Maternity Leave and the Evidence for Compensating Wage Differentials in Australia

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Abstract

Using data from Wave I of the Household, Income and Labour Dynamics in Australia (HILDA) Survey, 2001, this paper investigates the value of the maternity leave provisions available to Australian women. The theory of compensating wage differentials informs the model used to form estimates of the shadow price of eligibility for both paid and unpaid maternity leave benefits. The results found suggest evidence for a negative wage differential such that employed women eligible for maternity leave receive a lower rate of pay than those ineligible for maternity leave, all other things being equal. The policy implications of the results are also discussed.

Keywords: maternity leave, HILDA, compensating wage differentials, difference-in-difference estimation, treatment effects model

JEL Classification numbers:
C21, J31, J38

I gratefully acknowledge the advice and assistance provided by Denise Doiron and Garry Barrett. Financial assistance from the Reserve Bank of Australia and the UNSW School of Economics is gratefully acknowledged. The views expressed in this paper are those of the author and do not necessarily reflect those of the Reserve Bank of Australia.

I. Introduction

An important policy debate concerning the introduction of a national paid maternity leave scheme in Australia has developed over recent years. At present paid maternity leave is only available via enterprise bargaining agreements and awards leaving a majority of Australian women without access to paid leave. The lack of mandated access to maternity leave for all working women in Australia stands in contrast to the paid leave policies in place in New Zealand, Canada and across Europe.

However, the recent policy debate has prompted some reforms. The federal government has acknowledged the costs associated with having a child, introducing a $3000 maternity payment available to all new mothers from July 2004 (Costello, 2004) and has extended the provision of unpaid leave to casual employees. Meanwhile, in 2004 the state government of Western Australia introduced paid maternity leave for its public servants. In light of the debate and the policy changes underfoot, it is timely to examine the empirical evidence regarding the effect of existing policy provisions on the wages of women eligible for leave.

An alternative to the Federal government's maternity payment to all new mothers is a federally funded maternity leave scheme, such as that presented in a 2002 Human Rights and Equal Opportunities Commission (HREOC) report, *A Time to Value*. This scheme provides for a minimum of fourteen weeks paid leave for women in paid work in forty of the previous fifty-two weeks (HREOC, 2002, xv).

While this payment would not be available to all women, it does have the advantage of encouraging women to maintain their connections with the workforce. If women return to the workforce sooner rather than later after having a child, the reduction in

their future earning power that results from the break in employment associated with child-rearing,[1] may be minimised. If women are encouraged to maintain their employment connections, they will also contribute to the tax base as well as their superannuation. Each of these is an important social policy concern in the context of our ageing population and public concern over our ability to fund our growing pension bill.

Using data from Wave I of the Household, Income and Labour Dynamics in Australia (HILDA) Survey, 2001, this paper investigates the value of the maternity leave provisions available to Australian women. Rosen's (1974 and 1986) theory of compensating wage differentials informs the model. This theory "refers to the observed wage differentials required to equalise the total monetary and non-monetary advantages or disadvantages among work activities" (Rosen, 1986, p.641). As access to maternity leave is a benefit, we expect to see women eligible for maternity leave receiving lower wages on average than their ineligible counterparts, all other things being equal.[2]

In empirically quantifying this wage differential, the estimates will provide a measure of the wages that the marginal worker is willing to forgo to receive the maternity leave benefits. Although this question has been investigated previously using North

[1] See Breusch and Gray (2004) for recent estimates of the earnings forgone by Australian women when they have children.

[2] Note that the theory and applications of compensating wage differentials are based on the assumption of perfect information on both sides of the market. As such the theory cannot possibly explain all wage variation in some specific data set, even in the absence of measurement error (Rosen, 1986).

American and English data[3], such a study has not as yet been carried out in the Australian context. Thus, this study provides a unique insight into the Australian labour market and the policy debate surrounding maternity leave provisions.

Overall, the results suggest that women eligible for maternity leave receive a lower wage than women ineligible for leave, *ceteris paribus*. This indicates that in trading off wages for maternity leave eligibility, Australian women value their eligibility for maternity leave. It is also shown that, according to the estimated value placed on eligibility found here, if a national scheme of paid maternity leave such as the HREOC proposal were to be introduced, the aggregate benefit from such a program would exceed its expected cost.

Section 2 of the paper outlines the characteristics of the data used. Section 3 details the empirical results and diagnostic testing. Following that, Section 4 presents the results from sensitivity analysis and some important extensions to the model. The policy implications of the results are discussed in Section 5, while Section 6 offers some concluding remarks.

II. The Data

A sample selected from the HILDA Survey, Wave I, 2001 is used for the empirical work. Of the 13969 individuals surveyed in HILDA, 7347 are women, and the survey "bears a close resemblance to the wider population" (HILDA Survey Annual Report

[3] See Johnson and Provan (1995), Gariety and Shaffer (2001), Gruber (1994), Waldfogel (1999), Baum (2003) and Ruhm (1998).

2002, p.12). Extensive information on household composition, income, job characteristics, and labour force status is available.

The estimation sample consists of those women who responded to two questions. These asked whether the woman was eligible at her workplace for paid maternity leave and/or unpaid maternity leave respectively. Consequently, the responding women were necessarily employed. Although this raises issues of sample selection, Section 4 provides evidence that the exclusion of non-employed women does not qualitatively alter the results found.

The self-employed and those who were still in full-time education were excluded[4] as were fifteen observations from the Northern Territory, as this was too small a sub-sample to identify wage effects. Observations were dropped where there was no response recorded for the questions on maternity leave eligibility[5] and where there was no wage information provided. Two outlying observations were also excluded. After exclusions[6], the estimation sample numbered 1927 working women.

In order to establish the influence of these exclusions and whether the estimation sample is representative of the broader sample of *working* women surveyed in

[4] These observations were excluded because the wages and benefits of the self-employed differ in nature from those of an employee and the choices of full-time students about occupation and wage contracts will differ in nature from those no longer in full-time education.

[5] Of the 7347 women in the HILDA sample 3420 women were not asked or did not answer the questions on maternity leave eligibility.

[6] Full information regarding sample selection is shown in Table 9, Appendix I.

