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Article type : Special Conference Issue Paper

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Four Dimensions of Quality in Australian Jobs†

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† This article uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey conducted by the Melbourne Institute: Applied Economic & Social Research on behalf of the Australian Government Department of Social Services [DOI: doi:10.4225/87/VHRTR5]. The findings and views reported in this article are those of the authors only. The article's analysis data were extracted using PanelWhiz, a Stata add-on package written by John Haisken-DeNew. The authors gratefully acknowledge financial support from Australian Research Council Discovery Project no. DP180103462. They thank Tessa Loriggio for valuable research assistance and Andrew Cherlin, participants at the 2019 Australian Conference of Economists, and seminar participants at Deakin University for helpful comments.

Melbourne, Victoria 3010, Australia

March 2020

JEL Classification: J2, J3, J81
Keywords: Job quality, scales, Australia, HILDA Survey

Abstract:
We develop and analyze comprehensive, multi-item scales of the quality of Australian jobs, using the rich measures of job characteristics from the Household, Income and Labour Dynamics in Australia Survey. Through exploratory methods and multidimensional Item Response Theory modeling, we uncover four gender-specific scales that describe the autonomy, demands/engagement, compensation adequacy, and security of jobs. From 2001 to 2016, women's job demands/engagement and compensation adequacy grew noticeably, and men's job demands/engagement grew somewhat. Since the mid-2000s, women's and men's job security have fallen. Job quality rises with job tenure, work experience, and health and falls following involuntary job changes.

I. Introduction

The quality of paid employment is a perennial concern that goes back to the dawn of employer-worker relations (e.g., Marx, 1889; Polanyi, 2001). Although the "dark satanic mills" are things of the distant past in developed countries, worries about job quality are not, with threats seen from deindustrialization, deinstitutionalization, automation, globalization, and other processes (see, e.g., Bluestone & Harrison, 1982; Cherlin, 2014; Kalleberg et al., 2000). However, the definition of job quality is often inferred rather than stated. When explicit definitions or measures are offered, they vary from one analyst to the next. Reams of studies look at important aspects of jobs, such as earnings, hours, benefits, contractual arrangements, safety, and work-life balance, but different measures can lead to different conclusions. There is considerable need for comprehensive summative measures, and a growing literature is attempting to fill this gap.

The lack of a universal summative measure of job quality owes to several factors. First, job quality is a complex, multidimensional concept with many potential domains, such as compensation adequacy, job security, job demands and stresses, autonomy, safety, and satisfaction. The OECD (Cazes et al., 2015) identifies domains of earnings quality, labour market security, and work environment; Muñoz De Bustillo et al. (2011) identify domains of pay, employment quality, intrinsic job quality, health and safety, and work-life balance; and Butterworth et al. (2011) identify domains of effort-reward fairness, job security, job demands and complexity, and job control. Within each potential domain, there are further components we might consider, such as wage rates, hours, benefits, and time and money costs of work in determining compensation adequacy.

Second, concerns regarding job quality lie at the intersection of several different research disciplines and approaches, including economics, sociology, psychology, and industrial relations. Each discipline and approach emphasizes particular relationships and outcomes and focuses on different aspects of jobs (Wright, 2015).

Third, job quality must be assessed within context (Weller & Campbell, 2015). Job security, safety and health will be more salient concerns and vary more across jobs in countries with few worker protections, like the United States, than in countries with stronger protections. Certain benefits, such as health insurance and paid parental leave, are offered through employers in some countries but as public entitlements in others. The differences in context create a need for country-specific analyses and possibly country-specific measures.

Fourth, elements of job quality might be objectively observable, but they also depend on

personal valuations and circumstances.

Fifth, context and personal valuations may differ with gender. Women work fewer hours in the labour market and with lower pay than men. In Australia, women have higher rates of casual employment (Wilkins & Wooden, 2014), and they devote more time to unpaid household work and childcare (Sayer et al., 2009). Despite these differences, women report higher job satisfaction than men (Clark, 1997; Kifle et al., 2014) and fewer work-family job strains (Blunch et al., forthcoming). This evidence suggests that women and men may perceive and report job quality differently.

Addressing these many issues creates conceptual and methodological challenges. It also requires an extensive set of measures that can capture the relevant components of job quality.

In this article, we develop and analyze comprehensive, multi-item scales of the quality of Australian jobs, using the rich longitudinal measures of job conditions and characteristics from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. We follow a data-driven process that applies exploratory methods and rigorous multidimensional Item Response Theory (IRT) modeling to uncover four gender-specific scales based on 23 measures that describe the autonomy, demands and engagement, compensation adequacy, and security of Australian jobs. We investigate how these aspects of job quality changed from 2001 to 2016 and how they vary across Australians with different characteristics.

The article contributes to the research on job quality in several ways. First, previous studies have tended to develop scales from either objective attributes of jobs, such as earnings, hours, and contractual arrangements (e.g., Clogg, 1979; Kalleberg et al., 2000), or subjective measures, such as perceptions of "freedom" and "say" in how work is performed (e.g., Leach et al., 2010), but not from both types of measures. The HILDA Survey collects both types of information, and our scales make use of both types.

Second, several scales, including those from Clogg (1979) and Kalleberg et al. (2000), have topped out at a level of job adequacy and do not identify higher levels of job quality. Our scales measure job quality along a continuum and distinguish among a wide range of outcomes from very low to very high.

Third, many researchers, including Brummund et al. (2018), Cloutier-Villenueve (2012), Grzywacz and Dooley (2003), Kalleberg et al. (2000), and Muñoz De Bustillo et al. (2011), use informal approaches to combine variables into summative measures. We utilize formal methods, including exploratory factor analyses and IRT modeling. This provides us with detailed information about the measurement properties of the scales. Importantly, results from the IRT models help us confirm that all the outcomes of all of our component measures

contribute unique information to our scales. Further, IRT models can estimate relationships and predict scale values with partial data. This reduces the impact of item non-response. It also allows us to make maximum use of some changing content in the HILDA Survey—especially the additions of psycho-sociological job quality questions in the survey's fifth wave—to produce consistent and comparable scales.

Fourth, we examine job quality separately for men and women. Previous research has considered differences in objective outcomes, such as hours, earnings, and contract type (Wilkens & Wooden, 2014), and job satisfaction (Clark, 1997; Kifle et al., 2014), but not in the possible definitions of summative measures. We find that men and women have the same dimensions and components of job quality but that the measurement relationships between several components and the job quality scales vary with gender. In our multivariate analyses, we find that the determinants of job quality also vary with gender.

II. Research on the Measurement of Job Quality

Job quality has several dimensions, and this makes it challenging to analyze comprehensively. Researchers have taken indirect and direct approaches to address this complexity. The indirect approach measures job quality through a proxy, such as overall job satisfaction or satisfaction with components of work, which is likely to reflect workers' perceptions of job conditions (see, e.g., Barmby et al., 2012; Buddelmeyer et al., 2015; Ferreira & Taylor, 2011, and Kifle et al, 2014). Job satisfaction is an easy-to-use measure that is correlated with many aspects of job quality, but it is a distinct measure and may capture other aspects of a person's work situation.[1]

A direct, alternative approach is to examine the components of job quality in separate analyses. Wilkins and Wooden (2014) examined participation, unemployment, under-utilization, contract arrangements, and earnings in the Australian job market from 1993 to 2013. They found that job market conditions generally strengthened, especially during the 1990s, and that trends towards casualization moderated. Wilson et al. (2008) looked separately at Australian workers' reports of using existing skills and needing to learn new skills and found that both were higher among permanent employees than casual employees. Separate analyses along these lines are straightforward to perform and describe all the

[1] Kutscher et al. (2017) point to another difficulty. Their IRT analysis of the six (0-10) job satisfaction measures in the HILDA Survey indicated that the measures have poor psychometric properties. Rather than a single latent answering structure, the measures are more consistent with three structures: differential (use the full range of the scale), extreme (tend to answer 0 or 10), and semi-extreme (tend to answer 1, middle, or 9/10).

relationships in the data. However, they may be inefficient if measures are closely related and hard to summarize if there are many measures or different patterns across measures.

Another direct approach is to find measures that fit with a conceptualization of job quality and combine them without a formal analysis. Sometimes these involve just a few characteristics. Clogg (1979) extended the standard labor force categories of not in the labor force, unemployed, and employed into the Labour Utilization Framework that divided employment into part-time employment, underemployment by low income, underemployment by mismatch, and adequate employment. Kalleberg et al. (2000) created a "bad job" measure for the U.S. that summed binary indicators of whether a job had low pay, lacked health insurance, or lacked pension benefits. McGovern et al. (2004) examined a similar measure for the U.K. that summed indicators for low pay, no pension, no sick pay, and no promotion ladder.

Other measures are more comprehensive. Brummund et al. (2018) combined seven binary indicators that described compensation, benefits, stability, and job satisfaction in 15 Latin American countries. Cloutier-Villenueve (2012) developed a 12-category typology that combined information on wages, hours of work, skill levels, and stability and ordered the categories into low, intermediate, and high-quality groups. Grzywacz and Dooley (2003) considered psychological and social components of jobs and distinguished between jobs that were "inadequate," "barely adequate," "psychologically good," "economically good," and "optimal." Muñoz De Bustillo et al. (2011) considered dimensions involving pay, skills, autonomy, subjective qualities, contractual stability and development opportunities, health and safety, and work-life balance. An issue with these typologies is that they combine multiple dimensions of job quality and order the outcomes without a quantitative analysis of whether the combinations or orderings are appropriate. It is straightforward to categorize jobs that are good in all dimensions as the highest quality jobs and jobs that are bad in all dimensions as the lowest quality jobs. However, jobs that are good in some dimensions and bad in others are harder to order.

The third direct approach is to combine measures of job quality using formal quantitative methods. For the U.K., Holman (2013) applied cluster analysis to 38 measures of job quality and arrived at a six-category typology. In Australia, Leach et al. (2010) conducted factor analyses of 12 measures of psycho-sociological job characteristics that have been asked throughout the HILDA Survey and identified three factors that they labelled job demands and complexity, job control, and job security. In a subsequent study, Butterworth et al. (2011) also conducted factor analyses that dropped one of the job complexity measures and moved a

measure of effort-reward fairness into a separate (fourth) single-item component. Neither study utilized information on objective attributes of jobs. Also, their scales only utilized measures that were available in the first four waves of the HILDA Survey and not the larger set of measures that have been available since the fifth wave. Cassells et al. (2018) used the HILDA Survey to examine "precariousness" of work and through Principal Components Analysis identified dimensions of job insecurity, lack of control, and working conditions. Cassells et al. did not consider earnings in their precariousness measure.

