The Evolving Wage Structure of Young Adults in Australia: 2001 to 2019

Forthcoming Economic Record

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Abstract

Using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey together with OLS and quantile regressions, this paper examines the changing returns to education and the evolving wage structure of young adults (aged 25-34 years) between 2001 and 2019. Estimates show that real wage growth was strong for both males and females over the 2000s, underpinned by wage structure effects. Between 2010/11 and 2018/19 wage growth was flat (zero) for males and subdued for females. Institutional factors are thought to underpin the growth in wages of low-paid females over recent years, while education investments underpin recent wage growth amongst high-paid females. Since 2001/2 the wage premium on a degree qualification has declined for males and females. There has been no change in the adjusted gender wage gap across successive cohorts of 25-34 year olds.

Words: return to education, institutions, gender wage gap, Oaxaca-Blinder decomposition, quantile analysis, young adults

JEL Codes: J24, J31, J38, J71, J82

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Disclaimer

This paper uses data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. We acknowledge that 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 submission, however, are those of the authors and should not be attributed to either the DSS or the Melbourne Institute.

I Introduction

Slow wage growth is increasingly a defining feature of labour markets in developed economies, and has been since the 2008/9 global financial crisis (GFC). The trends reflect, amongst other things, a weakening labour market, declining labour productivity and a decline in the bargaining power of workers (ILO, 2018). Slow wage growth is also a feature of the Australian labour market, particularly since the end of the mining investment boom in 2012 (Treasury, 2017; ILO, 2018; Kalb & Meeks, 2019; Andrews *et al.*, 2019). It is a particular feature of the youth and young adult labour markets. For example, in the 10 years to 2018, workers aged 15-34 years experienced either negative or zero average annual wage growth while those aged 35-64 years experienced a growth in average wages of around 1.4 per cent per annum (Productivity Commission (PC), 2020). The relatively slower wages growth amongst younger workers has been attributed to demand and supply conditions, and the fact that younger workers are increasingly in competition with older workers (Borland & Coelli, 2016; Dhillon & Cassidy, 2018).

Subdued wage growth is a concern for policymakers. At a macro level it has obvious implications for aggregate demand and economic growth (RBA, 2018). It also matters for hardship, financial well-being and equity (Kalb & Meekes, 2019; ILO 2009; Rubery 1997). Slow, negative or zero wages growth for young people has particular policy implications, including policy related to university tuition fees and subsidies, student debt, retirement incomes, minimum wages and equity. Understanding the factors that underlie wage growth and changes in the patterns of wage relativities within and across groups is, therefore, an important research objective. It is particularly important for policy makers interested in minimising wage disparities. For example rising wage disparities may arise from changes in the composition of different labour market groups and/or from institutional factors such as differing methods of pay setting.

Using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey this paper considers changes in the wages of males and females between 2001 and 2019. The focus is on persons aged 25-34 years and a between cohort approach is adopted. Persons younger than 25 are excluded on the grounds that wages are generally more volatile during these years (Walker & Zhu, 2008). Those older than 34 years of age are also excluded as it is the particular experiences of young people that is the focus of this paper. Evidence suggests that young people are: increasingly underemployed and working in part-time and casual jobs; increasingly covered by individual rather than collective agreements (and thus have less

bargaining power); and are increasingly accepting jobs lower down the career ladder (PC, 2020; ABS, 2019; Borland & Coelli, 2020).

The paper has several aims. The first is to contribute to the growing literature examining the wage outcomes of young people in Australia. The second is to shed light on the source of wage growth for young people over the last two decades (i.e. since 2001/2) and, in particular, the returns to education. The third is to generate estimates that include persons employed part-time and to disaggregate by gender. Many earlier Australian studies relevant to this paper are based on Census data where the analysis is typically restricted to persons employed full-time (eg. Borland & Colli, 2016; Wei, 2010). The fourth is to offer an analysis at the mean and across the wage distribution. There is increasing interest in the wage outcomes beyond the mean, partly in recognition that the wage determination process for sub-groups may differ across the wage distribution (Miller, 2005; Barrett, 2012). The fifth is to consider whether or not changes in the composition and/or wage structure between cohorts has impacted on the gender wage gap.

The empirical analysis is cross-sectional with comparisons made between 2001/2, 2010/11 and 2018/19. Estimates at the mean show significant growth in the real wages of young males and females (around 15 and 14 per cent, respectively) between 2001/2 and 2010/11. Between 2010/11 and 2018/19 real (mean) wage growth was flat (zero) for males and subdued (around 5 per cent) for females. The developments at the mean are similar across the distribution, although a disaggregated analysis for females for the period 2010/11 to 2018/19 does point to favourable wage growth arising from educational investments for high-paid workers and from institutional factors (eg. minimum wage awards) for low-paid workers. Overall, the pay-off or wage return associated with a degree has significantly declined for males and females (at the mean and for high-paid workers) since 2001/2. A gender wage gap remains a characteristic of the young adult labour market, notwithstanding significant education investments by younger cohorts of females in recent years.

The remainder of the paper is organised as follows. Section II provides some contextual information and reviews previous Australian studies relevant to this paper. Section III describes the data, sample and variables used in the regression analysis and presents the descriptive statistics. Section IV presents the research method and Section V reports the empirical results. A summary and conclusion is provided in Section VI.

II Background

Historically wage setting in Australia was highly regulated with a clear role for wages policy in aligning wages growth, productivity growth, inflation and social needs (Preston, 2001). This was particularly the case during the 1970s and 1980s. Since the 1990s there have been numerous legislative reforms aimed at deregulating the Australian labour market and decentralising wage bargaining. A key piece of legislation in this regard was the 'Work Choices' amendments to the *Workplace Relations Act 1996* which came into effect in March 2006. 'Work Choices' profoundly changed the way in which wages and conditions were determined with the new framework permitting much more flexibility in wage outcomes (Pocock *et al.*, 2008; Peetz & Preston, 2009). Importantly Work Choices prioritised individual bargaining over collective bargaining, thus circumscribing the role of unions. By 2018 the majority of Australian employees had their pay set via an individual arrangement with younger workers disproportionately covered by such an arrangement (ABS, 2019, Table 1).

Following the adoption of Work Choices there was particular interest in understanding the effects of individual wage bargaining on wages. Studies found that in high-wage sectors many large employers offered a non-union premium (efficiency wage) to avoid union bargaining (Peetz & Preston, 2009). In sectors with low bargaining power such as retail, hospitality and childcare, individual wage agreements were associated with cost-cutting measures and low wage growth (Peetz & Preston, 2009; Pocock *et al.*, 2008).

Changes in methods of pay determination within Australia coincided with significant changes in the Australian labour market and a rapid expansion of the higher education sector. Between 2001 and 2016, for example, bachelor degree completions increased by 43 per cent with nearly a third of this increase occurring between 2006 and 2016 (Corliss *et al.*, 2020; Daly & Lewis, 2020). Parallel labour market developments included: a significant increase in employment participation by women of all ages (Birch & Preston, 2020); a change in the composition of skills (Coelli & Borland, 2016); a change in the distribution of working time; and, a growth in part-time, casual and non-standard forms of employment (Wilkins & Wooden, 2014; Laß & Wooden, 2020). By 2012, and the end of the mining boom, earnings inequality in Australia was significantly higher than that of previous decades (Wilkins & Wooden, 2014). Much of this inequality occurred in the few years prior to the GFC (2003/4 to 2007/8) (Wilkins, 2014).

Nationally and internationally there has been a resurgence of interest in the sources of wage growth, the rise in wage inequality and the expansion in wage differentials between

younger and older workers and workers with similar levels of education and experience. The rapid expansion in the higher education sector and the supply of graduates has generated particular interest in the returns to education. Recent Australian studies of this genre include: Barrett (2012), Birch *et al.* (2009), Borland & Coelli (2016), Coeilli (2015), Coelli & Borland (2016), Coelli & Wilkins (2009), Carroll *et al.* (2019), Corliss *et al.* (2013, 2020), Daly & Lewis (2010), Kalb & Meekes (2019), Koshy *et al.* (2016), Leigh & Ryan (2008), Lee (2014), Sinning (2017), and Wei (2010). Some have had a particular interest in understanding how the quality or rank of the tertiary institution attended affects education premiums (eg. Birch *et al.,* 2009; Lee, 2014; Koshy *et al.,* 2016; Carroll *et al.,* 2019). Others have examined how the rate of return to education varies across the business cycle (Corliss *et al.,* 2013).

Studies vary as to the methodology employed. The most common approach to estimating the returns to education is to estimate a human capital earnings function (Mincer, 1974). An alternative is to calculate the net present value of the investment based on an assessment of lifetime earnings. The differing approaches generate differing estimates as to the size of the education wage premium and each has its pros and cons. (For further discussion of these methodological approaches see Sinning (2017) and Lee (2014)). A particular advantage of the earnings function approach is the ability to control for education and a set of other characteristics likely to affect wages (eg. industry and sector of employment). A limitation, and one that is common to cross-sectional studies, is the problem of bias associated with unobservable information. The absence of information on ability, for example, may upwardly bias the estimated returns to education.

