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ABSTRACT

Back-to-front Down-under? Part-time/Full-time Wage Differentials in Australia*

In 2003, part-time employment in Australia accounted for over 42% of the Australian female workforce, nearly 17% of the male workforce, and represented 28% of total employment. Of the OECD countries, only the Netherlands has a higher proportion of working women employed part-time and Australia tops the OECD league in terms of its proportion of working men who are part-time. In this paper we investigate part-time full-time hourly wage gaps using important new panel data from the first four waves of the new Household, Income and Labour Dynamics in Australia Survey. We find that, once unobserved individual heterogeneity has been taken into account, part-time men and women typically earn an hourly pay premium. This premium varies with casual employment status, but is always positive, a result that survives our robustness checks. We advance some hypotheses as to why there is a part-time pay advantage in Australia.

JEL Classification: J16, J22, J31

Keywords: part-time, full-time, efficiency hours, gender

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1. INTRODUCTION

In 2003, part-time employment in Australia accounted for over 42% of the Australian female workforce, nearly 17% of the male workforce, and represented 28% of total employment (OECD, 2004). Of the OECD countries, only the Netherlands has a higher proportion of working women employed part-time and Australia tops the OECD league in terms of its proportion of working men who are part-time.[1] Against this background, our aim is to investigate whether there is, in Australia, a pay premium or penalty associated with part-time work relative to full-time work. We also explore the degree to which observed pay gaps differ by gender.

Part-time jobs are often viewed as bad jobs with low pay and little career prospects (Blank, 1990). Studies based on representative survey data typically find a part-time pay penalty (for a review of US studies see Hirsch (2004), and for the UK see *inter alia* Simpson (1986), Main (1988), Blank (1990), and Ermisch and Wright (1992)). However, more recent analysis by Hirsch (2005), using US panel data, finds little evidence of a pay gap between part-time and full-time women, although he does find a part-time pay penalty for men. Rodgers (2004) analyses cross-sectional data from Wave 1 of the new Household, Income and Labour Dynamics in Australia (HILDA) Survey, carried out in 2001. Although her raw data indicate a part-time pay penalty for female and male employees, this vanishes once observables and unobservables have been taken into account. Using a selection model to control for unobservables, she finds a part-time wage premium of 9% for women and 3% for men, although neither is statistically significant at the 5% confidence level.[2]

[1] According to the OECD Employment Outlook (2004:310), the OECD average for 2003 was 25% for women and 7% for men.

[2] Rodgers (2004) estimates a multinomial logit model of selection into part-time work and full-time work. The coefficient to lambda - the selectivity term – is positive and statistically significant in her full-time worker wage equations but is not statistically significant in her part-time wage equations.

In this paper we extend Rodgers' (2004) cross-sectional analysis by exploiting panel data from the first four waves of the HILDA Survey, which span the years 2001-2004. These data afford an opportunity to control for unobservables using panel data techniques. To our knowledge, ours is the first study using representative Australian panel data to estimate part-time/full-time wage differentials, probably because a suitable panel dataset has only very recently become available with the HILDA Survey. Important advantages of these data are that they provide a very rich set of controls and that they allow for estimation controlling for unobserved heterogeneity.

Our empirical analysis closely follows that of Hirsch (2005) using US data, although we deviate from his approach in allowing for a unique aspect of the Australian industrial relations system, the practice of "casual" employment. Casual workers in Australia are defined as those who are ineligible for sick and holiday pay entitlement and who are often paid a wage premium as a compensating differential (see Wooden and Warren, 2003, and references therein). Some 41% of part-time women in our sample and 60% of part-time men are classified as casual, and it is therefore important to distinguish carefully between casual and non-casual status in estimating pay differentials.

Our empirical analysis reveals that, once unobserved individual heterogeneity has been taken into account, part-time men and women in Australia typically earn an hourly pay premium. This premium varies with casual employment status. Thus part-time women who are on casual contracts earn more than part-time non-casual women, who in turn earn more than the full-time women *ceteris paribus*. However part-time men who are casuals earn less than part-time non-casual men, although they still earn more than full-time men, all else equal. These results survive our robustness checks. They suggest that, to some extent, the part-time pay advantage represents a compensation for the ineligibility of casual workers for holiday and sick pay. But that is not the only story,

since part-time workers who are non-casual also enjoy a pay advantage. In the conclusion of the paper, we discuss some hypotheses that are consistent with these stylized facts.

In the next section we briefly review hypotheses about part-time and full-time pay. Section 3 then outlines the econometric model, while Section 4 describes the data source and the raw data. The estimates are reported in Section 5, followed by the robustness checks. The final section concludes.

2. BACKGROUND

There are a number of hypotheses about the determinants of part-time/full-time wage differentials. Some suggest that part-time work should be associated with a penalty, while others suggest it might command a premium. Although all depend on the interaction of demand and supply factors, we group them below under the broad headings of demand-side factors, supply-side factors, and institutional aspects.

Demand-side factors

Fixed employment costs might mean firms prefer employees to work longer hours in order to recoup hiring and setup costs. According to this hypothesis, there should be a penalty to part-time work to enable firms to recover setup costs. However the "efficiency hours" hypothesis can predict the reverse. Suppose there is a hill-shaped relationship between hourly efficiency and the number of hours worked in a day or a week, as suggested by Booth and Ravallion (1993) in the debate on effects of hours cuts. To the extent that part-time workers are found on the rising part of the hill-shaped hourly efficiency profile, their average productivity will be higher than that of individuals working sufficiently long hours that they are on the declining part of the efficiency hours profile. If this is the case, part-time work might be associated with a pay premium.

An alternative hypothesis relates to firm's production schedules. Some firms' production technologies require part-time workers for demand peaks. For example, supermarkets and restaurants have variable demand, which might be best met by part-time workers. If there is a fixed supply of such workers, any wage gap will reflect relative demand and supply factors.[3]

Finally, firms might have more market power over part-time workers than full-time workers. For example, part-timers might have childcare commitments constraining them to seek work close to home, and therefore reducing their outside options. This could give employers a greater degree of market power over part-time workers and result in a part-time pay penalty.

Supply-side factors

Part-time work might suit worker's heterogeneous preferences, which can of course be affected by policies such as tax-benefit packages. Whether or not there are wage differentials depends on the supply of workers who prefer part-time work and the demand for them.[4]

According to human capital theory, individuals who anticipate working part-time will invest less in education than those who intend to work full-time. In addition, part-time workers accumulate experience capital at a lower rate than full-time workers, because they supply fewer hours. We should therefore observe in the raw data a part-time pay penalty, as part-time workers are likely to have lower levels of both human and

[3] Firms that are able to offer a range of part-time and full-time jobs might face better choice of workers. In countries where part-time work is preferred by many workers, firms could tinker the mix of jobs according to preferences of local labour supply. Firms in good position to offer part-time jobs might be in strong bargaining position to drive down part-time pay. Firms in poor positions might have to increase part-time pay.

