EQUAL PAY IN W.A.

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(WEPAU)

Discussion Paper Series 00/6

September 2000

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Abstract

Notwithstanding more than 30 years of equal pay within Australia, females continue to earn significantly less than their male counterparts. Recent data indicates that nationally the adjusted gender wage gap in hourly earnings in the full-time labour market is around 10.5 per cent. In Western Australia (WA) the equivalent gap is significantly higher, equal to 18.5 per cent. Previous research examining the extent of gender wage inequality within WA has been criticised for failing to adequately control for gender differences in hours of work in the full-time labour market in WA. This paper revisits the issue of female wage inequality in WA using alternative data sets. The results confirm the robustness of previous studies and further highlight the large and significant wage gap within the state. The results should make interesting reading for those associated with the development of policies to achieve equal pay in WA.

Introduction

Last year marked the 30th anniversary of the ratification of the principle of Equal Pay for Equal Work in Australian wage determination. A number of academic journals marked the occasion with the release of a series of edited papers on the topic.[1] In WA the 30th anniversary coincided with the release of an independent report on equal pay. Funded by the Department of Productivity and Labour Relations (DOPLAR) the report, prepared by Crockett and Preston (1999), presented a number of statistical facts on gender wage inequality within the state. The authors identified 'adverse changes in the way the market paid for equivalent male and female productivity characteristics' as the main factor driving the rising level of female relative wage disadvantage within WA.

[1] The *Australian Economic Review*, for example, published a 'Policy Forum' on Equal Pay, edited by Jeff Borland (Vol. 32, 1999). *Labour & Industry* (Vol. 10, 1999), also published a special issue on Equal Pay edited by Barbara Pocock.

Following the release of the report the WA Minister for Labour Relations formed a 'Ministerial Pay Equity Joint Working Party' to develop strategies to reduce the gender pay gap for women within the state. The working party, which has now been meeting for more than a year, is expected to report to the Minister before the end of the year.

In August 1999 members of the broader community also came together to establish the 'WA Pay Equity Coalition'. Since its establishment the group has engaged in further research and developed a set of policy proposals aimed at reducing the large and significant wage disadvantage experienced by females within the state.

The Crockett and Preston (1999) report forms an important information base for both the Ministerial Working Party and the WA Pay Equity Coalition. Using new data from the Australian Bureau of Statistics (ABS) this article revisits the earlier work of Crockett and Preston. The paper is organised as follows. It begins with a brief historical overview of female wage fixing in Australia and offers some discussion on the components of the persistent gap. Thereafter the paper presents new estimates measuring the extent of female relative wage disadvantage in WA. A summary and conclusion completes the article.

Female Relative Wages in Australia: A Synopsis

In Australia a historical dependence on institutionally determined wages and the use of principles such as 'needs' has served to disadvantage women. Prior to ratification of the principle of Equal Pay for Equal Work (EPEW) in 1969, claims for equal pay in Australia were often dismissed on the grounds that "… it was socially preferable to provide a higher wage for the male because of his social obligations to fiancée, wife and family" (*Basic Wage Inquiry,* 1949-50; 68 CAR 698). Accordingly, throughout most of the last century, the policies of the industrial tribunals explicitly discriminated against females in Australia. In 1917 the federal tribunal determined that females be awarded 54 per cent of the male Basic Wage. This rate was raised to 75 per cent during World War II on account of labour shortages.[2]

The 75 per cent ratio survived until the 1969 Equal Pay Cases (127 CAR 1142) when the Commission agreed to the principle of Equal Pay for Equal Work (EPEW). EPEW was to be phased in gradually over four stages (shown in Table 1 below).

[2] The Women's Employment Board was established during World War II primarily to encourage females into the munitions industry. The Board was required, under legislation, to set a higher rate (between 75 per cent and 100 per cent of the male rate) to attract more women into work (Plowman, 1995).

Table 1: Equal Pay Case of 1969

Date of Operation	Amount of female rate
1 October 1969	85 per cent of male rate
1 January 1970	90 per cent of male rate
1 January 1971	95 per cent of male rate
1 January 1972	100 per cent of male rate

Source: Equal Pay Cases, 1969; 127 CAR 1142, p.1159

The principle only applied in cases where males and females performed similar work, or worked under the same award. Work usually performed by females (e.g. nursing, secretarial services etc.) was not covered by the decision. As a result, around 80 per cent of the female workforce did not benefit from the decision (National Wage and Equal Pay Cases, 1972; 147 CAR 172, p.177).

