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 estimate 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. 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. This lack of mandated access to paid maternity leave for Australian working women 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). In 2001, an Australian Industrial Relations Commission (AIRC) determination extended the availability of unpaid leave to casual employees covered by federal awards (AIRC, 2001). In 2003, 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 maternity 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 Time to Value* (Human Rights and Equal Opportunities Commission (HREOC), 2002). This scheme provides for a minimum of fourteen weeks paid leave for women in paid work in forty of the previous fifty-two weeks.

While this payment would only be available to *working* women, it has 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 theory of compensating wage differentials (1974 and 1986) informs the model. The 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 found here will provide a measure of the wages that the marginal worker is willing to forgo to receive maternity leave benefits. Although this question has been investigated previously using North

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[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 a specific data set, even in the absence of measurement error (Rosen, 1986).

American, European and English data[3], such a study has not 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.

The results provide evidence to suggest that women eligible for maternity leave receive a lower wage than women ineligible for leave, at least in some Australian states, *ceteris paribus*. That is, many Australian women accept a lower wage in return for maternity leave eligibility and thereby signal a monetary value for that eligibility. A brief policy experiment also shows 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 II of the paper outlines the existing maternity leave provisions in Australia. Section III presents the characteristics of the data used. Section IV details the empirical results and diagnostic testing and Section V presents an extension to the model to control for the suspected endogeneity of maternity leave eligibility. The policy implications of the results are discussed in Section VI, while Section VII offers some concluding remarks.

II. Existing Maternity Leave Provisions in Australia

The *Workplace Relations Act* (1996, Schedule 14, s170KB) allows for 12 months unpaid maternity leave after 12 months service for full and part-time permanent employees covered by federal awards and agreements with state legislation providing for equivalent

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

eligibility.[4] The employee is generally entitled to return to her former position. A 2001 AIRC test case extended coverage to casual employees covered by a federal award with 12 months continuous service (AIRC, 2001).[5] Prior to 2002, these standards for casuals only existed in New South Wales and Queensland (*Industrial Relations Act* 1996 (NSW), s53(2) and *Industrial Relations Act* 1999 (QLD), s57).

With regards to access to paid maternity leave in Australia, there is no legislation, federal or state, providing access to paid maternity leave for all permanent employees. Instead, it is a matter left to be decided between employers and employees. Public servants are the exception, as state legislation does provide public servants with access to paid leave, although provisions vary across states.[6] As a result, the great majority of Australian women do not have access to paid leave and 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

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[4] By state: s 54(1) Industrial Relations Act 1996 (NSW); s 18(2) Industrial Relations Act 1999 (Qld); sch 5 cl 1 Industrial and Employee Relations Act 1994 (SA); In Tasmania the provisions of the federal Act apply; sch 1A Workplace Relations Act 1996 (Cth) applies to Victorian workers; s 33 Minimum Conditions of Employment Act 1993 (WA); s 5 Parental Leave (Private Sector Employees) Act 1992 (ACT); in the Northern Territory the provisions of the federal Act apply.

[5] This has yet to be added to the *Workplace Relations Act* 1996 and will be inserted into awards on an award-by-award basis on application. However, the Federal Government has indicated its support (Howard, 2003).

[6] Public sector employees in Victoria, the Northern Territory and Tasmania are eligible to receive twelve weeks paid leave, those in New South Wales 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).

Catholic University (Equal Opportunity for Women in the Workplace Agency, 2003) to just 2 days (Baird, 2002).

III. The Data

A sample selected from the HILDA Survey, Wave I, Release 1, 2001 is used for the empirical estimation. 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 2002, p.12). Extensive information on household composition, income, job characteristics, and labour force status is available.

Selecting the Sample

The estimation sample consists of those women who responded to two questions included in the Self Completion Questionnaire (SCQ).[7] 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 potential issues of sample selection, testing revealed that the exclusion of non-employed women does not qualitatively alter the results and so the findings of this paper are not conditional on the selection into employment.[8]

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[7] The SCQ was either picked up at a later date by the interviewer or could be returned by post. Response rates were lower than for the household and personal questionnaires with 92 per cent of those surveyed in Wave I responding. In addition the item non-response rate averaged 2.4 per cent per item, higher than in the other parts of the survey. (Melbourne Institute of Applied Economic and Social Research (2002), Watson and Wooden (2002)).