[4] With only two exceptions - Australia and the US - mandatory job-protection and paid maternity leave provisions exist in all the countries reviewed by the OECD survey (OECD, 2001).

experience capital. However, any such penalty should be reduced once we control for education and experience in the multivariate estimation.

Institutional Factors

Effective marginal tax rates in Australia are high for relatively low-skilled second earners. Apps (2004) documents the very large effective marginal tax rates that operate with the removal of certain family benefits as the second earner moves into taxable market work. As a consequence, firms requiring part-time workers – for example to meet demand peaks - may have to pay more to attract marginal workers into market-sector employment.

Australia is characterized by a unique award system of rates of pay (see Pocock, 1995, for a summary of how this affected women in particular). Award provisions are largely designed to meet the needs of the industry concerned, as well as to protect future employment of both part-time and full-time employees (Hawke, 1993). Although the Australian award system has been changing, part-time and full-time workers are not distinguished through the award system. However it is possible for individual agreements to allow particular workers to be paid above award agreements.

The Australian casual pay premium is enshrined in awards, where casual workers are defined as those who are ineligible for sick and holiday pay entitlement (for an extensive discussion, see Wooden and Warren, 2003). However not all part-time workers are casual, as we shall see below.

Finally, note that – unlike many US firms - Australian firms do not offer health insurance to their employees. However they are required to make compulsory

superannuation (pension) contributions for employees earning more than A$450 per month, and who are over 18 and under 70 years of age.[5]

3. THE ECONOMETRIC MODEL

Our basic estimating equation, which incorporates the influences of various observed and unobserved characteristics on the log of hourly wages, is given by:

$$\ln w_{it} = X'_{it}\beta + \alpha P_{it} + \mu_i + \varepsilon_{it} \qquad (1)$$

where $i=1,\ldots,N$ represents the number of individuals at each wave and $t=1,\ldots,4$ is the number of waves. Note that $\boldsymbol{X}_{it}$ is a vector of characteristics that influence the outcome variable w_{it}; the associated parameter vector is β; P_{it} denotes part-time employment status; μ_i is an unobserved individual-specific effect; and ε_{it} is a random error term. The parameter of interest is α.

Cross-sectional estimation of equation (1) is likely to produce biased estimates of α, since individuals are likely to self-select into full-time employment status based on unobservable factors. Suppose that μ_i denotes an individual's ability in market production relative to home production and μ_i is fixed over time. Suppose further that this is negatively correlated with self-selection into part-time jobs and positively correlated with hourly wages. Then the estimated coefficient for part-time work in a cross-sectional regression will be negatively biased through the omission of any control for unobserved μ. However, once appropriate control has been taken of unobserved heterogeneity, we would expect that the part-time wage gap would become larger,

[5] This compulsory Superannuation Guarantee Contribution Scheme was introduced by the Australian Government in 1992. It requires employers to pay 9% of an employees' salary into a superannuation fund. Prior to 2002 the amount was 3%. See the Australian Tax Office (2005) for further details. Individuals can also choose to make extra voluntary contributions to their superannuation, for which they receive tax breaks. In addition to this scheme, there is a means-tested state-funded old age pension provided by the Government.

ceteris paribus. Since failure to control appropriately for unobservables will result in omitted variable bias to the coefficient α, we utilise panel data techniques to control for unobserved heterogeneity in estimating equation (1).[6] We then compare these with the estimates obtained from ordinary least squares (OLS) using pooled person-year observations. Our standard errors for the latter models are robust to heteroskedasticity, clustering by respondents' cross-wave identifier.

4. THE DATA, VARIABLES AND RAW PART-TIME WAGE GAP

4.1 The Data

The Household, Income and Labour Dynamics in Australia (HILDA) survey is a nationally representative random-sample panel survey of private households in Australia. The first four waves span the period 2001-4.[7] HILDA is particularly appropriate for studying part-time/full-time wage gaps, for several reasons. First, usual pay and hours information is given for the main job (facilitating classification into part-time based on hours in main job). Second, there is a very rich set of other controls potentially affecting wage determination, including casual and contract status. Clearly the richer the set of controls, the lower is unobserved heterogeneity.

A further advantage to estimating the part-time/full-time wage gap using Australian rather than US data is that health insurance through the job is extremely rare in Australia, and thus the wage gap should not be influenced by differences in health insurance. However, as noted above, Australian employers are required to make compulsory

[6] In preliminary analysis, we also estimated a sample selection model of participation and wages. Since the inverse Mills ratio in the wage equations was statistically significant, we do not report this in the results described in detail in Section 5 below.

[7] The survey is a longitudinal study of representative households in Australia. For details, see http://www.melbourneinstitute.com/hilda. Wave 1 comprised 7682 households with 13,969 respondents aged 15 years and over.

superannuation (pension) contributions for employees earning more than A$450 per calendar month.[8] The vast majority of our sample are covered by this. In one of our robustness checks reported in Section 5, we impute coverage using information on salaries, and include this additional variable in our preferred specification.

Our analysis covers full-time and part-time employees aged between 18 and 60 years in Wave 1, who are not in the armed forces, farming or fisheries, and with valid information on our main variables (hours of work, salary, and whether casual or permanent). We exclude the self-employed and owner-managers drawing a salary from their own businesses. Individuals reporting over 100 working hours per week (hours are used to derive hourly wages) were dropped, as were full-time students. Where there were many missing observations for control variables, we created dummy variables indicating their status, to maintain reasonable sample sizes. Our estimating subsample therefore represents an unbalanced panel of respondents who are present - and satisfy the selection criteria - in at least two adjacent waves. It comprises 2,386 women and 2,427 men, representing 7,774 person-year observations for women and 8,097 person-year observations for men. We estimate all our models separately for men and women, since initial testing indicated it was inappropriate to pool them.

4.2 The Variables

The dependent variable in equation (1) is the *hourly wage rate* in the main job. To calculate this, we used the HILDA derived variables for the current weekly gross wages and salary for the main job, and for hours worked per week in the main job during the

[8] Employees who are covered by this may also choose to make contributions, typically deducted from gross pay at the job. The HILDA Survey does not indicate if individuals are covered by employer's superannuation contributions, although the special wealth module in Wave 2 did include this question.

survey week.[9] We deflated wages to 2001 (wave 1) levels using the headline Consumer Price Index (CPI) from the Australian Bureau of Statistics. Respondents earning less than A$1 or more than A$100 in 2001 values were omitted from the analysis. No imputed data are released with the HILDA Survey and therefore none are used in the analysis (apart from the "no superannuation coverage" variable discussed at the end of Section 5).

Our measure of *part-time* work is based on individuals' usual hours of work in their main job (including any paid or unpaid overtime for work done at the workplace or at home). Part-time status is assigned to individuals reporting fewer than 35 hours per week.[10] This is also the definition of part-time work used by Rodgers (2004).