In 1972 the Commission extended the principle to one of Equal Pay for Work of Equal Value (EPWEV). In adopting the principle of EPWEV the Commission agreed to determine female rates on the basis of work value comparisons. Where work was performed exclusively by females the Commission provided for intra and inter-award comparisons. This principle, however, only applied to award wages. Other types of remuneration, such as over-award payments, were considered beyond the jurisdiction of the Commission.

Notwithstanding the narrow application of the two equal pay principles, their adoption produced a significant convergence in the Australian gender pay gap (Gregory and Duncan, 1981; Miller, 1994; Short, 1986). The gains outstripped any other country's performance over the same period (Kidd and Meng, 1997). Over the 1980s improvements in the relative human capital endowments of females (principally labour market experience) produced further convergence in the gender wage gap (Preston 1997). Legislative provisions in the form of the *Sex Discrimination Act 1984* and the *Affirmative Action Act 1986* also helped close the gap, although their relative impact was low (Kidd and Meng, 1997). There was no further convergence during the 1990s. As at May 2000 the gender wage gap in the full-time labour market was equal to 16 per cent (see Figure 1 below).

Since 1972 no new pay equity principles have been ratified in the federal Australian Industrial Relations Commission (AIRC). At the state level there have been some interesting developments. The 1998 New South Wales (NSW) Pay Equity Inquiry, for example, recommended that a new state equal remuneration wage fixing principle be established to assess the true or proper value of female work (Pocock, 1999).[3] UnionsWA (the peak labour movement in WA) have recently filed an application with the WA Industrial Relations Commission to establish a pay equity principle to apply in the WA jurisdiction. The case is due to be heard later this year.

[3] It is often argued that early work value cases did not properly value female work. See Short (1986) for further discussion.

The under valuation of female work is, however, only one of a number of reasons explaining the on-going presence of a gender wage gap in Australia. Other factors include: monopsony/oligopsony labour market structures in some highly feminised occupations (e.g. nursing and teaching), thus reducing female bargaining power (Nowak and Preston 2000); occupational crowding, sex-segregation and other characteristics of female work such as a high incidence of part-time and casual employment (Pocock 1999).

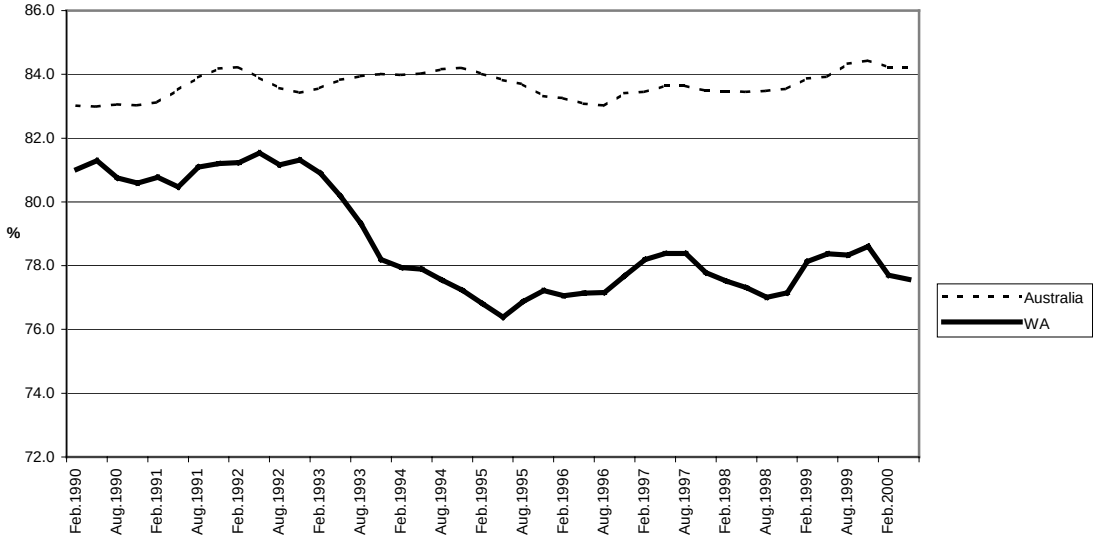
Institutional arrangements for wage determination also have an important impact on the size of the gender pay gap. According to international research the position of women's pay "… is influenced more by the overall system of pay determination than by the specific policies for gender equality …" (Rubery, 1992, p.619). Gregory (1999, p.277) makes a similar point, arguing that centralised wage fixing arrangements delivered a rapid reduction in the Australia gender pay gap in the early 1970s while other countries (notably the US) were unable to change their gender pay ratio even in the presence of Equal Pay provisions and civil rights legislation.