Our analyses of the HILDA Survey also adopt formal quantitative methods to develop summative measures of job quality. We build on the analyses of Leach et al. (2010) and Cassells et al. (2018) by incorporating objective measures of earnings, benefits, and contract type and the full set of psycho-social measures that are available in the HILDA Survey, rather than just the 12 questions from the first four waves. We extend their formal methodologies by utilizing multidimensional IRT methods. IRT methods have been used by Kutscher et al. (2017) to examine job satisfaction but not to investigate broader sets of job quality measures. Finally, we develop measures separately for Australian men and women.

III. Constructing Job Quality Scales from the HILDA Survey

The HILDA Survey is a large national longitudinal survey that began with 19,914 people in 7,682 Australian households in 2001 and has subsequently followed those people and their families in annual interviews. Each wave asks about work, family, and other characteristics through interviews about the household, in-person (person questionnaire, or PQ) interviews with each household adult, and self-completion questionnaires (SCQs) for the same adults. Attrition has been modest; by the 16th wave, just under two-thirds of the original survey respondents completed interviews (Summerfield et al., 2017). We extracted the HILDA data with the PanelWhiz add-on for Stata (Hahn & Haisken-DeNew, 2013).

The HILDA Survey asks about many characteristics of people's jobs. We considered 46 measures that were available in most or all waves, asked of all workers, and universally applicable. The measures are listed in Appendix A and fall into four principal groups. The first group includes the objective conditions of jobs that are asked in the PQ—specifically, measures of earnings, hours, contract type, leave entitlements, union membership, hiring through a temporary agency, tenure with the employer, commuting, and work schedules. There are also subjective measures regarding whether the person wants to work more hours and the estimated probability of losing or leaving a position. The second group consists of six questions from the PQ regarding job satisfaction. The third group consists of 21 questions

from the SCQ regarding psycho-social aspects of jobs. These include questions about job demands, stresses, autonomy, flexibility, fit with skills, variety, security, and compensation fairness. The fourth group comprises questions in the SCQ about several additional work entitlements. Together, the items in Appendix A include all the measures that were considered in previous Australian research by Buddelmeyer et al. (2015), Butterworth et al. (2011), Cassells et al. (2018), Green et al. (2010), Leach et al. (2010), Kutscher et al. (2017), and Wilson et al. (2008).[2]

For our analyses, we examine annual observations from the first 16 waves of the HILDA Survey for people who were 18 to 64 years old with completed PQs and SCQs and who were in paid employment at the time of the interview. We drop observations for people who were enrolled in school, self-employed, or unpaid family workers at the time of their interviews. Means and standard deviations of the job quality measures are reported in Table 1.

Preliminary analyses. Several measures had problems that made them unsuitable for use in a scale. We summed indicators of entitlements to flexible work times and home-based work into a 0-2 measure because the indicators were highly correlated. We dropped measures of time not employed over the previous year, employment through labour-hire firms or temporary work agencies, and entitlements to sick, holiday, and carer leave because they had low variability or were nearly collinear with other measures.

Exploratory factor analyses. For the remaining 34 measures, we conducted exploratory factor analyses, using observations from the 6th, 11th, and 16th waves of the HILDA Survey. These were a subset of the waves in which all the job quality items from Appendix A were asked. Scree analyses revealed that four factors adequately described the data. We fit rotated non-orthogonal factor solutions to the data. From these, we found that nine measures—tenure with the current employer, chance of voluntarily leaving the job in next 12 months, union or employee association membership, commuting time, regular weekday shifts, work-related training, getting paid fairly, repeated tasks, and the availability of permanent part-time work—had high levels of unexplained variance or weak factor loadings. Two other measures—the job being more stressful than imagined and fearing that stress on the job will make the person physically ill—loaded strongly positively on one factor and strongly negatively on another and thus had ambiguous interpretations as markers of job quality.

We dropped these 11 measures and re-ran the exploratory factor analyses on a final set of

[2] Because of the findings of Kutscher et al. (2017), we do not consider the measures of job satisfaction for our scales. However, we do use the measures in validation analyses.

23 measures. Scree and eigenvalue analyses indicated that the measures are explained by four factors. We report results from rotated non-orthogonal factor solutions in Table 2. For men and women, the same sets of measures align with each factor, though the magnitudes of the loadings vary.

For both genders, the measures of freedom to decide how to do work, say about what happens on the job, freedom to decide when to do work, choice in deciding what to do, flexible working times, ability to choose breaks, and entitlements to formal flexible scheduling and home-based work align on the first factor. Common elements of these measures are autonomy and flexibility in the job.

The measures of the job being difficult and complex, the job requiring the person to learn new skills, the person using his or her skills on the job, the job providing a variety of interesting things to do, the job requiring initiative, the job requiring intense work, and not having enough time to do everything on the job align on the second factor. Common elements of these measure are job demands and engagement with the job.

The compensation adequacy measures of gross weekly wages, usual weekly hours, preferences to work more hours, and having a non-casual contract align on the third factor.

Finally, the measures of the chance of losing the job, the job having a secure future, the job being at a business that is likely to last five years, and not having to worry about the job's future align on the last factor. Common elements in these measures are economic security.

Based on these results we label the factors of Australian men's and women's job quality as autonomy, demands and engagement, compensation adequacy, and security. The dimensions are similar to the four identified by Butterworth et al. (2011), who combined 11 measures into domains of job demands and complexity, job control, job security, and effort-reward fairness. Butterworth et al. used two items that we do not: the items about the job being more stressful than imagined and about getting paid fairly. Butterworth et al. (2011) did not include the psycho-social measures from Waves 5-16, the hours preference or job loss probability measures, or the objective earnings, hours, contract, or entitlements measures.

Multidimensional IRT models. Using the 23 job quality measures from the final factor analysis, we fit multidimensional IRT graded-response models for four latent variables corresponding to the factors. Let θ_m be a latent variable that represents the m^{th} (=1, 4) dimension of someone's job quality, and let Y_i be the ordered categorical measure of a person's response to item i for dimension m. We model the probability that someone gives a categorical response of j or higher to item i as

$$\text{Prob}(Y_i \geq j) = \frac{\exp[\alpha_i(\theta_m - \delta_{ij})]}{1 + \exp[\alpha_i(\theta_m - \delta_{ij})]}, \quad i = 1, 23 \tag{1i}$$

where exp[·] is an exponential operator; $\delta_{i,j}$ is the "severity," or differentiation, parameter of response category *j* from item *i*; and α_i is the discrimination parameter for item *i*. The severity parameters ($\delta_{i,j}$) indicate positions along the latent variable distribution, with higher values representing response values with higher job quality. The discrimination parameters (α_i) indicate the strength of the association between the observed categorical measure and the latent measure; higher values indicate more signal and less noise for the observed measure. The model further specifies that the latent variables, θ_1, θ_2, θ_3, and θ_4, follow a multivariate normal distribution.

The IRT modelling approach has several advantages over other scale construction approaches, such as exploratory factor analysis. Through the discrimination parameters, the IRT model allows measures to differ in the level of the latent variable that they indicate (for example, having a non-casual contract may indicate a relatively low level of compensation quality), and through the severity parameters, it allows measures to differ in the strength of their association with the latent variable. It can also fit the model for observations that are missing data for some of the outcomes, and it can predict latent values of job quality from the available data for each observation.[3] We fit the models separately for men and women to data from Waves 1, 6, 11 and 16 of the HILDA Survey using Stata's generalized structural equations modeling (gsem) package. Estimates of the severity and discrimination parameters for each item and the correlations between the latent variables are reported in Table 3.

For men's and women's job autonomy, the item regarding choice about what to do on the job has the strongest discrimination. The items regarding the person's freedom to decide how to work, his or her say about what happens on the job, and his or her freedom to decide when to work also have very high discrimination. The objective indicator of flexible scheduling and home-based work has the weakest discrimination, and the other items have moderate discrimination.

The IRT model results for job demands/engagement are more gendered. For men, the item about the job requiring initiative has the highest discrimination, while for women, the item regarding the job requiring new skills has the highest discrimination. For both genders, the

[3] We estimate the IRT model using maximum likelihood. For each observation, the likelihood function includes terms for specification (1i) for each *available* outcome. If an outcome is missing for an observation, the likelihood omits the corresponding specification.

items regarding not having enough time to do everything and having to work fast have low discrimination. All the other items have moderate discrimination.

Less gendered patterns appear for the dimensions of compensation adequacy and security. For men's and women's compensation adequacy, the measure for earnings has the highest discrimination, and the indicator for not wanting to work more has lower discrimination. However, the discrimination parameters for the compensation items have a wider range for women than men. For men's and women's job security, the item about having a secure future in the job discriminates the most; the item about worrying about the future of the job discriminates moderately; and the other items discriminate less.

We also see gender differences in the correlations between the latent job quality measures. All the latent measures have positive correlations. However, the correlations between autonomy and the other elements of job quality are stronger for men than for women.

An important aspect of IRT modeling is that it can be used to examine whether each of the outcomes from each of the component measures contributes unique information to the relevant scale. For each of our measures, we calculated Item Characteristic Curves. These confirmed that all of the outcomes and measures were informative.

IV. Descriptive Analyses

We use the parameters from the multidimensional IRT models in Table 3 to predict four scales of job quality for men and women in Waves 1 to 16 of the HILDA Survey. There are several reasons to use model-based predictions of the latent job quality variables rather than simple sums or normalized averages of the categorical measures. First, our categorical measures have different numbers of outcomes. The psycho-social measures each have seven outcomes, but the other measures have fewer. The predictions account for this. Second, the differences in discrimination between the components of several of the latent job quality variables indicate that the components should receive different weights in the respective scales. Third, it is possible to predict scale values from subsets of the items; thus, we can make predictions if people are not asked or do not respond to all the items. This allows us to build scales that use the psycho-social measures that were asked in the fifth and subsequent waves of the HILDA Survey but still predict comparable scale outcomes using the smaller set of measures from the first through fourth waves.

Job satisfaction. As an initial analysis, we examine correlations between the predicted job quality scales and the six job satisfaction measures and report the results in Table 4. The analysis serves two purposes. First, it provides a test of the validity of the job quality

measures, especially with respect to the associations between particular job quality and job satisfaction domains. Second, it helps us determine whether the domain of job demands/engagement should be interpreted as a positive or negative aspect of job quality.

For men and women, job autonomy and job security are positively correlated with all the measures of job satisfaction. Job autonomy has the strongest correlations with workers' satisfaction regarding the flexibility to balance work and non-work commitments, while job security has the strongest correlations with workers' satisfaction regarding job security.

