43	925.70	0.00	100.00	100.00	0.30	-1.04	16.67	33.33	66.67
D3B4 Say about what happens in job	50.84	27.59	761.25	0.00	100.00	100.00	-0.11	-0.89	33.33	50.00	66.67
Dimension 4: Work-life balance	**56.47**	**14.46**	**209.13**	**0.83**	**100.00**	**99.17**	**-0.23**	**0.07**	**47.22**	**57.36**	**66.25**
D4A Working time	61.02	16.53	273.14	1.11	100.00	98.89	-0.46	-0.07	50.46	62.96	73.24
D4AA Duration	51.68	22.36	499.89	0.00	100.00	100.00	0.24	-0.31	41.67	54.17	62.50
D4AA1 Usual weekly hours	61.80	29.46	868.10	0.00	100.00	100.00	-0.48	-0.69	50.00	75.00	75.00
D4AA2 Days worked in 4 week period	41.52	20.38	415.37	0.00	100.00	100.00	1.11	1.12	33.33	33.33	50.00
D4AA3 Satisfaction with hours	72.34	19.70	388.06	0.00	100.00	100.00	-0.83	0.52	60.00	80.00	90.00
D4AA4 Working time preference	60.48	48.32	2334.35	0.00	100.00	100.00	-0.43	-1.79	0.00	100.00	100.00
D4AB Scheduling	72.79	26.21	686.77	0.00	100.00	100.00	-1.12	0.46	61.11	80.56	94.44
D4AB1 Weekend work	79.84	40.12	1609.67	0.00	100.00	100.00	-1.49	0.21	100.00	100.00	100.00
D4AB2 Can decide when to take a break	56.64	34.39	1182.55	0.00	100.00	100.00	-0.39	-1.21	16.67	66.67	83.33
D4AB3 Unpredictable/unsociable	81.40	37.15	1380.34	0.00	100.00	100.00	-1.67	0.92	100.00	100.00	100.00
D4AB3a Predictability	83.18	37.40	1398.88	0.00	100.00	100.00	-1.77	1.15	100.00	100.00	100.00
D4AB3b Unsociable schedule	79.62	38.01	1444.49	0.00	100.00	100.00	-1.46	0.33	100.00	100.00	100.00
D4AC Flexibility	58.60	26.26	689.79	0.00	100.00	100.00	-0.24	-1.21	34.45	63.89	82.22
D4AC1 Flexibility to balance work/non-work	74.14	21.55	464.37	0.00	100.00	100.00	-1.03	0.84	60.00	80.00	90.00
D4AC2 Flexible start/finish	55.42	49.70	2470.58	0.00	100.00	100.00	-0.22	-1.95	0.00	100.00	100.00
D4AC3 Flexible working time	44.99	28.07	787.73	0.00	100.00	100.00	0.08	-0.93	25.00	50.00	66.67
D4AC3a Freedom when do work	40.47	30.43	925.70	0.00	100.00	100.00	0.30	-1.04	16.67	33.33	66.67
D4AC3b Flexible working time	49.45	32.27	1041.07	0.00	100.00	100.00	-0.09	-1.25	16.67	50.00	83.33
D4B Work intensity	42.08	22.29	497.00	0.00	100.00	100.00	0.12	-0.45	25.00	41.67	58.33
D4B1 Speed/Intensity	34.63	22.15	490.42	0.00	100.00	100.00	0.47	-0.03	16.67	33.33	50.00
D4B1a Work speed	32.47	24.13	582.46	0.00	100.00	100.00	0.62	-0.04	16.67	33.33	50.00

	Mean	Standard deviation	Variance	Min.	Max.	Range	Skewness	Kurtosis	Percentile		
									25th	50th	75th
D4B1b Work intensity	36.74	25.08	628.80	0.00	100.00	100.00	0.46	-0.37	16.67	33.33	50.00
D4B2 Not enough time to everything in job	49.54	29.78	886.95	0.00	100.00	100.00	-0.02	-1.01	33.33	50.00	66.67
Dimension 5: Health and safety	**73.39**	**13.31**	**177.10**	**12.43**	**100.00**	**87.57**	**-0.57**	**0.20**	**64.63**	**74.92**	**83.11**
D5A Physical risk	78.62	18.68	348.86	0.00	100.00	100.00	-1.08	1.17	70.83	79.17	95.83
D5A1 Excessive hours (50+ p.w.)	86.74	33.92	1150.38	0.00	100.00	100.00	-2.17	2.69	100.00	100.00	100.00
D5A2 Rest days in 4 week period	91.34	28.13	791.26	0.00	100.00	100.00	-2.94	6.64	100.00	100.00	100.00
D5A3 Shift work	79.23	38.49	1481.30	0.00	100.00	100.00	-1.42	0.16	100.00	100.00	100.00
D5A4 Can decide when to take a break	56.64	34.39	1182.52	0.00	100.00	100.00	-0.39	-1.21	16.67	66.66	83.33
D5B Psychosocial risk	68.77	24.20	585.87	0.00	100.00	100.00	-0.65	-0.22	50.00	75.00	83.33
D5B1 Fear stress in my job will make me physically ill	74.71	25.36	643.16	0.00	100.00	100.00	-0.99	0.22	66.66	83.33	100.00
D5B2 Job more stressful than I ever imagined	62.85	27.21	740.18	0.00	100.00	100.00	-0.35	-0.79	50.00	66.66	83.33
D5C OHS incidence risk	72.61	19.87	394.88	0.34	100.00	99.66	-0.97	0.29	62.53	79.31	87.15
D5C1 OHS risk by occupation	70.06	27.57	760.08	0.00	100.00	100.00	-1.08	0.01	49.66	81.88	90.60
D5C2 OHS risk by industry	75.02	18.53	343.52	0.00	100.00	100.00	-1.22	1.48	63.10	79.68	87.17
Dimension 6: Voice and collective representation	**40.38**	**22.80**	**520.05**	**0.00**	**100.00**	**100.00**	**0.27**	**-0.47**	**25.00**	**41.65**	**58.35**
D6A Voice	50.84	27.59	761.02	0.00	100.00	100.00	-0.11	-0.89	33.30	50.00	66.70
D6B Collective representation	30.73	37.39	1398.33	0.00	100.00	100.00	0.76	-0.83	0.00	0.00	50.00
D6B1 Union membership	24.80	43.18	1864.82	0.00	100.00	100.00	1.17	-0.64	0.00	0.00	0.00
D6B2 Collective agreement	37.51	48.41	2344.00	0.00	100.00	100.00	0.52	-1.73	0.00	0.00	100.00

11.5.5. Checking for correlation

The first robustness check involves examining whether the index is well-balanced with respect to the dimensions and whether the dimensions are adequately correlated to justify their inclusion in the index. First, the check involved looking for high positive correlations between indicators with each sub-dimension, where these correlations should, ideally, be higher than correlations with indicators nested within other dimensions. That is, the presence of high within-group and lower between-group correlations implies meaningful indicator contribution to the variance of the aggregate scores and that the indicators have been allocated to the most relevant dimension in the hierarchical structure (Athanasoglou, et al., 2014; OECD, 2008).

As mentioned in Appendix 11.4 separate pair-wise correlation matrices for each dimensions of the AJQI, showing pair-wise correlation coefficients for the dimension with its sub-dimensions, as well as with the AJQI itself.

Testing correlation in the AJQI shows that all of the six dimensions are positively correlated to the overall index (see Table 11.5.5.1, below). The strongest coefficients are found between the overall index and the dimensions of intrinsic characteristics of work (r=0.710; p<001 level, 2-tailed), and voice and collective representation (r=0.702; p<001 level, 2-tailed). Since these two dimensions are highly correlated with the AJQI; and because the geometric method of final aggregation punishes unbalanced sets of scores and rewards balanced sets of scores, a particularly high or low score on one or both of these dimensions will have a relatively large impact on the final score for the AJQI. In contrast, the weakest co-efficients (yet both positive and statistically significant at the 0.01 level) are between the overall index and the dimensions of work-life balance (r=0.144; p<001 level, 2-tailed), and health and safety (r=0.253; p<001 level, 2-tailed).

In terms of the correlations between the different dimensions, with the exception of two dimensions (work-life balance; and voice and collective interest representation), all of the correlations are positive. Work-life balance is negatively correlated with three dimensions: pay (-0.093; p<001 level, 2-tailed); quality of employment (-0.095; p<001 level, 2-tailed); and voice and collective interest representation (-0.091; p<001 level, 2-tailed). The dimensions of voice and collective interest representation and health and safety are also negatively correlated (-0.048; p<001 level, 2-tailed). All of the negatively correlated items as significant, negative yet weak. Overall, this means that at the level of the dimensions, there is more accumulation than compensation of both positive and negative attributes of job quality.

Table 11.5.5.1: Pair-wise correlation matrix for the AJQI

	AJQI	D1	D2	D3	D4	D5	D6
AJQI	1.00						
Dimension 1: Pay	0.582**	1.00					
Dimension 2: Quality of employment	0.435**	0.261**	1.00				
Dimension 3: Intrinsic characteristics of work	0.710**	0.413**	0.261**	1.00			
Dimension 4: Work-life balance	0.144**	-0.093**	-0.095**	0.094**	1.00		
Dimension 5: Health and safety	0.253**	0.031**	0.050**	0.186**	0.650**	1.00	
Dimension 6: Voice and collective representation	0.702**	0.307**	0.323**	0.450**	-0.091**	-0.048**	1.00

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.5.5.2: Pair-wise correlation matrix for the EJQI

	EJQI National	D1	D2	D3	D4	D5
EJQI National	1.00					
Dimension 1: Pay	0.47	1.00				
Dimension 2: Quality of employment	0.63	0.26	1.00			
Dimension 3: Intrinsic Characteristics of Work	0.58	0.30	0.26	1.00		
Dimension 4: Work-life balance	0.43	-0.03	0.06	0.20	1.00	
Dimension 5: Health and Safety	0.70	0.11	0.17	0.19	0.33	1.00

Source: Muñoz de Bustillo et al. (2011b), Table 5.12, p. 194 Note: significance was not individually reported. It was presumed that all correlations were statistically significant.

For the pay dimension, the correlation with the overall index is higher (r=0.58) than the correlation with the other five dimensions. While the pay dimension is positively correlated with four of the dimensions (quality of employment; intrinsic characteristics of work; health and safety; and voice and collective representation), it is negatively correlated with the dimension of work-life balance (r=-0.09). This negative correlation probably reflects some kind of trade-off, such as employees in relatively high paid jobs are also more likely to work long hours, and vice versa.

Within the pay dimension, the sub-dimension of objective pay (D1A) shows a high positive correlation with the AJQI (r=0.958; p<001 level, 2-tailed), while the sub-dimension of subjective pay (D1B) shows a small positive correlation with the AJQI (.228; p<001 level, 2-tailed). The two indicators in the sub-dimension of objective pay (D1A1 & D1A2) both show high positive correlations with the AJQI (.826 & .591; p<001 level, 2-tailed); with the one another (.534; p<001 level, 2-tailed).

For the quality of employment dimension, the correlation with the overall index (r=0.435; p<001 level, 2-tailed) is also higher than the correlation with the other five dimensions. While this dimension is positively correlated with four of the dimensions (pay; intrinsic characteristics of work; health and safety; and voice and collective representation), it is negatively correlated with the dimension of work-life balance (r=--0.095; p<001 level, 2-tailed). This weak negative correlation probably reflects another trade-off, where workers in jobs with poor terms of employment (such as those jobs with no entitlement to paid leave) also often work unsociable and/or irregular hours.

Within the dimension, the sub-dimensions of contractual stability (D2A) and development opportunities (D2B) are both positively correlated with the AJQI (.407 & .248; p<001 level, 2-tailed) and with one another (.220; p<001 level, 2-tailed). However, some of the correlations for contractual stability are lower among themselves than with the AJQI overall. In reverse, the indicators in the sub-dimension of development opportunities have higher correlations among themselves than with the dimension or the AJQI.

For the dimension of intrinsic characteristics of work, the correlation with the overall index (r=0.710; p<001 level, 2-tailed) is higher than the correlations with the five other dimensions. Apart from correlation with the overall index, this dimension was most strongly correlated with the dimensions of voice and collective representation (r=0.450; p<001 level, 2-tailed) and pay (r=0.413; p<001 level, 2-tailed). The dimension is also positively correlated with quality of employment, health and safety, and work-life balance, despite the strength of these correlation coefficients being small (r=0.256; 0.186 and 0.094, respectively; p<001 level, 2-tailed).

Within the dimension, the sub-dimensions of skills (D3A) and autonomy (D3B) are both strongly and highly correlated with the AJQI (.556 & .648; p<001 level, 2-tailed, more highly correlated with the dimension of intrinsic characteristics of work than with the AJQI (.844 & .800; p<001 level, 2-tailed), and while the indicators in the sub-dimension of autonomy are more highly correlated among themselves than with the dimension and AJQI overall, the correlation of skills and autonomy is lower (.333; p<001 level, 2-tailed) than the correlation of either with the dimension and AJQI overall.

For the dimension of work-life balance, the co-efficient with the overall index (r=0.144; p<001 level, 2-tailed) is not as strong as the co-efficient with the dimension of health and safety (r=0.650; p<001 level, 2-tailed). This is likely due to several of the indicators included in the sub-dimension of physical risk (D5A) having been constructed using the same underlying original HILDA variables (around duration and scheduling of work). Theoretically, it makes sense for these two dimensions to be correlated.

Within the dimension, the sub-dimension of working time (D4A) is positively correlated with the AJQI (.235; p<001 level, 2-tailed) and the sub-dimension of work intensity (D4B) is negatively correlated with the AJQI (-.079; p<001 level, 2-tailed). However, both working time and work intensity are positively correlated with the dimension of work-life balance (.922 & .520; p<001 level, 2-tailed). All of the indictors in both sub-dimensions positively correlated to the dimension, however the indicator for time pressure (D4B2) is negatively correlated to the indicator of flexibility (D4AB), suggesting a trade-off between these two aspects of work-life balance.