Accordingly, policies which seek to improve the relative human capital endowments of females, whilst laudable, are unlikely to have any immediate impact on the gender pay gap. Moreover, although human-capital type policies are shown to be effective in reducing the gender pay gap over time, the gains made here are often outweighed by adverse changes in the wage structure elsewhere (i.e. the institutional dimension). The phenomenon, sometimes referred to the 'Swimming Upstream Effect' describes the situation where adverse changes in the wage structure counterbalance any convergence arising from female accumulation of human capital endowments (Blau and Kahn 1994). Evidence of this effect in WA may be found in Crockett and Preston (1999).

The Gender Wage Gap in Western Australia

This section begins with a plot of the Australian and WA gender wage gap (see Figure 1). The diagram, as previously noted, shows that over the 1990s there has been no significant change in the size of the gap nationally. In WA the gender wage gap significantly deteriorated over the first half of the 1990s (particularly over the years 1993 and 1994).

Figure 1
AWOTE, Adults Employed Full-Time: Four quarter moving average



Source: ABS Average Weekly Earnings, Cat. No. 6302.

Analysis of the WA gap using data from one per cent public release sample files from the 1991 Census and 1996 Census revealed that the observed deterioration in female earnings in WA was the product of changing labour market rewards for equivalent male and female skills (with the change tending to favour males). Accordingly, by 1996 females within WA earned around 16.3 per cent less than their male counterparts (after controlling for differences in male and female characteristics such as education, experience, industry and occupation). The adjusted wage gap relative to females nationally was around 3.2 per cent (in 1998 dollars this equated to around $20.95 per week) (Crockett and Preston, 1999).

The analysis by Crockett and Preston met with a number of criticisms, most notable amongst them the suggestion that the study did:

> "… not adequately control for the effect of changes in the hours of work on weekly earnings for males and females. Labour force survey data from the Australian Bureau of Statistics suggests there have been higher increases in the weekly hours of work for full-time males than for full-time female employees in Western Australia in recent years." (Reith, 1999).

The absence of hours information in the Census data sets constrained the construction of a dependent variable measuring hourly earnings. There were two other limitations to the Crockett and Preston study: (a) the dependent variable measured earnings from *all sources* (and not just work); and (b) in the 1991 Census data set it was not possible to separately identify WA, accordingly the 1991-1996 change analysis was restricted to the Perth metropolitan area. The

rationale for using the Census data was: (a) that it was large enough to permit a detailed state-level analysis of male and female earnings; and (b) at the time it was the most suitable contemporary data set.

Since the release of the 1996 Census sample file the ABS has released a number of unit record files from the Income Distribution Survey. The advantage of the IDS over the Census is that it records income and earnings from a persons main job – thus permitting analysis of hourly income. The disadvantage of the IDS is that it contains much fewer observations, thus placing constraints on the form of analysis employed. The IDS, nevertheless, provides a good opportunity to revisit the analysis of Crockett and Preston (1999) and provide further evidence on the gender wage gap within the state. Accordingly, the remainder of this section details the data and methodological approach adopted and presents new estimates of the adjusted gender wage gap in WA.

Data and Methodology

Following Crockett and Preston (1999) the analytical framework is the human capital model. There are a number of ways in which the model may be used to study gender wage discrimination. The simplest is to include a female dummy variable in the wage equation. The level of wage disadvantage may be measured by the coefficient on this control variable. A more sophisticated approach involves the estimation of separate wage equations for males and females and a subsequent decomposition of the gap into explained and unexplained components (e.g. Blinder, 1973; and Oaxaca, 1973). Both approaches result in adjusted gender wage gaps of similar magnitudes (Miller 1994). Crockett and Preston (1999) employed the latter. In the analysis below the simple dummy variable approach is used, the rationale being that this approach requires fewer observations as the gender wage gap is estimated from a pooled male and female wage equation.