HILDA, summary statistics for the two samples were compared.[7] When the personal and job characteristics are compared, analysis suggests that there are no systematic differences between the estimation sample and the broader sample of women from HILDA in the relevant age group.[8]

Table 1 below shows selected summary statistics[9] for the estimation sample. The average woman is 37yrs of age, earns a wage of $18.50/hour and works 33 hours per week. Approximately 30% of the sample resides in New South Wales (NSW), with 27% and 20% living in Victoria and Queensland respectively. South and Western Australia each account for approximately 9% of the sample while fewer observations were available for Tasmania and the Australian Capital Territory (ACT).

[Insert Table 1 here]

Existing Maternity Leave Provisions in Australia

Nationally, current legislative provisions allow for 12 months unpaid maternity leave for full and part-time permanent employees after 12 months service. The employee is generally entitled to return to her former position (*Workplace Relations Act* 1996, Schedule 14, S170KB). Casuals with 12 months continuous service are now also eligible for 12 months unpaid leave nationally (Baird, 2002).[10] Prior to 2002, these

[7] Refer to Table 10, Appendix I.

[8] Given that women over the age of 67 and the self-employed were excluded from the estimation sample (for reasons outlined above) they are also excluded from the broader sample.

[9] Additional summary statistics can be found in Table 10, Appendix I.

[10] This has yet to be added to the *Workplace Relations Act* 1996, however there is a 2001 Australian Industrial Relations Court determination to this effect, which the federal government supports (Howard, 2003).

standards for casuals only existed in NSW and Queensland (*NSW Industrial Relations Act* 1996, S53(2) and *QLD Industrial Relations Act* 1999, S57).

With regards to access to paid maternity leave in Australia it has been estimated that "approximately only one-quarter to one-third of the female workforce" (Baird, 2002, p.3) is eligible for paid maternity leave. The duration of this paid leave varies from one year at the Australian Catholic University (Equal Opportunity for Women in the Workplace Agency, 2003) to just 2 days (Baird, 2002).

Although there is no legislation providing access to paid maternity leave for all permanent employees, each state does have legislation that provides public servants with access to paid leave although provisions vary across states. Public sector employees in Victoria, the Northern Territory and Tasmania are eligible to receive twelve weeks paid leave, those in NSW have access to nine weeks paid leave, those in Queensland six weeks and those in South Australia have access to five weeks (Baird, 2003). As of July 2003, public sector employees in Western Australia are now also eligible for six weeks paid leave (Government of Western Australia, 2003).

Eligibility for Maternity Leave in the HILDA Sample

The two key variables investigated are PML, a dummy variable indicating eligibility for paid maternity leave and UPML, a dummy variable indicating eligibility for unpaid maternity leave. UPML takes the value 1 if the woman is eligible for unpaid maternity leave and 0 if *in*eligible for *any* form of maternity leave. PML takes the value 1 if the woman is eligible for *paid* maternity leave and 0 if either *in*eligible for *any* form of maternity leave, or eligible for *unpaid* maternity leave *only*. Those

women eligible for paid maternity leave are assumed to be also eligible for unpaid leave.

As shown in Table 2 below, in the national sample approximately 84 per cent of the 1927 employed women are eligible for unpaid leave, while 48 per cent are eligible for paid leave (and unpaid leave). This is a larger percentage of women eligible for paid maternity leave than indicated in Baird (2002). However, the estimation sample used here does not include the self employed or working students whereas the results presented by Baird derive from a survey of employers and may include working students who may be unlikely to be eligible for paid maternity leave.

[Insert Table 2 here]

By state, between 77 and 87 per cent of women are eligible for unpaid leave, and between 33 and 55 per cent of women are eligible for paid leave. There is greater variation across states in paid leave eligibility. This may reflect greater uniformity in legislated access to unpaid leave in 2001, for permanent employees at least, across the nation while access to paid maternity leave varied substantially by state.

Over half of the sample is eligible for paid leave in NSW and VIC and eligibility for paid leave is highest in the ACT. This may reflect the higher concentration of well-paid occupations found in NSW and the ACT and the high concentration of public service jobs in the ACT.

Table 3 provides raw estimates of the wage differential between eligible and ineligible women, nationally and in each state. These raw estimates suggest, as expected, that women eligible for maternity leave receive a higher wage than those ineligible when

observable personal and job characteristics, other than the state of residence, are not controlled for. These raw estimates concur with *a priori* expectations for a positive correlation between eligibility and other factors that affect the wage, observable and unobservable, such as education and ability. Sections 3 and 4 investigate whether there is evidence for a *negative* wage differential such that eligible women receive a lower wage than those ineligible, once controls for observable characteristics and the endogeneity of eligibility for maternity leave are implemented.

[Insert Table 3 here]

III. Empirical Results

The wage model used is derived from the human capital model. A large number of control variables are included in order to capture heterogeneity across women. White's heteroskedasticity robust standard errors are used throughout.

To allow a comparison of the results found with those of Johnson and Provan (1995) the ordinary least squares results are presented first. Equation (1) shows the main features of the log wage model applied.

$$\ln(WAGE) = \mathrm{X}'\beta + \Gamma'\alpha + PML(\delta) + UPML(\gamma) + \varepsilon \qquad \textbf{(1)}$$

Worker and job characteristics are captured in the vectors X and Γ respectively, and both are assumed to be exogenous.[11] As detailed above, PML identifies women

[11] The vectors X and Γ included the following independent variables: age in years, the square of age, the number of children aged between zero and four years, tenure in years, experience in years, three dummy variables to capture level of education completed, five dummy variables to capture industry of employment, three dummy variables to capture occupation, three dummy variables to capture employer

eligible for paid leave and UPML those with unpaid leave. Negative coefficients on these dummy variables will indicate evidence of compensating wage differentials associated with eligibility for maternity leave. The stochastic error term, ε, is assumed to be independently and identically distributed and independent of the explanatory variables.

Throughout the empirical work conducted, the estimates produced are consistent with human capital theory. Wages increase, at a decreasing rate, with age. Additional education, particularly university education, tenure and experience each have a positive effect on wages.[12] Women working in retail services or in education, health, community or other services have significantly lower wages than their counterparts in other industries, while women in communications, finance and business services earn significantly higher wages than their counterparts in other industries. A woman's occupation has a strongly significant positive effect on their wage, with women in professional or managerial occupations receiving the highest wages. Employer size also has a significant positive effect on wages and the effect increases with the number of employees. The model also predicts that women who work part-time receive a significant positive premium on their wage. The effects of union membership, working in the private sector, marriage or being in a de-facto relationship, and the number of children on the wage are insignificant.