Following the procedure recommended by Wooden and Warren (2003), we adopt a measure of *casual* work based on self-assessment. The precise question eliciting this information is as follows: "Looking at (showcard), which of the following *best* describes your current contract of employment? Employed on a fixed term contract; employed on a casual basis; employed on a permanent or ongoing basis; other." We used responses to this question to construct indicator variables, which we include as controls in our multivariate regression analysis, including a dummy variable for casual work. We also interact this casual status variable with part-time status.[11]

Table A.1 in the Appendix gives the means of the main variables of interest, disaggregated by gender and by full-time or part-time employment status. Full-time women work on average 42 hours per week and earn an average hourly wage of

[9] If the reported wages and salary for the main job in the survey week are not the usual wages and salary then the usual wages and salary were substituted in the derivation. Where the reported hours for the main job varied, the average hours worked per week were substituted.

[10] This differs from the Australian Bureau of Statistics measure, where part-time workers are defined as those who reported that they worked fewer than 35 hours per week in *all* of their jobs in the survey week. Australian Bureau of Statistics Labour Statistics: Concepts, Sources and methods. Catalogue number 61020.55.001 Updated 28 July 2005.

[11] As discussed below, and shown in Table A.1, there is little difference across part-time and full-time workers in the extent of fixed term contracts, and so we do not interact this variable with part-time status in our multivariate analysis. Moreover, the cell sizes are relatively small for this variable.

A$17.66, while part-time women work 20.6 hours to earn A$16.74. This compares with full-time men who work 45.15 hours (earning A$19.89) and part-time men who work on average 20.80 hours (and earn A$16.78). A greater proportion of part-time workers of both sexes are casual (41% of women and 60% of men). Some 95% of full-time women and 94% of full-time men have only one job, as compared with 84% and 77% of part-time women and men respectively. Fewer part-time workers of both sexes are on standard daytime schedules. Slightly more full-time workers are on fixed-term contracts, with 11.6% of full-time women and 8.5% of part-time women on fixed-term contracts, while 9% of full-time men and 7% of part-time men are on fixed-term contracts.

There are also some interesting differences across demographic and educational variables. Proportionately more married and fewer cohabiting women work part-time while more married or cohabiting men work full-time. Full-time women and men are on average around 38 to 39 years old, while part-time women are 40 and part-time men 36. Experience and occupational tenure levels are fairly similar for full-time and part-time women, but part-time men are less experienced and have lower tenure levels (both in the occupation and in the firm) than full-time men who have the highest levels of these variables.[12] Typically there are differences of between 2 to 3 years in mean employer and occupational tenures. Full-time and part-time women have very similar occupational tenure at nearly 9 years. For men there are relatively large differences between full-time and part-time employees for both tenure measures.[13] Finally, note that full-time women

[12] The experience variable is a derived history variable issued with the dataset. The variable takes the data on years/months in paid employment at wave 1 or as collected from the new person questionnaire for a new survey entrant and the variable is updated with data suppled in the calendar section of the questionnaire for subsequent waves. The experience variable used is the HILDA derived variable for the actual time spent in paid work in years. For new persons, the value reported by the respondent is used. For continuing persons, the time spent in paid work as recorded in the calendar is added to the value for the variable reported in the previous wave. If the respondent was not interviewed in wave 2, then the calendar data is added to the value recorded for wave 1.

[13] Tenure with current employer variable (_JBEMPT in the questionnaire) was derived, by the Melbourne Institute, from the information supplied by the respondent at each wave. The derivation simply integrates the weeks and years into years with current employer. Tenure in current occupation variable (_JBOCCT)

have higher educational levels than full-time men: 37% of full-time women and 26% of full-time men have at least a university degree and above. The proportions of part-time women and men with at least a university degree are around 26%.

4.3. Transitions

Next we turn to transitions across adjacent waves between our principal states of interest – into and out of part-time work and into and out of casual status - disaggregated by gender. Table 1(a) shows female transitions between these four states: part-time casual, part-time non-casual, full-time casual, and full-time non-casual. (As noted under the table, in the interests of parsimony other possible transitions are not shown.) The stayers are on the leading diagonal and all the movers are in the 'off-diagonal' cells. Thus we see, for example, that 125 women changed from part-time non-casual to part-time casual across waves, while 200 women changed from part-time casual to part-time non-casual. Of those 818 women who were part-time casual or non-casual in one wave, 367 were full-time casual or non-casual by the next wave. Figure 1(b) shows analogous transitions for men. Note that there are far fewer transitions between our states of interest for men than there are for women.

Our initial fixed effects estimation (reported in Section 5.1) does not distinguish individuals moving into part-time status from individuals moving out of part-time status, in part because this reduces the number of cases making such a transition, as Table 1 makes clear. However, in one of our subsequent robustness checks we do make this distinction, as will be seen in Section 5.2.

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was derived in the same way ie. the weeks and years that the respondent has worked in the current occupation is integrated into years.

4.4 The Distribution of Hours and Hourly Wages

Figures 1(a) and 1(b) give the distribution of usual weekly hours worked in the main job for women and men respectively (where observations are pooled across waves). For both men and women there is a spike at 40 hours per week, but female hours are also more dispersed across the lower part of the distribution. In addition, there are small spikes at five hourly intervals, as is usual in reported hours per week.

Figure 2 shows mean hourly wages by hours worked across the distribution (from 0 to 60 hours). Inspection of these figures reveals first, that there is considerable noise at hourly intervals not divisible by five (fewer workers are observed at these points) and also at the bottom of the hours distribution. Second, there is a relatively flat profile especially over the interval 5 to 50 hours for women and for men around 18 to 50. This is in contrast to results for the US found by Hirsch (2004), where hourly wages increased across the hours distribution and especially so for men. Third, there is a slight tendency for hourly wages to decline with hours worked for women and men supplying more than 50 hours per week, perhaps reflecting the fact that some of these workers are not paid for overtime hours, as happens with some salaried workers.

5. PART-TIME/FULL-TIME WAGE GAP ESTIMATES

5.1 The OLS and FE Estimates

We estimate equation (1) separately by gender. The results are reported in Table 2 for the five different specifications described in the notes under the table. For each specification we report the pooled estimates and the fixed effects (FE) estimates of

equation (1).[14] The SEs for the pooled OLS estimates have been corrected for clustering. For readers interested in the impact of other variables, we report in Appendix Table A.2 the full set of estimates from Specification [3].

The first panel of Table 2 reports estimates for the main parameters of interest from Specification [1], which includes a constant, wave dummies, the part-time work variable, the casual work variable, and an interaction between the two. The interaction is included because it is often argued that part-time workers are predominantly casual workers and perhaps this is why they are paid more. However, while it is sometimes argued that the majority of part-timers are casual, our data show this is the case only for men. Casual women are in the minority amongst part-time women, as the means reported in Appendix Table A.1 indicate.[15]

The pooled OLS estimates in Specification [1] show that wages are around 1% lower for part-time women who are not casual workers, although this coefficient is not statistically significant. The base is full-time non-casual women. But once part-time women's casual status is taken into account, their wages are nearly 9% higher (ie -0.012 + 0.098 = 0.086) than full-time women. Full-time workers who are casual earn around 23% lower wages than full-time women who are non-casual. A similar result is found for men. But the FE estimates of Specification [1] tell a different story. There is now a statistically significant part-time pay *advantage* for both women and men. Only for part-time men does casual status diminish the pay advantage. The interaction coefficient is -0.078 for men, but is positive for women, though statistically insignificant.