The estimated wage equations are of the form $\ln \hat{Y}_i = \hat{\beta}_0 + V_i \hat{\beta}$. The dependent variable is a measure of hourly earnings in the person's main job.[4] The set of control variables includes measures for educational attainment, potential labour market experience, marital status, presence and age of dependent children, migrant status and location of residence.[5,6] As indicated above, a female dummy

[4] Hourly earnings are calculated as total weekly earnings from main job divided by hours of work in main job. In the 1996 data set the hours information is given on a continuous basis. In the 1990 data set the hours information are grouped. The mid points of the categories are thus used to construct hourly earnings.

[5] It is generally acknowledged that 'potential experience' (calculated as age minus years of schooling minus 5) is a poor proxy for female labour market experience on account of their intermittent labour force experience. There are a number of ways to 'adjust the experience measure', although the results from the various approaches are mixed. Indeed Blinder (1976) cautions that in the absence of data on actual work experience, any measure of experience will be plagued by statistical biases. Accordingly, the simple 'potential' measure is used here as the

variable is used to measure the female 'treatment-disadvantage' in the labour market.[7]

The model is applied to data from the 1989/90 Income Distribution Survey (IDS) and the merged data from the 1995/96 IDS and the 1996/97 IDS. The two 1995/96 and 1996/97 IDS data files were merged to produce a large enough sample for analysis purposes. The earnings data in the 1996/97 IDS were deflated to 1995/96 levels.[8] After restricting the sample to persons employed full-time, the 1996 Australian sample comprised 9068 persons (5866 males and 3202 females). In the WA sample there were 1298 persons (873 males and 425 females).[9]

Results

The results reported in Table 2 show that females are at an earnings disadvantage relative to men, even after standardising for differing productivity-related characteristics. Estimates of the adjusted hourly wage gap from the IDS show that, nationally, females earned 10.5 per cent less than their male counterparts in 1996. In Western Australia the corresponding disadvantage was significantly higher, equal to 18.5 per cent. (All estimates reported here were statistically significant at the one per cent level).[10,11]

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preferred approach. To help minimise the problem the analysis is restricted to persons employed full-time (35 or more hours per week). Following Gregory and Daly (1992) 'family controls' such as marital status and dependant children are included in the model as proxies for interrupted labour force experience. Langford (1995) shows that this approach yields fairly accurate results.

6 Further description of the explanatory variables are provided in the Appendix B.

7 It should be note that while it is common to interpret the gap as evidence that female skills and qualifications are undervalued the interpretation does have some limitations. For example, the model is unable to control for unmeasured differences in male and female characteristics. These unmeasured differences may account for a portion of the gender wage gap, or may cause the gap to be under-estimated (see Borland, 1999, p.271, fn 4).

8 In the 1996/97 data set the earnings of persons employed full-time were deflated by a factor of 4.8 (with 4.8 representing the average movement in full-time earnings between 1995/96 and 1996/97). Part-time earnings were deflated by 0.2 per cent.

9 In the 1990 Australian sample there were 6385 males and 3273 females (a total of 9658 persons). The WA 1990 sample comprised 1478 people (983 males and 495 females).

10 These estimates are lower (but not significantly lower) than comparable estimates from models including industry and occupational controls.

11 The 18.5 percentage point gap corresponds to the estimated 16.3 percentage point gap estimated using weekly earnings (all sources) data in the Crockett and Preston report.

Table 2: *Gender (Hourly) Wage Disadvantage*

	1996			1990		
	Female Wage Disadvantage (%-point)	t-stat	% females in the sample	Female Wage Disadvantage (%-point)	t-stat	% females in the sample
Australia	-0.105	12.544***	0.353	-0.113	15.580***	0.339
WA	-0.185	6.911***	0.327	-0.133	7.170***	0.335

Notes:

(a) The above results detail the coefficient estimates on a 'female dummy' in pooled (male plus female) wage equations. The set of explanatory variables includes controls for education (2 dummies), experience and its square, marital status (2 dummies), birthplace (1 dummy), children (3 dummies) and area of residence (urban/rural) (1 dummy).

(b) Absolute t-statistics are reported; *** indicates significance at the 1% level; ** at the 5% level

(c) Persons from the Northern Territory and Australian Capital Territory are not included in the Australian sample.