For the dimension of health and safety, the co-efficient with the overall index is positive, yet small (r=0.253; p<001 level, 2-tailed). It is smaller than the correlation with work-life balance (r=0.650; p<001 level, 2-tailed), but considerably larger than correlations with the four other dimensions. As already explained, a strong correlation with work-life balance makes sense theoretically.

Within the dimension, the sub-dimensions of physical risk (D5A), psycho-social risk (D5B) and occupational health and safety (OHS) risk of work-related injury or illness (calculated on the basis of official rates of serious claims by occupation and industry) (D5C) are all positively correlated to the AJQI; where the correlations for the three sub-dimensions are higher with the dimension than with the AJQI overall. The sub-dimension of OHS risk is negatively correlated with psycho-social risk, yet positively correlated with the sub-dimension of physical risk. This perhaps reflects the fact that physical injuries are more likely to be reported, and thus captured, in OHS statistics (as D5C was constructed by importing actual incidence rates of work-related health and safety accidents and illnesses) than injuries or illnesses connected to poor psycho-social health.

For the dimension of voice and collective interest representation, the correlation with the overall index is positive and large (r=0.702; p<001 level, 2-tailed); and larger than correlations with the other five dimensions of the AJQI. The dimension that is most strongly correlated with voice and representation is intrinsic characteristics of work (r=0.450; p<001 level, 2-tailed). This sixth dimension is negatively correlated with both work-life balance (r=-0.091 p<001 level, 2-tailed) and health and safety (r=-0.048; p<001 level, 2-tailed); where these negative correlations are likely to reflect trade-offs, such as where jobs found in employers that have well-established mechanisms for voice and representation (such as in the public sector; large employers and/or traditional heavy industries such as manufacturing) may also more commonly have long or unsociable work schedules, as well as greater exposure to health and safety risks .

Within the dimension, the sub-dimensions of voice (D6A) and collective interest representation (D6A) are both positively correlated to the AJQI (.545 & .786; p<001 level, 2-tailed) and the indicators in each sub-dimension are positively correlated with one another. The two sub-dimensions, however, are negatively correlated with one another (-.092; p<001 level, 2-tailed), suggesting a trade-off between voice and representation.

Crucially, all of the six dimensions are all positively correlated to the overall AJQI. At the level of the dimensions, there appears to be more accumulation than compensation of both positive and negative attributes of job quality. In terms of the correlations between the different dimensions, with the exception of one dimension (work-life balance), all of the correlations are positive. As reported in the methodology chapter (chapter four), in most instances, there were strong correlations between indicators within each dimension, implying a meaningful contribution to the variance of the aggregate score.

In summary, having undertaken this check for robustness, it was deemed that the dimensions are adequately correlated to the AJQI to justify their inclusion in the overall index and that the indicators are properly positioned in the nested structure of the AJQI.

As external type of robustness check, comparisons are made between the pair-wise correlations for the AJQI and a leading index, the EJQI. Prior to reporting on findings from these two comparisons, it is useful to reiterate that a number of differences exist between the AJQI and EJQI. The key differences are summarised as follows:

- The two indexes were created using different underlying datasets (i.e. HILDA and EWCS);

- While scores for the AJQI were restricted to the sample of employees in the HILDA dataset whereas scores for the EJQI were calculated for the sample of all workers in the EWCS dataset;
- The AJQI included an additional dimension (namely, Voice and Collective Interest Representation) not found in the EJQI;
- Several indicators in the AJQI (namely, D1A2 in the Pay dimension, D2AObj2 in the Quality of Employment dimension; D3AObj; and D5A1, D5C1 and D5C2 in the Health and Safety dimension) are customised based on the Australian employment regime; and
- Due to a difference in opinion about their relative importance, a number of sub-dimensions of the AJQI are assigned different weights than those weights used in the EJQI (Pay, Quality of Employment; and Health and Safety).

Notwithstanding the above differences, the notion of job quality that was used to inform the conceptual framework for both indexes is similar. In addition, both indexes were constructed by using the same aggregation methods (i.e. arithmetic aggregation up to the dimension-level and geometric aggregation at the final level). Taking all of the above factors into account, comparing correlations from the AJQI with the correlations from the EJQI is deemed suitable as one way to externally check robustness. This being so, it is not reasonable to expect that the correlations for the AJQI and EJQI will be exactly the same. Yet, it is reasonable to expect that the direction and strength of pair-wise correlations might be similar.

Table 11.5.5.2, above, sets out the pair-wise correlations for the EJQI and its five dimensions. In both the AJQI and the EJQI, all of the dimensions (six in the case of the AJQI; five in the case of the EJQI) are positively correlated with the overall index. For the AJQI, the strongest pair-wise correlation found between the overall index and its dimensions for intrinsic characteristics of work (r=0.710). In the EJQI, this dimension was also highly correlated to the overall index (r=0.63). In terms of the correlations between the different dimensions, with the exception of one dimension (work-life balance), in both the AJQI and EJQI, all of the correlations among dimensions are positive.

In both the AJQI and EJQI, pay is negatively correlated work-life balance (r=-0.093 in the AJQI and r=-0.03 in the EJQI). In the AJQI, quality of employment is positively correlated with all of the other dimensions except work-life balance (r=-0.095). In the EJQI, quality of employment is positively correlated with all of its four other dimensions, although the correlation with work-life balance is positive, it is very weak (r=0.06).

The strength and pattern of correlations for intrinsic characteristics of work with other dimensions is very similar in the AJQI and EJQI. That is, intrinsic characteristics of work had a medium strength correlation with pay (r=0.413 in the AJQI and r=0.30 in the EJQI); and quality of employment (r=0.256 in the AJQI and r=.26 in the EJQI). Intrinsic quality is weakly correlated with work-life balance (r=0.094 in the AJQI and r=0.20 in the EJQI) and health and safety (r=0.186 in the AJQI and r=.19 in the EJQI).

The weakest pair-wise correlation found between the AJQI and its dimensions is for work-life balance (r=0.144); the pair-wise correlation between the overall index and work-life balance in the EJQI was stronger (r=0.43). For the dimension of work-life balance in the AJQI, the correlation with the overall index (r=0.144) is not as strong as the correlation with the dimension of health and safety (r=0.650). By way of an external check, these two dimensions also had the highest among-dimension correlation (r=0.33) in the EJQI. In the AJQI, work-life balance has a negative yet weak correlation with pay (-0.093); and also with quality of employment (r=--.095). In the EJQI, work-life balance also has negative yet weak correlated with pay (r=-0.03); but it has a positive, yet weak, correlation with quality of employment (r=0.06).

In both the AJQI and the EJQI, the dimension of health and safety is positively correlated to the overall index (r=0.253 in the AJQI and r=0.70 in the EJQI). Health and safety is also positively correlated with all of the other dimensions in both indexes, with strong correlation to work-life balance (r=0.650 for AJQI and r=0.33 for EJQI), next strongest is with the dimension of intrinsic characteristics of work (r=0.186 in the AJQI and r=.19 in the EJQI); and with very weak correlations with pay (r=0.031 in AJQI and r=0.11 in EJQI) and quality of employment (r=0.050 in AJQI and r=0.17 in EJQI). As the dimension of voice and collective interest representation was not included in the EJQI, it is not possible to benchmark with the EJQI.

In summary, while there are some differences in the strength of correlations, the direction and pattern of correlations for the AJQI and EJQI are, in almost all cases, similar. Although the underlying conceptual framework differ, weights and indicators differ, including customisation of the AJQI to the Australian employment regime, both indexes were constructed by using a similar aggregation method. Taking all of the above factors into account, comparing correlations for the AJQI with correlations for the EJQI was deemed suitable as a way to do an external check of robustness.

11.5.6. Checking plausibility of AJQI scores

As a second check for robustness, average scores for five different categories of jobs found in the AJQI sample are examined. The purpose of making these comparisons is not to fully analyse the differences in job quality by occupation or industry (chapter seven sets out detailed analyses of the results for different sub-groups, including by occupation and industry), but purely illustrative. The aim is to make an assessment of the plausibility of the AJQI scores. The five categories of jobs were selected to represent a mixture of jobs in male and female-dominated industries, and occupations with higher or lower skill levels.

Table 11.5.6.1 (below) sets out the average scores for five categories of employees found in the AJQI sample. The first thing to observe is the average score for the overall AJQI is lowest for jobs in the accommodation and food services industry (38.59); followed by jobs in the major occupational group of machinery operators and drivers (48.24); jobs in the construction industry (53.32); jobs in the health care and social assistance industry (56.01). The highest is for professional jobs (62.85).

Second, pay quality is highest for professional jobs (77.36) and lowest for jobs in accommodation and food services (43.73). For quality of employment, scores are highest for jobs in health care and social assistance (73.84) and scores are lowest for jobs in accommodation and food services (57.08), where work is often precarious work and the majority of workers are paid at the minimum rate.

Scores for the quality of intrinsic characteristics of work are highest for professional jobs (71.41) and lowest for machinery operators and drivers (37.81); and lowest in accommodation and food services (33.02), closely followed by retail trade (34.85). With the dimension of work-life balance, quality is highest for professionals and lowest for machinery operators and drivers (50.69). For voice and collective interest representation, scores are highest for professionals (49.28), where the average score is two times highest than for jobs in accommodation and food services (25.83).

In summary, it emerged that results for the different categories of jobs in the AJQI seem plausible and within expectations.

Table 11.5.6.1: AJQI job quality scores for six representative categories of jobs, mean

	AJQI (i.e. all jobs)	Construction industry	Accommodation & Food service industry	Health Care & Social Assistance industry	Professional	Machine operators & Drivers
AJQI	53.30	53.32	38.59	56.01	62.85	48.24
Dimension 1: Pay	65.95	71.37	43.73	66.07	79.65	67.82
Dimension 2: Quality of employment	68.13	64.38	57.08	73.84	72.50	64.37
Dimension 3: Intrinsic characteristics of work	50.45	50.13	33.02	53.55	68.81	37.81
Dimension 4: Work-life balance	56.47	53.88	57.06	54.11	55.21	50.69
Dimension 5: Health and safety	73.39	67.96	73.96	69.29	76.32	60.14
Dimension 6: Voice and collective representation	40.69	42.66	25.83	46.06	49.28	41.39

11.5.7. Checking fit of conceptual framework with properties of the AJQI

The third test involves using PCA to determine whether the theoretically-derived conceptual framework is supported by the AJQI's statistical properties. At this stage, it is important to reiterate that it was decided that a theoretically-driven approach to assigning weights was more appropriate due to the multi-dimensionality of job quality and because important dimensions of job quality may not necessarily be strongly correlated. So, assigning weights according to correlations between dimensions was not deemed appropriate. As highlighted in chapter three, a composite index needs to correspond with real world phenomena, where correlations may not necessarily reflect the real influence of the individual indicators on the phenomena being measured. The validity of an index relies on the interplay between both statistical and conceptual soundness, whereby 'a sound composite indicator involves an iterative process that goes back and forth between the theoretical understanding of a phenomenon on the one hand, and the empirical observations on the other' (Athanasoglou et al., 2014).

This being so, PCA was performed to examine the extent to which the conceptual framework is confirmed (or not) by statistical approaches. In addition to undertaking exploratory PCA to check correlations among the grouped indicators for internal consistency (outlined in section 4.8.7), the final 13 sub-dimensions of the AJQI were subjected to a backwards looking PCA. While the Keiser-Mayer-Oklin value was .640, exceeding the minimum value of 0.6, and Bartlett's Test of Sphericity reached statistical significance (.000), the composition of components extracted results from the PCA did not strictly align with the theoretical structure of the index. Four factors were extracted explaining a total of 60.86 percent of the variance and the pattern matrix showed high loadings, where all loadings were above .3 and the highest loadings for autonomy (3B), voice (6B), working time (4A) all exceeded .8. However, the variables loaded onto a number of different components, making the results difficult to comprehend.

These results are not surprising, though, because a data-driven approach to assigning weights relies on multi-variate statistical models where, for example, PCA is used to choose weights that maximise (or minimise) the variance of the index, rather than support theoretical foundations (Parulo, Saisana & Saltelli, 2013). Finding that the statistical structure of the AJQI does not align very well with theory is not surprising; as this reiterates the point made Brandolini (2007), where he cautions against entrusting a mathematical algorithm with a fundamentally normative task.

11.5.8. Testing the effect of a change in aggregation method

Another way to check robustness of a composite index is to consider the impact of the aggregation method on the variation in overall scores (see for example OECD, 2008). The fourth test involved constructing an alternative version of the AJQI where an arithmetic mean – instead of a geometric mean – was used at the final stage of aggregation (hereafter referred to as AJQI Version 2).

For multi-country indexes, a common check for robustness involves looking at whether the individual country rankings change or remain stable as a result of a change in the method of aggregation. As the AJQI is for the single country of Australia, there are no country rankings to check, making it more complicated to report on the impact of a change in the method of aggregation. Consequently, the impact of changing the method of aggregation is examined in several different ways.

In the first instance, the pair-wise correlations for the two versions of the AJQI and its six dimensions are compared. From Table 11.5.8.1, below, it can be seen that the two versions of the index are highly correlated ($r=0.882$; $p<001$ level, 2-tailed) with one another. For both versions, all of the dimensions are positively correlated with the overall index. And, with the exception of voice and collective interest representation, the strength of the pair-wise correlations for the arithmetic version and the dimensions are larger than they are for the geometric version of the AJQI.

Second, three simple examples of hypothetical sets of scores for each dimension can be used to illustrate the impact on final scores for AJQI Version 1 and Version 2. In example 1, for a job with relatively high (balanced) scores across all six dimensions, the average score for AJQI Version 1 is very similar to the average score for AJQI Version 2 (89.21 compared to 90.00) (see Table 11.5.8.2, below).