[8] The effect of the selection into employment was investigated using a Heckman two-step estimation procedure, using the original estimation sample and an additional 2213 non-employed women. Two sets of relevant instruments judged to have a strong effect on a woman's decision to work were used: the level of

Of the 7347 women in the HILDA sample, 3420 women are excluded from the estimation sample because they did not answer the questions on maternity leave eligibility either because they did not return the SCQ or they were not employed. The maternity leave questions could also be answered with a yes, no, don't know or not applicable (included for male respondents). However, the survey designers have acknowledged that women did not always answer the maternity leave questions as expected. For example, older women appear to have often answered with 'not applicable' likely indicating that they are not planning on having any more children (Watson and Wooden, 2002). In this sample, 1437 women who entered a not applicable, blank or multi-response, or don't know had to be excluded.[9]

Other observations were excluded if the woman was unemployed or not in the labour force, self-employed or still in full-time education, or where there was missing information on wages or experience.[10] Fifteen observations from the Northern Territory were also excluded, as this was too small a sub-sample to identify wage effects. Two outlying

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non-labour income and; the level of non-labour income combined with variables to capture the effects of having children, particularly young children. The resulting inverse mills ratios were insignificant, the analysis did not indicate any systematic difference in the regression coefficients and the size of the wage differentials by state and the inferences drawn were almost identical to those reached when the sample selection was not taken into account. Detailed results are available from the author on request.

[9] Of these, 1251 observations were excluded due to blank, multi- or not applicable responses.

[10] 309 women that were unemployed or not in the labour force inadvertently responded to the maternity leave questions. Full-time students and the self-employed 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. Exclusions due to missing information on wages or experience numbered 101.

observations were also excluded.[11] After exclusions, 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 HILDA, summary statistics for the two samples were compared.[12] When the personal and job characteristics are compared, analysis suggests that there are no serious systematic differences between the estimation sample and the broader sample of women from HILDA in the relevant age group.

Characteristics of the Estimation Sample

Table 1 below shows selected summary statistics[13] for the estimation sample. The average employed woman is 37 years of age, earns a wage of $18.50 per hour and works 33 hours per week. Approximately 30 per cent of the sample resides in New South Wales, with 27 per cent and 20 per cent living in Victoria and Queensland respectively. South Australia and Western Australia each account for approximately 9 per cent of the sample while fewer observations were available for Tasmania and the Australian Capital Territory.

[Insert Table 1 here]

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[11] One observation was dropped as the hourly wage was recorded as $1198.50, while another, with age 73 years was also judged to be an outlier.

[12] Refer to Table 8, Appendix I. Note that 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.

[13] Additional summary statistics can be found in Table 8, Appendix I.

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.[14]

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

[14] Some women did report having access to paid leave only, although as this seems an improbable scenario, these observations were recoded such that those women who reported eligibility for paid maternity leave are recorded as also having access to unpaid maternity leave. One might imagine that any woman whose employer provides access to paid maternity leave, would likely be able to take this leave, or more leave, as unpaid leave. Alternatively, for an employer to grant eligibility for paid maternity leave the employee in question would likely have been working there for at least a year and would therefore be eligible for unpaid maternity leave by law.

states in paid leave eligibility. This may reflect greater uniformity in legislated access to unpaid leave in 2001, for permanent employees at least, while access to paid maternity leave varied substantially by state.

Over half of the sample is eligible for paid leave in New South Wales and Victoria and eligibility for paid leave is highest in the Australian Capital Territory. This may reflect the higher concentration of well-paid occupations found in New South Wales and Victoria as well as the high concentration of public service jobs in the Australian Capital Territory.

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 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 III and IV 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 introduced.

[Insert Table 3 here]

IV. 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.

Ordinary least squares results are presented first. Equation (1) shows the main features of the log wage model applied.