For men, the domain of job demands and engagement is also positively correlated with all the job satisfaction measures and especially strongly correlated with their satisfaction regarding "work itself". For women, the domain of job demands and engagement is positively correlated with four of the job satisfaction measures, including overall job satisfaction and satisfaction with the work itself, but the domain is negatively correlated with work/non-work flexibility and hours. Overall, the results suggest that jobs with higher demands and engagement are viewed by workers as better, higher-quality jobs. However, for women this dimension of quality may have a larger trade-off with non-market work time.

For men, the scale measure of compensation adequacy is positively associated with four of the job satisfaction measures, with the strongest correlation appearing for their satisfaction with total pay. For women, compensation adequacy is positive associated with three satisfaction measures—also including satisfaction with total pay. For men and women, compensation adequacy is negatively associated with satisfaction regarding work/non-work flexibility and hours. For women, compensation adequacy also has a weak negative correlation with overall job satisfaction.

The results from this analysis indicate that the scale measures have external validity—each scale measure is significantly and positively correlated with the most relevant aspect of job satisfaction. The results also bolster our interpretation of the scales as positive measures of quality.

Time trends. We next examine how the dimensions of Australian men's and women's job quality have changed over time. Figure 1 shows the annual means and 95 percent confidence intervals of each of the predicted job quality scales from 2001 to 2016. For men and women, average job autonomy fell from the first to the second wave of the HILDA Survey but had no discernible trend afterward. Average job demands and engagement for men and women also fell noticeably from 2001 to 2002. However, men's job demands and engagement had a moderate upward trend after 2002, while women's job demands and engagement had a more pronounced increase. Men's job compensation adequacy rose modestly from the early 2000s

to the early 2010s but then fell. In contrast, women's compensation adequacy rose over almost the entire period and at a faster rate. Men's and women's job security was more variable, mostly rising through 2007 and mostly falling thereafter.

Worker characteristics. Table 5 reports averages of the predicted job quality scales conditional on different worker characteristics, including their recent job changes, tenures with employers, general work experience, education, Indigenous and migrant backgrounds, disability, and health status (derived from the Physical Functioning sub-scale of the Short Form Health Survey, or SF-36). We also consider several geographic and contextual measures, including whether the person lives in a major urban area, other urban area, bounded locality, or rural area; deciles of the Australian Bureau of Statistics (ABS) Socio-Economic Index for Areas (SEIFA) measure for relative socio-economic advantage/disadvantage (ABS, 2001); and the regional unemployment rate. We further consider the worker's occupation (Australian and New Zealand Standard Classification of Occupations; ABS [2006a]), and industry (Australian and New Zealand Standard Industrial Classification; ABS [2006b]). These characteristics have all been found to be associated with job outcomes in previous research. Results are reported for men in the left panel and women in the right panel. Within the panels, the first column lists the percentage of workers with the given characteristic, and the next four columns list averages of the quality measures for workers with the characteristic.

For men and women, all four job quality measures tend to have similar relationships with the observed characteristics. The job quality measures are higher among workers who continue in their jobs and lower for workers who change jobs, especially those who change jobs involuntarily. Job quality is lower for workers in the first five years of their jobs. Demands, compensation, and security mostly increase with job tenure; however, women's autonomy is lower at the longest tenures. Job quality is also lower for workers with the least general work experience.

Job quality tends to increase with education, health, and economic conditions. However, the association between job security and education is weak. Indigenous men and women have lower compensation, and Indigenous men have lower job demands/engagement. Non-English-speaking migrants have lower job demands/engagement and lower job security.

The dimensions are better for professionals and worse for men in administrative occupations. Jobs in the health care industry have high demands/engagement and security but low compensation. Jobs in the education sector also have high demands/engagement, compensation, and security, but women's jobs in the education sector have low autonomy.

Manufacturing jobs tend to have low demands/engagement and low security.

V. Multivariate Analyses

To examine the properties of the job quality measures further, we estimate multivariate longitudinal random-effects models that account for indirect and confounding relationships among people's observed characteristics and serial correlation in their unobserved characteristics. Estimated coefficients and standard errors from these models are reported in Table 6. The left panel of the table lists results for men, and the right panel lists results for women. Because the explanatory variables in the models include changes in jobs from the previous wave to the current wave (i.e., require lagged information), they are estimated using data from Waves 2-16 of the HILDA Survey. The models include controls for state/territory, but for reasons of brevity, these are not reported.

The estimates indicate that involuntary job changes are associated with decreases in all four types of job quality for men and women. The results imply that the jobs workers find after an involuntary job loss are worse, on average. In contrast, voluntary job changes are associated with subsequent jobs that are more demanding and engaging. The jobs also have better compensation adequacy for women but lower compensation adequacy for men. The increased demands but reduced compensation for men who voluntarily switch jobs could result from them moving to jobs with more potential for compensation and quality growth.

Men's and women's demands/engagement, compensation adequacy, and job security increase for all or nearly all of their job tenures. Workers' autonomy also initially increases with job tenure but peaks at approximately 17 years for men and 12 years for women and then declines. Similarly, all four dimensions of job quality initially increase with general work experience. Men's demands and engagement peak at approximately 19 years of general experience, while women's demands and engagement peak at approximately eight years. Most of the other dimensions of job quality peak at 25 to 33 years of general experience.

Men's and women's job autonomy, demands/engagement, and compensation adequacy increase with education. However, men's job security is not related to their education, and women's job security has a modest negative relationship, though mainly for women with masters or doctorate degrees. Although less-educated workers are more susceptible to macroeconomic shocks, higher levels of schooling could increase workers' confidence in accepting economically risky jobs or jobs with more stringent confirmation criteria.

As with the descriptive results, Indigenous Australian workers have lower compensation adequacy than other Australians, and Indigenous men have jobs with lower demands and

engagement. Migrants from non-English-speaking countries have job quality that is lower in all dimensions. Disabilities that limit work are negatively associated with most dimensions of job quality, and better physical health is positively associated with most dimensions for men but only with job security for women.

Men's and women's job security and men's demands/engagement are higher outside of major urban areas, while women's compensation adequacy is lower outside of major urban areas. Most dimensions of job quality are higher in more economically advantaged areas as measured by the SEIFA codes. All four dimensions of job quality for men fall with local unemployment rates, while only the dimension of job autonomy falls for women.

Men who are managers have higher job quality than men in professional occupations (the omitted category in our regressions). Women who are managers have more autonomy and higher compensation adequacy than women in professional occupations. Other occupations all have lower job quality than professional occupations.

Industry patterns are more complex. For men and women, autonomy is very high in rental, hiring, and real estate services. Men's autonomy is also very high in agriculture, forestry, and fishing. Men's autonomy is lowest in mining, while women's autonomy is lowest in the education and training sector. For men and women, job demands/engagement are highest in the health care industry (our omitted category) and lowest in retail trade, accommodation and food service. Accommodation and food service also have the lowest compensation adequacy, while mining has the highest. The education and training sector offers the highest job security for men, while health care offers the highest job security for women. Men in information media and telecommunications and women in mining industries have the lowest job security.

Fixed-effects models. Our multivariate random-effects regressions control for many observed measures. However, it is possible that despite these controls, there are still unobserved characteristics that are correlated with job quality and the observed measures and that bias our estimated relationships. To address this issue, we re-estimated the models from Table 6 using fixed-effects specifications (and dropping the time-invariant controls). Estimates from these models were very similar to the results from Table 6.

VI. Conclusion

In this article, we analyze numerous characteristics of jobs that are available in the HILDA Survey and develop comprehensive, multi-item scales of job quality from 23 of the measures. We follow a data-driven process that first applies exploratory factor analysis and then estimates multidimensional IRT models. We develop four gender-specific scales that describe

the qualities of autonomy, demands and engagement, compensation adequacy, and security. We investigate how these aspects of job quality relate to different measures of job satisfaction, how they changed over time, and, in both descriptive and multivariate analyses, how they vary across Australians with different characteristics.

Several previous studies have constructed summative measures of the quality of Australian jobs, including studies by Butterworth et al. (2011), Cassells et al. (2018), and Leach et al. (2010), that used formal approaches but only leveraged some of the data from the HILDA Survey. We improve on their methodologies by incorporating objective measures of earnings, benefits, contract type, and entitlements and the full set of psycho-social measures that are available in the survey. We also improve on their methodologies by utilizing multidimensional IRT methods and considering job quality separately for men and women.

Although previous research has considered whether individual components of job quality, such as earnings, contract type, and job satisfaction, differ between men and women, it has not investigated whether summative measures differ. We find that the dimensions and components of job quality are the same for men and women, but that the strength of the contributions of some components differ, mainly in the dimension of job demands and engagement. For men, jobs that require initiative contribute most strongly to demand and engagement quality, while for women, jobs that make use of skills and abilities contribute most strongly.

As a test of external validity, we examine the relationships of the scales with job satisfaction measures from the HILDA Survey. Consistent with their interpretations as measures of job quality, each scale is positively correlated with the most relevant element of job satisfaction. Four of the eight scales are positively correlated with every element of job satisfaction, and seven of the scales are positively correlated with overall job satisfaction.

More substantively, we examine the trends in the scale measures over time. From 2001 to 2016, women's job demands/engagement and compensation adequacy grew markedly. The results are consistent with women's rising empowerment and increasing opportunities in the labour market. Men's job demands/engagement also rose from 2001 to 2016 but at a more modest rate. From 2001 until 2007, men's and women's job security grew, but since 2007 they have fallen. Since 2012, men's compensation adequacy has also fallen. The declines in security and men's compensation may reflect weaknesses in the labour market following the Global Financial Crisis. Over our analysis period, we did not observe a consistent trend up or down in men's or women's job autonomy.

Our descriptive and multivariate analyses indicate that all the dimensions of job quality for

men and women rise initially with job tenure and work experience, fall following involuntary job changes, and are lower for migrants from non-English-speaking countries. Most of the measures of job quality increase with workers' education, their health, and advantageous economic conditions and are lower for workers with disabilities. These results are consistent with expectations and reinforce the evidence of the external validity of the scale measures.

However, some unexpected patterns also emerge. Job security is modestly negatively associated with women's education and not strongly associated with men's education. The results for schooling could occur if education increases people's confidence to take economically risky jobs or jobs with more stringent confirmation or retention criteria. After conditioning on local economic conditions and other characteristics, we also find that job security is higher outside Australia's major metropolitan areas.