In example 2, for a job with relatively low (balanced) scores across all six dimensions, the average score for AJQI Version 1 is also very similar to the average score for AJQI Version 2 (23.05 compared to 23.33). In example 3, for a job with scores of 100 for three dimensions, 50 for two dimensions and zero for one dimension, the average score for AJQI Version 1 is 17.10. In comparison, the average score for Version 2 is 66.67. This third example clearly demonstrates how using the geometric method of aggregation punishes unbalanced sets of scores.

Table 11.5.8.1: Pair-wise correlations for the AJQI Version 1 and AJQI Version 2

	AJQI Version 1 (geometric)	AJQI Version 2 (arithmetic)
AJQI Arithmetic		1.00
AJQI Geometric	1.00	0.882**
Dimension 1: Pay	0.581**	0.653**
Dimension 2: Quality of employment	0.435**	0.523**
Dimension 3: Intrinsic Characteristics of Work	0.710**	0.759**
Dimension 4: Work-life balance	0.144**	0.302**
Dimension 5: Health and Safety	0.253**	0.420**
Dimension 6: Voice and Collective Representation	0.702**	0.660**

** Correlation is significant at the 0.01 level (2-tailed).

Table 11.5.8.2: Examples of different final scores with AJQI Version 1 and AJQI Version 2

	D1	D2	D3	D4	D5	D6	Calculation method	Final score after aggregation
Example 1								
AJQI V1	100	100	100	90	80	70	(D1*D2*D3*D4*D5*D6)^(1/6)	89.21
AJQI V2	100	100	100	90	80	70	(D1+D2+D3+D4+D5+D6)/6	90.00
Example 2								
AJQI V1	20	20	25	25	30	20	(D1*D2*D3*D4*D5*D6)^(1/6)	23.05
AJQI V2	20	20	25	25	30	20	(D1+D2+D3+D4+D5+D6)/6	23.33
Example 3								
AJQI V1	100	100	50	50	100	0	(D1*D2*D3*D4*D5*D6)^(1/6)	17.10
AJQI V2	100	100	50	50	100	0	(D1+D2+D3+D4+D5+D6)/6	66.67

Table 11.5.8.3: Descriptive statistics for the AJQI Version 1 and AJQI Version 2

	Mean	SD	Variance	Min	Max	Skewness	Kurtosis	Percentile		
								25th	50th	75th
AJQI V1	53.30	16.73	279.74	0.15	91.13	-1.19	1.57	45.65	56.25	64.62
AJQI V2	59.13	10.87	118.05	14.16	91.44	-0.29	-0.23	51.82	60.01	67.09

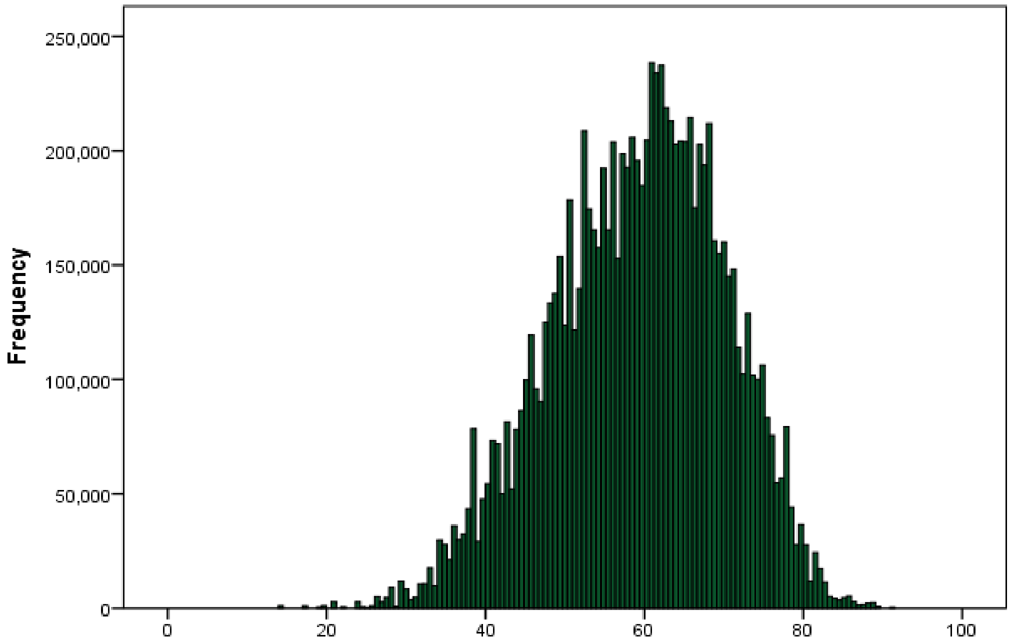
Next, the statistical properties of AJQI Version 1 are compared to those for AJQI Version 2. As shown in Table 11.5.8.3 (above), the AJQI Version 2 has higher scores at every quintile where the mean using the arithmetic method is 59.13 compared to 53.30 for the geometric method. The median (50th percentile) for AJQI Version 1 is 56.25 compared to 60.01 for AJQI Version 2. The range of scores for AJQI Version 1 is greater than the range for AJQI Version 2 (90.98 compared to 77.28). Consequently, the standard deviation and variance were both larger when the geometric method of aggregation was used.

The plotted distribution of final scores (i.e. Pen's parade) for AJQI Version 1 and AJQI Version 2 were then visually inspected. It can be seen from Figure 11.5.8.1 (below) that for both methods of aggregation, the distribution of job quality does not steadily increase across the distribution; rather it increases rapidly at the beginning and at the end. However, the distribution for the arithmetic version of the index starts at a higher point than the geometric version with the gap between the two lines widest at the bottom on the distribution, the two lines gradually come closer together until the gap almost disappears at the top of the distribution.

Figure 11.5.8.1: Pen's Parade distribution for the AJQI Version 1 and Version 2

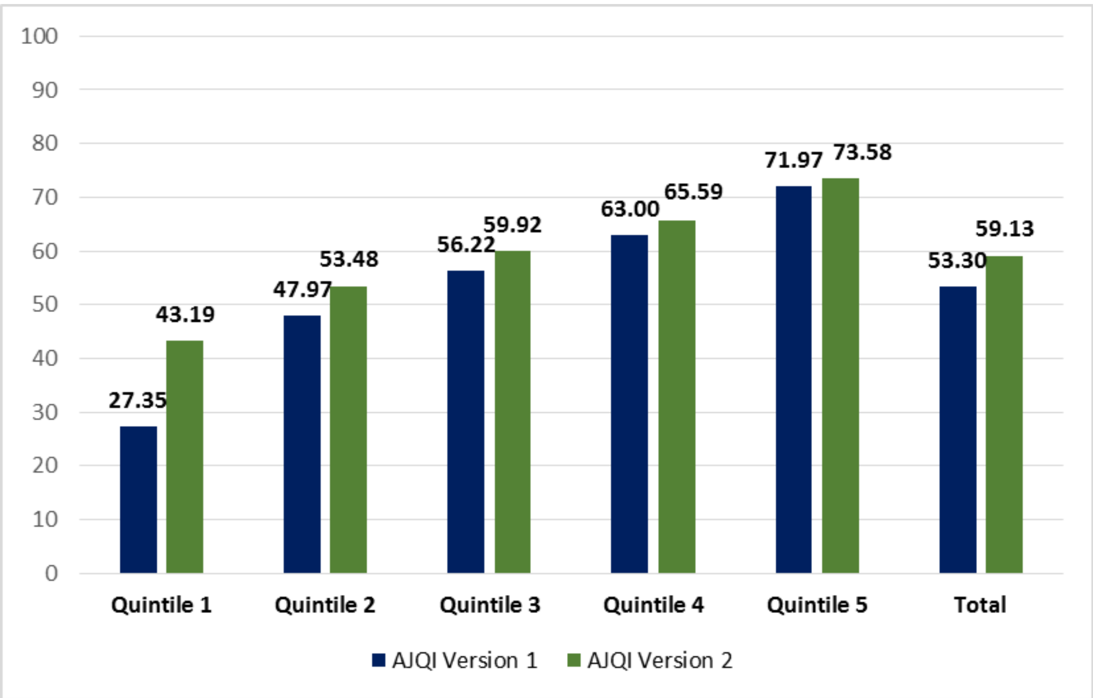
In addition, histograms showing the distribution for AJQI Version 1 and AJQI Version 2 were produced and inspected. In comparison to the distribution for AJQI Version 1 (where the distribution is highly skewed and not continuous, as shown in Figure 11.5.4.2 in section 11.4 above), Figure 11.4.8.2 (below) shows that the distribution for AJQI Version 2 is close to symmetric (-0.29); and the distribution is close to being continuous. Both versions of the AJQI are light-tailed. However, Version 2 is thin-tailed (i.e. platykurtic) while Version 1 is slender-tailed (i.e. leptokurtic) (1.57 compared to -0.23).

Figure 11.5.8.2: Histogram showing distribution of the AJQI Version 2



Furthermore, average scores by quintile for the two versions of the AJQI were compared (Figure 11.5.8.3 below). The most obvious difference between average scores for the two versions of the AJQI is apparent for quintile 1, where the mean is 27.35 when the geometric method is used compared to 43.19 when the arithmetic method is used.

Figure 11.5.8.3: Job quality scores by quintile for the AJQI Version 1 and Version 2, mean



An assessment was also undertaken to consider the size in the changes in the relative positions (ranking) of the same set of five categories of jobs as discussed earlier in section 11.5. Table 11.5.8.4, below, sets out average scores for AJQI Version 1 and AJQI Version 2 for five categories of jobs. From Table 11.5.8.4, it can be seen that for both AJQI Version 1 and AJQI Version 2, the average score is lowest for jobs in the accommodation and food services industry and highest for professional jobs. So, while the actual means vary numerically, the rank order of average scores for the five categories of jobs is the same for both versions of the AJQI.

Table 11.5.8.4: Job quality scores for the AJQI Version 1 and Version 2 for five representative categories of jobs, mean

	AJQI Version1			AJQI Version 2		
	Mean	Rank	% of AJQI mean	Mean	Rank	% of AJQI v1 mean
Jobs in Accommodation and Food industry	38.59	1	72.40%	48.48	1	81.99%
Machine operators & driver jobs	48.24	2	90.51%	53.70	2	90.82%
Jobs in Construction industry	53.32	3	100.04%	58.42	3	98.80%
Jobs in Health Care & Social Assistance Industry	56.01	4	105.08%	60.50	4	102.32%
Professional jobs	62.85	5	117.92%	66.58	5	112.60%
All jobs	**53.30**		**100.00%**	**59.13**		81.99%

Taken all together, the above analyses confirm that using the geometric aggregation as opposed to the arithmetic method for final aggregation means that a more balanced set of scores for each dimension results in a higher job quality score in comparison to extreme combinations of scores for dimensions. In particular, the intended effect of using the geometric method for final aggregation to punish low and unbalanced sets of scores, is evident in the findings.

11.5.9. Testing the effect of change in weights given to different sub-dimensions

The fifth test involves examining the sensitivity of overall results when changes are made to the weights assigned to different levels of the nested structure. In particular, assessment of the size of the changes in the relative position (rankings) of particular groups of jobs resulting from a change in the weight given to the sub-dimensions.

In AJQI Version 1, unequal weights are assigned to sub-dimensions in three dimensions (namely: pay, terms of employment and work-life balance). For pay, objective pay (D1A) is assigned 75 percent and subjective pay was assigned 25 percent (see section 4.8.1 in chapter four for why there was a departure from equal weighting). For terms of employment, contractual stability (D2A) is assigned 75 percent and development opportunities is assigned

25 percent (see section 4.8.2). For work-life balance, working time (D4A) is assigned 75 percent and work intensity is assigned 25 percent (see section 4.8.4).

A third version of the AJQI was constructed (hereafter referred to as AJQI Version 3) where sub-dimensions are assigned equal weights (requiring no change to original weights for D3, D5 or D6; as the sub-dimensions were already equally-weighted). The results for the two versions of the AJQI (Version 1 and Version 3) were compared to check the impact of such a change in weights.

In the first instance, the pair-wise correlations for AJQI Version 1 and AJQI Version 3 are compared. An analysis of this pair-wise correlation proves that the two versions of the index are highly correlated ($r=0.988$; $p<001$ level, 2-tailed) with one another (see Table 11.5.9.1). Importantly, for both versions, all of the dimensions are positively correlated with the overall index, however in Version 3 the correlation for the dimension of work-life balance is not statistically significant ($r=0.20$; $p>005$ level, 2-tailed). The strength of the pair-wise correlation for quality of pay and the overall index is lower in AJQI Version 3 than it is for the AJQI Version 1 ($r=.543$ compared to $r=.582$; $p<001$ level, 2-tailed). The strength of the pair-wise correlation for quality of employment and the overall index is lower in AJQI Version 3 than it is for AJQI Version 1 ($r=0.427$ compared to $r=0.435$; $p<001$ level, 2-tailed).