Evidence on trends in the return to education as reported in recent Australian studies (i.e. studies employing data from the 2000s) are mixed. Estimates in Borland & Coelli (2016), based on Census data, suggest that the return to education for males and females employed full-time declined between 2001 and 2011. Wei (2010) similarly observed a decline in the education premiums for these groups (males and females employed full-time) between 2001 and 2006. Corliss *et al.* (2013 and 2020), on the other hand, focus on the private rate of return. Their estimates for males and females employed full-time suggest that there was a slight increase in the rate of return between 2001 and 2006 (Corliss et al., 2013) and a slight decrease between 2006 and 2016 (Corliss et al., 2020).

A decline in education wage premiums, particularly those associated with tertiary study, could arise from an increase in the relative supply of degree qualified workers (Borland & Coelli, 2016) and/or strong economic growth resulting in increases in the relative wages of those with no post-school qualifications (Corliss *et al.,* 2013). It could also arise from a fall in

the quality of education (Fersterer & Winter-Ebmer, 2003), although were that to be the case one would expect the decline to be similar for males and females within each cohort. Coelli & Wilkins (2009) also raise the possibility of 'credential relabelling' (eg. certificate qualified nurses become degree qualified nurses without a concomitant increase in wages) as a factor associated with declining returns to education.

III Data, Sample and Descriptive Statistics

The empirical analysis below draws on data from the Household, Income and Labour Dynamics in Australia (HILDA) survey for the period 2001-2019. HILDA is a longitudinal nationally representative survey with detailed information on the respondent's education and labour market activities. Interviews are conducted annually with all households in the panel and with each household member aged 15 years and over. A particular advantage of HILDA over other datasets (eg. Census data) is that it contains information on actual time (years and months) in paid employment. Other advantages with HILDA is the information on labour earnings in the respondent's main job and detailed information on hours worked, thus permitting the inclusion of part-time workers in the analysis.

To obtain representative results we impose as few restrictions as possible on the data. The analysis is based on respondents aged 25 to 34 years who are employed, who are not full-time students and who have an observed hourly wage in their main job which is greater than $0. A focus on persons aged 25-34 years also helps overcome some common estimation challenges in this area of work. For example, a common limitation in cross-sectional studies of wages is that of selection bias. The latter may be particularly problematic where there are older cohorts in the analysis and where there is a greater tendency for older workers to drop out of the labour market, perhaps as a result of discrimination and/or because of family care related reasons. A focus on the young adult cohort may also address problems that arise where there are greater barriers to job advancement at higher levels of the career ladder (Blau & Kahn, 2000). It has also been argued that a between cohort analysis provides a cleaner assessment of changing wage relativities (Fortin, 2008).

In the empirical work, data from consecutive waves are pooled to increase the sample size. The estimated regressions cover three time periods: 2001/2 (waves 1 and 2); 2010/11 (waves 10 and 11) and 2018/19 (waves 18 and 19). The sample size for each of these time periods is, respectively: 3,146 (males=1,651; females=1,495); 3,489 (males=1,840; females=1,649); and 4,824 (males=2,460, females=2,364). The total number of observations

across the three time periods is 11,459. Restricting the analysis to those with an hourly wage greater than $0 resulted in a loss of 114 observations (less than 1 per cent of the sample).

The choice of the first and last time period is dictated by data availability. The choice of 2010/11 is somewhat arbitrary but is reflective of two considerations: (a) it is post the GFC; and (b) analysis of 19 waves of data (covering 2001 to 2019) shows year on year growth in the real wages of persons aged 25-34 between 2001 and 2010, with the rate declining thereafter. This is illustrated in Figure 1 where the real wage growth of young (aged 25-34) and older (age 35-64) adults is presented. As may be seen, between 2001 and 2010 the wages of young (particularly males) and older persons grew at a similar rate. Wage growth deteriorated amongst young females from 2010 and from 2013 for young males, while real wage growth remained positive for older workers.

<< insert Figure 1 here >>

(i) Variables and Descriptive Statistics

The dependent variable is the natural logarithm of the real hourly wage in the respondent's main job. It is constructed from information on weekly labour earnings and usual weekly hours worked and across all waves is measured in AUD 2019 prices. To account for the fact that the hourly wage may be upwardly biased if employees work long hours and are in receipt of a premium for overtime work or downwardly biased if employees work extra hours which are unpaid, a dummy variable capturing incidences where the usual hours of work are 41 or more hours per week is included in the regressions.

Table 1 describes the variables used in the empirical analysis and details the associated descriptive statistics. The data are disaggregated by sex. There are some noteworthy changes between the birth cohorts. For example, in 2001/2 the share of 24-35 year olds holding a post-graduate qualification was equal to 7.8 per cent for males and 9.7 per cent for females. By 2018/19 the corresponding shares had increased to 10.6 per cent for males and 20.7 per cent for females. Strong population growth between 2001 and 2019 has also seen a change in the composition of the labour market in terms of ethnicity. In 2001/2 14.9 per cent of males were born in a non-English speaking background (NESB) country; by 2018/19 this share had increased to 20.5 per cent. A similar pattern may be observed for females. The structure of industry has also changed. In 2001/2 Manufacturing accounted for 19.7 per cent of male jobs; by 2018/19 this share was equal to 10.3 per cent. The share of Manufacturing jobs held by females similarly fell during this period, from 8.1 per cent in 2001/2 to 3.1 per cent by 2018/19

while the Health Care and Social Assistance sector became an important site for female employment. Similarly, in 2001/2 the union membership rate or share was equal to 27.8 per cent for males and 24.4 per cent for females. By 2018/19 this had declined to 13.4 per cent for males and 18.0 per cent for females. Casual employment has increased for males (from 13.7 per cent to 16.1 per cent) and declined for females (from 21.1 per cent to 16.9 per cent).

<< Insert Table 1 here >>

IV Method

To study the evolving wage structure a human capital earnings function (wage equation) is employed with augmentations to capture wage related factors such as job characteristics and industry. Formally, the model may be written as:

$$ln(W)_i = \beta_0 + \beta_1 Dipcert_i + \beta_2 Degree_i + \beta_3 Postgrad_i + \beta_4 Experience_i + \beta_5 Experience_i^2 + X_i\gamma + \varepsilon_i \quad (1)$$

Where $ln(W)$ denotes the natural logarithm of real hourly wages in AUD 2019 prices for individual (i), '$dipcert$' '$degree$' and '$postgrad$' denote the highest qualification attained, and 'exp' denotes actual years/months of labour market experience. The vector X_i contains other wage related factors detailed in Table 1. Occupation is not included given that occupation may be regarded as a grouped-average of the dependent variable (Mincer, 1974). The presence of children is similarly not controlled for, noting that this may be endogenous with respect to women's work decisions (Blau & Kahn, 2017). Moreover, a common reason for the inclusion of controls for children in a wage equation is to compensate for incomplete information on work experience (Mincer & Polachek, 1974). As HILDA contains information on actual work histories this is not a problem in this study. The regressions may, however, suffer from endogeneity problems on account of omitted variables such as ability. However, as with Coelli & Wilkins (2009), the interest in this paper is on understanding trends in the wage structure. In other words, the aim is not the estimation of causal determinants per se.

The analysis begins with a pooled cross-sectional approach with separate male and female regressions estimated using ordinary least squares (OLS) and quantile regression (QR) (unconditional) techniques. Thereafter Oaxaca (1973) and Blinder (1973) (OB) decompositions are used to shed light on the source of male and female wage growth between

the periods and disentangle the contribution from compositional effects (eg. the acquisition of human capital) and wage structure effects (i.e. changes in the returns to observed and unobserved factors over time). The empirical analysis concludes with a study of the gender wage gap at the mean and across the distribution of wages.

V Empirical Results

(i) Cross-Section

Table 2 lists the coefficients from the OLS hourly wage regressions. Focusing first on the 2001/2 sample (i.e. the results in columns (i) and (iv)), the estimates show that in 2001/2 male degree holders earned 29.3 per cent (evaluated as 100*(exp(coef)-1)) more than their counterparts with no post-school qualifications (PSQs). For females the corresponding wage differential was 28.1 per cent. By 2018/19 (columns (iii) and (vi)) the return associated with a degree had fallen to 19.4 per cent for males and 19.0 per cent for females. The change (decline) in the male and female return to a degree between 2001/2 and 2018/19 was statistically significant for both groups. Distributional analysis shows that the pay-off or wage return associated with having a degree rises across the wage distribution (see Figure 2). Moreover, since 2001/2 there has been no significant change in the return to a degree for low-paid workers and a significant decline in the returns for high-paid workers (median and above). This would be consistent with an increase in the supply of educated workers in high-paid jobs.

<< Insert Figure 2 here >>

Information on the return to experience in the labour market is given by the coefficients on the experience variable and its square. When evaluated at 10 years of experience the coefficients suggest that, in 2001/2, an additional year of labour market experience increased male and female earnings by 1.2 and 1.4 per cent, respectively. By 2018/19 an additional year of work experience (also evaluated at 10 years of experience) increased male earning by 1.8 per cent and female earnings by 1.5 per cent. The increasing pay-off associated with general labour market experience, together with the decline in the returns to a degree, might reflect the fact that employers are increasingly valuing experience over qualifications (a point also made in the PC (2020) report on the declining incomes of young people).