Next consider Specification [2], containing all the additional individual characteristics as detailed in the notes under Table 2. As shown in the second panel of

[14] FE is consistent when μ_i and the x_{ijt} are correlated. In preliminary analysis we also estimated random effects models. However since the FE estimates were preferred across all specifications, we report only these and the pooled OLS estimates in the interests of space.

[15]

Table 2, the FE estimates of the part-time coefficient are again positive and statistically significant, and represent a pay advantage of about 9% for women and 14% for men.[16] The interaction variable *PT*Casual* is also statistically significant for both women and men, albeit only at the 10% level. Non-casual women in part-time work enjoy a pay advantage over full-time non-casual women of just over 9%. But if such women are casual as well as part-time, their pay advantage increases to nearly 15%. Non-casual part-time men enjoy a larger pay advantage, of about 14%, over full-time men. However, if men are both part-time *and* casual, their pay advantage relative to full-time permanent workers falls to around 9%. Notice that the estimated coefficient to casual status on its own is not statistically significant across all FE specifications. Casual status does not significantly affect the wages of full-time male and female employees. It is only through its interaction with part-time status that it has an effect.

Specification [3] adds in additional controls for education, employer tenure and experience, our three measures of human capital. We know from the means in Table A1 that PT workers are on average less educated, have lower tenure with the current employer, and are less experienced than full-time workers. As expected, once these variables are included, the part-time pay advantage increases further, albeit only by a small amount. We also re-estimated Specifications [3] to [5] using occupational tenure in place of employer tenure. This made no difference to the FE estimates, but it did result in very small changes to the pooled OLS estimates.[17]

[16] The FE estimates are identified from individuals changing their employment status between waves, and the number of changers for each sex are reported in Table 1. It is interesting that the majority of the changers for whom we have information about the employer stayed with the same employer. Note however that not all changers were asked the question eliciting this information.

[17] Controlling for occupational rather than employer tenure in Specification [3], our pooled OLS estimates for women were -0.011 (0.87) for the part-time coefficient, -0.147 (5.14) for the casual coefficient and 0.104 (3.24) for PT*casual. For men, the pooled OLS estimates were -0.062 (1.82) for the part-time coefficient, -0.069 (3.26) for the casual coefficient and 0.070 (1.57) for PT*casual. The FE estimates were virtually identical to those reported in Table 2 regardless of the tenure measure used.

Each of the additional specifications in Table 2 incrementally adds in blocks of explanatory variables, in the order given in the notes under the table. We included occupational status dummy variables only in the last specification, Specification [5], since occupation is potentially endogenous. Note that our estimated parameters of interest do not alter with the inclusion of this set of occupational dummies. Controlling for occupational change, there is still a large part-time pay advantage. It is interesting to see that the OLS estimates for part-time women across Specifications [3] to [5] are positive, although statistical significant only for Specifications [4] and [5]. Moreover, the OLS estimates show that, once the interaction is taken into account, PT casuals enjoy a larger pay advantage.

To summarise, the FE estimates show that part-time non-casual women – once other observable and unobservable characteristics have been taken into account - earn a pay premium of around 10 log points over and above comparable full-time colleagues. But if they are casual as well as part-time, their pay advantage increases to around 14-15 log points. However, the majority of part-time women are non-casual. In contrast, part-time non-casual men enjoy a pay advantage over full-time comparable men of around 15% but this drops to around 10% if they are casual as well as part-time. And the majority of part-time men are casual.

These findings suggest that there is self-selection into part-time work. We controlled for this by differencing out time-invariant unobservables that could otherwise lead to negatively biased coefficients to our variables of interest, part-time and casual status. This negative selection is consistent with the results of Hirsch (2005) and Rodgers (2004).

5.2 Robustness Checks

In this subsection we undertake a number of robustness checks. First, we investigate whether or not our results sensitive to the 35 hour cut point defining part-time work. Second, Figure 2 showed that there was considerable noise in the data at low hours, and we investigate if our results are sensitive to exclusion of those observations at very low hours. Third, our FE estimates so far have treated changes into part-time status the same as changes out of part-time status, and casual status has been similarly treated. We therefore experiment with relaxing this assumption and treating changes into these employment types separately from changes out of these states. Finally, we investigate whether or not those few workers whose employers do not make superannuation contributions on their behalf are paid a wage differential to compensate for their lack of superannuation accumulation.

Table 3 displays the results of these different robustness checks. To save space, we report only the estimated coefficients for the parameters of interest from Specification [3]. Recall that our definition of part-time work was based on usual hours of work in the main job being less than 35 hours. But individuals in the neighbourhood of this margin might have been erroneously classified as part-time when they were actually full-time, or vice versa. To take this possibility into account, in our first robustness check we dropped all cases whose reported usual hours of work in their main job lay in a band of 6 hours around 35 hours. Thus we dropped men and women whose usual hours lay between 32 and 37 hours inclusive. The pooled OLS and FE estimates from this exercise are reported in the first panel of Table 3. The FE estimates are now larger compared to Specification [3] in Table 2 and remain statistically significant.

As our second robustness check, we restored those observations described above and instead dropped from our estimating sub-sample all individuals whose usual hours

were less than five. We did this to eliminate from the sub-sample the noisy observations illustrated in Figure 2. In the second panel of Table 3, we report our estimates obtained from this sub-sample. Again we find that the estimates are very similar to those for Specification [3] in Table 2. We next repeated this procedure on a further-reduced sub-sample in which we dropped all individuals whose usual hours were less than ten. These estimates are reported in Panel 3 of Table 3. The FE estimates are slightly smaller than before, although still large and statistically significant. However for women the part-time*casual effect is only statistically significant at the 10% confidence level.

As our next robustness check, we distinguished between individuals moving into and out of part-time status, and into and out of casual status. The fourth panel of Table 3 displays the results from this estimation. There were very small numbers of cases making some of these transitions, as indicated in the transition matrix of Table 1. For this reason, we would not wish to place too much emphasis on these results. Nonetheless, they do show that moving into part-time work is, *ceteris paribus*, associated with a pay gain, while moving out is associated with a pay loss. This is found for both the OLS and FE estimates, although not all are statistically significant. Consider women for example. The FE estimates indicate that shifting from full-time to part-time work is associated with a 9% gain, while the reverse transition involves a 7% wage loss. A shift into part-time *and* casual generates an extra 8% gain.

Finally, we investigated whether or not those workers whose employers do *not* make superannuation contributions on their behalf are paid a compensating wage differential. Using information from the Australian Tax Office about allowable exclusions from the compulsory Superannuation Guarantee Contribution Scheme (SGCS),[18] we constructed a dummy variable "no super" taking the value 1 if an

[18] HILDA does not provide this information, apart from in Wave 2, so we had to impute it from earnings per calendar month in the main job. There are two instances where the employer of a person working less

individual earned less than $450 per calendar month in his or her main job and zero otherwise. The number of cases in this "no super" category was extremely small, being 4.01% of female person-year observations and just 0.90% of male.