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size, and separate dummy variables to indicate union membership, employment in the private sector, whether the woman works part-time and whether the woman is married/de-facto.

[12] A discussion of the human capital wage model and its predictions can be found in Ehrenberg and Smith, 2000, p.305.

This model (Equation (1)), where the effects of maternity leave legislation on the wage are constrained to be equal across states and territories, does not predict a significant wage differential associated with eligibility for maternity leave. The predicted wages and wage differentials are shown in Table 4 below.[13] These results are comparable with those found by Johnson and Provan (1995) who also found insignificant wage differentials associated with eligibility for maternity leave. The lack of significant negative wage differentials may be due to the possible endogeneity of the maternity leave variables.[14]

[insert Table 4 here]

However, it also appears that the effects of maternity leave eligibility in the different states across Australia are cancelling each other out. Given known differences in state legislation regarding eligibility for paid and unpaid maternity leave, and given expected differences in earning capacities across states, a model that allows the effect of maternity leave policies on wages to vary by state was considered. Equation 2 below shows the features of this model.

$$\ln(WAGE) = \mathrm{X}'\beta + \Gamma'\alpha + \mathrm{STATE}'\lambda + PML(\delta) + UPML(\gamma) + (\mathrm{STATE} * PML)'\phi_1 + (\mathrm{STATE} * UPML)'\phi_2 + \varepsilon \quad \textbf{(2)}$$

The regression used the national estimation sample and included the same control variables as the national regression. As such, the effects of the various worker and

[13] Full results with standard errors can be found in Table 11, Appendix II.

[14] The endogeneity of the maternity leave variables is addressed below and potential solutions to the problem are implemented.

occupational characteristics were constrained to be equal across states while the effects of maternity leave legislation were permitted to vary.

The resulting predicted wage differentials are shown in Table 5. The coefficients on personal and job characteristics are consistent with those of Equation (1).[15] Moreover, women residing in NSW receive higher wages on average than their counterparts in other states as expected.

[insert Table 5 here]

Only Tasmania and NSW exhibit a negative wage differential associated with both paid leave and unpaid leave while Queensland shows a negative wage differential only for unpaid leave. The point estimate for the size of the negative wage differential associated with paid maternity leave eligibility in Tasmania is almost as large as that in NSW however it appears that the small sample available for Tasmania is resulting in a large standard error on this estimate.

NSW may show significant and large negative wage differentials because there may be greater variation in terms of employment contracts in the sample of working women from NSW. However, as discussed above, in 2001 legislation in NSW provided for 12 months unpaid leave for all permanent *and* casual employees, while Queensland was the only other state with similar provisions for casuals. In addition, legislation provides that NSW public sector employees have access to nine weeks of paid maternity leave, which is longer than that provided for public sector employees in South Australia, Western Australia, and Queensland. Therefore, the strength of the

[15] Full results with White's standard errors can be found in Table 11, Appendix II.

legislation in NSW may have caused employers to pass the cost of the maternity leave onto their female employees.

In 2001, the provisions for casuals had only been in place in Queensland for 2 years. The legislation was relatively new and the full effects of the legislation on the wages of working women may have yet to flow through. This may help to explain why Queensland exhibits a smaller negative, but significant, wage differential associated with eligibility for unpaid maternity leave.

Victoria, South Australia, Western Australia and the ACT each exhibit significant positive wage differentials. It appears that either women with access to paid maternity leave do not face any negative compensating wage differential in some states, or, it may also be that the problem of endogeneity as already noted is masking negative wage differentials. The distinct results for the ACT may be driven by a few observations as the ACT represents less than three per cent of the sample. Furthermore, the substantial presence of the public sector in the ACT is likely to be affecting the results for the ACT.

Tests for heteroskedasticity were conducted. When the form of heteroskedasticity was not specified and when specified as a function of the six dummy variables for the states, there was no evidence for the presence of heteroskedastic errors. Significant evidence for heteroskedastic errors was found when specified as a function of the state dummy variables, the maternity leave variables and their interactions. This finding is consistent with the hypothesis that the impact of maternity leave legislation on wages differs across states, and that there is greater variability in the wage offers and their associated benefits across states. Given this finding, feasible generalised

least squares was employed. However, this estimator did not generate qualitatively different inferences from those discussed above.[16]

IV. Extensions and Sensitivity Analysis

While eligibility for maternity leave will be correlated with observed factors, such as the woman's education or occupation, it may *also* be correlated with *unobservable* factors, for example, ability or personality traits. As a result, the maternity leave variables are not exogenous regressors. As the regression models employed above do not make any allowances for this endogeneity, they may fail to detect significant evidence of a negative compensating wage differential. With the exception of the results for NSW, this proved to be the case.

Indeed, there may be a positive bias in the estimated coefficients on the maternity leave dummy variables as the omitted variables, such as ability, are expected to have a positive impact on the wage. Although the models suggest positive wage differentials associated with eligibility for maternity leave for some states, the true effect may be a negative wage differential masked by the endogeneity. Additionally, the negative wage differentials found may be interpreted as smaller than the true wage differential. Following Gruber (1994) and Baum (2003) Difference-in-Difference (DD) estimation is used[17] in order to control for this endogeneity. This method controls for the

[16] Full results are available from the author on request.

[17] While Gruber and Baum employed Difference-in-Difference-in-Difference estimation, only Difference-in-Difference (DD) estimation is used here. With only one wave of HILDA available at the time of writing, the time-dimension could not be exploited.

selection of women into wage contracts wherein they are either eligible or ineligible for maternity leave.

The treatment group used consists of the 16-44 year old women from the estimation sample, as these women should value maternity leave benefits. Two different control groups are used as "additional comparison groups reduce the importance of biases or random variation in a single comparison group" (Meyer, 1995, p.157). The first control group consists of women 45 years old and over from the original estimation sample. Women of this age have little reason to value maternity leave benefits, as they are unlikely to be having children and therefore constitute a valid control group. The second control group consists of 730 men.[18] Men constitute a valid control group[19] as they either do not have access to maternity leave, or if they have access to *paternity* leave they are not expected to place a high value on eligibility for leave given that men use such leave much more rarely than women use maternity leave (Ruhm, 1998, p.286).[20]

Table below presents the national DD estimates and state estimates for NSW, Victoria and Queensland.[21]

[insert Table 6 here]

[18] Summary statistics for this sample of men are available from the author on request.