Other interesting results in Table 2 include the wage penalty associated with long hours of work, equal to 3.9 per cent for males and 4.8 per cent for females in 2018/19. Amongst other

things these results reinforce the importance of including such a control in wage studies based on HILDA data. The coefficients on the union membership variable suggests that the wage premium associated with union membership has increased over recent decades and by 2018/19 was equal to around 9 per cent for males and females. It may be that this variable is also capturing differences in methods of wage determination, with union members more likely to be covered by a collective agreement. The wage premium associated with employment in the government sector has also increased over the last two decades, particularly for females. In 2001/3 it was equal to 5.3 per cent and by 2018/19 it was equal to 12.0 per cent.

<< Insert Table 2 here >>

(ii) Between Cohort Wage Decompositions

In this section the Oaxaca-Blinder decomposition technique is used to examine the factors underpinning wage growth (or not) between periods studied. The technique allows one to ask "How much of the change in the real wages of 25-34 year olds between different cohorts is due to changes in the observed characteristics of this age group (eg. investments in education) and how much is due to wage structure effects (eg. a change in the returns to observed and unobserved skills)?". At the mean the decomposition of the wage change for males between 2001/2 and 2010/11 may written as:

$$\overline{\ln(w_{m2011})} - \overline{\ln(w_{m2001})} = \hat{\beta}_{m2011}\,(\bar{X}_{m2011} - \bar{X}_{m2001}) + \left(\hat{\beta}_{m2011} - \hat{\beta}_{m2001}\right)\bar{X}_{m2001} + (\hat{\alpha}_{m2011} - \hat{\alpha}_{m2001}) \qquad (2)$$

where 'w' is the real wage (as defined in Table 2), 'm' denotes males and 2001 and 2011 refer to 2001/2 and 2010/11, respectively; i.e. the time periods under consideration. The term on the left-side is the change in the log real wage of males between 2001/2 and 2010/11. The first term on the right-side is the amount of the change arising from differences in observed characteristics of the two birth cohorts (i.e. differences in the values of "X" between 2001/2 and 2010/11) weighted by the prevailing wage structure in 2010/11.[1] This component is commonly referred to as the "explained" component (or the component 'due to data'). In

[1] In decomposition studies there is some debate as to which wage structure to use for weighting purposes. In studies of the gender wage gap it is common to weight by the male wage structure with the justification that this is considered non-discriminatory norm (Blau and Kahn, 2017). In the between cohort analysis conducted here the most recent wage structure is employed as the reference wage structure.

studies of wages growth it may be referred to as the compositional effect. The remaining terms on the right-side measure differences in the change due to differences in the regression coefficients and the constant terms (α). These two terms, taken together, are commonly referred to as the unexplained component and in this study are referred to as the wage structure effects.

At the mean it is a straightforward exercise to undertake the decomposition manually, although, within Stata, the decomposition has been operationalised by Jann (2008) and may be undertaken using the 'oaxaca' command. Across the wage distribution the decomposition is a more complicated exercise. In this paper the distributional analysis is undertaken following an approach proposed by Firpo *et al.* (2018) to estimate and decompose quantile (unconditional) regressions. The method is operationalised in Stata using the 'oaxaca_rif' command. The results from this exercise are summarised in Tables 3A (for males) and 3B (for females).

<< Insert Tables 3A and 3B here >>

The estimates show that, between 2001/2 and 2010/11, the mean wages of males and females increased by 0.140 log points (around 15 per cent) and 0.129 log points (around 14 per cent), respectively. The change was highly significant and for both groups was underpinned by wage structure effects. The distributional analysis parallels the analysis at the mean in terms of the dominant contribution made by wage structure effects.

In the case of males, wage growth arising from wage structure effects was stronger amongst low-paid workers than it was amongst high-paid workers. For example, at the 10th and 20th percentiles the growth in male real wages between 2001/2 and 2010/11 was 21.0 per cent and 16.5 per cent, respectively. At the 80th and 90th percentiles the corresponding growth was 12.0 per cent and 13.0 per cent, respectively. This likely reflects the strong economic growth during this time and opportunities for males with no post-school qualifications (Corliss *et al.*, 2013). These estimates contrast with those for females where wage structure effects were relatively uniform across the distribution (averaging around 13 per cent).

The wage growth story is different when considering the change between 2010/11 and 2018/19. At the mean there was no significant change in the real wage of males during this period and a significant change in the real wage of females (0.049 log points or 5 per cent). Compositional effects accounted for around half of the growth in female mean wages while wage structure effects made up the balance. Wages growth was positive across the wage distribution with composition effects particularly important for high-paid females and wage structure effects more important for low-paid females. The latter may reflect institutional

factors such as minimum wage award increases in sectors employing low-waged females. It may, for example, reflect a decision by Fair Work Australia (FWA) in 2012 to increase the minimum wages for Social and Community Services (SACs) workers. This decision arose from a successful application to FWA by unions for an 'equal remuneration order' based on the arguments that the work in the sector was undervalued (FWA, 2012).

An overall comparison (between 2001/2 and 2018/19) shows that, at the mean, the total wage change for males was 0.126 log points (13.4 per cent) for males and 0.178 log points (19.5 per cent) for females with wage structure effects delivering a real wage increase of 14.0 per cent for males and 15.5 per cent for females. In terms of composition effects, a decline in years of work experience held back the overall growth in male wages while education investments added to the growth in female wages. Wage structure estimates show that, at the mean, both males and females benefited from an increase in the returns to general labour market experience and both suffered from a decline in the return to education (see Table 4). (Detailed decomposition estimates across the distribution are provided in an appendix to this paper).

<< Insert Table 4 here >>

(iii) Gender Wage Gap

In this section the focus is on the evolving gender wage gap (GWG). The GWG is an important indicator and widely used to assess the progress of women in the labour market. Convergence in the GWG may arise from compositional effects which are favourable to women, wage structure effects which are favourable to women or wage structure effects which are unfavourable to men. Ideally, convergence arises from outcomes favourable to women rather than from those which adversely affect men. Given the various compositional and wage structure effects previously described the following examines the GWG in 2001/2, 2010/11 and 2018/19. The OB decomposition technique is used to decompose the observed GWG into explained (compositional or characteristic) effects and unexplained (wage structure or coefficient) effects for each period. The approach is as follows at the mean:

$$\overline{\ln(w_m)} - \overline{\ln(w_f)} = \hat{\beta}_m \left(\bar{X}_m - \bar{X}_f\right) + \left(\hat{\beta}_m - \hat{\beta}_f\right)\bar{X}_f + \left(\hat{\alpha}_m - \hat{\alpha}_f\right) \quad (3)$$

where the term on the left-side shows the mean (raw) gender wage gap (the difference in the log wages of males (*m*) and females (*f*)). The first term on the right-side shows the 'explained'

gap. The remaining two terms, together, provide a measure of the unexplained gender gap. The latter is commonly referred to as the adjusted gender wage gap.

The results associated with a decomposition of the GWGs are summarised in Table 5. At the mean there is no difference in the wages of young adult males and females in 2018/19 with the raw GWG equal to -0.005 log points. Once gender differences in characteristics are taken into account the adjusted GWG is equal to 0.043 log points or 4.4 per cent. This suggest that were females to look like males (in terms of characteristics such as education attainment) the gender gap would be wider, not narrower. The corresponding adjusted GWGs in 2001/2 and 2010/11 were 0.054 log points (5.5 per cent) and 0.047 log points (4.8 per cent), respectively. In other words, notwithstanding the significant educational investments by females over recent decades it would seem that there has been no significant change in the adjusted GWG at the mean across successive cohorts of 25-34 year olds. This same conclusion holds for comparisons across the distribution. (At the median the adjusted GWG was equal to 6.1 per cent in 2001/2, 4.3 per cent in 2010/11 and 4.8 per cent in 2018/19).

In 2001/2 and 2018/19 the GWG was larger at the 90th percentile than it was at the median (equal to 9.1 and 7.9 per cent, respectively). The larger gender wage gaps at the top of the wage distribution are indicative of glass ceiling effects (Blau & Kahn, 2017). Breaking down the glass ceiling is, therefore, as hard today as it was at the turn of this Century. These findings are, of course, somewhat surprising in the light of various legislative changes adopted to improve gender outcomes in employment. Examples include the *Workplace Gender Equality Act 2012* and the *Paid Parental Leave Act 2010*. That said, it is not inconceivable that these policy interventions have had some effect, its just that their impact on the gender wage gap may be small. Kidd & Shannon (2001), for example, show that Australian legislative reforms in the 1980s only had a small impact on the then prevailing gender wage gap.