The results of re-estimation of Specification [3] including this variable are reported in the last panel of Table 3. *Ceteris paribus*, workers who are *not* eligible for coverage by the provisions of the SGCS have hourly wages that are significantly lower than those who are eligible. These results suggest that there is no compensating differential for the lack of mandatory employer pension contributions for uncovered workers. Perhaps this is unsurprising, since "no super" is also an indicator for being towards the bottom of the earnings distribution, where workers are unlikely to have any market power and by construction workers in the "no super" group are on average low paid. Nonetheless we reported these results for completeness. The estimated coefficients for part-time work and its interaction with casual status are similar to those reported in Table 2 for Specification [3], although for women part-time status alone has a smaller impact while the interaction has a larger impact. Both coefficients are statistically significant. For men, part-time status alone has a smaller impact. Its interaction with casual also has a smaller impact and the latter is not statistically significant. Nonetheless there remains a clear pay advantage to part-time work for Australian women and men.

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than 30 hours per week and earning more than $450 in a calendar month is not required to contribute to the Superannuation Guarantee Scheme: (a) if the person is less than 18 years of age; (b) if the person is employed for domestic or private work. The first case is not a problem for us following our age sample selection criteria. The second case is a problem as we cannot identify these people easily in our sample. They will include domestic cleaners/housekeepers and education professionals such as private art or music teachers and others. To identify them we need an occupational code at the 4-digit level and we only have the 2-digit code. We have 3 respondents who are employed by private households, 2 of whom work 15 hours per week but earn more than $450 per month. We incorporate these in our "no_super" measure. Finally, note that the $450 per calendar month in main job must be based on ordinary time earnings so that no overtime is included. However the HILDA respondents are asked to state their usual hours of work including overtime. We may therefore have some respondents in the file who have given wages/salary figures that include overtime payments.

6. CONCLUSIONS

Our empirical analysis revealed that, once unobserved individual heterogeneity is taken into account, part-time men and women in Australia typically earn an hourly pay premium. This premium varies with casual employment status. Thus part-time women who are on casual contracts earn more than part-time non-casual women, who in turn earn more than the full-time women *ceteris paribus*. However part-time men who are casuals earn less than part-time non-casual men, although they still earn more than full-time men. These results suggest that, to some extent, the part-time pay advantage represents a compensation for the ineligibility of casual workers for holiday and sick pay. But that is not the only story, since part-time workers who are non-casual also enjoy a pay advantage. Moreover our robustness checks indicated these findings are quite stable. Our penultimate robustness check – distinguishing between changes into and out of part-time status and casual status – suggested the wage *advantage* from shifting into part-time work was slightly larger in absolute terms than the wage *penalty* from shifting out of part-time work, although the difference was very small.

What hypotheses are consistent with these stylized facts? Our discussion can only speculative, since we are unable to distinguish empirically between hypotheses with our data. In the Australian context, the only way part-time workers can earn more is through individual agreements paid above awards agreements, or because part-time workers are less likely to work extra hours, which has the effect of bringing down measured hourly wages for FT workers.[19]

Our interaction results (in which part-time status was interacted with casual status), suggest that the part-time pay advantage is to some degree a compensating wage differential for the lack of holiday and sick pay entitlement experienced by most casual

[19] We are grateful to an anonymous referee for making these two points.

workers. But nonetheless, even part-time non-casual workers enjoy a part-time pay advantage. Why might firms be willing to pay non-casual part-time workers more than their full-time counterparts? One candidate explanation is high effective marginal tax rates drive up part-time wages. The part-time pay premium could reflect the high effective marginal tax rates faced by relatively low-skilled second earners in Australia (Apps, 2004). As a consequence, firms with strong demand for part-time workers may have to pay more to attract these workers.

Another candidate explanation is that part-time workers are more productive for the time that they are at work. According to the efficiency hours hypothesis, part-time workers may be more productive because they are more focused on their jobs for a shorter time period each day and therefore are on the rising part of the hours-productivity hill. For this reason firms might be willing to pay part-time workers a pay premium. Booth and Van Ours (2005), also using the HILDA dataset, found that partnered women's life satisfaction is higher if they work part-time. It is conceivable – although impossible to test with these data - that this greater life satisfaction might spill over into higher workplace productivity.

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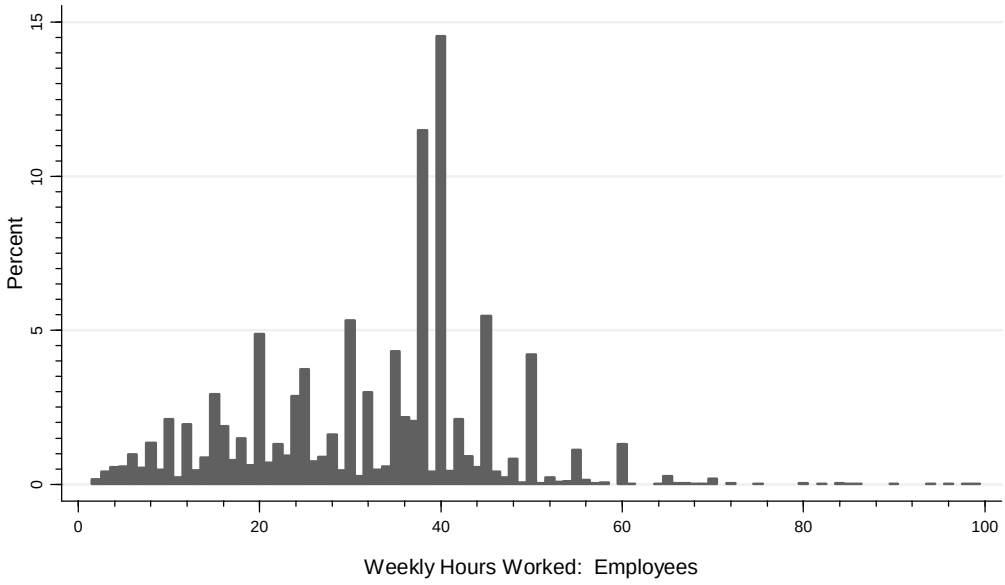
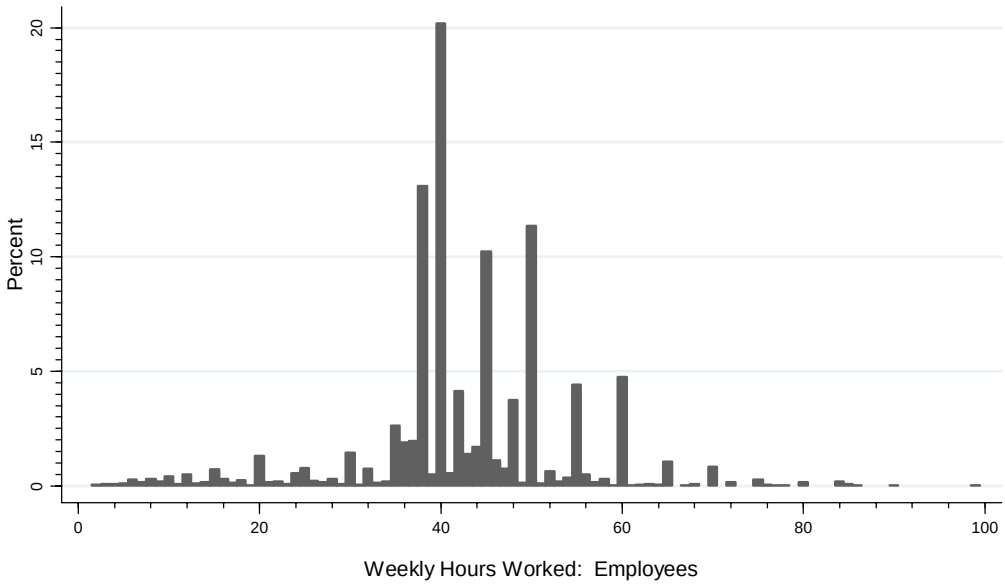
Figure 1(a): Females - Hours per Week in Main Job