[19] Gruber (1994), Ruhm (1998) and Baum (2003) also use men as a comparison group.

[20] A table showing the construction of the national DD estimates can be found in Table 12, Appendix 2. Detailed results and the results for each state are available on request from the author.

[21] The samples for SA, WA, TAS and the ACT were too small to generate meaningful results here.

Unlike the results from Equation (1), negative wage differentials between those eligible and those ineligible for maternity leave are found nationally. This result holds when either control group is used. Negative wage differentials are also seen in all three states. In comparison with earlier results, where the endogeneity was not accounted for, the wage differential is now much larger in NSW, and in Queensland both of the wage differentials are now negative. Despite the size of these wage differentials, only those in NSW, with men as the control group, are significant.

Conditional DD estimates, which control for all of the observable characteristics of the workers, were formed. The estimated wage differentials, nationally and by state, are shown below in Table 7.[22]

[insert Table 7 here]

The predicted wage differentials tend to vary depending on the control group used. The national wage differential estimates are negative and where men are used as the control group the differentials are large, if not statistically significant.

When men are used as the control group the slightly larger sample size[23] used may assist the estimation of the wage differentials. For NSW, the wage differentials are

[22] The results from these regressions where men are used as the control group can be found in Table 13 and Table 14, Appendix II. Similar results where women over age 45 are used as the control group are available on request from the author.

[23] The sample size when men are used as the control group is 2137, while it is 1927 when older women are employed as controls.

substantial and more significant than in Equation (2). The wage differentials for Queensland are both negative and significant.

Importantly, using this method to control for the endogeneity of the maternity leave variable produces estimates of a negative wage differential in most states. The correlation between wages, unobserved characteristics, such as ability, and maternity leave eligibility was found to cause a positive bias in the coefficient estimates for eligibility.

While the DD estimates control for the endogeneity of the maternity leave variables, as noted previously, the estimation sample consists of 1927 *working* women. As a result, the sample is not a randomly selected population sample and may suffer from sample selection bias. There may be a significant selection process occurring whereby employed and non-employed women are distinctive groups and these distinctions are not being controlled for by the set of observed personal and job characteristics utilised in the models. If this were the case, the results derived above may only apply *conditional* on the employment selection and not more generally.

A Heckman two-step estimation procedure is used to investigate whether correcting for this sample selection alters the inferences made. A probit model is estimated for the conditional probability of employment using the original estimation sample and an additional 2213 non-employed women.[24]

[24] The regressors in this probit model only include variables on personal characteristics. Ideally, information on the potential job offers of the women would be included. However, information on job characteristics is incomplete as the 2213 non-employed women do not have an observed wage.

To identify the wage equation separately from the employment selection equation, six instruments are used. Four variables were entered linearly to jointly capture the effects of having children, particularly young children, as well as the value of home production on the choice to work. In line with expectations having young children, aged 0-1 years or 2-4 years old[25], has a negative impact on the probability of employment. Non-labour income[26] is entered in a quadratic to allow for non-linearities. The coefficients suggest that increases in non-labour income up $32,000 per annum, increase the probability that the woman is employed, while at levels of non-labour income beyond $32,000 further increases in non-labour income reduce the probability of employment. These instruments were judged to have a strong effect on a woman's decision to work and testing suggested they were relevant instruments.[27]

When the wage regression is re-estimated, the coefficient on the Inverse Mills Ratio (IMR), included to net out the effects of the sample selection, is negative but insignificant.[28] A Hausman specification test also shows that introducing the IMR does not generate any systematic difference in the regression coefficients. Furthermore, Table 8 shows that the size of the wage differentials by state and the inferences drawn from this regression are almost identical to those reached when the sample selection was not taken into account (refer back to Table 5).

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[25] While the number of young children between the ages of 0-4 years enters the wage equation, the instruments on the number of young children provide additional, more detailed information by identifying the number of children aged between 0-1 and 2-4 years separately.

[26] Non-labour income is the sum of all weekly income in the household from both labour and transfer payments net of the labour income of the woman herself.

[27] The instruments were found to be jointly significant at the one per cent level.

[28] The results are available in Table 16, Appendix II.

[insert Table 8 here]

These results suggest that, conditional on the available instruments, the unobserved characteristics of the women are not correlated over the selection process and the wage equation. Consequently, the results derived from the modelling carried out in this paper are robust to the selection of a sample of *working* women and can be interpreted as representative of the wage equations and wage differentials faced by employed and non-employed women.

V. Policy Implications

The analysis suggests that Australian women eligible for maternity leave face a negative compensating wage differential. The estimate of this differential represents the value placed on maternity leave by the marginal working woman and will therefore be an underestimate of the value placed on eligibility by those women not at the margin.

The estimate can be interpreted as a shadow price for maternity leave. Consequently, the annual aggregate value to women of a paid maternity leave scheme can be estimated and compared with the forecasted net annual cost of $213 million for the national paid maternity leave scheme proposed by HREOC.

To form this estimate, the wage differential results for NSW[29] from Equation (2) are extrapolated to cover all employed NSW women of childbearing ages, of which there are 948,200 between 16–44 years old[30] in 2001 (NSW Year Book 2002).

The results for an employed woman in NSW of average age, tenure, experience, with no children in the 0-4 age group (the sample average) suggest that she values eligibility for paid and unpaid maternity leave at $1.92 per hour[31]. This grosses up to an annual individual value of just over $2600 for a woman working 28.3 hours per week (the average hours worked by Australian women in 2001, (Year Book Australia 2002)) in 48 of 52 weeks in the year.

Given that 45.3% of the estimation sample in NSW is ineligible for paid maternity leave, if a paid maternity leave scheme were introduced, it is this proportion of women in NSW that would gain eligibility from the policy. Hence, the resulting estimate is equal to $2600 per annum for each individual woman, multiplied by 45.3% of the 948,200 women employed in NSW, that is, over $1.12 billion.