Our four summative scales will be useful for tracking whether Australia is adding to workers' wellbeing not only through increases in employment but through the creation of high-quality jobs and improvements in job quality. Because the scales describe a continuum of outcomes, they will also provide information on the distribution of job quality. The scales will also support research on the policies, conditions, and circumstances that contribute to good jobs. Our findings of positive effects from job tenure and work experience and negative effects from involuntary job change indicate that policies that enhance employment stability are likely to also increase job quality. With the scales in hand, researchers can examine these and other policies more closely.

References

ABS (2001), *Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA)* (ABS catalogue no. 2033.0.30.001), ABS, Canberra.

ABS (2006a), *ANZSCO – Australian and New Zealand Standard Classification of Occupations, First Edition* (ABS catalogue no. 1220.0), ABS, Canberra.

ABS (2006b), *Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 2.0)* (ABS catalogue no. 1292.0), ABS, Canberra.

Barmby, T., Bryson, A. and Eberth, B. (2012), 'Human Capital, Matching and Job Satisfaction', *Economics Letters*, 117(3), 548-51.

Bluestone, B. and Harrison, B. (1982), *The Deindustrialization of America: Plant Closings,*

Community Abandonment, and the Dismantling of Basic Industry, Basic Books, New York.

Blunch, N., Ribar, D.C. and Western, M. (forthcoming), 'Under Pressure? Assessing the Roles of Skills and Other Personal Resources for Work-Life Strains', *Review of Economics of the Household.*

Brummund, P., Mann, C. and Rodriguez-Castelan, C. (2018), 'Job Quality and Poverty in Latin America', *Review of Development Economics*, 22(4), 1682-1708.

Buddelmeyer, H., McVicar, D. and Wooden, M. (2015), 'Non-Standard "Contingent" Employment and Job Satisfaction: A Panel Data Analysis', *Industrial Relations*, 54(2), 256-75.

Butterworth, P., Leach, L., Strazdins, L., Olesen, S.C., Rodgers, B. and Broom, D.H. (2011), 'The Psychosocial Quality of Work Determines Whether Employment Has Benefits for Mental Health: Results from a National Longitudinal Household Panel Survey', *Occupational and Environmental Medicine*, 68(11), 806-12.

Cassells, R., Duncan, A., Mavisakalyan, A., Phillimore, J., Seymour, R. and Tarverdi, Y. (2018), *Future of Work in Australia: Preparing for Tomorrow's World*, Bankwest Curtin Economics Centre, Focus on the State Series, Issue #6, Curtin University, Perth.

Cazes, S., Hijzen, A. and Saint-Martin, A. (2015), 'Measuring and Assessing Job Quality: The OECD Job Quality Framework', OECD Social, Employment and Migration Working Papers No. 174, OECD Publishing, Paris.

Cherlin, A. (2014), *Labor's Love Lost: The Rise and Fall of the Working-Class Family in America*, Russell Sage Foundation, New York.

Clark, A. (1997), 'Job Satisfaction and Gender: Why Are Women So Happy at Work?', *Labour Economics*, 4(4), 341-72.

Clogg, C. (1979), *Measuring Underemployment: Demographic Indicators for the United States*, Academic Press, New York.

Cloutier-Villenueve, L. (2012), 'Job Quality in Quebec and the United Kingdom: Trends by Sex and Family Status, 1998-2008', *International Labour Review*, 151(1-2), 61-84.

Ferreira, P. and Taylor, M. (2011), 'Measuring Match Quality Using Subjective Data', *Economics Letters*, 113(3), 304-6.

Green, C., Kler, P. and Leeves, G. (2010), 'Flexible Contract Workers in Inferior Jobs: Reappraising the Evidence', *British Journal of Industrial Relations*, 48(3), 605-29.

Grzywacz, J. and Dooley, D. (2003), '"Good Jobs" to "Bad jobs": Replicated Evidence of an Employment Continuum from Two Large Surveys', *Social Science & Medicine*, 56, 1749-60.

Hahn, M. and Haisken-DeNew, J. (2013), 'PanelWhiz and the Australian Longitudinal Data Infrastructure in Economics', *Australian Economic Review*, 46(3), 379-86.

Holman, D. (2013), 'Job Types and Job Quality in Europe', *Human Relations*, 66(4), 475-502.

Kalleberg, A., Reskin, B. and Hudson, K. (2000), 'Bad Jobs in America: Standard and Nonstandard Employment Relations and Job Quality in the United States', *American Sociological Review*, 65(2), 256-278.

Kifle, T., Kler, P. and Shankar, S. (2014), 'Are Women Really That Happy at Work? Australian Evidence on the "Contented Female"', *Applied Economics*, 46(7), 686-97.

Kutscher, T., Crayen, C. and Eid, M. (2017), 'Using a Mixed IRT Model to Assess the Scale Usage in the Measurement of Job Satisfaction', *Frontiers in Psychology*, 7, article 1998.

Leach, L., Butterworth, P., Rodgers, B. and Strazdins, L. (2010), 'Deriving an Evidence-Based Measure of Job Quality from the HILDA Survey', *Australian Social Policy Journal*, 9, 67-86.

Marx, K. (1889), *Capital: A Critical Analysis of Capitalist Production* (Translated from the Third German Edition, by Samuel Moore and Edward Aveling and Edited by Frederick Engels), Appleton & Co., New York.

McGovern, P., Smeaton, D. and Hill, S. (2004), 'Bad Jobs in Britain: Nonstandard Employment and Job Quality', *Work and Occupations*, 31(2), 225-49.

Muñoz De Bustillo, R., Fernández-Macías, E., Antón, J.-I. and Esteve, F. (2011), *Measuring*

More than Money: The Social Economics of Job Quality, Edward Elgar, Cheltenham.

Polyani, K. (2001), *The Great Transformation: The Political and Economic Origins of Our Time*, Beacon Press, Boston.

Sayer, L., England, P., Bittman, M. and Bianchi, S. (2009), 'How Long Is the Second (Plus First) Shift? Gender Differences in Paid, Unpaid, and Total Work Time in Australia and the United States', *Journal of Comparative Family Studies*, 40(4), 523-45.

Summerfield, M., Bevitt, A., Freidin, S., Hahn, M., La, N., Macalalad, N., O'Shea, M., Watson, N., Wilkins, R. and Wooden, M. (2017), *HILDA User Manual – Release 16*, Melbourne Institute of Applied Economic and Social Research, Melbourne:

Weller, S. and Campbell, I. (2015), 'The Contextualised Geographies of Job Quality', in Knox, A. and Warhurst, C. (eds), *Job Quality in Australia: Perspectives, Problems and Proposals*, Federation Press, Sydney; 84-102.

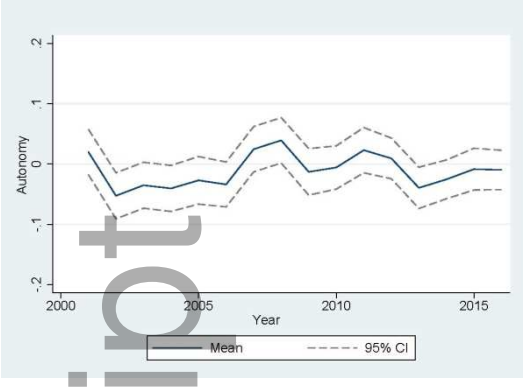
Wilkins, R. and Wooden, M. (2014), 'Two Decades of Change: The Australian Labour Market, 1993-2013', *Australian Economic Review*, 47(4), 417-31.

Wilson, K., Brown, M. and Cregan, C. (2008), 'Job Quality and Flexible Practices: An Investigation of Employee Perceptions', *International Journal of Human Resource Management*, 19(3), 473-86.

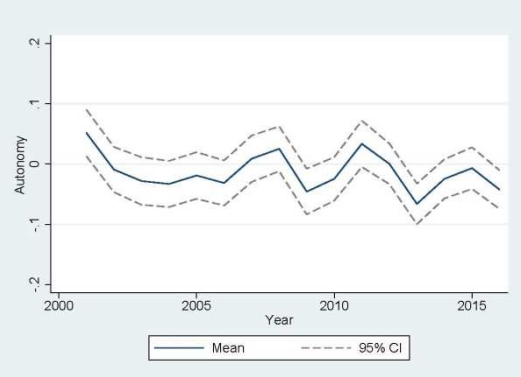
Wright, S. (2015), 'Challenges in Researching Job Quality', in Knox, A. and Warhurst, C. (eds), *Job Quality in Australia: Perspectives, Problems and Proposals*, Federation Press, Sydney; 15-36.