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

Worker and job characteristics are captured in the vectors X and Γ respectively, and both are assumed to be exogenous.[15] As detailed above, PML identifies women 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 have a positive effect on the wage. 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 her 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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[15] See Appendix I for a list of variables and their definitions and Table 8, Appendix I for summary statistics.

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 find evidence for a significant wage differential associated with eligibility for maternity leave. The predicted wages and wage differentials are shown in Table 4 below.[16] The lack of significant negative wage differentials may be due to the possible endogeneity of the maternity leave variables.[17]

[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.

$$
\begin{aligned}
\ln(WAGE) = {} & X'\beta + \Gamma'\alpha + \text{STATE}'\lambda + PML(\delta) + UPML(\gamma) \\
& + (\text{STATE} * PML)'\phi_1 + (\text{STATE} * UPML)'\phi_2 + \varepsilon
\end{aligned}
\tag{2}
$$

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

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[16] Full results with standard errors can be found in Table 9, Appendix II.

[17] The endogeneity of the maternity leave variables is addressed below and potential solutions implemented.

The resulting predicted wage differentials are shown in Table 5. The coefficients on personal and job characteristics are consistent with those of Equation (1).[18] Moreover, as expected, women residing in New South Wales receive higher wages on average than their counterparts in other states.

[insert Table 5 here]

Only Tasmania and New South Wales exhibit a negative wage differential associated with both paid leave and unpaid leave while Queensland shows a negative wage differential only for unpaid leave. However, it appears that the small sample available for Tasmania is resulting in a large standard error on this estimate.

New South Wales 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 New South Wales. However, as discussed above, in 2001 existing legislation in New South Wales 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 New South Wales 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 legislation in New South Wales may have caused employers to pass the cost of the maternity leave onto their female employees.

In 2001, the unpaid leave 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

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[18] Full results with White's standard errors can be found in Table 9, Appendix II.

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 Australian Capital Territory 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 distinctive results for the Australian Capital Territory may be driven by a few observations as the Australian Capital Territory represents less than three per cent of the sample. Furthermore, the results may also be influenced by the strong presence of the public sector in the Australian Capital Territory.

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.[19]

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

V. Controlling for Endogeneity

While eligibility for maternity leave is 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.

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 in order to control for this endogeneity.[20] This method controls for the 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

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[20] While Gruber and Baum employed Difference-in-Difference-in-Difference estimation, only Difference-in-Difference (DD) estimation is used here.

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 bear children and therefore constitute a valid control group.

The second control group consists of 730 men who responded to the two questions on *maternity* leave.[21] Given men should not have access to *m*aternity leave, these responses may reflect access to *p*aternity leave or may indicate whether a woman in an equivalent job at that man's workplace would have access to maternity leave. In either case, these men constitute a valid control group[22] 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. Men use such leave rarely in comparison to the use of maternity leave by women (Ruhm, 1998, p.286) and where men are eligible for paternity leave it often provides for less leave time than does maternity leave (EOWA, 2001).[23]

Table 6 below presents the national DD estimates and state estimates where controls for the personal and job characteristics of the workers are not included.[24]

[insert Table 6 here]

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

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

[23] A table showing the construction of the national DD estimates can be found in Table 8, Appendix 2. Detailed results and the results for each state are available on request from the author.

[24] Wage differences for South Australia, Western Australia, Tasmania and the Australian Capital Territory should be interpreted cautiously as the samples from these states were relatively small.

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 a larger number of states than when estimating Equation (2). In comparison with earlier results, where the endogeneity was not accounted for, the wage differential is now much larger in New South Wales, and in Queensland where both of the wage differentials are now negative. Despite the size of these wage differentials, only those in New South Wales, 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.[25]

[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[26] used may assist the estimation of the wage differentials. For New South Wales, the wage differentials are

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[25] The results from these regressions where men are used as the control group can be found in Table 9 and Table 10, Appendix II. Similar results where women over age 45 are used as the control group are available on request from the author.

[26] 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 results also suggest that the correlation between wages, unobserved characteristics, such as ability, and maternity leave eligibility does cause a positive bias in the coefficient estimates for eligibility.