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[29] NSW was selected to use in this policy experiment as, of the seven states examined, NSW has lead the other states in its implementation of maternity leave policies. NSW was the first state to extend unpaid leave to casual employees and with the exception of the ACT, the incidence of eligibility for paid leave is highest in NSW. In addition, the results for NSW are the most robust throughout the modelling.

[30] This age group is used because, as argued above, it is women in this age group that will value eligibility.

[31] This estimate is the dollar value corresponding to the -13.7% wage differential estimated for women eligible for paid and unpaid leave in NSW from Equation (2) shown in Table 5.

This estimate for NSW alone is more than five times the estimated cost to the government of introducing the proposed HREOC scheme *nationally*. Furthermore, this estimate of the value placed on the scheme does not incorporate any externalities that may be associated with women's access to paid maternity leave, such as any benefits to the child's health that the woman may not have included in her valuation of eligibility for paid leave. Nor does it include the social value of maternity leave or the value women's partners place on the eligibility for leave.

VI. Conclusions

This paper explores a research question that as yet has been unanswered in the Australian context. The issue of the relationship between wages and fringe benefits such as maternity leave is a complex one. However, the methods used explicitly account for the suspected endogeneity of the maternity leave variables incorporating the methods employed by Gruber (1994), Waldfogel (1999) and Baum (2003). Evidence is found for negative compensating wage differentials associated with eligibility for maternity leave in the Australian labour market. In addition, the results are applicable to both employed and non-employed women. The results are particularly robust in NSW while there is some evidence for negative wage differentials in Queensland and Victoria.

The evidence for negative wage differentials indicates that, under the theory of compensating wage differentials, women value eligibility for maternity leave. The estimates of the value placed on eligibility by women in aggregate are shown to greatly outweigh the estimated cost of a proposed national paid maternity leave scheme, indicating that Australian women stand to benefit from the introduction of such a scheme.

Table 1: Selected Summary Statistics (1927 Observations)

Variable	Mean	Standard Deviation	Minimum	Maximum
Hourly Wage* (in $)	18.5	8.0	4.6	62.5
Hours	32.5	12.8	2	90
Log Hourly Wage	2.8	0.4	1.5	4.1
Age	36.6	10.3	16	67

*The wage has been 'Winsorised'. The top and bottom 1% of the wages have been set equal to the values of the wages at the first and 99th percentiles. Angrist and Kreuger (1999, p.1349) suggest that wage data can be improved by winsorising extreme values.

Variable	Frequency	Percentage of Observations
NSW	581	30.2
VIC	513	26.6
QLD	373	19.4
SA	167	8.7
WA	177	9.2
TAS	62	3.2
ACT	54	2.8

Table 2: **Eligibility for Maternity Leave Nationally and by State**

Variable	Frequency	Percentage of Observations^{+}
National		
Eligible for Paid Leave*	923	47.9
Eligible for Unpaid Leave	1610	83.6
NSW		
Eligible for Paid Leave	318	54.7
Eligible for Unpaid Leave	501	86.2
VIC		
Eligible for Paid Leave	260	50.7
Eligible for Unpaid Leave	440	85.8
QLD		
Eligible for Paid Leave	166	44.5
Eligible for Unpaid Leave	301	80.7
SA		
Eligible for Paid Leave	55	32.9
Eligible for Unpaid Leave	132	79.0
WA		
Eligible for Paid Leave	70	39.5
Eligible for Unpaid Leave	143	80.8
TAS		
Eligible for Paid Leave	23	37.1
Eligible for Unpaid Leave	51	82.3
ACT		
Eligible for Paid Leave	31	57.4
Eligible for Unpaid Leave	42	77.8

$^{+}$ For each state, percentages shown are the percentage eligible as a proportion of number of women residing in that state.

* Those women eligible for paid leave are a sub-set of those eligible for unpaid leave.

Table 3: Selected Unconditional Wage Differentials (%)
Comparison Group: Women ineligible for any maternity leave

	Wage Differential		Wage Differential
National		**SA**	
Eligible for Paid & Unpaid ML	17.2	Paid and Unpaid ML	25.3
Eligible for Unpaid ML only	12.8	Unpaid ML only	20.3
NSW		**WA**	
Paid and Unpaid ML	2.9	Paid and Unpaid ML	26.6
Unpaid ML only	-1.2	Unpaid ML only	22.5
VIC		**TAS**	
Paid and Unpaid ML	15.8	Paid and Unpaid ML	9.5
Unpaid ML only	11.2	Unpaid ML only	-0.5
QLD		**ACT**	
Paid and Unpaid ML	20.1	Paid and Unpaid ML	40.8
Unpaid ML only	14.4	Unpaid ML only	37.3

Table 4: **Predicted Wage Differentials from Equation (1)**

	Unpaid Maternity Leave	Paid & Unpaid Maternity Leave
In dollars	-0.005	0.190
In percentage terms	-0.04	1.47

Table 5: **Predicted Wage Differentials from Equation (2)** (%)
Comparison Group: Women Ineligible for Maternity Leave

Wage Differential if Eligible for:	Unpaid Maternity Leave	Paid & Unpaid Maternity Leave
NSW	-11.8**	-13.7**
VIC	7.3**	4.8*
QLD	-2.3*	2.6*
SA	2.5*	7.5*
WA	6.7*	11.2*
TAS	-7.4*	-1.3
ACT	24.8**	19.5**

* Significant at 10% using a standard F-test for joint significance
** Significant at 5% using a standard F-test for joint significance

Table 6: Unconditional DD Estimates for Working Women of Childbearing Age

Comparison Group: Working Women of Childbearing Age *Ineligible* for Maternity Leave

	Control Individuals 45+ year old women		Control Individuals Men of all ages	
National				
Eligible for Paid & Unpaid Leave	-0.0971	(0.0630)	-0.0511	(0.0541)
Eligible for Unpaid Leave only	-0.0661	(0.0679)	-0.0745	(0.0582)
NSW				
Eligible for Paid & Unpaid Leave	-0.1642	(0.1381)	-0.2229	(0.1066)
Eligible for Unpaid Leave only	-0.0158	(0.1618)	-0.1900	(0.1108)
VIC				
Eligible for Paid & Unpaid Leave	-0.1361	(0.1181)	0.0250	(0.1084)
Eligible for Unpaid Leave only	-0.0297	(0.1297)	-0.0355	(0.1338)
QLD				
Eligible for Paid & Unpaid Leave	-0.0520	(0.1402)	-0.1068	(0.1098)
Eligible for Unpaid Leave only	-0.1311	(0.1474)	-0.1265	(0.1170)

Differences in log hourly wages are shown with standard errors in parentheses.