<< Insert Table 5 here >>

To examine how the GWG (at the mean) has changed since 2001/2 a decomposition procedure proposed by Wellington (1993) is adopted. It is simply an extension of the one-period OB decomposition approach previously described:

$$\left(\overline{\ln(w_{m2019})} - \overline{\ln(w_{m2001})}\right) - \left(\overline{\ln(w_{f2019})} - \overline{\ln(w_{f2001})}\right)$$
$$= [\,\hat{\beta}_{m2019}\,(\bar{X}_{m2019} - \bar{X}_{m2001}) - \hat{\beta}_{f2019}\,(\bar{X}_{f2019} - \bar{X}_{f2001})$$

$$+[(\hat{\beta}_{m2019} - \hat{\beta}_{m2001})\bar{X}_{m2001} - (\hat{\beta}_{f2019} - \hat{\beta}_{f2001})\bar{X}_{f2001}]$$
$$+[(\hat{\alpha}_{m2019} - \hat{\alpha}_{m2001}) - (\hat{\alpha}_{f2019} - \hat{\alpha}_{f2001})] \quad (3)$$

where the subscripts 2001 and 2019 refer to periods 2001/2 and 2018/19 respectively and other notations are as previously defined. The approach holds the group means constant at 2001/2 levels and shows the change in the wage gap when evaluated using the 2018/19 coefficients. The results are summarised in Table 6 and show that, between 2001/2 and 2018/19 the raw GWG, at the mean, narrowed by 0.051 log points. Changes in the observed characteristics of the two cohorts accounted for 80 per cent of this convergence with the main contributory factor being education (60 per cent). A narrowing in the gender gap in 'years of experience' also contributed to a narrowing of the GWG. Working against convergence was the widening gender gap in the returns to experience. In summary, notwithstanding significant education investments by younger cohorts of females, there remains an ongoing GWG. Decomposition analysis shows countervailing wage structure effects. The persistent glass ceiling effects are particularly concerning given that the focus of this study is on young people and that many, presumably, have yet to advance in their careers.

<< Insert Table 6 here >>

VI Summary and Conclusion

Using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey from 2001 to 2019 together with OLS and quantile regressions this paper uses a between cohort analysis to examine the changing returns to education and the changing wage structure of young adults aged 25-34 years. Estimates show that, at the mean and amongst high-paid workers, there has been a significant decline in the pay-off associated with a degree qualification since the turn of this Century. This is consistent with an increase in the supply of degree qualified workers but may also reflect a fall in the quality of education. A distributional analysis finds that this decline is insignificant for low wage workers and significant for high wage workers. By 2018/19 the return to a degree (relative to those with no post-school qualifications) was equal to around 19 per cent for both males and females, down from around 29 per cent in 2001/2.

Analysis of wage growth between 2001/2 and 2010/11 shows strong wage growth for males and females over the 2000s (increasing by around 15 per cent and 14 per cent for males

and females, respectively). The dominant source of the growth during this time was wage structure effects (i.e. changes in the returns to observed characteristics). Between 2010/11 and 2018/19 wages growth was flat (zero) for males and subdued (5 per cent) for females. The 5 per cent growth experienced by females derived in part (half) from composition effects (namely education investments) and the balance from favourable wage structure effects amongst low-paid females. It is possible that latter is underpinned by Fair Work Australia's 2012 decision to significantly increase the minimum wages of employees in the Social and Community Services (SACs) sector.

Analysis of the gender wage gap shows that between 2001/2 and 2018/19 there was a significant convergence (narrowing) in the mean raw gender wage gap by 0.051 log points. Female investments in education accounted for 60 per cent of this convergence, with a further 20 per cent of the overall convergence arising from a narrowing in the gender gap in years of work experience. These gains, however, were partially off-set by wage structure developments (eg. the increasing returns to experience) that were relatively more favourable for males. Estimates demonstrate the on-going presence of a glass ceiling, with the gender wage gap at the 90^{th} percentile equal to 7.6 per cent in 2018/19.

To sum up, the work in this paper highlights the importance of disaggregating any wage analysis by gender and of controlling for compositional and wage structure effects when considering the factors linked to changing wage relativities. Future work in this area might further explore why the wage premium associated with a degree has declined and whether or not there are heterogeneous effects depending on institution attended? Other avenues for future research include a consideration of the long-term wage effects associated with the rising incidence of part-time work and a closer inspection of the labour market experience effects. In the case of the latter research might seek to unpack the effects of full-time and part-time work experience, volunteering and unpaid internships, industry experience, firm tenure, occupational tenure and job mobility on wages. Finally, more needs to be done to understand why the Australian gender wage gap is so resistant to change and why a glass ceiling prevails even amongst persons aged 25-34. An investigation of the diverging trends in the growth of young and older adult wages would also be instructive, particularly for debates concerning the (in)flexibility of the Australian wage structure.

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APPENDIX

<< Insert Appendix Tables A1 and A2 here >>

TABLE 1

Means and Standard Deviations of Variables

		Males			Females		
Variables	Description	2001/2	2010/11	2018/19	2001/2	2010/11	2018/19
w	log hourly wage (main job) in 2019 Australian dollars (AUD), bottom and top coded at the 5% and 95% levels	3.3	3.5	3.4	3.3	3.4	3.4
		(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
DipCert	=1 if highest PSQ a diploma or certificate	36.3%	32.6%	32.5%	23.2%	28.2%	26.7%
Degree	=1 if highest PSQ a bachelor degree	20.5%	23.9%	23.7%	24.1%	32.3%	33.0%
Postgraduate	=1 if highest PSQ postgraduate	7.8%	11.0%	10.6%	9.7%	14.5%	20.7%
Experience	Actual time in employment (years/months)	10.8	9.6	9.6	10.1	8.9	9.2
		(4.0)	(3.5)	(4.1)	(4.1)	(3.6)	(3.9)
Partnered	=1 if married or de-facto	56.9%	61.6%	59.2%	62.5%	59.1%	66.6%
Born Australia#	=1 if born in Australia	76.4%	71.4%	72.4%	76.1%	75.5%	72.5%
Born ESB	=1 if foreign, born in a main English speaking country	8.7%	7.8%	7.1%	9.8%	5.7%	5.9%
Born NESB	=1 if foreign, born in a non-English speaking country	14.9%	20.8%	20.5%	14.1%	18.8%	21.5%
City	=1 if resides major metropolitan area	74.4%	73.5%	71.1%	76.8%	73.8%	71.6%
VIC	=1 if resides in Victoria	25.7%	24.9%	25.4%	25.2%	29.4%	28.7%
QLD	=1 if resides in Queensland	18.8%	18.3%	18.8%	19.8%	17.2%	17.2%
SA	=1 if resides in South Australia	8.0%	6.8%	5.8%	5.7%	7.3%	6.2%
WA	=1 if resides in Western Australia	9.7%	8.2%	8.6%	10.1%	9.0%	8.1%
TAS	=1 if resides in Tasmania	2.3%	2.2%	2.1%	1.9%	2.1%	1.9%
NT/ACT	=1 if resides in Northern Territory or Australian Capital Territory	2.5%	3.7%	3.2%	3.3%	3.5%	3.8%
Long hours	=1 if usual weekly hours main job 41+	51.7%	40.5%	38.3%	24.0%	23.8%	18.5%
Casual	=1 if employed on a casual basis	13.7%	13.5%	16.1%	21.1%	15.2%	16.9%
MJH	=1 if holds more than one job	7.7%	7.2%	6.1%	8.3%	6.9%	8.0%
Union member	=1 if trade union member	27.8%	13.8%	13.4%	24.4%	18.4%	18.0%
Government sector	=1 if employed in the public sector	14.8%	15.8%	15.1%	27.0%	27.4%	27.5%
Agri	=1 if employed in Agriculture, forestry and fishing	3.0%	2.1%	2.1%	0.9%	0.7%	1.4%
Mining	=1 if employed in Mining	2.5%	3.2%	3.2%	0.4%	1.6%	1.7%
Manuf.	=1 if employed in Manufacturing	19.7%	10.7%	10.3%	8.1%	3.9%	3.1%
EGW	=1 if employed in Electricity, gas, water and waste services	1.0%	2.0%	1.3%	0.4%	0.7%	0.5%
Construct.	=1 if employed in Construction	7.6%	12.4%	14.6%	1.2%	2.0%	3.0%
Wholsale T.	=1 if employed in Wholesale trade	5.2%	3.8%	4.4%	2.9%	2.6%	1.1%

Accomm. Café	=1 if employed in Accommodation and food services	5.0%	5.0%	4.1%	5.4%	5.9%	5.5%
Transport	=1 if employed in Transport, postal and warehousing	6.6%	5.0%	5.4%	1.9%	2.1%	3.2%
Media	=1 if employed in Information media and telecommunications	3.4%	3.0%	1.8%	3.7%	3.6%	1.3%
Finance&Ins	=1 if employed in Finance and insurance services	4.8%	6.1%	3.8%	8.0%	7.0%	4.3%
Real Estate	=1 if employed in Rental, hiring and real estate services	0.7%	0.9%	1.1%	1.4%	1.6%	1.4%
Prof&Sci	=1 if employed in Professional, scientific and technical	8.4%	12.2%	10.6%	10.0%	9.7%	10.6%
Admin&Support	=1 if employed in Administrative and support services	1.7%	2.2%	2.5%	4.0%	3.8%	2.7%
Public admin	=1 if employed in Public administration and safety	7.4%	7.3%	6.5%	6.6%	7.0%	6.7%
Ed&training	=1 if employed in Education and training	3.4%	3.9%	5.1%	10.9%	13.2%	14.2%
Health & care	=1 if employed in Health care and social assistance	4.1%	3.6%	5.7%	18.7%	19.3%	24.8%
Arts & rec	=1 if employed in Arts and recreation services	2.9%	2.1%	4.4%	1.2%	1.3%	1.5%
Other serv	=1 if employed in Other services	3.6%	4.0%	4.1%	2.7%	3.1%	2.9%
Observations		1,651	1,840	2,460	1,495	1,649	2,364

Notes:

(a) Source: HILDA, waves 1&2, 10&11, 18&19.
(b) Estimates have been weighted to reflect population totals.
(c) Standard deviations are in parentheses for continuous variables only and the means for binary variables are reported as percentages.
(d) The hourly wage data has been deflated using the all groups, weighted average, 8 capital cities CPI (ABS 2020), Series ID A2325846C. A four quarter annual average has been used.
(e) In 2010/11 and 2018/19 there are, respectively, 111 and 315 observations with missing information on actual work experience. A potential measure (based on age minus years of schooling minus five) is imputed for these cases.
(f) The reference categories for the education, location and industry variables are, respectively: no post-school-qualification (PSQ); New South Wales; and Retail trade plus a small share (0.7 per cent) with missing industry information.