VI. Policy Implications

The analysis suggests that Australian women eligible for maternity leave may face a negative compensating wage differential. The estimated 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 Australian 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 New South Wales[27] from Equation (2) are extrapolated to cover all employed New South Wales women of childbearing ages,

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[27] New South Wales was selected to use in this policy experiment as, of the seven states examined, New South Wales has led the other states in its implementation of maternity leave policies. New South Wales was the first state to extend unpaid leave to casual employees and with the exception of the Australian Capital

of which there are 948,200 between 16–44 years old[28] in 2001 (New South Wales Year Book 2002).

The results for an employed woman in New South Wales of average age, tenure, experience, with no children in the 0-4 years age group (the sample average), suggest that she values eligibility for paid and unpaid maternity leave at $1.92 per hour.[29] 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 per cent of the estimation sample in New South Wales is ineligible for paid maternity leave, if a paid maternity leave scheme were introduced, it is this proportion of women in New South Wales that would gain eligibility from the policy. Hence, the resulting estimate for the annual aggregate benefit to women in New South Wales is over $1.12 billion, equal to $2600 per annum for each individual woman, multiplied by 45.3 per cent of the 948,200 women of child-bearing age employed in New South Wales.

This estimate of the value placed on eligibility for paid leave for New South Wales 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

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Territory, the incidence of eligibility for paid leave is highest in New South Wales. In addition, the results for New South Wales are the most robust throughout the modelling.

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

[29] This estimate is the dollar value corresponding to the -13.7 per cent wage differential estimated for women eligible for paid and unpaid leave in New South Wales from Equation (2) shown in Table 5.

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 a 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.

VII. 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 to suggest the presence of 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 New South Wales 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. A simple policy experiment suggests that the estimated value placed on eligibility by women in aggregate outweighs 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: Sample 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 the women in the estimation sample 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	Paid & Unpaid Leave	-0.0971	(0.0630)	-0.0511	(0.0541)
	Unpaid Leave only	-0.0661	(0.0679)	-0.0745	(0.0582)
NSW	Paid & Unpaid Leave	-0.1642	(0.1381)	-0.2229	(0.1066)
	Unpaid Leave only	-0.0158	(0.1618)	-0.1900	(0.1108)
VIC	Paid & Unpaid Leave	-0.1361	(0.1181)	0.0250	(0.1084)
	Unpaid Leave only	-0.0297	(0.1297)	-0.0355	(0.1338)
QLD	Paid & Unpaid Leave	-0.0520	(0.1402)	-0.1068	(0.1098)
	Unpaid Leave only	-0.1311	(0.1474)	-0.1265	(0.1170)
SA	Paid & Unpaid Leave	0.0170	(0.1620)	0.2618	(0.1879)
	Unpaid Leave only	0.1019	(0.1550)	0.0692	(0.1662)
WA	Paid & Unpaid Leave	0.2036	(0.1828)	-0.0521	(0.1715)
	Unpaid Leave only	-0.1609	(0.1769)	-0.1366	(0.1770)
TAS	Paid & Unpaid Leave	-0.1924	(0.2196)	0.1399	(0.2652)
	Unpaid Leave only	-0.5602	(0.2387)	0.1498	(0.2050)
ACT	Paid & Unpaid Leave	-0.3090	(0.3111)	0.0842	(0.5364)
	Unpaid Leave only	-0.3052	(0.3675)	--[#]	--

Differences in log hourly wages are shown with standard errors in parentheses.
[#] Estimates could not be formed due to insufficient observations.

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

Appendix I: Data

Variable Descriptions

Dependent Variable:

Log Hourly Wage = natural log of the hourly wage calculated from the weekly wage divided by hours per week usually worked.