Note: Excludes low and high income earners

Figure 1(b): Males - Hours per Week in Main Job



Note: Excludes low and high income earners

Figure 2(a): Females - Mean Hourly Wage by Hours Worked

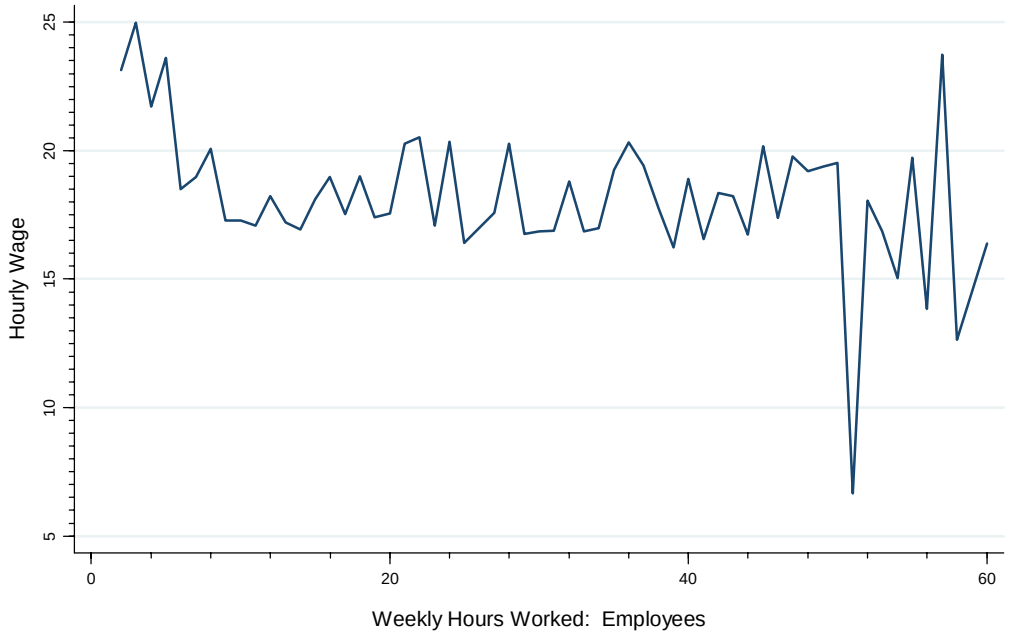


Figure 2(b): Males - Mean Hourly Wage by Hours Worked

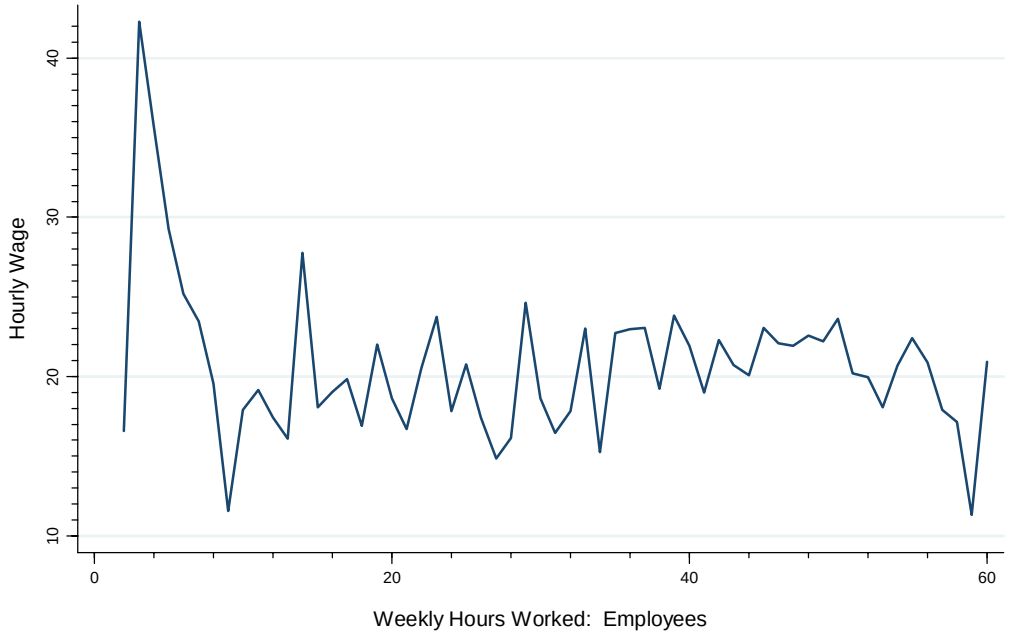


Table 1(a): Transition Matrix Showing Changes in Part-time and Casual Status Across Waves, Women

Time t	Part-time Casual t+1	Part-time Non-casual t+1	Full-time Casual t+1	Full-time Non-casual t+1
Part-time Casual at time t	693	200	41	106
Part-time Non-casual at time t	125	1093	12	208
Full-time casual at time t	30	12	51	78
Full-time Non-casual at time t	68	215	48	2408

Notes: (i) Data from waves 1 to 4 of the HILDA Survey for employees with data for all waves or at least two consecutive waves. (ii) Other transitions (for example from part-time casual or non-casual to part-time fixed term contract or to part-time in the residual contract type category) are not illustrated in this transition matrix.

Table 1(b): Transition Matrix Showing Changes in in Part-time and Casual Status Across Waves, Men

Time t	Part-time Casual t+1	Part-time Non-casual t+1	Full-time Casual t+1	Full-time Non-casual t+1
Part-time Casual at time t	197	42	35	86
Part-time Non-casual at time t	85	128	11	60
Full-time casual at time t	33	6	128	152
Full-time Non-casual at time t	47	49	85	4583

Notes: (i) Data from waves 1 to 4 of the HILDA Survey for employees with data for all waves or at least two consecutive waves. (ii) Other transitions (for example from part-time casual or non-casual to part-time fixed term contract or to part-time in the residual contract type category) are not illustrated in this transition matrix.