Table 7: Conditional DD Estimates for Working Women of Childbearing Ages (%)

Comparison Group: Working Women of Childbearing Age *Ineligible* for Maternity Leave

	Control Individuals 45+ year old women	Control Individuals Men of all ages
National		
Eligible for Paid & Unpaid	-1.3	-5.5
Eligible for Unpaid only	-0.7	-6.6
NSW		
Eligible for Paid & Unpaid	-5.4	-21.4**
Eligible for Unpaid only	1.8	-17.4*
VIC		
Eligible for Paid & Unpaid	-4.9	3.6
Eligible for Unpaid only	-0.3	5.1
QLD		
Eligible for Paid & Unpaid	-6.8	-13.3**
Eligible for Unpaid only	-10.8	-18.0**
SA		
Eligible for Paid & Unpaid	19.2	18.6
Eligible for Unpaid only	24.6	5.6*
WA		
Eligible for Paid & Unpaid	25.2	-2.3*
Eligible for Unpaid only	3.8	-16.3*
TAS		
Eligible for Paid & Unpaid	-1.1*	19.8*
Eligible for Unpaid only	-34.6*	16.0*
ACT		
Eligible for Paid & Unpaid	-29.4	--[#]
Eligible for Unpaid only	-19.3	--

*Significant at 10% using a standard F-test

** Significant at 5% using a standard F-test

[#] Estimates could not be formed due to insufficient observations

Table 8: Wage Differentials from Equation (2) with Sample Selection Correction (%)
Comparison Group: Women Ineligible for Maternity Leave

Wage Differential if Eligible for:	Unpaid Maternity Leave	Paid & Unpaid Maternity Leave
NSW	-11.9**	-13.7**
VIC	7.2**	4.8*
QLD	-2.3*	2.5*
SA	2.3*	7.3*
WA	6.6*	11.1*
TAS	-7.5*	-1.2
ACT	24.8**	19.6**

* Significant at 10% using a standard F-test
** Significant at 5% using a standard F-test

Appendix I: Data

Table 9: Sample Selection Summary

	Observations dropped:	Sample Remaining
		13969
a.	All men	7347
b.	If Not Asked questions on maternity leave eligibility or if Self Completed Questionnaire not completed (as there will be no response to maternity leave questions available)	3927
c.	If (i) Unemployed or, (ii) Not in the labour force	3618
d.	If neither a Yes or No response recorded for either of the questions regarding paid and unpaid leave	2181
e.	If "Don't Know" is response recorded for Years/months in paid work (experience of these respondents unknown)	2180
f.	If wage information is unavailable/not provided	2080
g.	If respondent either still at school or still in full-time education and has not taken a gap between school and further education	2017
j.	Outliers: Dropped if Hourly Wage = $1198.50 Dropped if Age = 73	2015
k.	Northern Territory respondents dropped (sample here too small to form any accurate estimates)	2000
l.	Dropped if Self-employed	1927

Table 10: Representativeness of Estimation Sample

	Estimation Sample (n=1927)		**Broader Sample** (n=3389)	
Variable	**Mean**	**St. Deviation**	**Mean**	**St. Deviation**
Hourly Wage (in $)	18.50	8.01	19.05	13.58
Log Hourly Wage	2.84	0.40	2.79	0.52
Age	36.64	10.25	36.85	12.05
Tenure (in yrs)	6.00	6.64	5.36	6.46
Experience (in yrs)	15.75	9.42	16.43	10.37
No. of Children Aged 0-4	0.18	0.48	0.14	0.42
Coupled	0.68	0.47	0.62	0.49
Education ≤ Yr 10	0.15	0.36	0.21	0.40
Education ≤ Yr 12	0.28	0.45	0.29	0.46
Education: Tech/Trade	0.29	0.45	0.27	0.45
Education: Uni. +	0.28	0.45	0.23	0.42
Industry Group 1	0.07	0.25	0.08	0.27
Industry Group 2	0.06	0.24	0.06	0.24
Industry Group 3	0.16	0.37	0.22	0.41
Industry Group 4	0.18	0.39	0.17	0.37
Industry Group 5	0.47	0.50	0.43	0.49
Industry Group 6	0.06	0.23	0.04	0.20
Occupations 1	0.36	0.48	0.30	0.46
Occupations 2	0.14	0.35	0.14	0.34
Occupations 3	0.43	0.50	0.47	0.50
Occupations 4	0.07	0.26	0.10	0.30
Employer Size < 20	0.20	0.40	0.45	0.43
Employer Size 20 – 99	0.15	0.36	0.16	0.37
Employer Size 100-999	0.26	0.44	0.26	0.44
Employer Size 1000+	0.40	0.49	0.33	0.47
Private Sector	0.63	0.48	0.70	0.46
Union	0.35	0.48	0.29	0.45
Part Time	0.42	0.49	0.50	0.50
New South Wales	0.30	0.46	0.30	0.46
Victoria	0.27	0.44	0.27	0.44
Queensland	0.19	0.40	0.19	0.39
South Australia	0.09	0.28	0.09	0.28
Western Australia	0.09	0.29	0.09	0.29
Tasmania	0.03	0.18	0.03	0.17
ACT	0.03	0.17	0.02	0.15

Appendix II: Selected Results

Table 11: Regression Results (with Robust Standard errors in parentheses)