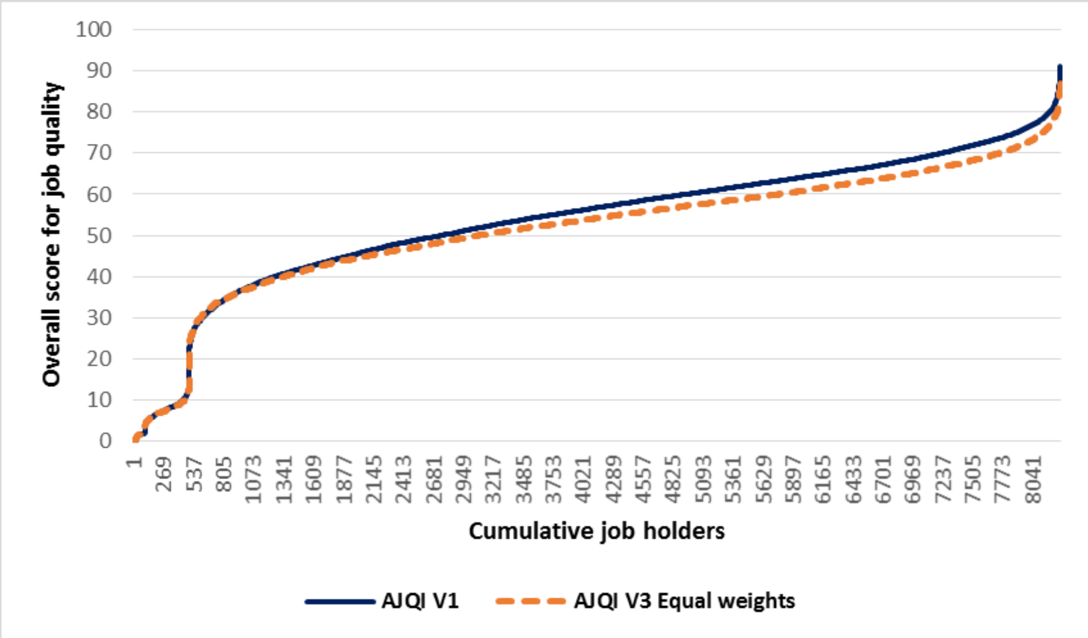
Table 11.5.9.1: Pair-wise correlations for the AJQI Version 1 and Version 3

	AJQI V1	**AJQI V3**
AJQI Version 1	1.00	
AJQI Version 3	0.988**	1.00
Dimension 1: Pay	0.582**	0.541**
Dimension 2: Quality of employment	0.435**	0.427**
Dimension 3: Intrinsic Characteristics of Work	0.710**	0.686**
Dimension 4: Work-life balance	0.144**	0.083**
Dimension 5: Health and Safety	0.253**	0.271**
Dimension 6: Voice and Collective Interest Representation	0.702**	0.698**

** Correlation is significant at the 0.01 level (2-tailed).

A visual inspection of the distribution for AJQI Version 1 compared to AJQI Version 3 was also undertaken. Figure 11.5.9.1, below, plots on the same graph the distribution of the scores for AJQI Version 1 and AJQI Version 3. While the distribution for both versions of the index track similar paths at the bottom of the distribution, a small gap emerges further up the distribution where AJQI Version 3 grows at a slower rate than it does for AJQI Version 1, until the gap disappears at the very top of the distribution.

Figure 11.5.9.1: Pen's Parade showing distribution for the AJQI Version 1 and Version 3



In addition, histograms showing the distributions for AJQI Version 1 and AJQI Version 3 were inspected, where the distributions for AJQI Version 1 (see Figure 11.5.4.2 in section 11.5.4 above) and AJQI Version 3 are both highly skewed (-1.19 and -1.27) and light-tailed (Figure 11.5.9.2, below).

Figure 11.5.9.2: Histogram showing distribution for the AJQI Version 3

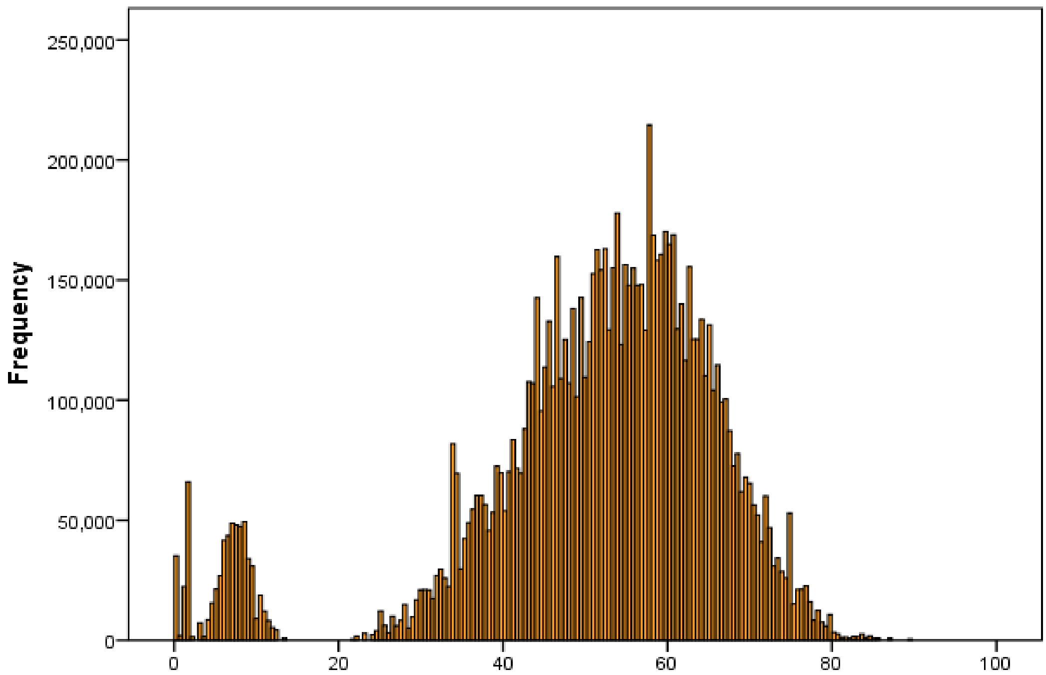
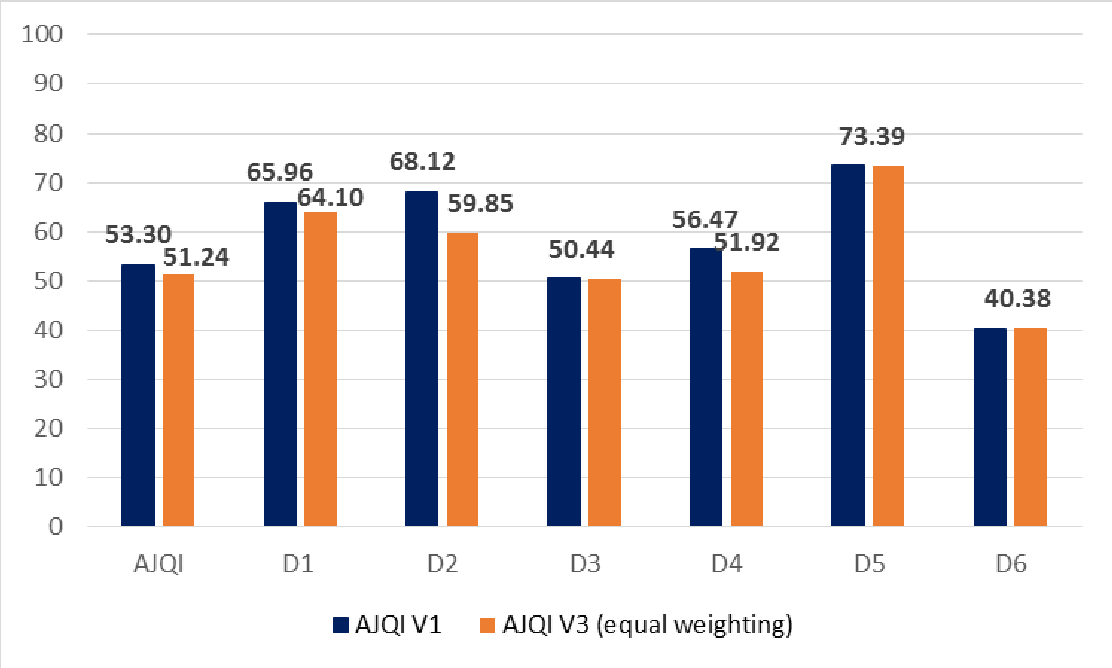


Table 11.5.9.2: Descriptive statistics for the AJQI Version 1 and Version 3

	Mean	SD	Variance	Min	Max	Range	Skewness	Kurtosis	Percentile		
									25th	50th	75th
AJQI											
Version 1	53.30	16.73	279.74	0.15	91.13	90.98	-1.19	1.57	45.65	56.25	64.62
Version 3	51.24	15.62	243.93	0.17	89.58	89.41	-1.27	1.97	44.59	58.82	61.45
D1 Pay											
AJQI Version 1	64.54	20.45	418.15	0.00	100.00	100.00	-0.68	0.03	51.65	68.35	80.85
AJQI Version 3	64.10	21.18	448.61	0.00	100.00	100.00	-0.27	0.24	44.59	53.82	61.45
D2 Quality of Employment											
AJQI Version 1	68.12	15.93	236.76	0.00	99.06	99.06	-0.76	0.22	58.44	71.30	80.32
AJQI Version 3	59.85	13.89	192.79	0.00	98.13	98.13	-0.30	0.24	51.04	60.93	69.27
D4 Work-life Balance											
AJQI Version 1	56.47	14.46	209.13	0.83	100.00	99.17	-0.23	0.07	47.22	57.36	66.25
AJQI Version 3	51.92	15.10	228.05	0.56	100.00	99.44	0.46	0.00	41.94	51.99	61.81

As can be seen in Table 11.5.9.3 and Figure 11.5.9.3 (below), the average score for AJQI Version 3 is lower than it is for AJQI Version 1 (51.24 compared to 53.30). The median for AJQI Version 3 is also lower than it is for AJQI Version 1 (53.82 versus 56.25). There is very little difference in the minima or maxima, but the score for the 25th and 75th percentiles are both lower in Version 3 compared to Version 1.

Figure 11.5.9.3: Job quality scores by dimension for the AJQI Version 1 and Version 3, mean



From Figure 11.5.9.3 (above) it can be seen that for the dimension of **pay**, the average score is slightly lower for AJQI Version 3 than it is for AJQI Version 1 (64.10 & 65.96). Scores for the 25th, 50th and 75th percentile are lower for AJQI Version 3 than they are for AJQI Version 1 (50.85 & 57.50; 67.50 & 71.67; 80.85 & 83.75; respectively). In general, the scores for objective pay (D1A) are lower than the scores for subjective pay (D1B). For example, the average score for objective pay is 67.80 and for subjective pay it is 60.75. Thus, changing the weighting within this sub-dimension does have a small impact on the final scores.

For the dimension of **quality of employment**, scores for the mean, 25th, 50th (i.e. median) and 75th percentile are all lower for AJQI Version 3 compared to AJQI Version 1. This is because scores for development opportunities (D2B) are generally much lower than those for contractual stability (D2A). For example, the average score for D2A is 76.40 and for D2B it is 43.29. This means changing the weighting within this sub-dimension does impact the final scores.

For the dimension of **work-life balance**, scores for the mean, 25th, 50th and 75th percentile are all lower for AJQI Version 3 compared to AJQI Version 1. This is because scores for work intensity (D4B) are typically much lower than those for working time (D4A). For example, the average score for working time is 61.02 compared to an average of 42.08 for work intensity. So, changing the weighting within this sub-dimension does, to a certain extent, impact the final scores.

While the above analysis shows that changing the weights for the sub-dimensions does result in a change to overall scores, Table 11.5.9.3 shows that rankings for a sample of five representative categories for jobs do not change as a result of changing to equally-weighted sub-dimensions.

Table 11.5.9.3: Job quality scores for the AJQI Version 1 and Version 3 for five representative categories of jobs

	AJQI Version 1			AJQI Version 3		
	Mean	Rank	% of AJQI mean	Mean	Rank	% of AJQI mean
Jobs in Accommodation and Food industry	38.59	1	72.40%	38.58	1	75.29%
Machine operators & driver jobs	48.24	2	90.51%	47.08	2	91.88%
Jobs in Construction industry	53.32	3	100.04%	51.63	3	100.76%
Jobs in Health Care & Social Assistance Industry	56.01	4	105.08%	53.59	4	104.59%
Professional jobs	62.85	5	117.92%	59.50	5	116.12%
All jobs	**53.30**		**100.00%**	**51.24**		**100.00%**

Taken all together, from the above analyses it emerged that changing the relative weights so that all sub-dimensions were equally-weighted did not lead to fundamentally changes in overall scores. This check, however, confirms the importance of having good theoretical and/or empirical bases for assigning weights.

11.5.10. Testing the effect of a change in the weights given to dimensions

The sixth test involves examining the sensitivity of the overall results when changes are made to the weights assigned to different dimensions in the AJQI. In particular, assessment of the size of the changes in the relative position (rankings) of particular groups of jobs resulting from increasing the weight assigned to the dimension of pay. The illustrative example of pay was chosen because monetary compensation is thought by orthodox economics to compensate for other less favourable aspects of job quality; that is, the theory of compensating wage differentials (CWD) (see chapter two for a more detailed discussion on this matter).

A fourth version of the AJQI was constructed where pay is assigned a weight of 50 percent and the each of the other five dimensions are assigned a weight of 10 percent (hereafter reference as AJQI Version 4). As an initial step, scores for the five other (i.e. non-pay) dimensions were used to construct an Amenities Index, where the five dimensions were aggregated using a geometric mean. Then the second step involved constructed of AJQI Version 4 by aggregating the pay index and the amenities index, once again using a geometric mean at this final stage of aggregation.

From Table 11.5.10.1 (below), it can be seen that AJQI Version 1 is highly positively correlated with AJQI Version 4 ($r=0.927$; $p<0.00$, 2-tailed) and with the Amenities Index ($r=0.956$; $p<0.00$, 2-tailed). AJQI Version 4 is highly positively correlated with both the Pay Index ($r=0.831$; $p<0.00$, 2-tailed) and the Amenities Index ($r=0.793$; $p<0.00$, 2-tailed); whereas the Pay Index shows a medium strength positive correlation with the Amenities Index ($r=0.369$; $p<0.00$, 2-tailed).