Figure 1. Trends in Job Quality 2001-2016

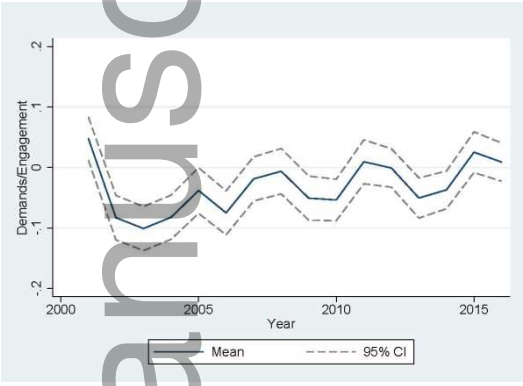
Men's autonomy Women's autonomy



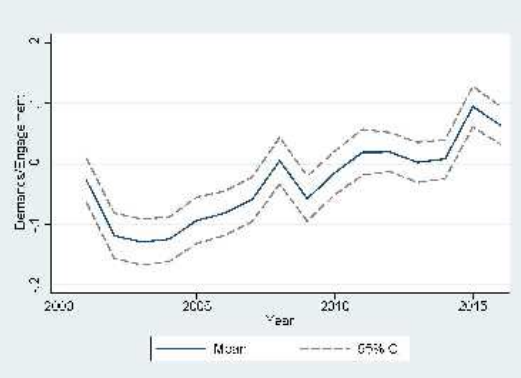
Men's demands and engagement



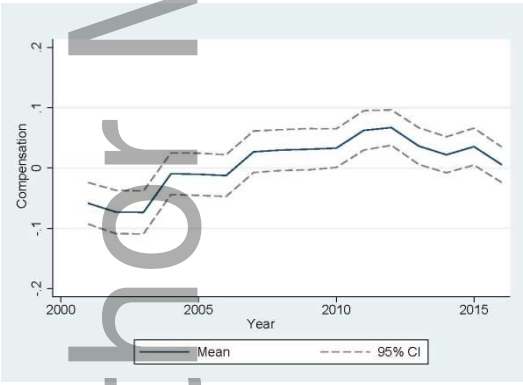
Women's demands and engagement



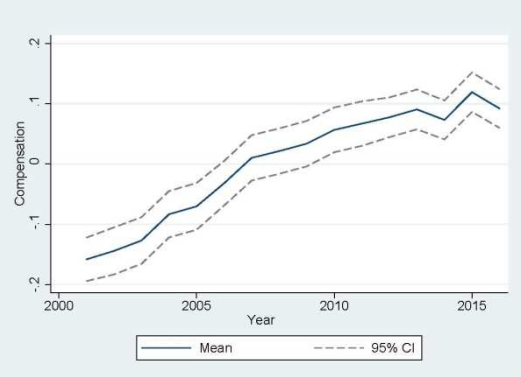
Men' compensation adequacy



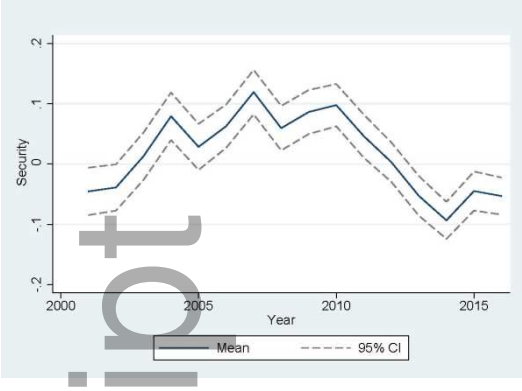
Women's compensation adequacy



Men's security



Women's security



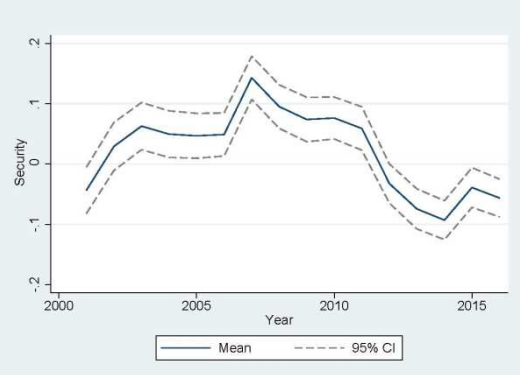


Table 1. Means and Standard Deviations of Job Quality Measures

Variable	Men		Women	
	Mean	(S.D.)	Mean	(S.D.)
Earnings and employment				
Weekly gross wages (1-5)	3.604	(1.293)	2.612	(1.343)
Weekly gross wages ($)	1512.5	(945.6)	978.5	(609.0)
Usual weekly hours in main job (1-5)	3.240	(0.832)	2.500	(0.931)
Usual weekly hours in main job (hours)	42.540	(11.127)	32.450	(12.707)
Prefer to work more (reverse, 0/1)	0.879	(0.326)	0.863	(0.344)
Non-casual contract (0/1)	0.877	(0.329)	0.807	(0.395)
Employer provides paid sick leave (0/1)	0.843	(0.364)	0.779	(0.415)
Employer provides paid holiday leave (0/1)	0.842	(0.365)	0.775	(0.417)
Proportion time working last financial year	0.974	(0.111)	0.962	(0.140)
Tenure with current employer (years)	3.166	(1.418)	3.129	(1.388)
Chance of losing job in 12 months (1-4)	3.083	(1.096)	3.279	(1.066)
Chance of leaving job in 12 months (1-4)	3.069	(1.115)	3.145	(1.135)
Union membership (0/1)	0.293	(0.455)	0.298	(0.457)
Employed through employment agency (0/1)	0.028	(0.165)	0.021	(0.144)
Commute time per week	2.794	(1.215)	2.451	(1.182)
Worked regular week day shifts (0/1)	0.640	(0.480)	0.682	(0.466)
Participation in work-related training (0/1)	0.345	(0.475)	0.385	(0.487)
Job satisfaction, satisfaction with… (0-10)				
Overall job	7.536	(1.673)	7.716	(1.666)
Work-life balance	7.284	(2.287)	7.491	(2.244)
Hours	7.185	(1.985)	7.367	(2.064)
Total pay	7.088	(1.942)	7.078	(2.059)
Job security	7.870	(2.053)	8.014	(2.088)

The work itself	7.560	(1.776)	7.634	(1.833)
Job characteristics (1-7)				
Job more stressful than imagined (reverse)	4.754	(1.610)	4.745	(1.719)
Fear stress in job will make me physically ill (reverse)	5.447	(1.527)	5.506	(1.593)
Have a secure future in job	4.971	(1.608)	5.134	(1.649)
Company will be in business in 5 years	5.829	(1.465)	6.028	(1.406)
Worry about future of job (reverse)	4.871	(1.797)	5.151	(1.808)
Job is complex and difficult	4.279	(1.758)	3.895	(1.868)
Job requires me to learn new skills	4.655	(1.674)	4.580	(1.791)
Use many of my skills and abilities	5.373	(1.429)	5.386	(1.500)
Freedom to decide how I do work	4.716	(1.655)	4.514	(1.748)
Have a lot of say about what happens on job	4.361	(1.681)	4.055	(1.737)
Have freedom to decide when I do work	3.483	(1.828)	3.311	(1.921)
Have choice deciding what I do	3.704	(1.755)	3.438	(1.791)
Working times can be flexible	3.965	(1.924)	3.855	(2.049)
Can decide when to take a break	4.682	(1.976)	4.285	(2.196)
Job provides variety of interesting things to do	4.696	(1.555)	4.701	(1.599)
Job requires me to take initiative	5.455	(1.398)	5.492	(1.426)
Have to work fast in job	4.931	(1.455)	5.104	(1.504)
Have to work very intensely in job	4.814	(1.491)	4.896	(1.589)
Not enough time to do everything	4.173	(1.771)	4.264	(1.897)
Paid fairly for the things I do	4.625	(1.593)	4.617	(1.693)
Job is repetitive	3.453	(1.646)	3.304	(1.688)
Workplace entitlements				
Flexible start/finish times (0/1)	0.560	(0.496)	0.526	(0.499)
Home-based work (0/1)	0.249	(0.433)	0.231	(0.421)
Flexible schedule/can work at home (0-2)	0.793	(0.799)	0.738	(0.790)
Carers leave (0/1)	0.791	(0.406)	0.807	(0.395)
Permanent part-time work (0/1)	0.692	(0.462)	0.859	(0.349)

Notes: Authors estimates from Waves 1-16 of the HILDA Survey. See Appendix A for additional descriptions of the measures.

Measure was excluded from final scale.

Table 2. Job Quality Factor Loadings

a. Men

Variable	Factor1: Autonomy	Factor2: Demands	Factor3: Comp.	Factor4: Security	Uniqueness
Freedom to decide how I do work	0.7517	0.0470	-0.0472	0.1030	0.3705
Have a lot of say about what happens on job	0.6910	0.1116	0.0273	0.1424	0.3652
Have freedom to decide when I do work	0.8913	-0.0966	-0.0328	-0.1225	0.3008
Have choice deciding what I do	0.8064	-0.0136	0.0232	-0.0010	0.3470
Working times can be flexible	0.8178	-0.0666	-0.1414	-0.0767	0.4128
Can decide when to take a break	0.7243	-0.0945	0.0957	-0.0275	0.4807
Flexible schedule/can work at home	0.6496	-0.0509	0.1313	-0.1295	0.5783
Job is complex and difficult	0.0429	0.6186	0.2152	-0.1016	0.4795
Job requires me to learn new skills	0.0551	0.6079	0.0142	0.0308	0.5908
Use many of my skills and abilities	0.1182	0.5231	-0.0329	0.2674	0.5386
Job provides a variety of interesting things to do	0.3783	0.3952	-0.0335	0.2012	0.5094
Job requires me to take initiative	0.3045	0.5153	-0.0015	0.2041	0.4259
Have to work fast in job	-0.1739	0.7504	-0.1406	-0.0407	0.5331
Have to work very intensely in job	-0.1212	0.8371	-0.0300	-0.0965	0.3775
Not enough time to do everything	-0.0555	0.5516	0.1492	-0.2265	0.6400

Weekly gross wages	0.0552	0.0448	0.7243	-0.0475	0.4371
Usual weekly hours in main job	-0.1249	0.0359	0.7021	-0.0058	0.5170
Prefer to work more (reverse)	0.0191	-0.0821	0.6810	0.0385	0.5562
Non-casual contract	-0.0165	-0.0279	0.7444	0.1293	0.4210
Chance of losing job in next 12 months	-0.1083	-0.0661	-0.0003	0.6016	0.6763
Have a secure future in job	-0.0120	0.0008	0.0565	0.8186	0.3177
Company will be in business 5 years from now	-0.0413	0.0666	0.0897	0.5806	0.6278
Worry about future of job (reverse)	-0.0049	-0.1720	-0.0383	0.7142	0.5207

b. Women

Variable	Factor1: Autonomy	Factor2: Demands	Factor3: Comp.	Factor4: Security	Uniqueness
Freedom to decide how I do work	0.7555	0.0976	-0.0206	0.1224	0.3616
Have a lot of say about what happens on job	0.7079	0.1489	0.0352	0.1341	0.3829
Have freedom to decide when I do work	0.8589	-0.0701	-0.0422	-0.0854	0.2878
Have choice deciding what I do	0.7696	0.0495	0.0438	0.0151	0.3792
Working times can be flexible	0.7640	-0.0562	-0.1757	-0.0807	0.4288
Can decide when to take a break	0.7274	-0.0904	0.0743	-0.0655	0.4695
Flexible schedule/can work at home	0.6422	-0.1113	0.1323	-0.1730	0.5616
Job is complex and difficult	-0.0102	0.6173	0.2674	-0.1265	0.4516
Job requires me to learn new	-0.0388	0.6400	0.1102	0.0258	0.5175

skills					
Use many of my skills and abilities	0.0837	0.6211	-0.0498	0.2207	0.5010
Job provides a variety of interesting things to do	0.2843	0.5011	0.0084	0.1843	0.5373
Job requires me to take initiative	0.2583	0.6150	-0.0447	0.1810	0.4451
Have to work fast in job	-0.1310	0.6623	-0.1867	-0.0781	0.6306
Have to work very intensely in job	-0.1024	0.8160	-0.0246	-0.1409	0.3877
Not enough time to do everything	-0.1023	0.5731	0.1718	-0.1920	0.5936
Weekly gross wages	0.0453	0.0837	0.8007	-0.0335	0.2945
Usual weekly hours in main job	-0.0679	0.0180	0.8123	-0.0431	0.3497
Prefer to work more (reverse)	0.0439	-0.0811	0.6781	0.0852	0.5429
Non-casual contract	-0.0278	-0.0091	0.7323	0.1297	0.4269
Chance of losing job in next 12 months	-0.0711	-0.0693	-0.0366	0.6230	0.6395
Have a secure future in job	0.0046	-0.0033	0.0693	0.8119	0.3172
Company will be in business 5 years from now	-0.1252	0.1156	0.0923	0.5534	0.6264
Worry about future of job (reverse)	-0.0055	-0.1402	-0.0667	0.7266	0.5083

Notes: Estimates from oblique promax rotation for four factors, using Waves 6, 11, and 16 of the HILDA Survey.