	National Equation (1)		W' State dummy variables & Interactions Equation (2)	
Paid ML	0.0151	(0.0180)	-0.0186	(0.0310)
Unpaid ML	-0.0004	(0.0270)	-0.1181	(0.0539)
VIC			-0.2009	(0.0666)
QLD			-0.2035	(0.0642)
SA			-0.2530	(0.0912)
WA			-0.2688	(0.0840)
TAS			-0.1614	(0.0851)
ACT			-0.3133	(0.1395)
VIC * Paid ML			-0.0065	(0.0438)
QLD * Paid ML			0.0674	(0.0489)
SA * Paid ML			0.0687	(0.0593)
WA * Paid ML			0.0637	(0.0625)
TAS * Paid ML			0.0801	(0.0859)
ACT * Paid ML			-0.0353	(0.0865)
VIC * Unpaid ML			0.1909	(0.0751)
QLD * Unpaid ML			0.0949	(0.0735)
SA * Unpaid ML			0.1429	(0.1001)
WA * Unpaid ML			0.1847	(0.0940)
TAS * Unpaid ML			0.0439	(0.1090)
ACT * Unpaid ML			0.3665	(0.1577)
Age	0.0413	(0.0056)	0.0418	(0.0056)
Age^2	-0.0005	(0.00007)	-0.0005	(0.0001)
Yr 12 Education	0.0279	(0.0250)	0.0383	(0.0254)
Technical/Trade Edu.	0.0139	(0.0247)	0.0158	(0.0246)
University Education	0.1278	(0.0298)	0.1332	(0.0299)
Tenure	0.0040	(0.0015)	0.0039	(0.0015)
Experience	0.0033	(0.0018)	0.0035	(0.0018)
Industry Group 2	0.0569	(0.0442)	0.0683	(0.0442)
Industry Group 3	-0.0983	(0.0369)	-0.0902	(0.0373)
Industry Group 4	0.0660	(0.0369)	0.0735	(0.0366)
Industry Group 5	-0.0778	(0.0355)	-0.0689	(0.0355)
Industry Group 6	0.0411	(0.0458)	0.0547	(0.0464)
Occupation Group 1	0.3703	(0.0371)	0.3521	(0.0378)
Occupation Group 2	0.2013	(0.0380)	0.1863	(0.0381)
Occupation Group 3	0.0936	(0.0331)	0.0809	(0.0339)
Union	0.0274	(0.0186)	0.0239	(0.0186)
Private	0.0037	(0.0229)	0.0002	(0.0230)
Employer Size 20-99	0.0401	(0.0288)	0.0493	(0.0289)
Employer Size 100-999	0.0735	(0.0277)	0.0795	(0.0275)
Employer Size 1000+	0.1149	(0.0260)	0.1219	(0.0260)
No. children ages 0 – 4yrs	0.0212	(0.0213)	0.0212	(0.0211)
Coupled (Marital Status)	0.0214	(0.0168)	0.0217	(0.0168)
Part time	0.0539	(0.0177)	0.0553	(0.0176)
Constant	1.6599	(0.1196)	1.8182	(0.1255)
R – squared	0.3120		0.3289	
N	1927		1927	

Table 12: National Unconditional DD Estimates

Paid and Unpaid vs. No leave	Treatment Individuals 16-44yr old women	Control Individuals 45+ yr old women	Control Individuals Men (all ages)
Eligible for Paid and Unpaid Maternity Leave	2.8780	2.9682	3.0445
	(0.0147)	(0.0224)	(0.0294)
	[675]	[248]	[284]
Ineligible for Maternity Leave	2.7321	2.7252	2.8474
	(0.0323)	(0.0470)	(0.0283)
	[223]	[94]	[256]
Average log Wage Differential	0.1459	0.2430	0.1970
	(0.0355)	(0.0520)	(0.0408)
Difference-in-Difference		**-0.0971**	**-0.0511**
		(0.0630)	(0.0541)

Unpaid only vs. No leave	Treatment Individuals 16-44yr old women	Control Individuals 45+ yr old women	Control Individuals Men (all ages)
Eligible for Unpaid Maternity Leave	2.7870	2.8462	2.9768
	(0.0163)	(0.0331)	(0.0358)
	[559]	[128]	[190]
Ineligible for Maternity Leave	2.7321	2.7252	2.8474
	(0.0323)	(0.0470)	(0.0283)
	[223]	[94]	[256]
Average log Wage Differential	0.0548	0.1210	0.1294
	(0.0361)	(0.0574)	(0.0456)
Difference-in-Difference		**-0.0661**	**-0.0745**
		(0.0679)	(0.0582)

In log hourly wages, standard errors in parentheses, and sample size in square brackets.

Table 13: Conditional DD Estimates: Men of all ages as the control group

Variable	Coefficient Estimate	Robust St. Error	Variable	Coefficient Estimate	Robust St. Error
			Treatment Dummy	-0.0456	0.0426
Paid ML	0.0005	0.0383	Treat * Paid ML	0.0110	0.0421
Unpaid ML	0.0486	0.0388	Treat * Unpaid ML	-0.0656	0.0500
Age	0.0430	0.0061	Occupation Group 1	0.3621	0.0322
Age^2	-0.0006	0.0001	Occupation Group 2	0.2333	0.0317
Yr 12 Education	0.0711	0.0269	Occupation Group 3	0.1153	0.0293
Technical/Trade Edu.	0.0477	0.0255	Union	0.0341	0.0184
University Education	0.1894	0.0318	Private	0.0294	0.0232
Tenure	0.0046	0.0015	Employer Size 20-99	0.0521	0.0278
Experience	0.0058	0.0024	Empl. Size 100-999	0.1195	0.0265
Industry Group 2	0.0255	0.0328	Empl. Size 1000+	0.1600	0.0256
Industry Group 3	-0.1330	0.0325	No. Children 0-4yrs	0.0229	0.0165
Industry Group 4	0.0759	0.3259	Coupled - Marital Status	0.0325	0.0175
Industry Group 5	-0.0970	0.0320	Part time	0.0469	0.0205
Industry Group 6	-0.0138	0.0409	Constant	1.5981	0.1174
R – squared	0.3261				
N	2187: 1457 treatment observations, 730 control observations				