TABLE 2

OLS: Pooled Cross-Section. Dependent Variable=Log Hourly Wages (Main Job). Aged 25-34.

	Males			Females		
Variable	2001/2	2010/11	2018/19	2001/2	2010/11	2018/19
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
DipCert	0.054**	0.050**	0.025	0.046*	0.004	0.023
	(0.021)	(0.025)	(0.022)	(0.026)	(0.027)	(0.021)
Degree	0.257***	0.224***	0.177***	0.248***	0.197***	0.174***
	(0.032)	(0.030)	(0.029)	(0.029)	(0.033)	(0.024)
Postgrad	0.216***	0.284***	0.129***	0.277***	0.196***	0.206***
	(0.055)	(0.036)	(0.039)	(0.036)	(0.040)	(0.032)
Experience	0.029**	0.057***	0.022*	0.009	0.045***	0.035***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Experience^2	-0.001*	-0.002***	-0.000	0.000	-0.001**	-0.001*
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partnered	0.046**	0.029	0.107***	0.062***	0.052**	0.044**
	(0.021)	(0.021)	(0.020)	(0.021)	(0.022)	(0.020)
Born-ESB	-0.022	-0.001	-0.016	0.036	0.012	-0.059
	(0.039)	(0.037)	(0.045)	(0.040)	(0.040)	(0.038)
Born-NESB	-0.086***	-0.054*	-0.043	-0.052	-0.035	0.029
	(0.032)	(0.030)	(0.028)	(0.039)	(0.040)	(0.035)
City	0.035	0.024	0.028	0.041*	0.063***	0.033*
	(0.022)	(0.021)	(0.020)	(0.022)	(0.022)	(0.018)
VIC	-0.003	-0.036	-0.041*	0.009	-0.041	-0.025
	(0.025)	(0.027)	(0.022)	(0.029)	(0.029)	(0.024)
QLD	-0.094***	-0.019	-0.083***	-0.080***	-0.066**	-0.030
	(0.031)	(0.028)	(0.024)	(0.028)	(0.029)	(0.023)
SA	-0.099***	-0.032	-0.120***	-0.096***	-0.032	-0.022
	(0.036)	(0.034)	(0.032)	(0.035)	(0.041)	(0.033)
WA	-0.071**	0.100***	-0.019	-0.016	0.028	0.037
	(0.035)	(0.032)	(0.035)	(0.036)	(0.034)	(0.030)
TAS	-0.115**	-0.109*	-0.178***	-0.005	-0.027	-0.071
	(0.046)	(0.057)	(0.047)	(0.051)	(0.068)	(0.045)
NTACT	-0.039	0.087*	-0.042	0.042	0.110*	0.096*
	(0.066)	(0.049)	(0.057)	(0.055)	(0.061)	(0.053)
Long hours	-0.001	0.014	-0.040**	-0.068***	-0.049*	-0.049**
	(0.019)	(0.019)	(0.018)	(0.025)	(0.027)	(0.024)
Casual	-0.034	-0.004	-0.022	-0.023	-0.068**	-0.002
	(0.026)	(0.031)	(0.034)	(0.029)	(0.029)	(0.032)
MJH	-0.011	-0.063*	-0.028	0.074**	0.035	0.013
	(0.037)	(0.034)	(0.033)	(0.037)	(0.033)	(0.026)
Union memb.	0.067***	0.056*	0.088***	0.078***	0.006	0.089***
	(0.022)	(0.029)	(0.022)	(0.022)	(0.027)	(0.026)
Govt. Sector	0.034	0.091***	0.094***	0.052*	0.109***	0.113***
	(0.034)	(0.032)	(0.025)	(0.028)	(0.029)	(0.028)
Agri	-0.084	0.026	-0.049	0.202**	-0.241	-0.255***
	(0.058)	(0.078)	(0.053)	(0.099)	(0.159)	(0.068)
Mining	0.486***	0.437***	0.432***	0.249***	0.266***	0.334***
	(0.068)	(0.051)	(0.056)	(0.073)	(0.076)	(0.058)
Manuf	0.133***	0.162***	0.086**	0.121**	0.116**	0.003
	(0.040)	(0.035)	(0.041)	(0.047)	(0.056)	(0.044)
EGW	0.118**	0.365***	0.218***	0.088	0.165***	0.248**
	(0.058)	(0.074)	(0.080)	(0.060)	(0.050)	(0.098)
Construction	0.206***	0.213***	0.193***	0.167***	0.157**	0.066
	(0.047)	(0.044)	(0.038)	(0.061)	(0.061)	(0.089)

WT	0.024	0.041	0.106**	0.116**	0.016	0.075
	(0.050)	(0.041)	(0.047)	(0.050)	(0.053)	(0.086)
ACCF	0.039	-0.070	0.011	0.018	-0.108**	-0.056
	(0.052)	(0.061)	(0.086)	(0.046)	(0.053)	(0.044)
Transport	0.179***	0.088	0.027	0.142*	0.100	0.098
	(0.053)	(0.063)	(0.048)	(0.082)	(0.078)	(0.062)
Media	0.364***	0.275***	0.056	0.218***	0.063	0.052
	(0.060)	(0.050)	(0.074)	(0.054)	(0.076)	(0.060)
Finance&Ins	0.313***	0.206***	0.139***	0.287***	0.195***	0.289***
	(0.064)	(0.046)	(0.051)	(0.050)	(0.049)	(0.063)
Rental &R.Est.	0.148	0.034	0.070	0.166**	0.138**	0.146***
	(0.133)	(0.111)	(0.091)	(0.068)	(0.069)	(0.046)
Prof&Sci	0.311***	0.257***	0.119***	0.181***	0.148**	0.146***
	(0.051)	(0.041)	(0.041)	(0.044)	(0.058)	(0.038)
Admin&support	0.108	0.048	0.018	0.172**	0.095*	0.045
	(0.073)	(0.056)	(0.072)	(0.076)	(0.056)	(0.042)
Public admin.	0.185***	0.164***	0.155***	0.197***	0.093*	0.126***
	(0.053)	(0.046)	(0.044)	(0.052)	(0.053)	(0.039)
Edu & Training	0.121*	0.032	0.101**	0.084*	0.033	0.048
	(0.064)	(0.052)	(0.042)	(0.044)	(0.047)	(0.045)
Health care	0.176***	0.082	0.140***	0.137***	0.049	0.151***
	(0.060)	(0.050)	(0.046)	(0.042)	(0.045)	(0.033)
Arts & rec	-0.012	0.067	-0.016	0.049	-0.034	0.009
	(0.091)	(0.057)	(0.044)	(0.081)	(0.072)	(0.062)
Other serv.	0.056	0.095	0.053	0.028	-0.106*	-0.011
	(0.063)	(0.059)	(0.049)	(0.058)	(0.059)	(0.045)
Constant	2.859***	2.844***	3.045***	2.859***	2.912***	2.940***
	(0.075)	(0.059)	(0.069)	(0.066)	(0.062)	(0.065)
Observations	1,651	1,840	2,460	1,495	1,649	2,364
R-squared (%)	30.1%	30.1%	27.6%	28.4%	28.3%	33.0%

Notes:

(a) Source: HILDA, waves 1&2, 10&11, 18&19.

(b) Estimates are weighted to reflect population totals.

(c) Robust standard errors are in parentheses and are clustered on the individual.

(d) Significance levels given as: *** p<0.01, ** p<0.05, * p<0.1.