Primary loading.

Table 3. Multidimensional IRT Results

a. Men

Dimension/component	Severity and discrimination parameters						
	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	δ_{i5}	δ_{i6}	α_i
Autonomy							
Freedom to decide how I do work	-5.248	-3.404	-2.174	-0.823	0.883	3.639	2.640
Have a lot of say about what happens on job	-4.704	-2.858	-1.596	-0.113	1.657	4.270	2.639
Have freedom to decide when I do work	-2.827	-0.950	0.066	1.243	2.648	4.805	2.439
Have choice deciding what I do	-4.121	-1.735	-0.353	1.194	2.941	5.739	3.083
Working times can be flexible	-2.569	-1.266	-0.592	0.241	1.365	3.280	1.725
Can decide when to take a break	-2.989	-1.921	-1.382	-0.664	0.252	2.180	1.736
Flexible schedule/can work at home	-0.277	1.403					1.144
Demands and Engagement							
Job is complex and difficult	-3.274	-2.057	-1.225	-0.153	1.109	3.162	1.586
Job requires me to learn new skills	-3.984	-2.682	-1.799	-0.761	0.648	2.769	1.707
Use many of my skills and abilities	-5.196	-3.964	-3.042	-1.918	-0.524	2.035	1.817
Job provides variety of interesting things to do	-4.257	-2.925	-1.904	-0.635	0.801	3.005	1.678
Job requires me to take initiative	-5.591	-4.439	-3.556	-2.222	-0.691	2.031	2.166
Have to work fast in job	-4.409	-3.070	-2.048	-0.801	0.468	2.145	1.135

Have to work very intensely in job	-4.697	-3.206	-2.080	-0.701	0.725	2.606	1.576
Not enough time to do everything	-2.981	-1.606	-0.732	0.184	1.087	2.307	0.924
Compensation Adequacy							
Weekly gross wages	-4.158	-1.898	-0.305	1.238			2.256
Usual weekly hours in main job	-4.921	-3.155	1.425	3.303			1.820
Prefer to work more (reverse)	-2.565						1.415
Non-casual contract	-2.838						1.755
Security							
Chance of losing job in next 12 months	-2.442	-0.715	-0.084				1.202
Have a secure future in job	-8.179	-6.082	-4.367	-2.073	0.371	4.728	4.520
Company will be in business in 5 years	-4.769	-3.836	-2.998	-1.781	-1.029	0.317	1.372
Worry about future of job (reverse)	-3.918	-2.468	-1.430	-0.589	0.179	1.821	1.543

Latent variable correlations			
	Autonomy	Demands	Compensation
Demands	0.412		
Compensation	0.225	0.421	
Security	0.286	0.299	0.178

b. Women

Dimension/component	Severity and discrimination parameters						
	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	δ_{i5}	δ_{i6}	α_i
Autonomy							
Freedom to decide how I do work	-4.848	-2.929	-1.785	-0.424	1.189	3.725	2.761
Have a lot of say about what happens on job	-4.153	-2.250	-1.010	0.473	2.074	4.420	2.649
Have freedom to decide when I do work	-2.212	-0.583	0.352	1.388	2.653	4.555	2.450
Have choice deciding what I do	-3.283	-1.156	0.154	1.529	3.099	5.586	2.950
Working times can be flexible	-1.917	-0.942	-0.397	0.307	1.217	2.816	1.472
Can decide when to take a break	-2.085	-1.252	-0.837	-0.244	0.460	2.052	1.611
Flexible schedule/can work at home	-0.203	1.484					1.067
Demands and Engagement							
Job is complex and difficult	-2.657	-1.474	-0.696	0.364	1.602	3.395	1.737
Job requires me to learn new skills	-3.824	-2.498	-1.680	-0.638	0.702	2.706	1.977
Use many of my skills and abilities	-4.801	-3.615	-2.797	-1.781	-0.509	1.689	1.761
Job provides variety of interesting things to do	-3.886	-2.639	-1.749	-0.542	0.740	2.727	1.483
Job requires me to take initiative	-5.030	-3.961	-3.162	-2.000	-0.653	1.643	1.785
Have to work fast in job	-4.269	-2.974	-2.085	-0.940	0.192	1.717	1.039
Have to work very intensely in job	-4.721	-3.222	-2.180	-0.878	0.528	2.338	1.837
Not enough time to do everything	-2.935	-1.548	-0.822	0.043	0.920	2.063	1.215
Compensation Adequacy							

Weekly gross wages	-2.497	0.492	2.574	4.758			3.658
Usual weekly hours in main job	-3.031	-0.291	4.062	6.170			2.530
Prefer to work more (reverse)	-2.480						1.479
Non-casual contract	-2.115						1.797
Security							
Chance of losing job in next 12 months	-2.744	-1.262	-0.722				1.367
Have a secure future in job	-7.364	-5.809	-4.466	-2.382	-0.325	3.584	4.150
Company will be in business 5 in years	-4.600	-3.865	-3.171	-2.054	-1.372	-0.110	1.301
Worry about future of job (reverse)	-3.982	-2.780	-1.884	-1.020	-0.306	1.318	1.650

	Latent variable correlations		
	Autonomy	Demands	Compensation
Demands	0.213		
Compensation	0.154	0.460	
Security	0.196	0.267	0.184

Note: Authors' estimates of multidimensional IRT models from Waves 1, 6, 11, and 16 of the HILDA Survey.

Table 4. Correlations of Job Quality and Job Satisfaction Measures

	Satisfaction with

	Overall job	Work/non-work flexibility	Hours	Total pay	Job security	Work itself
			Men			
Autonomy	0.305	0.361	0.186	0.198	0.206	0.277
Demands and Engagement	0.194	0.063	0.027	0.155	0.177	0.258
Compensation Adequacy	0.093	-0.074	-0.047	0.252	0.141	0.104
Security	0.363	0.211	0.196	0.208	0.651	0.275
			Women			
Autonomy	0.275	0.329	0.173	0.161	0.160	0.224
Demands and Engagement	0.089	-0.100	-0.056	0.082	0.127	0.202
Compensation Adequacy	-0.015	-0.188	-0.093	0.122	0.113	0.048
Security	0.321	0.135	0.173	0.197	0.655	0.240

Notes: Authors' estimates from Waves 1-16 of the HILDA Survey. All the correlations are statistically distinguishable from zero at the 0.01 level.

Table 5. Average Job Quality for Workers with Different Characteristics

	Men					Women				
	%	Autonomy	Demands	Compensation	Security	%	Autonomy	Demands	Compensation	Security
All		-0.011	-0.029	0.010	0.010		-0.014	-0.023	0.011	0.014
No job change	83.4	0.025	0.000	0.096	0.056	82.8	-0.006	0.017	0.091	0.065
Vol. job change	8.6	-0.063	-0.047	-0.088	-0.062	7.9	-0.022	-0.045	-0.008	-0.079
Invol. job change	8.1	-0.257	-0.338	-0.547	-0.357	9.4	-0.105	-0.339	-0.559	-0.283
<6 years job tenure	62.1	-0.078	-0.105	-0.161	-0.086	67.5	-0.035	-0.118	-0.143	-0.085
6-10 years tenure	22.2	0.070	0.011	0.125	0.084	22.1	0.046	0.034	0.108	0.086
11+ years tenure	15.7	0.036	0.133	0.305	0.222	10.4	-0.068	0.265	0.452	0.307
<6 years work exp.	6.0	-0.348	-0.290	-0.753	-0.021	5.8	-0.227	-0.257	-0.338	-0.103
6-10 years exp.	11.1	-0.091	-0.041	-0.203	0.076	10.9	-0.040	0.070	0.146	0.088
11-20 years exp.	24.3	0.034	0.058	0.108	0.048	21.8	0.046	0.016	0.055	0.038
21-30 years exp.	26.0	0.025	0.018	0.164	-0.036	26.6	0.011	-0.028	-0.010	-0.022
31+ years exp.	32.6	0.017	-0.079	0.026	0.003	34.8	-0.028	-0.035	0.015	0.023
Postgrad	5.4	0.430	0.473	0.534	0.037	5.2	0.387	0.495	0.766	-0.038
Grad diploma/cert.	5.6	0.254	0.375	0.412	0.185	8.8	0.002	0.484	0.481	0.187

	Men					Women				
	%	Autonomy	Demands	Compensation	Security	%	Autonomy	Demands	Compensation	Security
Bachelor or honours	15.2	0.223	0.254	0.293	0.043	19.9	0.098	0.287	0.361	0.113
Adv. Diploma	8.9	0.082	0.114	0.141	0.034	10.6	-0.034	0.030	0.065	-0.037
Certificate III or IV	29.9	-0.088	-0.069	0.011	-0.003	16.2	-0.107	-0.150	-0.217	-0.030
Year 12	14.4	-0.072	-0.208	-0.238	0.006	15.5	-0.044	-0.222	-0.152	-0.026
Less than Year 12	20.6	-0.253	-0.353	-0.328	-0.056	23.8	-0.110	-0.390	-0.382	-0.042
Aboriginal/Torres Strait Islander	1.7	-0.090	-0.263	-0.340	0.012	1.7	-0.036	-0.035	-0.209	0.006
Non-English-speaking migrant	9.9	-0.007	-0.141	-0.076	-0.107	10.9	-0.009	-0.149	0.049	-0.171
No disability	84.1	0.009	-0.006	0.052	0.039	84.1	0.001	-0.021	0.038	0.034
Does not limit work	8.5	-0.089	-0.072	-0.032	-0.061	7.1	-0.057	0.026	0.031	-0.009
Dis. limits work	7.5	-0.151	-0.237	-0.426	-0.233	8.8	-0.126	-0.079	-0.256	-0.162
Health: 0-50	5.2	-0.100	-0.233	-0.283	-0.155	5.6	-0.049	-0.124	-0.151	-0.170
Health: 51-75	6.8	-0.154	-0.213	-0.216	-0.205	10.3	-0.114	-0.101	-0.093	-0.112
Health: 76-100	88.0	0.006	-0.002	0.045	0.037	84.1	0.000	-0.006	0.036	0.042
Major urban area	63.3	0.038	0.002	0.061	-0.004	64.7	0.020	0.001	0.108	-0.012
Other urban area	22.8	-0.130	-0.104	-0.085	0.030	21.3	-0.099	-0.088	-0.168	0.053