Table 14: DD Estimates – Men of all ages as the control group

Variable	Coefficient Estimate	Robust St. Error	Variable	Coefficient Estimate	Robust St. Error
			Treatment Dummy	0.0829	0.0708
Paid ML	0.0021	0.0750	Treat * Paid ML	-0.0402	0.0806
Unpaid ML	0.0372	0.0689	Treat * Unpaid ML	-0.1740	0.0908
VIC	-0.00004	0.0763	Treat * VIC	-0.1951	0.1097
QLD	-0.0962	0.0684	Treat * QLD	-0.1072	0.1023
SA	-0.1377	0.0761	Treat * SA	-0.2117	0.1399
WA	-0.1323	0.0843	Treat * WA	-0.1677	0.1286
TAS	0.0517	0.0806	Treat * TAS	-0.1846	0.1231
ACT	0.2573	0.3117	Treat * ACT	-0.4602	0.3455
VIC * Paid ML	-0.0270	0.1107	Treat * VIC * Paid ML	0.0242	0.1204
QLD * Paid ML	0.0038	0.1083	Treat * QLD * Paid ML	0.0867	0.1198
SA * Paid ML	-0.0917	0.1314	Treat * SA * Paid ML	0.1703	0.1504
WA * Paid ML	-0.0527	0.1415	Treat * WA * Paid ML	0.1798	0.1585
TAS * Paid ML	0.0992	0.2103	Treat * TAS * Paid ML	0.0780	0.2338
ACT * Paid ML	-0.3605	0.3754	Treat * ACT * Paid ML	0.3393	0.3711
VIC * Unpaid ML	-0.0280	0.1187	Treat * VIC * Unpaid ML	0.2254	0.1470
QLD * Unpaid ML	0.0793	0.1052	Treat * QLD * Unpaid ML	-0.0055	0.1349
SA * Unpaid ML	0.0037	0.1139	Treat * SA * Unpaid ML	0.2302	0.1706
WA * Unpaid ML	0.1865	0.1331	Treat * WA * Unpaid ML	0.0111	0.1719
TAS * Unpaid ML	-0.3578	0.1284	Treat * TAS * Unpaid ML	0.3340	0.1769
ACT * Unpaid ML	0.2636	0.1696	Treat * ACT * Unpaid ML	dropped	
Age	0.0425	0.0062	Occupation Group 1	0.3569	0.0324
Age^2	-0.0006	0.0001	Occupation Group 2	0.2254	0.0318
Yr 12 Education	0.0752	0.0270	Occupation Group 3	0.1118	0.0298
Technical/Trade Edu.	0.0501	0.0252	Union	0.0364	0.0183
University Education	0.1871	0.0315	Private	0.0282	0.0232
Tenure	0.0043	0.0015	Employer Size 20-99	0.0649	0.0277
Experience	0.0063	0.0024	Empl. Size 100-999	0.1270	0.0264
Industry Group 2	0.0225	0.0330	Empl. Size 1000+	0.1700	0.0256
Industry Group 3	-0.1304	0.0329	No. Children 0-4yrs	0.0204	0.0163
Industry Group 4	0.0703	0.0321	Coupled – Marital Status	0.0316	0.0176
Industry Group 5	-0.0977	0.0318	Part time	0.0486	0.0205
Industry Group 6	-0.0151	0.0418	Constant	1.6528	0.1218
R – squared	0.3481				
N	2187				

Table 15: Probit Maximum Likelihood Results

Variable	Coefficient Estimate	St. Error	Variable	Coefficient Estimate	St. Error
Instruments					
No. of Children Ages 0-1 years	-1.1202	0.0797	No. of Children Ages 13-18 years	0.0965	0.0452
No. of Children Ages 2-4 years	-0.5095	0.0562	Non- Labour Income ('000s)	0.0652	0.0309
No. of Children Ages 5-12 years	-0.1722	0.0326	Non-Labour Income Squared ('000,000s)	-0.0010	0.0007
Age	0.0982	0.0151			
Age^2	-0.0026	0.0002	VIC	-0.0254	0.0640
Yr 12 Education	0.5319	0.0670	QLD	-0.0735	0.0901
Technical/Trade Edu.	0.4736	0.0658	SA	-0.0986	0.0684
University Education	1.0055	0.0750	WA	-0.0503	0.0872
Experience	0.1033	0.0045	TAS	0.3474	0.1426
Coupled - Marital Status	0.1013	0.0564	ACT	0.3753	0.1690
Constant	-1.4241	0.2739			
Pseudo R – squared	0.3555		Log likelihood	-1847.0931	
N	4150				

Table 16: Re-estimating Equation (2) with the Inverse Mills Ratio

Variable	Coefficient Estimate	Robust St. Error	Variable	Coefficient Estimate	Robust St. Error
IMR	-0.0370	0.0675	VIC	-0.2010	0.0666
			QLD	-0.2023	0.0639
Paid ML	-0.0185	0.0310	SA	-0.2503	0.0913
Unpaid ML	-0.1190	0.0539	WA	-0.2679	0.0841
			TAS	-0.1672	0.0859
			ACT	-0.3219	0.1400
VIC * Paid ML	-0.0061	0.0438	VIC * Unpaid ML	0.1911	0.0750
QLD * Paid ML	0.0663	0.0488	QLD * Unpaid ML	0.0960	0.0736
SA * Paid ML	0.0682	0.0592	SA * Unpaid ML	0.1421	0.1002
WA * Paid ML	0.0638	0.0626	WA * Unpaid ML	0.1848	0.0940
TAS * Paid ML	0.0819	0.0859	TAS * Unpaid ML	0.0435	0.1088
ACT * Paid ML	-0.0336	0.0870	ACT * Unpaid ML	0.3665	0.1577
Age	0.0403	0.0062	Occupation Group 1	0.3519	0.0377
Age^2	-0.0005	0.0001	Occupation Group 2	0.1856	0.0380
Yr 12 Education	0.0264	0.0319	Occupation Group 3	0.0803	0.0337
Technical/Trade Edu.	0.0056	0.0304	Union	0.0242	0.0186
University Education	0.1129	0.0459	Private	0.0003	0.0230
Tenure	0.0039	0.0015	Employer Size 20-99	0.0488	0.0289
Experience	0.0013	0.0043	Empl. Size 100-999	0.0792	0.0275
Industry Group 2	0.0686	0.0441	Empl. Size 1000+	0.1216	0.0260
Industry Group 3	-0.0899	0.0372	No. Children 0-4yrs	0.0358	0.0302
Industry Group 4	0.0739	0.0366	Coupled - Marital Status	0.0196	0.0174
Industry Group 5	-0.0683	0.0355	Part time	0.0552	0.0176
Industry Group 6	0.0554	0.0464	Constant	1.8700	0.1520
R – squared	0.3277				
N	1927				

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