TABLE 3A

Oaxaca-Blinder Decompositions of the Changing Real Wage Between 2001/2 & 2010/11, 2010/11 & 2018/19; and 2001/2 & 2018/19, Males

	Mean	10th Percentile	20th Percentile	30th Percentile	40th Percentile	50th Percentile	60th Percentile	70th Percentile	80th Percentile	90th Percentile
Males: 2001/2 to 2010/11										
Total log wage change	0.140***	0.184***	0.145***	0.129***	0.134***	0.144***	0.150***	0.174***	0.138***	0.138***
	(0.016)	(0.025)	(0.021)	(0.020)	(0.021)	(0.023)	(0.024)	(0.026)	(0.026)	(0.028)
Composition effect	0.0005	-0.005	-0.008	-0.000	0.005	0.005	0.015	0.015	0.026	0.018
	(0.012)	(0.014)	(0.013)	(0.012)	(0.012)	(0.014)	(0.016)	(0.017)	(0.019)	(0.019)
Wage structure effect	0.135***	0.189***	0.153***	0.129***	0.129***	0.138***	0.134***	0.159***	0.112***	0.121***
	(0.015)	(0.027)	(0.021)	(0.020)	(0.020)	(0.021)	(0.023)	(0.026)	(0.027)	(0.030)
Males: 2010/11 to 2018/19										
Total log wage change	-0.014	0.012	0.025	0.005	-0.009	-0.017	-0.049**	-0.043*	-0.033	-0.023
	(0.016)	(0.023)	(0.018	(0.019)	(0.021)	(0.023)	(0.024)	(0.026)	(0.025)	(0.033)
Composition effect	-0.003	-0.006	-0.008	-0.013	-0.014	-0.013	-0.019	-0.018	-0.015	-0.018
	(0.009)	(0.009)	(0.009)	(0.010)	(0.014)	(0.015)	(0.015)	(0.014)	(0.013)	(0.016)
Wage structure effect	-0.011	0.018	0.033*	0.019	0.005	-0.004	-0.030	-0.025	-0.018	-0.006
	(0.014)	(0.023)	(0.018)	(0.019)	(0.020)	(0.021)	(0.022)	(0.024)	(0.022)	(0.031)
Males: 2001/2 to 2018/19										
Total log wage change	0.126***	0.195***	0.169***	0.135***	0.0125***	0.137***	0.101***	0.131***	0.105***	0.115***
	(0.016)	(0.028)	(0.020)	(0.019)	(0.020)	(0.021)	(0.023)	(0.025)	(0.027)	(0.028)
Composition effect	-0.007	-0.023	-0.019	-0.015	-0.010	-0.007	0.004	0.000	0.012	0.004
	(0.011)	(0.020)	(0.015)	(0.014)	(0.013)	-0.015	(0.016)	(0.018)	(0.019)	(0.021)
Wage structure effect	0.134***	0.219***	0.188***	0.150***	0.136***	0.133***	0.097***	0.131***	0.092***	0.111***
	(0.015)	(0.032)	(0.022)	(0.019)	(0.019)	(0.021)	(0.024)	(0.026)	(0.027)	(0.031)

Notes:

(a) See Table 2 for the regression specification.
(b) Decompositions undertaken using the 'oaxaca_rif' command in Stata but with no re-weighting.
(c) The period 2 coefficients are the reference coefficients.
(d) Estimates weighted using population weights.
(e) Standard errors are clustered on the individual and reported in parentheses.
(f) Significance is given by: ***p<0.01; **p<0.05, *p<0.1.

TABLE 3A

Oaxaca-Blinder Decompositions of the Changing Real Wage Between 2001/2 & 2010/11, 2010/11 & 2018/19; and 2001/2 & 2018/19, Females

	Mean	10th Percentile	20th Percentile	30th Percentile	40th Percentile	50th Percentile	60th Percentile	70th Percentile	80th Percentile	90th Percentile
Females: 2001/2 to 2010/11										
Total log wage change	0.129***	0.123***	0.137***	0.136***	0.148***	0.140***	0.148***	0.153***	0.156***	0.134***
	(0.017)	(0.029)	(0.024)	(0.022)	(0.021)	(0.022)	(0.023)	(0.024)	(0.027)	(0.029)
Composition effect	0.007	0.007	0.002	0.005	0.009	0.026*	0.021	0.011	0.018	0.010
	(0.011)	(0.014)	(0.013)	(0.012)	(0.013)	(0.014)	(0.015)	(0.014)	(0.017)	(0.017)
Wage structure effect	0.123***	0.116***	0.135***	0.131***	0.139***	0.114***	0.127***	0.142***	0.138***	0.124***
	(0.015)	(0.029)	(0.023)	(0.020)	(0.019)	(0.020)	(0.021)	(0.023)	(0.028)	(0.030)
Females: 2010/11 to 2018/19										
Total log wage change	0.049***	0.105***	0.054**	0.040*	0.041**	0.039*	0.031	0.040*	0.041*	0.050
	(0.017)	(0.025)	(0.022)	(0.021)	(0.021)	(0.022)	(0.023)	(0.024)	(0.027)	(0.032)
Composition effect	0.023**	-0.024	0.000	0.010	0.023*	0.023*	0.035***	0.036***	0.034**	0.043***
	(0.011)	(0.017)	(0.014)	(0.013)	(0.012)	(0.012)	(0.013)	(0.014)	(0.014)	(0.014)
Wage structure effect	0.025*	0.129***	0.055***	0.030	0.018	0.016	-0.004	0.004	0.007	0.008
	(0.014)	(0.030)	(0.020)	(0.019)	(0.018)	(0.020)	(0.022)	(0.022)	(0.027)	(0.032)
Females: 2001/2 to 2018/19										
Total log wage change	0.178***	0.228***	0.192***	0.176***	0.189***	0.179***	0.178***	0.194***	0.197***	0.184***
	(0.017)	(0.023)	-0.022	(0.021)	(0.021)	(0.022)	(0.024)	(0.024)	(0.028)	(0.030)
Composition effect	0.034**	0.022	0.01	0.023	0.029**	0.053***	0.053***	0.039**	0.070***	0.055**
	(0.013)	(0.018)	-0.015	(0.014)	(0.014)	(0.016)	(0.017)	(0.017)	(0.021)	(0.023)
Wage structure effect	0.144***	0.205***	0.181***	0.153***	0.161***	0.126***	0.125***	0.154***	0.127***	0.128***
	(0.015)	(0.024)	-0.022	(0.021)	(0.020)	(0.021)	(0.022)	(0.023)	(0.030)	(0.035)

See notes to Table 3A.

TABLE 4:

Explaining the Changing Mean Wages of Male and Female Cohorts, 2001/2 to 2018/19

	Gap to be explained	Change in gap due to change in characteristics	*Column (ii) as % of column (i)*	Change in gap due to coefficients	*Column (iv) as % of column (i)*
	(i)	(ii)	(iii)	(iv)	(v)
Males					
Education		0.008* (0.066)	6.5%	-0.034* (0.019)	-26.8%
Experience		-0.022*** (0.006)	-17.3%	0.014 (0.084)	11.0%
Demographics		0.0003 (0.004)	0.2%	0.042** (0.018)	32.8%
Location		0.002 (0.003)	1.7%	-0.010 (0.029)	-8.2%
Job-char.		-0.007 (0.005)	-5.6%	-0.005 (0.019)	-4.3%
Industry		0.011* (0.006)	8.9%	-0.058 (0.044)	-46.0%
Constants		-	-	0.186* (0.0101)	147.1%
Total	*0.126*** 0.016)*	*-0.007 (0.011)*	*-5.6%*	*0.134*** (0.015)*	*105.6%*
Females					
Education		0.039*** (0.007)	22.0%	-0.030* (0.017)	-16.9%
Experience		-0.011** (0.005)	-5.9%	0.116 (0.078)	65.4%
Demographics		0.006* (0.006)	3.5%	-0.009 (0.019)	-5.2%
Location		-0.002 (0.002)	-1.2%	0.005 (0.027)	2.9%
Job-char.		-0.002 (0.005)	-1.3%	0.023 (0.020)	13.1%
Industry		0.004 (0.008)	2.1%	-0.042 (0.36)	-23.7%
Constants		-	-	0.081 (0.080)	45.3%
Total	*0.178*** (0.017)*	*0.034** (0.013)*	*19.2%*	*0.144*** (0.015)*	*80.9%*

Notes:

(a) The results may not sum due to rounding errors.

(b) Estimates based on weighted data and the detailed decomposition undertaken by summing up the coefficients within each of the factor groups as follows: Education (DipCert, Degree, Postgrad); Experience (Experience, Experience^2); Demographics (Partnered, Born-ESB, Born-NESB); Location (City, VIC, QLD, SA, WA, TAS, NTACT); Job-char. (Long-hours, Casual, MJH, Union member, Govt. sector); Industry (industry dummies).

(c) The results may be sensitive to choice of omitted category (eg. with a different industry reference group the sign on the industry effects might be different).

(d) Standard errors are clustered on the individual and reported in parentheses.

(e) Significance is given by: ***p<0.01; **p<0.05, *p<0.1.