	Men					Women				
	%	Autonomy	Demands	Compensation	Security	%	Autonomy	Demands	Compensation	Security
Bounded locality	2.5	-0.186	-0.092	-0.116	0.051	2.3	-0.067	-0.157	-0.314	0.058
Rural balance	11.5	-0.010	-0.036	-0.059	0.039	11.7	-0.039	-0.011	-0.136	0.079
SEIFA deciles 1-3	27.8	-0.197	-0.200	-0.239	-0.013	25.7	-0.138	-0.156	-0.234	-0.039
SEIFA deciles 4-7	40.6	-0.036	-0.073	-0.015	-0.003	40.4	-0.046	-0.057	-0.033	0.024
SEIFA deciles 8-10	31.7	0.184	0.176	0.258	0.047	33.8	0.118	0.118	0.250	0.043
Unemployment <5%	34.3	0.034	0.006	0.085	0.064	34.5	0.027	-0.027	0.092	0.052
Unemp. 5-6.9%	59.3	-0.028	-0.047	-0.018	-0.008	59.2	-0.035	-0.018	-0.017	0.000
Unemp. 7% or more	6.3	-0.092	-0.052	-0.139	-0.106	6.3	-0.042	-0.045	-0.165	-0.067
Professionals	21.3	0.239	0.368	0.322	0.084	29.8	0.060	0.493	0.460	0.184
Administration	8.7	-0.085	-0.245	-0.111	-0.026	26.1	0.086	-0.225	-0.037	-0.019
Tech/trade occ.	20.4	-0.061	0.005	0.001	-0.016	3.9	0.029	-0.094	-0.247	-0.052
Other occupation	49.6	-0.085	-0.175	-0.099	-0.004	40.2	-0.138	-0.268	-0.266	-0.085
Health care	4.9	-0.034	0.068	-0.184	0.125	23.9	-0.113	0.146	-0.023	0.149
Education	6.4	0.055	0.446	0.139	0.358	17.7	-0.084	0.365	0.264	0.189
Manufacturing	15.3	-0.140	-0.175	0.002	-0.160	5.0	-0.002	-0.307	-0.001	-0.231
Other industry	73.4	0.009	-0.047	0.009	0.010	53.4	0.049	-0.200	-0.059	-0.080

Note: Authors' estimates from Waves 1-16 of the HILDA Survey.

Table 6. Random-Effects Regression Results

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
Voluntary job change	-0.021	0.029**	-0.024**	-0.001	0.015	0.083***	0.077***	0.005
	(0.014)	(0.013)	(0.011)	(0.016)	(0.015)	(0.014)	(0.012)	(0.016)
Involuntary job change	-0.087***	-0.097***	-0.228***	-0.164***	-0.037**	-0.093***	-0.205***	-0.124***
	(0.015)	(0.014)	(0.011)	(0.016)	(0.015)	(0.013)	(0.012)	(0.015)
Tenure with current employer	0.009***	0.007***	0.019***	0.014***	0.007***	0.015***	0.035***	0.017***
(years)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tenure squared (/100)	-0.026***	0.001	-0.012**	-0.023***	-0.032***	-0.020***	-0.043***	-0.025***
	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.008)
Workforce experience	0.020***	0.013***	0.053***	-0.015***	0.018***	0.002	-0.001	-0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Workforce experience squared	-0.031***	-0.035***	-0.105***	0.023***	-0.028***	-0.011***	-0.009***	0.014***
(/100)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Masters or doctorate	0.364***	0.413***	0.481***	-0.021	0.251***	0.403***	0.670***	-0.117***
	(0.042)	(0.040)	(0.034)	(0.042)	(0.040)	(0.036)	(0.034)	(0.039)
Grad diploma, grad certificate	0.164***	0.318***	0.405***	0.028	-0.005	0.386***	0.475***	0.012
	(0.041)	(0.039)	(0.033)	(0.040)	(0.035)	(0.031)	(0.030)	(0.034)
Bachelor or honours	0.182***	0.266***	0.359***	-0.021	0.110***	0.305***	0.440***	0.004

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
	(0.031)	(0.030)	(0.025)	(0.031)	(0.028)	(0.025)	(0.024)	(0.027)
Advanced diploma, diploma	0.146***	0.213***	0.212***	0.011	0.014	0.183***	0.269***	-0.054*
	(0.033)	(0.031)	(0.027)	(0.033)	(0.031)	(0.027)	(0.026)	(0.030)
Certificate III or IV	0.074***	0.120***	0.168***	0.005	0.027	0.139***	0.162***	-0.021
	(0.023)	(0.022)	(0.018)	(0.023)	(0.024)	(0.021)	(0.020)	(0.023)
Year 12	0.091***	0.015	0.078***	-0.049*	0.034	0.045*	0.081***	-0.048*
	(0.028)	(0.027)	(0.023)	(0.028)	(0.027)	(0.024)	(0.023)	(0.026)
Aboriginal or Torres Strait	0.019	-0.119**	-0.150***	-0.033	0.044	0.051	-0.087*	0.049
Islander origin	(0.060)	(0.058)	(0.050)	(0.058)	(0.060)	(0.054)	(0.052)	(0.058)
Migrant from non-English-	-0.093***	-0.200***	-0.204***	-0.107***	-0.058**	-0.167***	-0.084***	-0.163***
speaking country	(0.030)	(0.028)	(0.025)	(0.028)	(0.028)	(0.025)	(0.024)	(0.026)
Disability but no work limitation	-0.025*	-0.015	-0.022**	-0.041***	-0.018	0.031**	0.008	-0.020
	(0.014)	(0.013)	(0.010)	(0.015)	(0.015)	(0.014)	(0.012)	(0.016)
Disability limits work	-0.020	-0.061***	-0.134***	-0.115***	-0.066***	-0.009	-0.096***	-0.095***
	(0.017)	(0.016)	(0.012)	(0.018)	(0.017)	(0.015)	(0.013)	(0.017)
Physical health (/100)	0.016	0.060**	0.086***	0.155***	0.008	0.038	-0.012	0.144***
	(0.027)	(0.025)	(0.020)	(0.029)	(0.029)	(0.026)	(0.023)	(0.030)

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
Other urban area	-0.017	0.048***	-0.008	0.059***	0.004	0.007	-0.081***	0.050***
	(0.017)	(0.016)	(0.013)	(0.018)	(0.018)	(0.016)	(0.015)	(0.018)
Bounded locality	0.039	0.099***	0.027	0.028	-0.054	-0.045	-0.125***	0.074*
	(0.036)	(0.034)	(0.028)	(0.038)	(0.039)	(0.035)	(0.032)	(0.040)
Rural balance area	0.034*	0.031*	-0.034**	0.057***	-0.015	0.003	-0.105***	0.055***
	(0.019)	(0.018)	(0.014)	(0.020)	(0.020)	(0.018)	(0.016)	(0.020)
SEIFA decile	0.009***	0.008***	0.016***	0.002	0.010***	-0.001	0.012***	0.003
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Regional unemployment	-0.013**	-0.009*	-0.014***	-0.041***	-0.013**	0.001	-0.007	-0.007
	(0.006)	(0.005)	(0.004)	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)
Manager	0.136***	0.058***	0.110***	0.039**	0.135***	-0.017	0.198***	-0.020
	(0.016)	(0.015)	(0.012)	(0.017)	(0.019)	(0.017)	(0.015)	(0.020)
Technician or trades worker	-0.150***	-0.122***	-0.078***	-0.045**	-0.057*	-0.153***	-0.195***	-0.049
	(0.019)	(0.018)	(0.014)	(0.020)	(0.029)	(0.026)	(0.023)	(0.030)
Community or personal service	-0.301***	-0.123***	-0.253***	-0.021	-0.206***	-0.319***	-0.325***	-0.150***
worker	(0.027)	(0.025)	(0.020)	(0.028)	(0.020)	(0.018)	(0.016)	(0.020)
Clerical or administrative	-0.126***	-0.190***	-0.125***	-0.031	-0.057***	-0.334***	-0.161***	-0.060***
worker	(0.020)	(0.019)	(0.015)	(0.021)	(0.017)	(0.015)	(0.014)	(0.018)

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
Sales worker	-0.111***	-0.236***	-0.178***	-0.041	-0.166***	-0.414***	-0.327***	-0.112***
	(0.025)	(0.024)	(0.019)	(0.027)	(0.024)	(0.022)	(0.019)	(0.025)
Machinery Operator or driver	-0.352***	-0.424***	-0.205***	-0.097***	-0.450***	-0.542***	-0.270***	-0.143***
	(0.022)	(0.020)	(0.016)	(0.023)	(0.046)	(0.041)	(0.037)	(0.047)
Labourer	-0.343***	-0.403***	-0.328***	-0.122***	-0.358***	-0.617***	-0.471***	-0.200***
	(0.021)	(0.020)	(0.016)	(0.023)	(0.026)	(0.024)	(0.021)	(0.027)
Agriculture, forestry or fishing	0.176***	-0.067*	0.081**	-0.202***	0.136**	-0.326***	-0.094**	-0.180***
	(0.043)	(0.040)	(0.032)	(0.045)	(0.057)	(0.052)	(0.047)	(0.059)
Mining	-0.096**	-0.031	0.568***	-0.234***	0.080	-0.197***	0.421***	-0.413***
	(0.039)	(0.037)	(0.030)	(0.041)	(0.062)	(0.056)	(0.050)	(0.065)
Manufacturing	-0.082***	-0.092***	0.171***	-0.217***	0.169***	-0.185***	0.096***	-0.259***
	(0.030)	(0.028)	(0.023)	(0.032)	(0.028)	(0.026)	(0.023)	(0.029)
Utility	0.036	-0.007	0.258***	-0.144***	0.018	-0.253***	0.253***	-0.343***
	(0.044)	(0.042)	(0.034)	(0.047)	(0.065)	(0.059)	(0.052)	(0.068)
Construction	0.040	0.046	0.262***	-0.156***	0.219***	-0.205***	0.104***	-0.237***
	(0.031)	(0.030)	(0.024)	(0.033)	(0.042)	(0.038)	(0.034)	(0.043)
Wholesale Trade	0.029	-0.113***	0.102***	-0.110***	0.175***	-0.253***	0.064**	-0.226***