Table 11.5.10.1: Pair-wise correlations for the AJQI Version 1, Version 4, the Pay Index and the Amenities Index

	AJQI V1	**AJQI V4**	**Pay Index**	**Amenities Index**
AJQI Version 1	1.00			
AJQI Version 4	0.927**	1.00		
Pay Index	0.582**	0.831**	1.00	
Amenities Index	0.957**	0.793**	0.369**	1.00

** Correlation is significant at the 0.01 level (2-tailed).

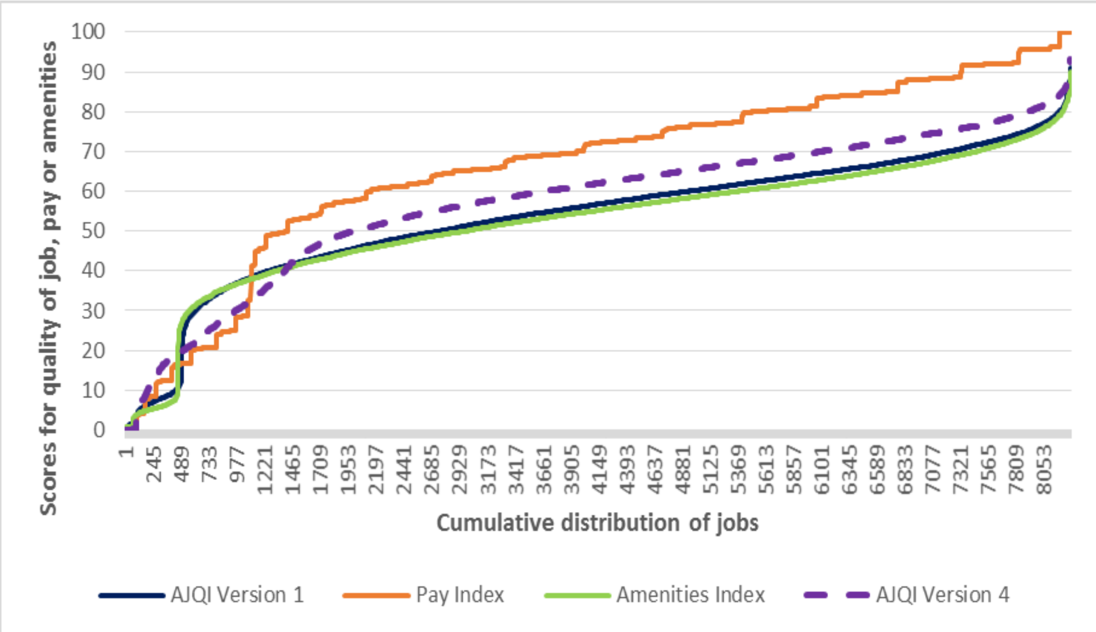
Next, the statistical properties of AJQI Version 1 are compared to those for AJQI Version 4 in order to check whether the impact on scores as a result of changing the structure of the index. As shown in Table 11.5.10.2 (below), the AJQI Version 4 has higher scores at every quintile and the mean for AJQI Version 4 is 56.89 compared to 53.30 for the geometric method. The median (50th percentile) for AJQI Version 1 is 56.25 compared to 61.65 for AJQI Version 4. The range of scores for AJQI Version 1 is slightly smaller than the range for AJQI Version 4 (90.98 compared to 93.12). It is, therefore, important to note that increasing the weight assigned to pay tends to result in higher overall scores.

Table 11.5.10.2: Descriptive statistics of the AJQI Version 1, Version 4, the Pay Index, and the Amenities Index

	Mean	SD	Variance	Min	Max	Skewness	Kurtosis	Percentile		
								25th	50th	75th
AJQI V1	53.30	16.73	279.74	0.15	91.13	-1.19	1.57	45.65	56.25	64.62
AJQI V4	56.89	18.74	351.35	0.02	93.14	-1.07	0.59	50.04	61.65	70.12
Pay Index	65.96	23.80	566.36	0.00	100.00	-1.05	0.52	57.50	71.68	83.75
Amenities Index	52.28	16.22	263.25	0.09	90.14	-1.22	1.90	45.14	54.63	63.03

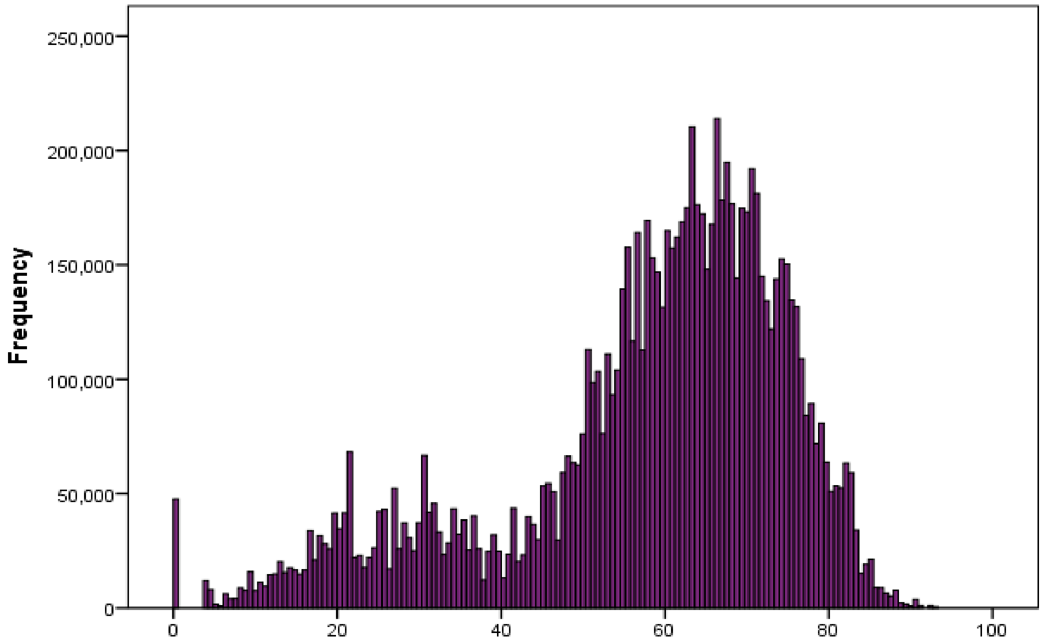
A visual inspection of the distribution for AJQI Version 1 compared to Version 4, the Pay Index and the Amenities Index was also undertaken. Figure 11.5.10.1, below, plots on the same graph the distribution of the scores for Version 1 and Version 4, as well as for the Pay and Amenities Indexes. When comparing the distribution of Version 4 with Version 1, it is apparent that the two distributions cross paths twice: first, at the bottom of the distribution and again slightly higher up in the distribution. Thereafter, the distribution for Version 4 remains above Version 1 until the gap disappears at the very top of the distribution. This is because across the distribution, pay scores are higher than those for amenities.

Figure 11.5.10.1: Pen's Parade showing distribution for the AJQI Version 1, Version 4, the Pay Index, and the Amenities Index



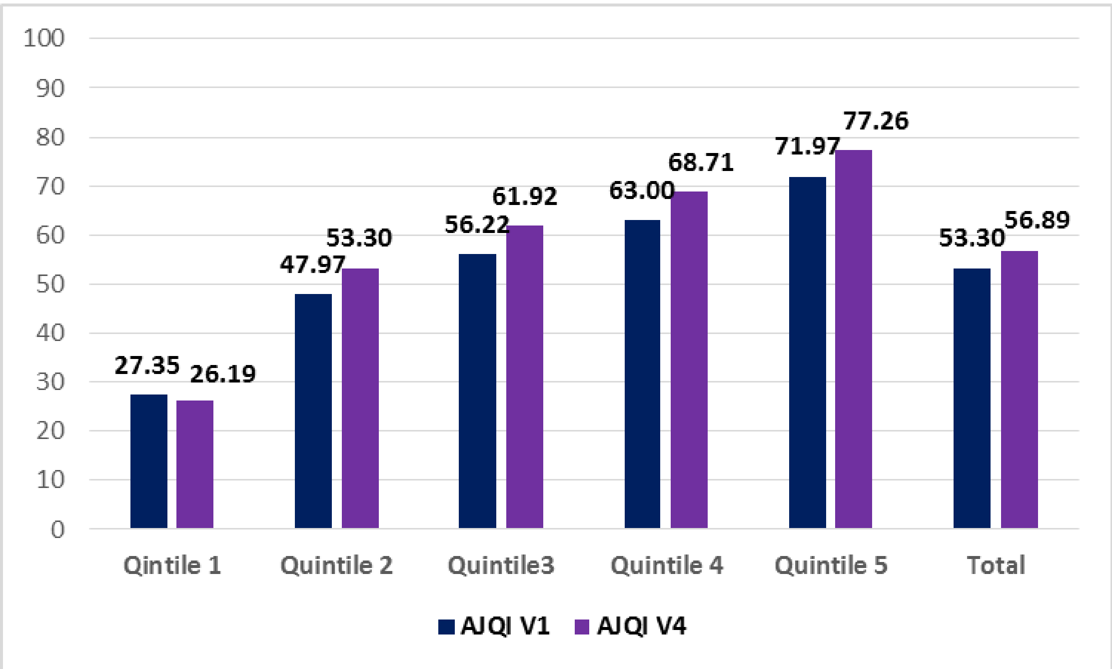
In addition, histograms showing the distributions for AJQI Version 1 and AJQI Version 4 were inspected, where the distributions for AJQI Version 1 (see Figure 11.5.4.2 in section 11.5.4, above) and AJQI Version 4 are both highly skewed (-1.19 and -1.07) and light-tailed measures (see Figure 11.5.10.2, below).

Figure 11.5.10.2: Histogram showing distribution for the AJQI Version 4



Furthermore, average scores by quintile for the two versions of the AJQI were compared (Figure 11.5.10.3, below). The mean for quintile 1 for AJQI Version 1 is slightly higher than the mean for quintile 1 for AJQI Version 4 (27.35 compared to 26.19). However, the reverse occurs in the four higher quintiles, where the means in AJQI Version 1 are lower than those in AJQI Version 4. This can likely be explained by the fact that pay does not compensate for poor amenities for the group of jobs in the lowest quintile, but there is some compensatory effect for better quality jobs.

Figure 11.5.10.3: Job quality scores by quintile for the AJQI Version 1 and Version 4, mean



While the above analysis shows that changing the weights for the sub-dimensions does result in some change to overall scores, Table 11.5.10.3 (below) shows that rankings for a sample of five representative categories for jobs remain unchanged despite changing to an index where pay and amenities are equally weighted.

Table 11.5.10.3: Job quality scores for the AJQI Version 1 and Version 4 for five representative categories of jobs

	AJQI Version 1			AJQI Version 4		
	Mean	Rank	% of AJQI mean	Mean	Rank	% of AJQI mean
Jobs in Accommodation and Food industry	38.59	1	72.40%	38.86	1	68.31%
Machine operators & driver jobs	48.24	2	90.51%	54.10	2	95.10%
Jobs in Construction industry	53.32	3	100.04%	58.91	3	103.55%
Jobs in Health Care & Social Assistance Industry	56.01	4	105.08%	58.98	4	103.67%
Professional jobs	62.85	5	117.92%	67.74	5	119.07%
All jobs	**53.30**		100.00%	**56.89**		**100.00%**

Taken all together, from the above analyses it emerged that changing the fundamental structure of the AJQI from one where all six dimensions are weighted equally to a version where pay is assigned equal weight to all of the other five dimensions combined (amenities), does result in some change in overall scores for job quality. While only preliminary, the analysis provided an idea about whether, in the Australian labour market, pay is a compensating device for other aspects of job.

As already outlined in Chapter Four, the starting point for the conceptual framework underpinning the AJQI is based on the assumption that the *theory of compensating wage differentials* has been dispelled by many other researchers. In addition, the conceptual framework used in this thesis is also based on the assumption that pay is no more important than the other dimensions of job quality. So while the above analysis further confirms the robustness of the index, it also serves as a theoretical example of how scores do change, when a different theoretical premise is used as the basis of constructing the index. While beyond the scope of this thesis, having now constructed the Amenities Index, it will be possible to use the Amenities Index as another way to try to better understand interrelations between the non-pay aspects of job quality.

11.5.11. Testing the effect of change in the number of dimensions

One additional way to check robustness is to consider what happens to the overall scores when each dimension, one at a time, is removed. To do this would involve making five more different versions of the index, so as an additional (seventh) check, a fifth version of the AJQI (hereafter referred to as AJQI Version 5) was constructed using five, instead of six, dimensions.

The sixth dimension of voice and collective interest representation was dropped because this dimension had the lowest average score in Version 1 of the AJQI. Plus, due to the geometric method of final aggregation, it may have unduly brought down the overall scores for job quality. Also, it was absent from the EJQI.

Apart from dropping the sixth dimension, the weights assigned to the sub-dimensions in the remaining five dimensions were held constant; as was the geometric method of aggregation (in this instance, each of the five dimensions were assigned a weight of 20 percent; as opposed to each of the six dimensions being assigned a weight of 16.67 percent in Version 1).

In the first instance, the pair-wise correlations for AJQI Version 1 and AJQI Version 5 are compared. From Table 11.5.11.1 (below) it can be seen that the two versions of the index are highly correlated with one another (r=0.85; p<001 level, 2-tailed). For both versions, all of the dimensions are positively correlated with the overall index. The order of the strength of pair-wise correlations of the overall index with its dimensions is the same for AJQI Version 1 and AJQI Version 5 (highest to lowest: intrinsic quality; pay; quality of employment; health and safety; and work-life balance). Removal of the dimension of voice and collective interest in AJQI Version 5 loses important information about the connection between voice, the other dimensions and overall job quality.