TABLE 5:
Oaxaca-Blinder Decompositions of the Gender Wage Gap

	Mean	10th Percentile	20th Percentile	30th Percentile	40th Percentile	50th Percentile	60th Percentile	70th Percentile	80th Percentile	90th Percentile
2001/2										
Raw gender wage gap	0.047***	0.026	0.039*	0.045**	0.054***	0.051**	0.057**	0.055**	0.080***	0.082***
	(0.017)	(0.028)	(0.022)	(0.021)	(0.021)	(0.021)	(0.024)	(0.024)	(0.027)	(0.032)
Gap due to characteristics	-0.008	-0.006	-0.003	0.003	0.006	-0.008	-0.016	-0.021	-0.024	-0.004
	(0.015)	(0.024)	(0.017)	(0.017)	(0.017)	(0.018)	(0.020)	(0.023)	(0.025)	(0.028)
Gap due to coefficients	0.054***	0.032	0.042*	0.042*	0.048**	0.059***	0.073***	0.077***	0.104***	0.087**
(the adjusted GWG)	(0.017)	(0.034)	(0.024)	(0.023)	(0.022)	(0.022)	(0.024)	(0.027)	(0.032)	(0.039)
2010-11										
Raw gender wage gap	0.057***	0.087***	0.047**	0.038*	0.040*	0.054**	0.059**	0.076***	0.063**	0.063**
	(0.017)	(0.027)	(0.022)	(0.022)	(0.022)	(0.024)	(0.025)	(0.026)	(0.026)	(0.026)
Gap due to characteristics	0.011	-0.017	-0.006	0.016	0.015	0.013	0.028	0.020	0.019	0.019
	(0.014)	(0.014)	(0.014)	(0.017)	(0.019)	(0.020)	(0.021)	(0.021)	(0.020)	(0.020)
Gap due to coefficients	0.047***	0.103***	0.052**	0.022	0.025	0.042*	0.031	0.056**	0.044	0.044
(the adjusted GWG)	(0.017)	(0.027)	(0.023)	(0.023)	(0.023)	(0.024)	(0.025)	(0.027)	(0.028)	(0.027)
2018/19										
Raw gender wage gap	-0.005	-0.006	0.017	0.003	-0.010	-0.002	-0.020	-0.007	-0.012	0.014
	(0.019)	(0.022)	(0.018)	(0.020)	(0.020)	(0.022)	(0.023)	(0.025)	(0.027)	(0.027)
Gap due to characteristics	-0.048***	-0.038**	-0.033***	-0.038***	-0.042***	-0.048***	-0.070***	-0.078	-0.062***	-0.062***
	(0.012)	(0.017)	(0.013)	(0.013)	(0.015)	(0.016)	(0.017)	(0.019)	(0.021)	(0.022)
Gap due to coefficients	0.043***	0.032	0.050***	0.042**	0.032	0.047**	0.049**	0.071***	0.050*	0.076**
(the adjusted GWG)	(0.016)	(0.023)	(0.019)	(0.020)	(0.020)	(0.022)	(0.024)	(0.027)	(0.030)	(0.033)

Notes:

(a) See Table 2 for the regression specification.
(b) Decompositions undertaken using the 'oaxaca_rif' command in Stata but with no re-weighting. A detailed decomposition is available from the authors on request.
(c) The male coefficients are the reference coefficients.
(d) Estimates weighted using population weights.
(e) Standard errors are clustered on the individual and reported in parentheses.
(f) Significance is given by: ***p<0.01; **p<0.05, *p<0.1.

TABLE 6:
Explaining the Changing Gender Wage Gap: 2001/2 to 2018/19

	Gap to be explained	Change in gap due to change in characteristics	*Column (ii) as % of column (i)*	Change in gap due to coefficients	*Column (iv) as % of column (i)*
	(i)	(ii)	(iii)	(iv)	(v)
Education		-0.031	*59.9%*	-0.004	*7.3%*
Experience		-0.011	*22.2%*	-0.102	*198.8%*
Demographics		-0.006	*11.6%*	0.051	*-98.4%*
Location		0.004	*-8.2%*	-0.015	*30.1%*
Job Characteristics		-0.005	*9.3%*	-0.029	*56.0%*
Industry		0.008	*-14.9%*	-0.016	*31.1%*
Constants		-	-	0.105	*-204.8%*
Total	-0.051	-0.041	*79.9%*	-0.010	*20.1%*

Source: Author's calculations based on weighted data. Note: Standard errors are not available.

APPENDIX TABLE A1

*Oaxaca-Blinder **Detailed** Decompositions of the Changing Real Wage Between 2001/2 & 2018/19, Males*

	mean		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Total log wage change	0.126***		0.195***	0.169***	0.135***	0.0125***	0.137***	0.101***	0.131***	0.105***	0.115***
	(0.016)		(0.028)	(0.020)	(0.019)	(0.020)	(0.021)	(0.023)	(0.025)	(0.027)	(0.028)
Composition (ΔX)	-0.007		-0.023	-0.019	-0.015	-0.010	-0.007	0.004	0.000	0.012	0.004
	(0.011)		(0.020)	(0.015)	(0.014)	(0.013)	-0.015	(0.016)	(0.018)	(0.019)	(0.021)
Wage structure ($\Delta\hat{\beta}$)	0.134***		0.219***	0.188***	0.150***	0.136***	0.133***	0.097***	0.131***	0.092***	0.111***
	(0.015)		(0.032)	(0.022)	(0.019)	(0.019)	(0.021)	(0.024)	(0.026)	(0.027)	(0.031)
Composition as % of total change	-5.6%		-12.0%	-11.2%	-11.3%	-8.3%	-5.3%	3.9%	0.2%	11.8%	3.3%
Wage structure as % of total change	105.6%		112.0%	111.2%	111.3%	108.3%	105.3%	96.1%	99.8%	88.2%	96.7%
Composition components	Coef.	% of total change									
Education	0.008	6.5%	0.003	0.005	0.008	0.008	0.011	0.016	0.022	0.023	0.021
Experience	-0.022	-17.3%	-0.013	-0.018	-0.012	-0.009	-0.010	-0.013	-0.019	-0.018	-0.017
Demographics	0.000	0.2%	-0.003	-0.002	-0.003	-0.003	-0.004	-0.002	-0.004	-0.002	-0.006
Location	0.002	1.7%	0.000	0.001	-0.001	-0.001	0.001	0.002	0.003	0.004	0.007
Job-char.	-0.007	-5.6%	-0.009	-0.007	-0.010	-0.013	-0.015	-0.011	-0.015	-0.011	-0.017
Industry	0.011	8.9%	-0.002	0.002	0.004	0.007	0.010	0.013	0.012	0.016	0.016
Total	*-0.007*	*-5.6%*	*-0.023*	*-0.019*	*-0.015*	*-0.010*	*-0.007*	*0.004*	*0.000*	*0.012*	*0.004*
Wage structure components											
Education	-0.034	-26.8%	-0.015	-0.040	-0.044	-0.036	-0.022	-0.046	-0.071	-0.045	-0.036
Experience	0.014	11.0%	-0.021	-0.075	-0.018	0.008	0.049	0.086	0.034	0.042	-0.035
Demographics	0.042	32.8%	0.003	0.031	0.038	0.050	0.062	0.069	0.062	0.063	0.051
Location	-0.010	-8.2%	-0.006	0.020	-0.016	-0.020	0.008	-0.004	-0.010	-0.033	0.011
Job-char.	-0.005	-4.3%	-0.025	-0.026	0.002	0.009	0.010	0.029	0.001	0.015	-0.049
Industry	-0.058	-46.0%	-0.127	-0.117	-0.057	0.010	-0.016	-0.093	-0.038	-0.073	-0.100
constants	0.186	147.1%	0.410	0.396	0.244	0.116	0.042	0.056	0.153	0.124	0.269
Total	*0.134*	*105.6%*	*0.219*	*0.188*	*0.150*	*0.136*	*0.133*	*0.097*	*0.131*	*0.092*	*0.111*

Note: See Table 3A for information on the variables within each factor group above. Standard errors are not available for the detailed results.