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
	(0.033)	(0.032)	(0.025)	(0.035)	(0.033)	(0.030)	(0.027)	(0.034)
Retail Trade	-0.075**	-0.199***	-0.087***	-0.104***	0.023	-0.345***	-0.225***	-0.168***
	(0.034)	(0.032)	(0.026)	(0.036)	(0.026)	(0.023)	(0.021)	(0.026)
Accommodation or food service	0.044	-0.199***	-0.263***	-0.164***	0.060**	-0.354***	-0.329***	-0.250***
	(0.039)	(0.037)	(0.029)	(0.041)	(0.027)	(0.024)	(0.022)	(0.028)
Transport, postal or warehousing	-0.050	-0.136***	0.168***	-0.084**	0.062*	-0.267***	0.143***	-0.219***
	(0.033)	(0.031)	(0.025)	(0.035)	(0.036)	(0.033)	(0.030)	(0.038)
Information media or	0.044	-0.021	0.131***	-0.331***	0.107***	-0.191***	0.104***	-0.235***
telecommunications	(0.042)	(0.039)	(0.032)	(0.044)	(0.038)	(0.034)	(0.031)	(0.039)
Financial or insurance services	0.090**	0.046	0.173***	-0.146***	0.048	-0.108***	0.176***	-0.158***
	(0.042)	(0.040)	(0.032)	(0.043)	(0.032)	(0.029)	(0.026)	(0.032)
Rental, hiring or real estate	0.171***	-0.019	0.137***	-0.027	0.353***	-0.102***	0.069*	-0.113**
services	(0.053)	(0.050)	(0.040)	(0.057)	(0.043)	(0.039)	(0.035)	(0.045)
Professional, scientific or	0.064**	0.011	0.135***	-0.158***	0.162***	-0.106***	0.053***	-0.198***
technical services	(0.032)	(0.030)	(0.024)	(0.034)	(0.025)	(0.023)	(0.020)	(0.026)
Administrative or support	-0.030	-0.084**	-0.024	-0.175***	0.118***	-0.216***	-0.060***	-0.219***
services	(0.039)	(0.036)	(0.029)	(0.041)	(0.029)	(0.026)	(0.023)	(0.030)

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
Public administration and safety	-0.028	0.021	0.168***	0.046	0.092***	-0.045**	0.162***	-0.085***
	(0.031)	(0.029)	(0.024)	(0.032)	(0.024)	(0.022)	(0.020)	(0.025)
Education or training	-0.086**	0.051	-0.093***	0.072*	-0.055***	-0.056***	-0.078***	-0.101***
	(0.037)	(0.035)	(0.028)	(0.038)	(0.021)	(0.019)	(0.018)	(0.021)
Arts or recreation services	0.115***	-0.053	-0.117***	-0.115**	0.131***	-0.132***	-0.197***	-0.213***
	(0.045)	(0.042)	(0.034)	(0.047)	(0.043)	(0.039)	(0.035)	(0.045)
Other Services	0.061*	-0.016	0.058**	-0.065*	0.287***	-0.181***	-0.128***	-0.103***
	(0.036)	(0.034)	(0.027)	(0.038)	(0.033)	(0.030)	(0.027)	(0.034)
2003 Wave	-0.007	-0.028	-0.012	0.042*	-0.034*	-0.025	0.012	0.038*
	(0.019)	(0.018)	(0.014)	(0.021)	(0.021)	(0.019)	(0.016)	(0.022)
2004 Wave	-0.026	-0.036*	0.008	0.069***	-0.027	-0.000	0.046***	0.024
	(0.020)	(0.019)	(0.015)	(0.022)	(0.021)	(0.019)	(0.017)	(0.023)
2005 Wave	-0.001	0.013	0.023	0.013	-0.025	0.025	0.070***	0.017
	(0.021)	(0.020)	(0.015)	(0.023)	(0.022)	(0.020)	(0.017)	(0.023)
2006 Wave	-0.034	-0.044**	0.009	0.009	-0.051**	0.028	0.094***	0.031
	(0.022)	(0.020)	(0.016)	(0.024)	(0.023)	(0.021)	(0.018)	(0.024)
2007 Wave	-0.000	-0.009	0.037**	0.059**	-0.016	0.051**	0.125***	0.103***
	(0.022)	(0.021)	(0.016)	(0.024)	(0.023)	(0.021)	(0.018)	(0.025)

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
2008 Wave	0.045**	0.022	0.044***	0.004	-0.004	0.094***	0.105***	0.050**
	(0.022)	(0.021)	(0.017)	(0.024)	(0.023)	(0.021)	(0.018)	(0.025)
2009 Wave	-0.020	-0.033*	0.053***	0.068***	-0.039*	0.022	0.139***	0.050**
	(0.020)	(0.019)	(0.015)	(0.022)	(0.021)	(0.019)	(0.017)	(0.022)
2010 Wave	-0.009	-0.033*	0.050***	0.057**	-0.036*	0.056***	0.133***	0.038*
	(0.020)	(0.019)	(0.015)	(0.022)	(0.022)	(0.019)	(0.017)	(0.023)
2011 Wave	0.033	0.037*	0.066***	0.015	0.015	0.086***	0.140***	0.012
	(0.021)	(0.019)	(0.015)	(0.022)	(0.022)	(0.020)	(0.017)	(0.023)
2012 Wave	0.007	0.014	0.067***	-0.034	-0.016	0.074***	0.148***	-0.082***
	(0.020)	(0.019)	(0.015)	(0.021)	(0.021)	(0.019)	(0.017)	(0.022)
2013 Wave	-0.032	-0.024	0.061***	-0.066***	-0.078***	0.039**	0.146***	-0.120***
	(0.020)	(0.019)	(0.015)	(0.021)	(0.021)	(0.019)	(0.017)	(0.022)
2014 Wave	-0.022	-0.009	0.062***	-0.080***	-0.041*	0.039**	0.128***	-0.138***
	(0.020)	(0.019)	(0.015)	(0.021)	(0.021)	(0.019)	(0.017)	(0.022)
2015 Wave	-0.002	0.053***	0.078***	-0.062***	-0.022	0.122***	0.173***	-0.071***
	(0.020)	(0.019)	(0.015)	(0.022)	(0.021)	(0.019)	(0.017)	(0.022)
2016 Wave	-0.016	0.022	0.042***	-0.079***	-0.076***	0.089***	0.143***	-0.114***

	Men				Women			
Variable	Autonomy	Demands	Compensation	Security	Autonomy	Demands	Compensation	Security
	(0.020)	(0.019)	(0.015)	(0.022)	(0.021)	(0.019)	(0.017)	(0.022)
Person-year observations	34,710	34,710	34,710	34,710	34,249	34,249	34,249	34,249
Person observations	6,743	6,743	6,743	6,743	6,944	6,944	6,944	6,944
Rho	0.533	0.539	0.610	0.438	0.516	0.510	0.575	0.434
Tenure turning point	16.9	-	84.0	30.0	11.6	37.0	40.4	34.3
Work experience turning point	32.5	18.7	25.1	32.8	31.3	7.6	-	33.1

Notes: Authors' estimates from random-effects regressions of the listed outcomes from Waves 2-16 of the HILDA Survey. Omitted categories are Job Change (No job change), Education (below Year 12), Disability (No disability), Region (Major Urban), Occupation (Professionals), and Industry (Health care). The models also include controls for state/territory. Standard errors are listed in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Appendix A. Job Quality Content in HILDA Survey

Question/Variable	Waves	Disposition/description
PERSON QUESTIONNAIRE		
Earnings and employment		
Current weekly gross wages & salary from main job (DV)	All	Deflated to 2016/17 values using CPI; categorized by quintile
Hours per week usually worked in main job (DV)	All	Categorized 1-19, 20-34, 35-45, 46-55, 56+
Hours you prefer to work	All	Recoded as 0/1 indicator for prefer to work more
Employment contract	All	Recoded as 0/1 indicator for non-casual employment
Does employer provide paid sick leave	All	Excluded – little independent variation from contract indicator
Does employer provide paid holiday leave	All	Excluded – little independent variation from contract indicator
Proportion of time working last financial year	All	Excluded – low incidence of non-work
Tenure with current employer (DV)	All	Excluded – high uniqueness in exploratory factor analyses
Percent chance of losing job in next 12 months	All	Categorized 50-100, 6-49, 1-5, 0
Percent chance of voluntarily leaving job in next 12 months	All	Excluded – high uniqueness in exploratory factor analyses
Union membership or employee association	All	Excluded – high uniqueness in exploratory factor analyses
Employed through labour-hire or temporary employment firm	All	Excluded – low incidence
Time per week travelling to/from paid employment (DV)		Excluded – high uniqueness in exploratory factor analyses
Worked regular week day shifts	All	Excluded – high uniqueness in exploratory factor analyses
Took part in work-related training in past 12 months	3-16	Excluded – high uniqueness in exploratory factor analyses
Job satisfaction, satisfaction with…		

Overall job	All	
The flexibility to balance work and non-work commitments	All	
The hours you work	All	Excluded – based on analysis by Kutscher et al. (2017)
Total pay satisfaction	All	Categorical from 0 (totally dissatisfied) to 10 (totally satisfied)
Job security satisfaction	All	
The work itself	All	

SELF-COMPLETE QUESTIONNAIRE

Job characteristics

My job is more stressful than I had ever imagined (reverse)	All	Excluded – inconsistent loadings
I fear that the amount of stress in my job will make me physically ill (reverse)	All	Excluded – inconsistent loadings
I have a secure future in my job	All	
The company I work for will still be in business 5 years from now	All	
I worry about the future of my job (reverse)	All	
My job is complex and difficult	All	
My job often requires me to learn new skills	All	Categorical from 1 (strongly disagree) to 7 (strongly agree)
I use many of my skills and abilities in my current job	All	
I have a lot of freedom to decide how I do my own work	All	
I have a lot of say about what happens on my job	All	
I have a lot of freedom to decide when I do my work	All	

I have a lot of choice in deciding what I do at work	5-16	
My working times can be flexible	5-16	
I can decide when to take a break	5-16	
My job provides me with a variety of interesting things to do	5-16	
My job requires me to take initiative	5-16	
I have to work fast in my job	5-16	
I have to work very intensely in my job	5-16	
I don't have enough time to do everything in my job	5-16	
I get paid fairly for the things I do in my job	All	Excluded – high uniqueness in exploratory factor analyses
My job requires me to do the same things over and over again	5-16	Excluded – high uniqueness in exploratory factor analyses
Workplace entitlements		
Flexible start/finish times	2-16	Combined into 0-2 count of work flexibility entitlements
Home-based work	2-16	
Special leave for caring for family members	2-16	Excluded – became a universal benefit in 2006
Permanent part-time work	2-16	Excluded – high uniqueness in exploratory factor analyses

Note: Measure was excluded from final scale.