Control Variables:

Age	= age in years.
Tenure	= years worked for current employer.
Experience	= years in paid work.
No. of Children of Aged 0-4	= count of number of children in this age group.
Coupled	= 1 if legally married or de-facto, 0 if not.
Education: Uni. +	= 1 if has Bachelors degree or higher qualification, 0 if not.
Education: Tech/Trade	= 1 if has trade or technician's certificate or apprenticeship, associate or undergraduate diploma but has no higher qualifications, 0 if not.
Education ≤ Yr 12	= 1 if highest year of school completed is Yr 12 or Yr11 or equivalent and has no post-school qualifications, 0 if not.
Education ≤ Yr 10	= 1 if highest year of school completed is Yr 10 or equivalent or below and has no post-school qualifications, 0 if not.
Employer Size < 20	= 1 if fewer than 20 persons employed at employer, 0 if not.
Employer Size 20 – 99	= 1 if between 20 and 99 persons employed at employer, 0 if not.
Employer Size 100-999	= 1 if between 100 and 999 persons employed at employer, 0 if not.
Employer Size 1000+	= 1 if more than 1000 persons employed at employer, 0 if not.
Private Sector	= 1 if employer is a Private sector "for profit"/"not for profit", other commercial or other non-commercial organisation, 0 if not.
Union	= 1 if belongs to trade union or employee association, 0 if not or if responded with "Don't Know"
Part Time	= 1 if usual hours worked per week is less than 35 hours, 0 if not.

Industry Group 1: Primary/Manufacturing = 1 if works in agriculture, forestry, logging, commercial fishing, coal/metal ore mining, oil/gas extraction, food, beverage, tobacco, textile, clothing, footwear, leather, wood and paper product, printing, publishing, recorded media, petroleum, coal, chemical, non-metallic mineral product, metal product, machinery and equipment or other manufacturing, 0 if not.

Industry Group 2 : Trade/Transport = 1 if works in electricity, gas or water supply, sewerage/drainage services, general construction, construction trade services, basic material, machinery, motor vehicle, personal, household good wholesaling, road, rail, water, air or space transport, or storage, 0 if not.

Industry Group 3: Retail Services = 1 if works in food, personal and household good, motor vehicle retailing and services, or accommodation, cafes and restaurants, 0 if not.

Industry Group 4: Communications/Finance/Business Services = 1 if works in communication services, finance, insurance, services to finance and insurance, property services, business services, 0 if not.

Industry Group 5: Education/Health/ Community/Other Services = 1 if works in education, health services, community services, motion picture, radio and television services, libraries, museums and the arts, sport and recreation, personal or other services, 0 if not.

Industry Group 6: Public (Government Admin/Defence) = 1 if works in government administration or defence, 0 if not.

Occupations 1: Managers/ Professional = 1 if is manager (generalist, specialist, farmer or farm manager), administrator, or professional (n.e.c., science, building or engineering, business or information, health, education, or social, arts or miscellaneous), 0 if not.

Occupations 2: Associate/Para-professional/Skilled Tradespersons = 1 if is associate professional (science, engineering or related, business or administration, health or welfare, or other), managing supervisor (sales and services), or tradesperson (mechanical or fabrication engineering, automotive, electrical or electronics, construction, food, skilled agricultural or horticultural, or other), 0 if not.

Occupations 3: Clerical/Sales/Services = 1 if is a secretary or personal assistant, other advanced clerical or service worker, intermediate clerical, services, sales or related worker, elementary clerk or sales or service worker, 0 if not.

Occupations 4: Manual Worker = 1 if is an intermediate machine or plant operator, road or rail transport driver, other intermediate production or transport worker, cleaner, factory labourer, or other labourer or related worker, 0 if not.

Table 8: Summary Statistics and Representativeness of Estimation Sample

Variable	Estimation Sample (n=1927)		Broader Sample (n=3389)	
	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 9: 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)
Occupations 1	0.3703	(0.0371)	0.3521	(0.0378)
Occupations 2	0.2013	(0.0380)	0.1863	(0.0381)
Occupations 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 8: 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 9: 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	Occupations 1	0.3621	0.0322
Age^2	-0.0006	0.0001	Occupations 2	0.2333	0.0317
Yr 12 Education	0.0711	0.0269	Occupations 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 10: 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	Occupations 1	0.3569	0.0324
Age^2	-0.0006	0.0001	Occupations 2	0.2254	0.0318
Yr 12 Education	0.0752	0.0270	Occupations 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				

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