APPENDIX TABLE A2

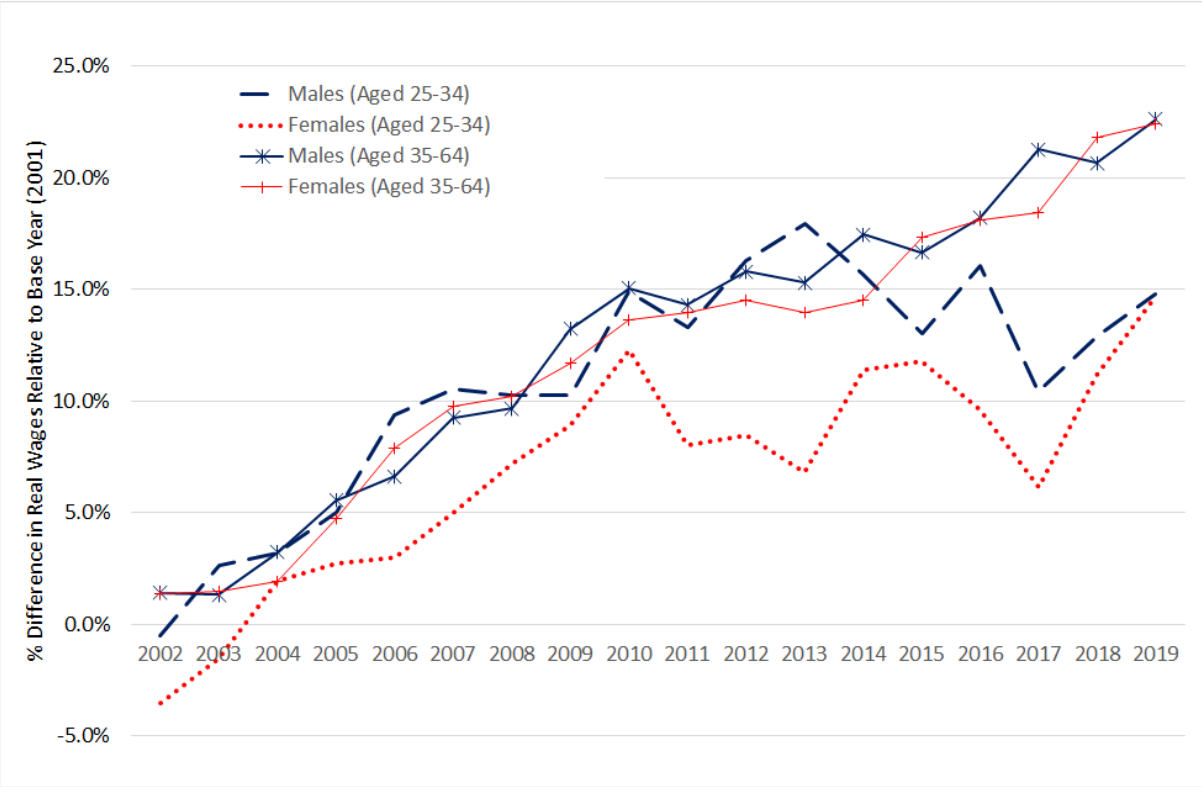
*Oaxaca-Blinder **Detailed** Decompositions of the Changing Real Wage Between 2001/2 & 2018/19, Females*

	mean		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Total log wage change	0.178***		0.228***	0.192***	0.176***	0.189***	0.179***	0.178***	0.194***	0.197***	0.184***
	(0.017)		(0.023)	-0.022	(0.021)	(0.021)	(0.022)	(0.024)	(0.024)	(0.028)	(0.030)
Composition (ΔX)	0.034**		0.022	0.01	0.023	0.029**	0.053***	0.053***	0.039**	0.070***	0.055**
	(0.013)		(0.018)	-0.015	(0.014)	(0.014)	(0.016)	(0.017)	(0.017)	(0.021)	(0.023)
Wage structure ($\Delta\hat{\beta}$)	0.144***		0.205***	0.181***	0.153***	0.161***	0.126***	0.125***	0.154***	0.127***	0.128***
	(0.015)		(0.024)	-0.022	(0.021)	(0.020)	(0.021)	(0.022)	(0.023)	(0.030)	(0.035)
Composition as % of total change	19.2%		9.8%	5.4%	12.9%	16.1%	29.9%	29.9%	20.2%	35.6%	30.1%
Wage structure as % of total change	80.8%		90.0%	94.4%	87.1%	89.8%	70.4%	70.3%	79.5%	64.3%	69.7%
Composition components	Coef.	% of total change									
Education	0.039	22.0%	0.023	0.031	0.040	0.048	0.077	0.075	0.067	0.093	0.079
Experience	-0.011	-5.9%	-0.010	-0.006	-0.009	-0.010	-0.013	-0.013	-0.012	-0.017	-0.018
Demographics	0.006	3.5%	0.002	-0.012	-0.010	-0.006	-0.003	-0.002	0.001	0.003	0.002
Location	-0.002	-1.2%	-0.003	-0.002	-0.002	0.000	0.001	0.001	0.001	0.002	0.000
Job-char.	-0.002	-1.3%	0.012	0.002	0.001	0.002	-0.001	-0.003	-0.003	-0.004	-0.006
Industry	0.004	2.1%	-0.002	-0.003	0.002	-0.006	-0.008	-0.004	-0.014	-0.007	-0.002
Total	*0.034*	*19.2%*	*0.022*	*0.010*	*0.023*	*0.029*	*0.053*	*0.053*	*0.039*	*0.070*	*0.055*
Wage structure components											
Education	-0.030	-16.9%	-0.001	0.007	-0.008	-0.027	-0.095	-0.054	-0.037	-0.094	-0.146
Experience	0.116	65.4%	-0.164	0.071	0.068	0.145	0.188	0.137	0.211	0.213	0.292
Demographics	-0.009	-5.2%	-0.098	-0.023	-0.023	-0.008	0.002	0.001	0.026	0.034	0.079
Location	0.005	2.9%	0.008	-0.026	-0.016	-0.012	-0.035	-0.043	-0.006	0.068	0.043
Job-char.	0.023	13.1%	0.042	0.017	0.031	0.025	0.016	0.009	0.029	0.036	0.038
Industry	-0.042	-23.7%	0.008	0.013	-0.071	0.004	-0.034	-0.058	-0.053	-0.026	-0.089
constants	0.081	45.3%	0.411	0.121	0.173	0.033	0.083	0.134	-0.017	-0.104	-0.089
Total	*0.144*	*80.8%*	*0.205*	*0.181*	*0.153*	*0.161*	*0.126*	*0.125*	*0.154*	*0.127*	*0.128*

See notes to Table A1 above.

FIGURE 1

Changes in the Real Mean Wage, 2001-2019, by Sex and Age



Notes:

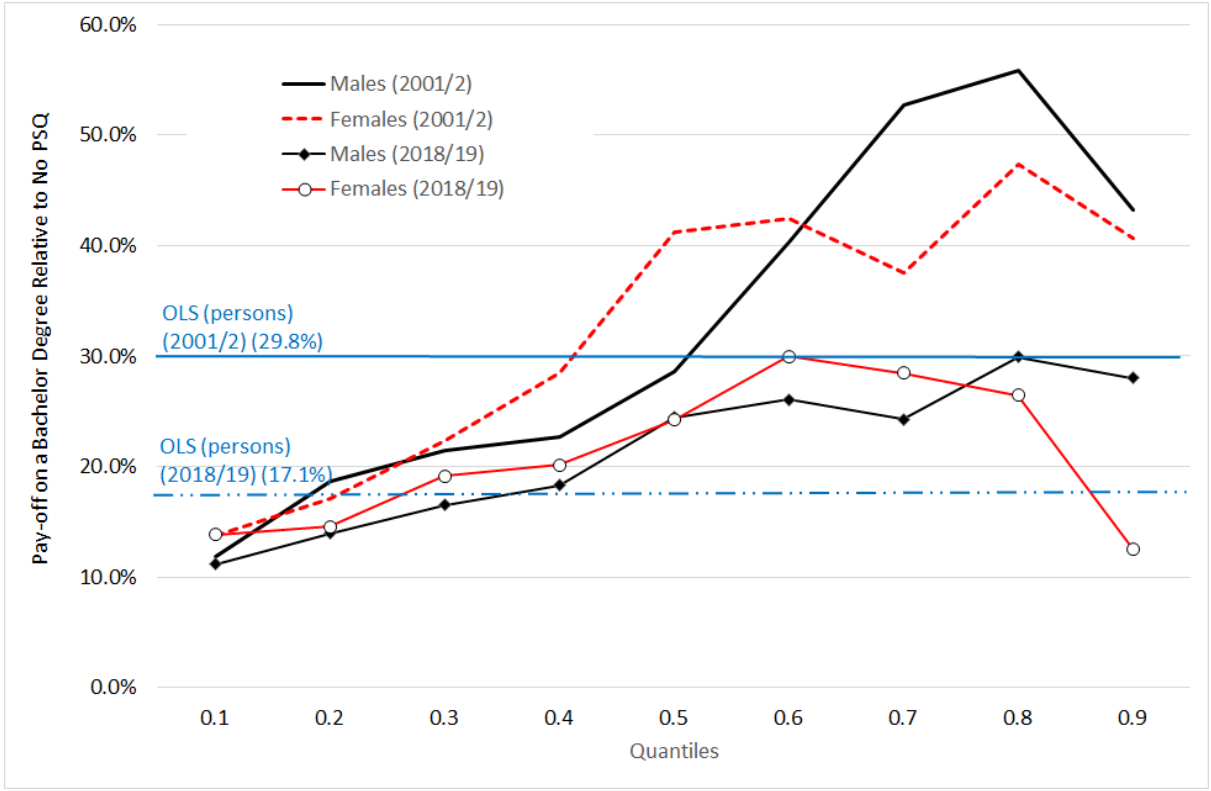
(a) Source. HILDA, Waves 1&2, 18&19.

(b) Estimates are weighted using population weights and are derived from a pooled wage equation estimated over 19 waves of data with controls for education, labour market experience, demographic characteristics, location, job characteristics and industry. The dependent variable is the real hourly wage in 2019 Australian dollars (AUD).

(c) Wage differences (%) based on coefficients on wave dummies. The base year is 2001.

FIGURE 2

Wage Premiums Associated with a Degree Qualification by OLS and Quantile Regression, 2001/2 and 2018/19



Source: HILDA, waves 1&2 and 18&19. Estimates weighted.