Table 2: Estimates of Part-time/Full-time Log Wage Differential

		WOMEN		MEN	
Specification	**Variables**	**Pooled**	**FE**	**Pooled**	**FE**
[1]	Part-time	-0.012	0.098	-0.129	0.147
		(0.82)	(7.67)	(3.35)	(6.99)
	Casual	-0.229	-0.006	-0.213	0.170
		(8.05)	(0.29)	(10.86)	(1.06)
	Part-time*Casual	0.098	0.035	0.125	-0.078
		(2.95)	(1.45)	(2.59)	(2.82)
[2]	Part-time	-0.036	0.096	-0.073	0.139
		(2.54)	(7.46)	(1.96)	(6.60)
	Casual	-0.222	-0.023	-0.128	0.002
		(7.38)	(1.02)	(5.92)	(0.15)
	Part-time*Casual	0.130	0.047	0.106	-0.052
		(3.79)	(1.88)	(2.23)	(1.89)
[3]	Part-time	-0.002	0.101	-0.062	0.156
		(0.18)	(7.85)	(1.85)	(7.41)
	Casual	-0.132	-0.020	-0.053	0.010
		(4.52)	(0.89)	(2.41)	(0.60)
	Part-time*Casual	0.095	0.055	0.059	-0.056
		(2.94)	(2.22)	(1.34)	(2.03)
[4]	Part-time	0.156	0.103	0.000	0.156
		(1.32)	(7.98)	(0.00)	(7.41)
	Casual	-0.085	-0.015	0.013	0.007
		(2.86)	(0.68)	(0.62)	(0.44)
	Part-time*Casual	0.092	0.053	0.050	-0.051
		(2.83)	(2.15)	(1.16)	(1.86)
[5]	Part-time	0.051	0.107	0.053	0.159
		(4.55)	(8.20)	(1.67)	(7.58)
	Casual	-0.042	-0.014	0.043	0.008
		(1.52)	(0.64)	(2.13)	(0.51)
	Part-time*Casual	0.060	0.054	0.008	-0.052
		(1.98)	(2.17)	(0.19)	(1.91)
Observations		7,774 person-yr	2,386 persons	8,097 person-yr	2,427 persons

Notes: robust t-statistics (corrected for clustering) in parentheses. The number of observations reported for the FE models are the numbers changing part-time status between waves.
(i) Specification [1] contains a constant, part-time and casual employment status dummies, and three wave dummies.
(ii) Specification [2] also contains personal characteristics (onejob, daywork, contract, tempagency, state/territory dummies (7), marital status (3), Australian-born, born in English speaking country, urban dummies, and seven age dummies (age2529 age3034 age3539 age4044 age4549 age5054 age55plus). The base is full-time workers <25 years, in shift work on a permanent contract, not a casual worker, in NSW in a remote area, single, and born in nes country.
(iii) Specification [3] is as for [2] plus tenure, tensq, experience, expersq, and educational dummies (the base is "year 11 and below").
(iv) Specification [4] adds in firm attributes and industry dummies (union member, establishment size, public sector, one-digit industry dummies). The base is someone who is not a union member, who works in a very small private sector establishment (fewer than 20 employees) in "other services" industry.
(v) Specification [5] adds in occupational dummies with the base being "elementary clerical".
(vi) The full set of estimates from Specification [3] are reported in Appendix Table A.2.
(vii) *** denotes significance at 1% level; ** at 5% level and * at 10% level.

Table 3: Robustness Checks of Part-time/Full-time Log Wage Differential Based on Specification [3] - NEW

		WOMEN		MEN	
Robustness Check	**Variables**	**Pooled**	**FE**	**Pooled**	**FE**
[1] Omit PT/FT Borderline cases (hrs≥32 and hrs≤37)	Part-time	0.014	0.156	-0.051	0.178
		(0.97)	(9.11)	(1.35)	(6.59)
	Casual	-0.147	-0.034	-0.042	0.004
		(4.10)	(1.14)	(1.71)	(0.22)
	Part-time*Casual	0.113	0.056	0.051	-0.077
		(2.87)	(1.81)	(1.02)	(2.33)
	No. of obs.	6286	2016	7174	2206
[2] Omit cases <5hrs	Part-time	-0.005	0.099	-0.059	0.157
		(0.35)	(7.80)	(1.75)	(7.46)
	Casual	-0.134	-0.021	-0.054	0.010
		(4.63)	(0.96)	(2.49)	(0.60)
	Part-time*Casual	0.090	0.052	0.047	-0.059
		(2.78)	(2.13)	(1.06)	(2.13)
	No. of obs.	7653	2352	8059	2416
[3] Omit cases <10hrs	Part-time	-0.005	0.092	-0.064	0.143
		(0.39)	(7.51)	(1.84)	(6.70)
	Casual	-0.136	-0.019	-0.052	0.004
		(4.75)	(0.89)	(2.39)	(0.24)
	Part-time*Casual	0.089	0.042	0.039	-0.058
		(2.75)	(1.80)	(0.89)	(2.04)
	No. of obs.	7210	2228	7936	2385
[4] Asymmetries	Into part-time	0.064	0.086	0.047	0.083
		(2.95)	(4.77)	(0.84)	(2.93)
	Out of part-time	-0.83	-0.071	-0.104	-0.041
		(3.96)	(3.95)	(3.22)	(1.56)
	Into casual	-0.020	-0.013	-0.006	0.012
		(0.68)	(0.61)	(0.19)	(0.51)
	Out of casual	-0.046	0.004	-0.058	0.009
		(1.65)	(0.25)	(2.23)	(0.48)
	Into PT*Incasual	0.011	0.084	-0.077	0.002
		(0.15)	(1.92)	(0.77)	(0.05)
	Out PT*Incasual	0.010	0.016	-0.086	-0.405
		(0.11)	(0.19)	(0.52)	(4.70)
	In PT*Outcasual	0.025	-0.035	0.013	0.011
		(0.30)	(0.43)	(0.14)	(0.10)
	In PT*Outcasual	-0.009	-0.039	-0.017	-0.074
		(0.20)	(1.07)	(0.31)	(1.73)
	No. of observations	7772	2386	8097	2427

Notes: robust t-statistics in parentheses.

Table 3 (Continued): Based on Specification [3]

		WOMEN		MEN	
Robustness Check	**Variables**	**Pooled**	**FE**	**Pooled**	**FE**
[5] Addition of "No superannuation" variable	Part-time	0.008	0.106	-0.041	0.157
		(0.64)	(8.34)	(1.22)	(7.51)
	Casual	-0.134	-0.020	-0.051	0.012
		(4.73)	(0.92)	(2.38)	(0.71)
	Part-time*Casual	0.146	0.070	0.114	-0.034
		(4.46)	(2.90)	(2.59)	(1.23)
	No superannuation	-0.386	-0.295	-0.720	-0.406
		(7.38)	(12.97)	(5.3)	(10.59)
	Observations	7,774	2,386	8,097	2,427

See notes under Table 2 for list of additional variables included in Specification [3]. Pooled OLS standard errors corrected for clustering.