Table 11.5.11.1: Pair-wise correlation matrix for the AJQI Version 1 and Version 5

	AJQI V1	AJQI V5	D1	D2	D3	D4	D5
AJQI Version 1	1.00						
AJQI Version 5	0.851**	1.00					
Dimension 1: Pay	0.582**	0.686**	1.00				
Dimension 2: Quality of employment	0.435**	0.442**	0.261**	1.00			
Dimension 3: Intrinsic characteristics of work	0.710**	0.730**	0.413**	0.256**	1.00		
Dimension 4: Work-life balance	0.144**	0.279**	-0.093**	-0.095**	0.094**	1.00	
Dimension 5: Health and safety	0.253**	0.411**	0.31**	0.050**	0.186**	0.650**	1.00

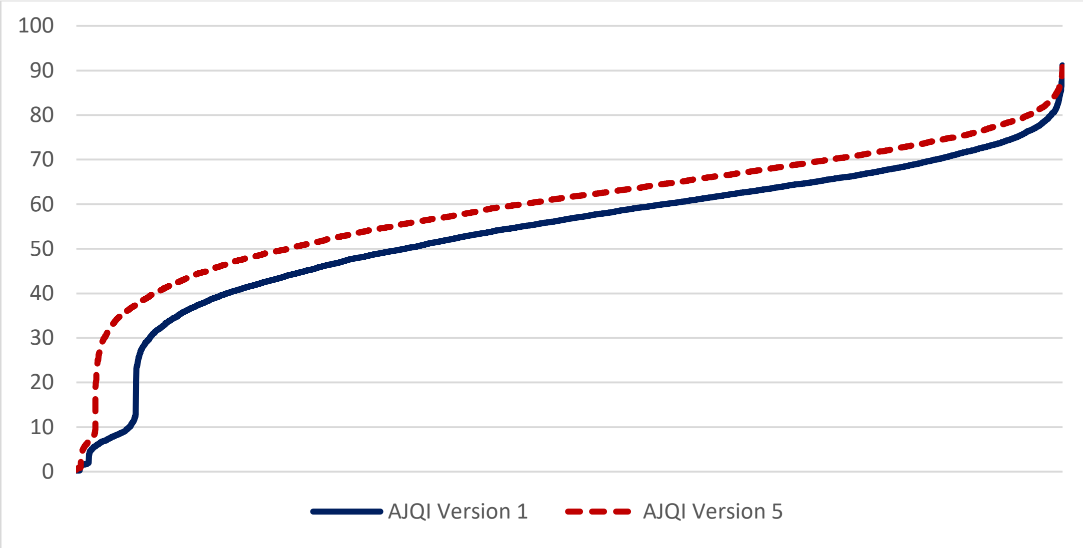
** Correlation is significant at the 0.01 level (2-tailed).

Table 11.5.11.2: Descriptive statistics for the AJQI Version 1 and Version 5

								Percentile		
	Mean	S.D.	Variance	Min.	Max.	Skewness	Kurtosis	25th	50th	75th
AJQI Version 1	53.30	16.73	279.74	0.15	91.13	-1.19	1.570	45.65	56.25	64.62
AJQI Version 5	59.20	14.30	204.63	0.41	90.78	-1.16	2.470	51.32	61.23	69.28

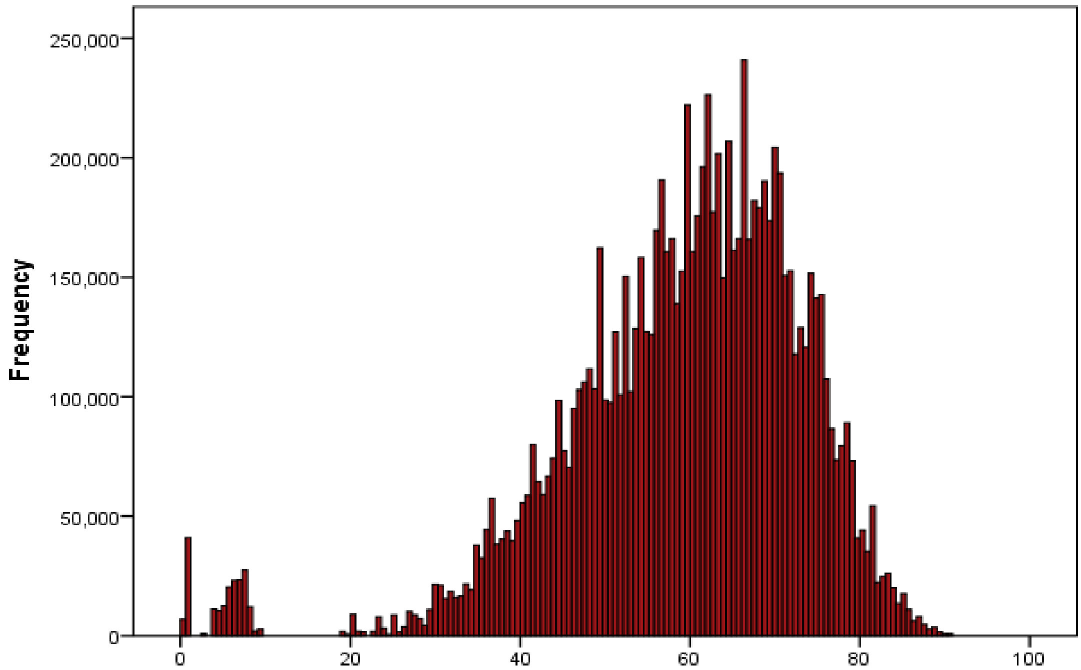
A visual inspection of the distribution for AJQI Version 1 (see Figure 11.5.4.2 in section 11.5.4, above) compared to AJQI Version 5 was also undertaken. Figure 11.5.11.1 (below) plots on the same graph the distribution of the scores for AJQI Version 1 and AJQI Version 5. The distribution for AJQI Version 5 tracks higher than AJQI Version 1, until the gap disappears at the very top of the distribution.

Figure 11.5.11.1: Pen's Parade for the AJQI Version 1 and Version 5



In addition, histograms showing the distributions for AJQI Version 1 and AJQI Version 5 are both highly skewed (-1.19 and -1.16) and light-tailed measures (Figure 11.5.11.2, below, shows the histogram for AJQI Version 5).

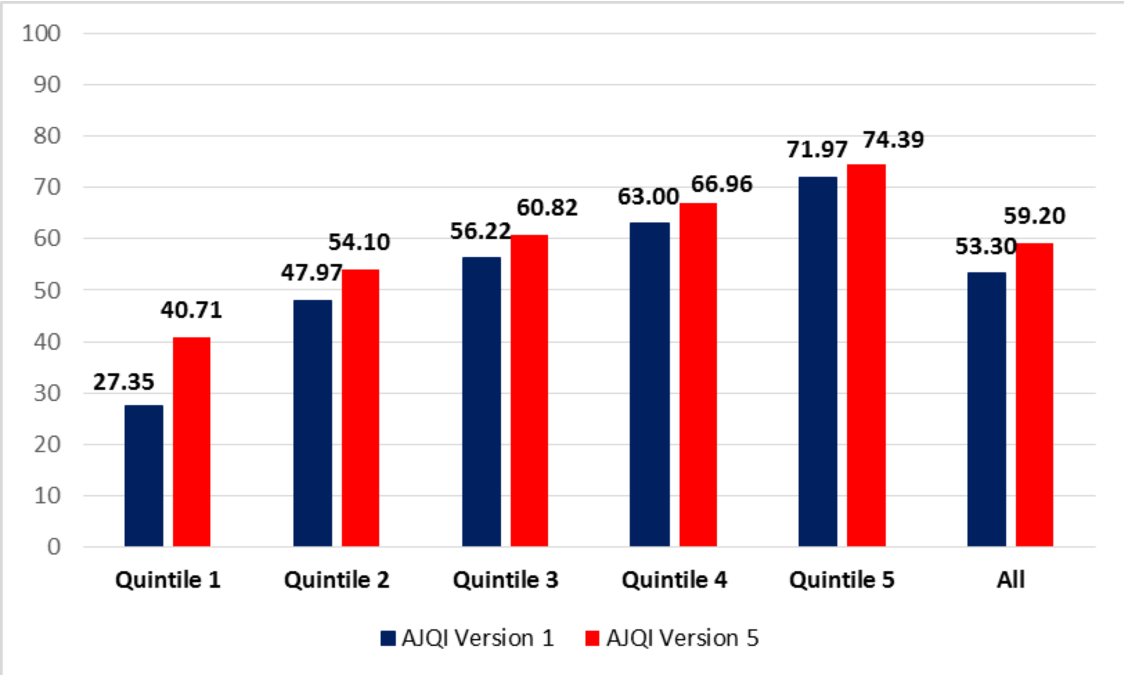
Figure 11.5.11.2: Histogram showing distribution of the AJQI Version 5



As can be seen in Table 11.5.11.2 (above), the average score for AJQI Version 5 is higher than it is for AJQI Version 1 (59.20 compared to 53.30); as is the median (61.23 versus 56.25). There is very little difference in the minima or maxima, but the score for the 25th and 75th percentiles are both higher in Version 5.

As can be seen from the Figure 11.5.11.3 (below), the average score for quintile 1 in AJQI Version 1 is considerably lower than it is for AJQI Version 5 (27.35 & 40.71). Similarly, the average score for quintile 2 of AJQI Version 1 is lower than it is for AJQI Version 5 (47.97 & 54.10). Although the average scores for quintiles 3, 4 and 5 are also lower in AJQI Version 1 than they are in AJQI Version 5, the differences are not as large as in the lowest two quintiles.

Figure 11.5.11.3: Job quality scores by quintile for the AJQI Version 1 and Version 5, mean



While the average scores by quintile are lower for AJQI Version 1 compared to AJQI, from Table 11.5.11.3, below, it can be seen that the order of rankings for the five categories of jobs remains the same for both versions of the AJQI. This shows consistency between the two versions.

Table 11.5.11.3: Job quality scores for the AJQI Version 1 and Version 5 for five representative categories of jobs

	AJQI Version 1			AJQI Version 5		
	Mean	Rank	% of AJQI mean	Mean	Rank	% of AJQI mean
Jobs in Accommodation and Food industry	38.59	1	72%	46.00	1	77.70%
Machine operators & driver jobs	48.24	2	91%	52.71	2	89.04%
Jobs in Construction industry	53.32	3	100%	58.06	3	98.07%
Jobs in Health Care & Social Assistance Industry	56.01	4	105%	60.53	4	102.25%
Professional jobs	62.85	5	118%	68.87	5	116.33%
All jobs	**53.30**		**100%**	**59.20**		**100.00%**

Taken all together, from the above analyses it emerged that dropping the dimension of voice and collective interest representation from the overall index generally leads to higher overall scores, which by and large, increases the proportion of ‘good quality’ jobs. Dropping this dimension from the index would, however, would mean that the index does not capture an aspect of job quality that has been found to be important in the literature.

11.5.12. Correlation check of AJQI against measures of job satisfaction

For the eighth series of tests, the AJQI and its dimensions were checked for correlation with three outcome measures of job satisfaction (namely: the work itself satisfaction; satisfaction with hours; and overall job satisfaction) found in the HILDA data.

As discussed in section 3.2.1 in chapter three, job satisfaction is sometimes used as a proxy measure for job quality, yet doing this has been questioned by a number of researchers due to, among other reasons, job satisfaction not being relevant to objective indicators of job quality and because workers might be conditioned to expect a lot or a little from their job (see for example, Muñoz de Bustillo & Fernández-Macías, 2005). In addition, job satisfaction has been understood by some researchers as an output, where the focus should more correctly be on the inputs (that is, the characteristics of the job).

One way to explore the plausibility of the AJQI is, therefore, to check whether the index and its dimensions are correlated to the job satisfaction measures found in the HILDA data. Arguably, if the measure for overall job satisfaction is highly correlated with the AJQI, then this may suggest that job satisfaction is a good proxy measure for job quality.

In addition to checking whether overall job satisfaction is correlated with the AJQI, it is also possible to check whether specific outcome measures correlate with the dimensions of the AJQI.

A matrix showing correlations for the AJQI and the three job satisfaction variables is set out in Table 11.5.12.1. While all three job satisfaction measures are positively and significantly correlated to the overall AJQI in the matrix, the correlation coefficients are small (i.e. less than r=0.300); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from r=0.392 to 0.684) than overall job satisfaction is with the AJQI (r=0.262).

A matrix showing the correlations for the AJQI's **pay** dimension (D1) and the three job satisfaction variables is set out in Table 11.5.12.2. While all three satisfaction measures are positively and significantly correlated to the pay dimension (D1), the correlation coefficients are small (i.e. less than r=.13); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from .392 to .684) than overall job satisfaction is with pay (r=.120).

A matrix showing the correlations for the AJQI's **quality of employment dimension** (D2) and the three satisfaction measures is set out in Table 11.5.12.3. While all three satisfaction measures are positively and significantly correlated to the quality of employment dimension (D2), the correlation coefficients are small (i.e. less than r=.24); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from .392 to .684) than overall job satisfaction is with quality of employment (r=.235).

A matrix showing the correlations for the AJQI's **intrinsic characteristics of work dimension** (D3) and the three satisfaction measures is set out in Table 11.5.12.4. While all three satisfaction measures are positively and significantly correlated to the quality of intrinsic characteristics of work dimension (D3), the correlation coefficients are small (i.e. less than r=.17); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from .392 to .684) than overall job satisfaction is with quality of employment (r=.152).

A matrix showing the correlations for the AJQI's dimension of **work-life balance** (D4) and the three satisfaction measures is set out in Table 11.5.12.5. While all three satisfaction measures are positively and significantly correlated to the quality of work-life balance (D4), the correlation coefficients are relatively small (i.e. less than r=.31); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from .392 to .684) than overall job satisfaction is with quality of work-life balance (r=.248).

A matrix showing the correlations for the AJQI's dimension of **health and safety** (D5) and the three satisfaction measures is set out in Table 11.5.12.6. While all three satisfaction measures are positively and significantly correlated to the quality of health and safety (D5), the correlation coefficients are relatively small (i.e. less than r=.30); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from .392 to .684) than overall job satisfaction is with quality of work-life balance (r=.252).

A matrix showing the correlations for the AJQI's dimension of **voice and collective interest representation** (D6) and the three satisfaction measures is set out in Table 11.5.12.7. While all three satisfaction measures are positively and significantly correlated to the quality of voice and collective interest representation (D6), the correlation coefficients are relatively small (i.e. less than r=.17); the pair-wise correlations for the three job satisfaction measures are more highly correlated amongst themselves (with correlations ranging from .392 to .684) than overall job satisfaction is with quality of work-life balance (r=.152).

Taken all together, the strength and direction of pair-wise correlations for the AJQI and its dimensions with the three outcome measures of job satisfaction appear to suggest that there is a relatively weak connection between the inputs of job quality (the AJQI and its dimensions) and the outputs (job satisfaction measures). However, the pair-wise correlations tend to be stronger amongst the job satisfaction measures themselves than with the AJQI and its dimensions. These findings support the view that that while job satisfaction is an important construct in itself, it does not encapsulate the same underlying construct as job quality, and therefore it should not be used as a proxy for job quality.

Table 11.5.12.1: Correlation matrix for the AJQI and three aspects of job satisfaction

	AJQI geometric mean	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
AJQI	1.00			
The work itself satisfaction	0.236**	1.00		
The hours you work satisfaction	0.232**	0.392**	1.00	
Overall job satisfaction	0.262**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Table 11.5.12.2: Correlation matrix for the pay dimension of the AJQI and three aspects of job satisfaction

	D1 Pay	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
D1 Pay	1.00			
The work itself satisfaction	0.110**	1.00		
The hours you work satisfaction	0.098**	0.392**	1.00	
Overall job satisfaction	0.120**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed).

Table 11.5.12.3: Correlation matrix for the quality of employment dimension of the AJQI and three aspects of job satisfaction

	D2 Quality of Employment	D2A Contractual Stability	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
D2 Quality of employment	1.00				
The work itself satisfaction	0.199**	0.139**	1.00		
The hours you work satisfaction	0.195**	0.166**	0.392**	1.00	
Overall job satisfaction	0.235**	0.174**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Table 11.5.12.4: Correlation matrix for the intrinsic characteristics of work dimension of the AJQI and three aspects of job satisfaction

	D3 Intrinsic characteristics of work	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
D3 Intrinsic characteristics of work	1.00			
The work itself satisfaction	0.251**	1.00		
The hours you work satisfaction	0.133**	0.392**	1.00	
Overall job satisfaction	0.192**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Table 11.5.12.5: Correlation matrix for the work-life balance dimension of the AJQI and three aspects of job satisfaction

	D4 Work-life balance	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
D4 Work-life balance	1.00			
The work itself satisfaction	0.101**	1.00		
The hours you work satisfaction	0.307**	0.392**	1.00	
C35f Overall job satisfaction	0.248**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Table 11.5.12.6: Correlation matrix for the health and safety dimension of the AJQI and three aspects of job satisfaction

	D5 Health and safety	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
D5 Health and safety	1.00			
The work itself satisfaction	0.143**	1.00		
The hours you work satisfaction	0.299**	0.392**	1.00	
Overall job satisfaction	0.252**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Table 11.5.12.7: Correlation matrix for the voice and collective representation dimension of the AJQI and three aspects of job satisfaction

	D6 Voice and collective representation	The work itself satisfaction	The hours you work satisfaction	Overall job satisfaction
D6 Voice and collective representation	1.00			
The work itself satisfaction	0.162**	1.00		
The hours you work satisfaction	0.108**	0.392**	1.00	
Overall job satisfaction	0.152**	0.684**	0.541**	1.00

** Correlation is significant at the 0.01 level (2-tailed)

11.5.13. Final assessment of robustness

It was necessary to check whether the AJQI is sensitive to changes in the methodology and whether the results seem plausible. While there are many ways to check robustness of an index, this technical report set out details about the statistical properties of the AJQI along with details about a series of seven tests that were conducted to check robustness of the AJQI.

Taken all together, it emerged that plausible shifts in the weighting methodology did not lead to fundamentally different rankings at the dimension-level. It was established that the index is adequately fit-for-purpose as a tool for measuring job quality in Australia. In addition, a backwards thinking approach was used to assess whether the conceptual framework of job quality provided a good fit to the Australian data. This overarching assessment is set out in the concluding chapter of this thesis.

11.6. Supporting data on job quality and outcome measures

Table 11.6.1: Overall job quality by three measures of overall job satisfaction, mean

	N	Mean	S.D.	St. Error	95% Confidence Interval for Mean		Minimum	Maximum
Satisfaction with the job itself								
Totally dissatisfied	19107	21.90	21.29	0.15	21.60	22.20	1.71	67.60
1	46197	30.96	21.24	0.10	30.76	31.15	0.77	69.52
2	89609	42.28	17.57	0.06	42.17	42.40	0.18	74.92
3	188927	42.60	15.64	0.04	42.53	42.67	0.29	79.10
4	267468	43.06	18.25	0.04	42.99	43.13	0.23	88.00
5 Neither satisfied nor dissatisfied	680516	46.24	16.88	0.02	46.20	46.28	0.21	81.19
6	820747	49.50	16.06	0.02	49.46	49.53	0.19	79.84
7	1971473	51.99	15.85	0.01	51.97	52.02	0.15	87.23
8	2874089	55.55	15.03	0.01	55.54	55.57	0.26	85.26
9	1848525	58.25	15.26	0.01	58.23	58.27	0.18	91.13
Totally satisfied	1111696	55.33	18.64	0.02	55.29	55.36	0.20	87.18
All	9918354	53.30	16.73	0.01	53.29	53.31	0.15	91.13
Satisfaction with the hours worked								
Totally dissatisfied	26091	32.35	19.88	0.12	32.11	32.59	0.29	71.52
1	46229	40.10	17.01	0.08	39.94	40.25	0.29	71.02
2	197349	39.18	19.45	0.04	39.09	39.26	0.18	71.84
3	280153	44.52	17.49	0.03	44.46	44.59	0.21	78.86
4	374471	46.08	16.15	0.03	46.03	46.14	0.25	80.45
5 Neither satisfied nor dissatisfied	912250	46.64	16.72	0.02	46.60	46.67	0.15	85.06
6	1041679	51.67	15.32	0.02	51.64	51.70	0.21	81.44
7	1904235	55.02	15.03	0.01	55.00	55.04	0.22	87.23
8	2484837	55.87	15.23	0.01	55.86	55.89	0.23	87.81
9	1546663	56.61	16.64	0.01	56.58	56.64	0.18	91.13
Totally satisfied	1102657	55.19	18.36	0.02	55.15	55.22	0.20	87.99
All	9916614	53.30	16.73	0.01	53.29	53.31	0.15	91.13

Satisfaction with the job itself	N	Mean	S.D.	St. Error	95% Confidence Interval for Mean		Minimum	Maximum
Overall job satisfaction								
Totally dissatisfied	24264	33.18	22.86	0.15	32.89	33.46	0.29	85.23
1	27578	24.87	19.08	0.11	24.64	25.10	0.77	61.63
2	62853	36.09	18.81	0.08	35.94	36.23	4.49	65.14
3	142486	43.05	17.18	0.05	42.97	43.14	0.18	78.34
4	218547	41.27	15.86	0.03	41.20	41.34	0.22	83.73
5 Neither satisfied nor dissatisfied	588776	43.15	17.45	0.02	43.11	43.20	0.21	88.00
6	744702	47.71	16.90	0.02	47.67	47.75	0.21	83.00
7	2069417	52.27	14.98	0.01	52.25	52.29	0.24	81.37
8	3247371	55.47	15.50	0.01	55.45	55.49	0.15	87.81
9	1945505	57.84	15.47	0.01	57.82	57.87	1.05	88.02
Totally satisfied	843498	56.59	18.28	0.02	56.55	56.63	0.20	91.13
All	9914997	53.30	16.73	0.01	53.28	53.31	0.15	91.13

Table 11.6.2: Jobs by quality levels by job satisfaction, percent

	Very poor quality	Poor quality	Middling quality	Good quality	Very good	All jobs
Satisfaction with the work itself						
Totally dissatisfied	59.98	18.01	13.23	8.78	0.00	100.00
1	36.79	22.64	32.22	8.34	0.00	100.00
2	14.61	20.27	56.38	8.74	0.00	100.00
3	8.31	30.54	50.56	10.59	0.00	100.00
4	14.82	19.16	55.43	10.04	0.55	100.00
5 Neither satisfied nor dissatisfied	10.09	15.74	54.02	19.97	0.19	100.00
6	6.13	17.36	48.68	27.83	0.00	100.00
7	5.80	9.47	51.45	32.58	0.70	100.00
8	3.97	8.06	43.43	43.78	0.75	100.00
9	3.99	5.11	38.21	51.01	1.68	100.00
Totally satisfied	8.43	5.30	37.19	47.13	1.95	100.00
Satisfaction with hours worked						
Totally dissatisfied	33.44	9.66	53.90	3.00	0.00	100.00
1	13.74	23.70	53.16	9.40	0.00	100.00
2	19.51	24.35	46.36	9.78	0.00	100.00
3	12.26	18.10	52.88	16.76	0.00	100.00
4	7.08	21.87	55.29	15.43	0.33	100.00
5 Neither satisfied nor dissatisfied	9.44	15.42	53.40	21.58	0.16	100.00
6	5.41	11.66	48.84	34.02	0.07	100.00
7	4.25	7.26	46.83	41.02	0.64	100.00
8	4.11	8.25	43.15	43.44	1.04	100.00
9	5.32	6.68	38.31	48.20	1.49	100.00
Totally satisfied	8.09	5.34	38.50	45.67	2.39	100.00
Overall job satisfaction						
Totally dissatisfied	33.14	31.28	18.79	14.34	2.45	100.00
1	45.60	23.18	29.15	2.07	0.00	100.00
2	25.73	19.75	49.95	4.57	0.00	100.00
3	12.24	16.09	53.90	17.77	0.00	100.00
4	11.87	30.03	49.45	8.39	0.26	100.00
5 Neither satisfied nor dissatisfied	13.34	17.36	56.97	12.18	0.15	100.00
6	8.68	13.98	54.82	22.39	0.13	100.00
7	4.80	11.89	49.47	33.54	0.30	100.00
8	4.56	7.39	43.66	43.65	0.74	100.00

	Very poor quality	Poor quality	Middling quality	Good quality	Very good	All jobs
9	3.90	5.58	39.49	49.24	1.78	100.00
Totally satisfied	7.70	5.53	33.11	50.94	2.72	100.00
All jobs	**6.17**	**9.70**	**44.99**	**38.22**	**0.92**	**100.00**

Table 11.6.3: Job quality by life satisfaction and self-assessed health, mean

	N	Mean	S.D.	St. Error	95% Confidence Interval for		Minimum	Maximum
					Lower bound	Upper bound		
Satisfaction with life								
1 Totally dissatisfied	5233	27.35	20.45	0.28	26.79	27.90	6.78	57.74
2	10001	53.45	11.32	0.11	53.23	53.68	40.83	85.23
3	24185	36.11	22.61	0.15	35.83	36.40	0.29	63.91
4	110548	41.61	19.91	0.06	41.50	41.73	1.73	87.67
5 Neither satisfied nor dissatisfied	292839	41.85	19.30	0.04	41.78	41.92	0.77	80.53
6	627642	49.71	14.48	0.02	49.68	49.75	0.21	88.00
7	2171667	52.59	15.95	0.01	52.56	52.61	0.15	87.23
8	3654312	55.05	15.60	0.01	55.03	55.06	0.18	91.13
9	2169081	55.07	16.81	0.01	55.05	55.09	0.19	88.02
10 Totally satisfied	853715	51.84	19.57	0.02	51.80	51.88	0.20	87.99
Self-assessed health								
Poor	1306276	53.62	17.88	0.02	53.59	53.65	0.23	87.99
Fair	4155464	54.71	16.42	0.01	54.69	54.73	0.18	87.81
Good	3411903	52.92	15.61	0.01	52.90	52.94	0.21	91.13
Very Good	848427	50.08	17.22	0.02	50.05	50.12	0.15	88.00
Excellent	108370	39.05	24.72	0.08	38.90	39.20	1.49	77.08
Long term health condition								
Yes	1472333	50.47	18.89	0.02	50.44	50.50	0.18	88.00
No	8434201	53.80	16.27	0.01	53.79	53.82	0.15	91.13
All jobs	9906534	53.30	16.73	0.01	53.30	53.32	0.15	91.13

Table 11.6.4: Jobs by quality levels by life satisfaction and self-assessed health, percent

	Very poor quality	Poor quality	Middling quality	Good quality	Very good quality	All jobs
Satisfaction with life						
1 Totally dissatisfied	49.78	0.00	50.22	0.00	0.00	100.00
2	0.00	0.00	74.62	19.44	5.94	100.00
3	27.24	15.79	42.53	14.43	0.00	100.00
4	18.35	22.50	45.56	12.84	0.76	100.00
5 Neither satisfied nor dissatisfied	18.27	13.15	54.60	13.59	0.38	100.00
6	5.03	14.76	58.50	21.57	0.14	100.00
7	5.87	9.19	49.04	35.43	0.47	100.00
8	4.40	9.19	42.62	42.79	1.01	100.00
9	5.55	9.56	40.22	43.36	1.31	100.00
10 Totally satisfied	10.37	7.01	43.48	37.73	1.41	100.00
Self-assessed health						
Poor	7.63	8.86	41.69	40.49	1.33	100.00
Fair	5.43	8.90	41.88	42.86	0.93	100.00
Good	5.08	10.15	49.71	34.28	0.78	100.00
Very Good	7.32	13.05	48.52	30.39	0.72	100.00
Excellent	32.17	6.87	35.79	25.17	0.00	100.00
Long term health condition						
Yes	9.67	11.87	44.83	32.51	1.13	100.00
No	5.56	9.21	45.10	39.24	0.88	100.00
All jobs	**6.17**	**9.70**	**44.99**	**38.22**	**0.92**	**100.00**