Appendix Table A.1: Means for Full-time and Part-time (Main Job) Men and Women for Selected Variables

	Women		Men	
	Full-time	**Part-time**	**Full-time**	**Part-time**
Work Attributes				
Log hourly earnings	2.871	2.818	2.990	2.820
Usual hours per week in main job	41.970	20.561	45.154	20.798
Casual	0.057	0.409	0.063	0.603
Part-time/casual interaction	0	0.409	0	0.603
Into part-time/into casual interaction	0	0.019	0	0.057
Out of part-time/into casual interaction	0.003	0	0.389	0
Into part-time/out of casual interaction	0	0.003	0	0.007
Out of part-time/out of casual interaction	0.025	0	0.108	0
Fixed term contract	0.116	0.085	0.091	0.071
Employed through a labour hire firm	0.024	0.034	0.030	0.049
One job only	0.948	0.841	0.942	0.769
Regular daytime schedule (main job)	0.833	0.684	0.784	0.552
Tenure with current employer (years)	6.839	5.429	7.760	3.619
Tenure in current occupation (years)	8.720	8.809	10.194	5.718
Trade union member	0.371	0.282	0.369	0.236
Public sector	0.193	0.155	0.122	0.100
Demographics				
Age	38.509	39.883	38.898	36.464
Experience	17.985	17.517	20.776	16.698
Married	0.458	0.599	0.599	0.390
Cohabiting	0.165	0.108	0.138	0.122
Urban	0.686	0.612	0.669	0.642
Inner regional	0.205	0.267	0.227	0.252
Outer regional (base is remote/very remote)	0.086	0.101	0.083	0.086
Australian born	0.783	0.805	0.775	0.762
Born in English speaking country	0.099	0.089	0.112	0.078
Education dummy variables:				
Postgraduate degree (masters or doctorate)	0.047	0.024	0.048	0.041
Grad diploma, grad certificate	0.101	0.074	0.054	0.060
Bachelor degree	0.220	0.161	0.162	0.165
Advanced diploma, diploma	0.122	0.090	0.083	0.088
Certificate iii or iv	0.123	0.139	0.305	0.143
Certificate i or ii and certificate not defined	0.004	0.010	0.006	0.010
Year 12	0.160	0.181	0.128	0.281
Year 11 and below	0.219	0.316	0.215	0.213
Number of person-year observations	*4197*	*3577*	*7274*	*823*

Appendix Table A.2 Full Estimates of Specification [3]

	WOMEN				MEN			
	Pooled OLS		Fixed Effects		Pooled OLS		Fixed Effects	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Part-time	-0.002	0.18	0.101	7.85	-0.062	1.85	0.156	7.41
Casual	-0.132	4.52	-0.020	0.89	-0.053	2.41	0.010	0.60
PT* casual	0.095	2.94	0.055	2.22	0.059	1.34	-0.056	2.03
Onejob	-0.045	2.66	-0.011	0.83	-0.013	0.59	-0.046	3.01
Daywork	-0.033	2.59	-0.006	0.51	-0.057	3.42	0.026	2.33
Fixd contract	-0.019	1.27	-0.009	0.70	0.051	2.34	0.002	0.14
tempagency	0.054	1.41	0.063	2.74	0.071	2.21	0.078	3.78
Vic	-0.091	5.72	0.022	0.39	-0.046	2.4	0.099	1.86
Qld	-0.091	5.90	0.010	0.16	-0.075	3.82	-0.155	3.38
Sa	-0.125	4.90	0.076	0.74	-0.164	5.80	0.102	0.92
Wa	-0.078	3.60	-0.067	0.80	-0.070	2.73	0.111	1.66
Tas	-0.088	2.94	-0.007	0.07	-0.100	2.53	-0.351	2.81
Nt	-0.011	0.15	0.295	2.24	-0.107	1.03	0.062	0.58
Act	0.068	1.97	0.149	1.33	0.071	1.46	0.068	0.89
Marr	0.040	1.87	0.020	0.69	0.138	6.36	0.088	3.35
Cohab	0.033	1.66	0.013	0.57	0.099	4.45	0.058	2.82
Wds	0.032	1.27	0.002	0.05	0.072	2.09	0.087	2.71
born_oz	0.016	0.77	(dropped)		0.052	2.30	(dropped)	
born_engsp	0.067	2.51	(dropped)		0.120	3.72	(dropped)	
Urban	-0.010	0.33	-0.008	0.18	-0.049	1.18	-0.039	0.98
Innreg	-0.050	1.64	-0.008	0.19	-0.146	3.48	-0.034	0.88
Outreg	-0.073	2.26	-0.027	0.62	-0.140	3.13	0.003	0.08
Age25-29	0.064	2.79	-0.030	1.09	0.075	2.76	-0.018	0.70
Age30-34	0.069	2.43	-0.055	1.40	0.083	2.25	-0.024	0.72
Age35-39	0.026	0.75	-0.085	1.79	0.057	1.24	-0.062	1.50
Age40-44	0.020	0.56	-0.109	2.03	0.067	1.25	-0.059	1.24
Age45-49	-0.015	0.38	-0.096	1.61	-0.026	0.42	-0.063	1.18
Age50-54	-0.033	0.72	-0.120	1.84	0.017	0.23	-0.064	1.09
Age55+	-0.041	0.89	-0.104	1.41	-0.036	0.41	-0.065	0.99
Tenure	0.014	6.06	-0.003	1.28	0.008	3.11	0.001	0.34
Tensq	-0.0003	3.13	-0.0001	1.40	-0.00003	0.35	0.00004	0.51
Exper	0.017	5.17	0.018	0.65	0.015	3.21	0.054	1.99
Expersq	-0.0003	4.41	-0.001	5.23	-0.0002	2.02	-0.001	6.45
Postgrad	0.369	10.03	0.116	1.39	0.389	10.12	-0.010	0.12
Graddip	0.334	15.54	0.0	0.00	0.327	10.60	0.005	0.07
Bachelor	0.284	17.12	0.006	0.011	0.296	11.98	0.078	1.37
cert3or4	0.007	0.42	-0.033	0.82	0.034	2.07	-0.013	0.30
cert12nd	-0.065	1.89	-0.003	0.03	-0.366	2.29	0.353	2.21
year12	0.050	2.78	-0.115	2.27	0.032	1.31	-0.145	3.00
wave2	0.012	1.50	0.037	1.34	0.011	1.40	0.009	0.32
Wave3	0.026	3.13	0.079	1.49	0.023	2.72	0.015	0.29
Wave4	0.047	4.87	0.121	1.55	0.053	5.69	0.032	0.41
_cons	2.583	57.09	2.845	6.52	2.611	44.46	2.302	4.55