Table 11.6.5: Job quality by socio-economic status, mean

	N	AJQI Mean	S.D.	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower bound	Upper bound		
SEIFA 2011 Decile of Index of relative socio-economic advantage/disadvantage (SEIFA 2011 IRSAD)								
Lowest decile	585669	48.49	18.00	0.02	48.44	48.53	0.27	87.21
2nd decile	1010303	49.49	17.45	0.02	49.46	49.53	0.15	81.02
3rd decile	787688	51.11	16.50	0.02	51.07	51.14	0.26	87.23
4th decile	888285	51.26	16.70	0.02	51.23	51.30	0.18	88.02
5th decile	991660	54.22	15.19	0.02	54.19	54.25	0.21	82.32
6th decile	1038779	52.89	16.82	0.02	52.86	52.93	0.18	85.50
7th decile	1092531	51.78	18.18	0.02	51.75	51.82	0.21	86.52
8th decile	1169873	54.97	15.73	0.01	54.95	55.00	0.26	86.06
9th decile	1079067	55.91	16.63	0.02	55.88	55.94	1.53	88.00
Highest decile	1276951	58.47	14.27	0.01	58.44	58.49	1.41	91.13
SEIFA 2011 Decile of Index of economic resources (SEIFA 2011 IER)								
Lowest decile	878307	49.27	16.57	0.02	49.24	49.31	0.21	87.21
2nd decile	896218	51.30	17.35	0.02	51.26	51.33	0.23	87.81
3rd decile	915781	53.03	16.16	0.02	53.00	53.07	0.15	87.99
4th decile	876909	53.03	16.22	0.02	52.99	53.06	0.18	88.02
5th decile	943260	53.51	17.53	0.02	53.47	53.54	0.28	83.48
6th decile	1029308	50.60	16.96	0.02	50.57	50.63	0.20	84.69
7th decile	1170280	53.28	17.63	0.02	53.25	53.31	0.18	88.00
8th decile	1036652	55.91	16.39	0.02	55.88	55.95	0.29	86.52
9th decile	1037964	55.32	15.59	0.02	55.29	55.35	1.54	84.37
Highest decile	1136129	56.49	15.29	0.01	56.46	56.51	0.26	91.13
SEIFA 2011 Decile of Index of education and occupation (SEIFA 2011 IEO)								
Lowest decile	628371	47.86	17.87	0.02	47.81	47.90	0.27	77.77
2nd decile	865554	49.59	17.77	0.02	49.55	49.63	0.15	87.21
3rd decile	835382	50.67	16.96	0.02	50.63	50.70	0.28	82.32
4th decile	939470	50.77	17.50	0.02	50.74	50.81	0.20	85.44
5th decile	1107665	53.63	15.61	0.01	53.60	53.66	0.25	88.02
6th decile	986945	54.00	16.05	0.02	53.97	54.04	0.26	87.23
7th decile	1057514	53.67	16.48	0.02	53.64	53.70	0.27	84.61

	N	AJQI Mean	S.D.	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower bound	Upper bound		
8th decile	1241806	54.59	15.93	0.01	54.56	54.62	0.21	87.81
9th decile	1047428	56.36	16.88	0.02	56.32	56.39	0.18	85.66
Highest decile	1210671	57.40	15.01	0.01	57.37	57.42	1.45	91.13
All jobs	**9920806**	**53.30**	**16.73**	**0.01**	**53.29**	**53.31**	**0.15**	**91.13**

Table 11.6.6: Jobs by quality levels by socio-economic status, percent

	Very poor quality	Poor quality	Middling quality	Good quality	Very good	All jobs
SEIFA 2011 Decile of Index of relative socio-economic advantage/disadvantage						
Lowest decile	10.55	13.15	47.95	28.20	0.14	100.00
2nd decile	8.72	12.75	48.42	29.95	0.15	100.00
3rd decile	6.92	10.34	50.86	31.24	0.63	100.00
4th decile	6.97	9.82	50.38	32.15	0.68	100.00
5th decile	4.36	9.14	48.08	37.72	0.70	100.00
6th decile	6.35	8.62	47.25	36.96	0.82	100.00
7th decile	7.84	14.27	39.65	37.62	0.61	100.00
8th decile	4.62	8.27	45.07	41.10	0.94	100.00
9th decile	5.77	6.87	39.50	46.10	1.75	100.00
Highest decile	2.67	6.33	38.47	50.53	2.00	100.00
SEIFA 2011 Decile of Index of economic resources						
Lowest decile	7.59	15.12	48.35	28.78	0.16	100.00
2nd decile	7.60	10.46	45.90	35.52	0.52	100.00
3rd decile	5.84	9.07	47.59	36.55	0.94	100.00
4th decile	5.75	9.82	46.59	37.25	0.59	100.00
5th decile	7.10	8.55	44.68	38.95	0.72	100.00
6th decile	7.69	12.06	49.30	30.55	0.40	100.00
7th decile	7.63	8.03	45.01	38.33	1.00	100.00
8th decile	4.93	8.33	38.68	46.60	1.45	100.00
9th decile	4.18	9.27	41.42	43.92	1.21	100.00
Highest decile	3.79	7.51	43.73	43.15	1.82	100.00
SEIFA 2011 Decile of Index of education and occupation						
Lowest decile	10.20	15.26	48.72	25.82	0.00	100.00
2nd decile	9.29	10.87	49.87	29.27	0.71	100.00
3rd decile	8.13	10.45	51.29	29.64	0.50	100.00
4th decile	8.25	9.64	49.46	31.94	0.71	100.00
5th decile	4.16	12.84	43.74	38.69	0.58	100.00
6th decile	5.55	6.76	49.34	37.77	0.59	100.00
7th decile	6.11	8.49	45.49	39.32	0.60	100.00
8th decile	4.84	9.76	44.42	40.08	0.90	100.00
9th decile	4.96	8.49	35.99	48.72	1.83	100.00
Highest decile	3.66	7.09	37.31	49.87	2.08	100.00
All jobs	**6.17**	**9.70**	**44.99**	**38.22**	**0.92**	**100.00**

11.7. Supporting data on industry shares of employment

Figure 11.7.1: Share of total employment by industry, jobs (%)

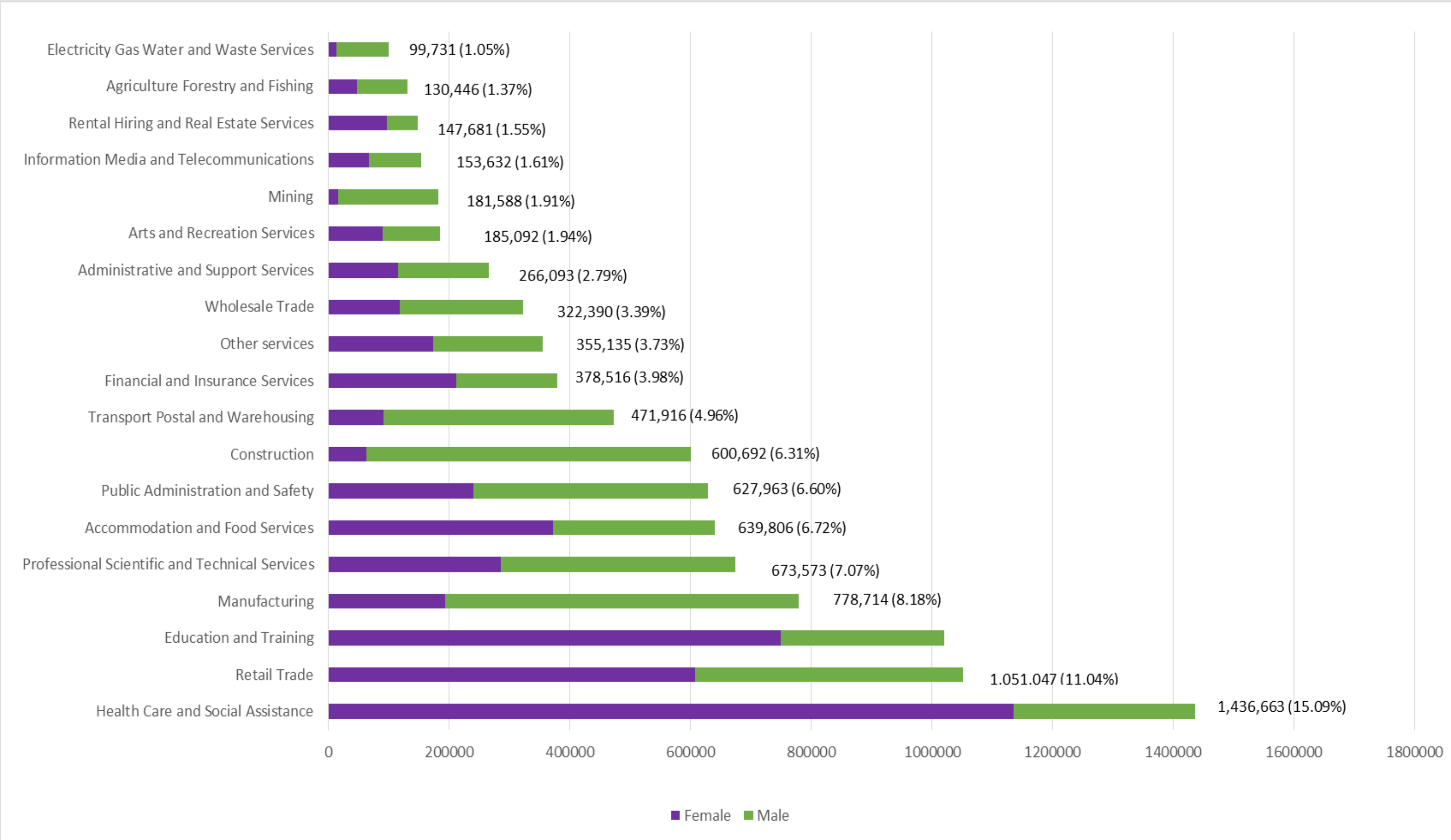


Figure 11.5.13: Share of female employment by ANZSIC Industry Division, jobs, (%)

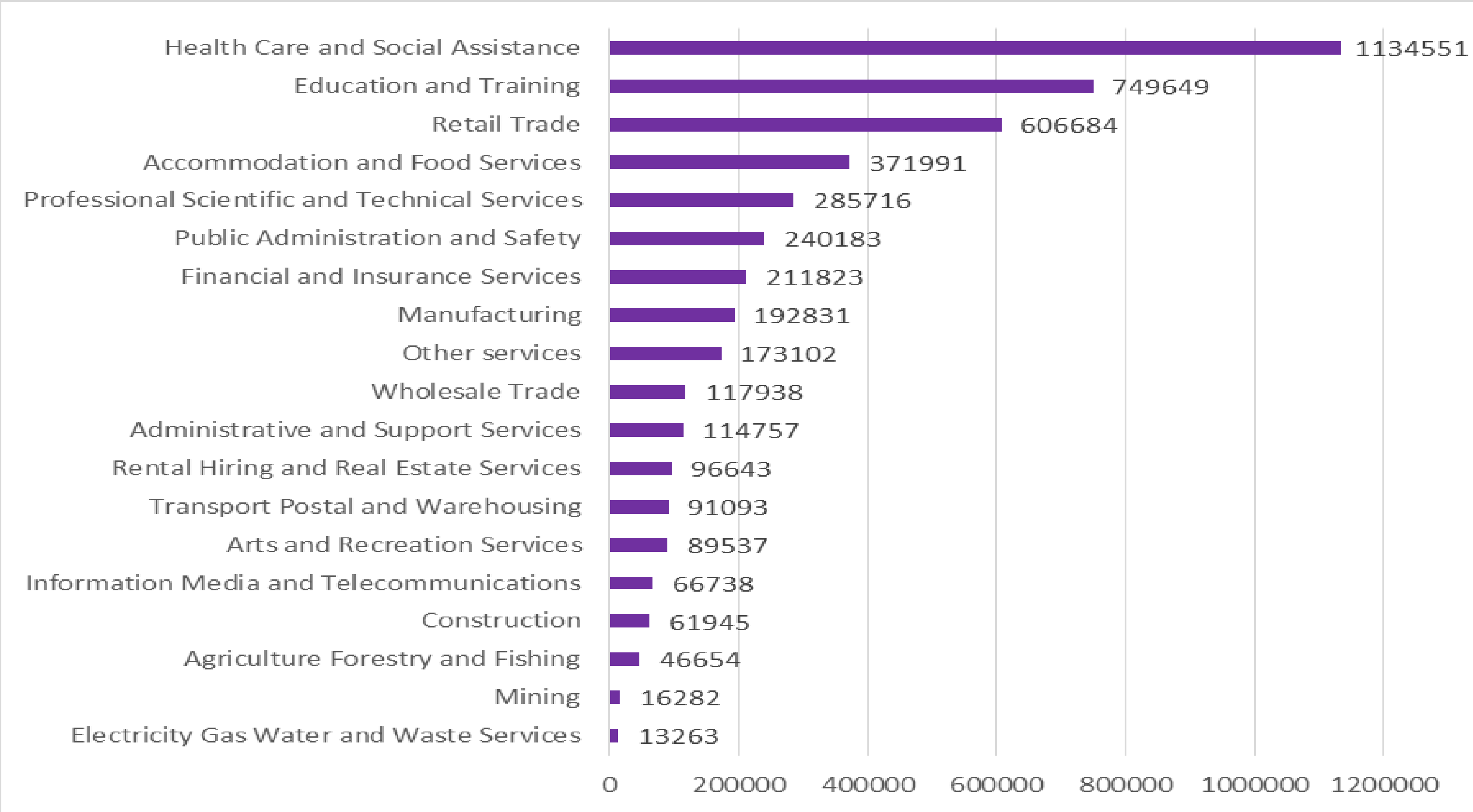


Figure 11.5.13: Share of male employment by ANZSIC Industry Division, jobs, (%)