According to these estimates, in 1990 females earned 13.3 per cent less than their male counterparts in WA. The observed 5 percentage point deterioration in the WA gender pay gap over the first half of the 1990s was statistically significant (see Table 3 below).

It should be noted that the 5 percentage point change observed here, although consistent with the change recorded on Figure 1 above, is considerably higher than the 1.1 percentage point deterioration noted in the earlier Crockett and Preston (1999) report. The difference (as shown in appendix A) relates to different decomposition approaches employed, the model estimated (i.e. absence of industry and occupation) and, importantly, the data set used. As noted earlier, in the Crockett and Preston study the focus was on weekly earnings all sources, rather than hourly earnings (main job). Due to coding restrictions the earlier Crockett and Preston analysis was also restricted to Perth rather than to the whole of WA.

Table 3: ***Movements in Hourly Gender Wage Gaps: 1990 to 1996***

	Change in the Gender Wage Gap	t-statistic
Australia	0.009	0.817
WA	-0.050	1.622*

Notes:

(a) The results here were estimated using the IDS data and a pooled 1990-1996 wage equation, a time period dummy (equal to one for the 1996 period) and a 'female*1996-dummy' interaction term. See the footnotes to Table 2 above for details the other variables in the model.

(b) Absolute t-statistics are reported; * indicates significance at the 10% level.

A part explanation for the high gender wage gap in WA vis a vis Australia as a whole, is that males within the state are well paid relative to their national counterparts. In 1996 males within WA earned 3.8 per cent more than their national counterparts (net of differences in their productivity characteristics) (see

appendix B). In 1996 dollars this translates to a wage advantage of around $27.00 per week. Assuming no change in the WA male relative advantage since 1996, the estimated May 2000 WA male relative earnings advantage would be around $31.00 per week (see Table 4).

Females, in comparison, are not only underpaid relative to their male counterparts within the state, they are also significantly underpaid relative to their female counterparts nationally. In 1996 females in WA were, on average, paid 6.8 per cent (or $41.00) less than their national female counterparts. The within-state WA gender wage gap of 18.5 per cent corresponds to a dollar gap of around $138.00 per week in 1996, and around $157.00 by May 2000.

Table 4: Relative Wage Gaps, Australia and WA.

	Estimated Gaps (%)	1996 ($)	May 2000 ($)
	(i)	(ii)	(iii)
• WA Gender Pay Gap	-18.5%	-$138.00	-$157.00
• National Gender Pay Gap	-10.5%	-$75.00	-$86.00
• Women: Australia-WA Gap	-6.8%	-$41.00	-$47.00
• Men: Australia-WA Gap	+3.8%	+$27.00	+$31.00

Note:

(a) The first two %-gap estimates (net of differences in 'productivity characteristics) in column (i) are from Table 2 above. The last two may be found in Table B1 (Appendix B).

(b) These $-gaps are estimated by applying the percentage wage gaps (column (i)) to the following annual average weekly ordinary time earnings (seasonally adjusted) estimates from ABS Cat. 6302 for 1996 and for the year to May 2000.

Annual Average Weekly Ordinary Time Earnings, Adults Employed Full-Time.

	Australia		WA	
	Males	Females	Males	Femlaes
Feb-96 to Nov-96	$717.60	$598.55	$746.43	$579.78
Aug-99 to May-00	$816.00	$687.08	$850.73	$659.95

It is possible that the declining gender earnings ratio partly reflects a decline in the quality of the WA female workforce overtime. One way to test for this is to compute 'quality-adjusted' measures of the changing gap. Following the approach adopted by Blau and Kahn (1997), Table 5 below presents actual, human-capital constant, and price-constant mean wage levels for males and females in 1990 and 1996.

The human-capital constant predicted wage level shows that males within WA experienced a 0.149 log points (or 14.9 per cent) increase in their average hourly wage between 1990 and 1996.[12] The equivalent female 'quality adjusted' mean

[12] The human-capital constant predicted wage level is estimated by combining the coefficient estimates from a 1996 wage equation with the measured characteristics (means) from the equivalent 1990 wage equations. In other words the process assumes that over the period

wage increase in WA was considerably lower, equal to 0.106 log points (or 10.6 per cent). In price-constant terms the results indicate that changes in the human capital endowments between 1990 and 1996 would have, *ceteris paribus*, increased the average male wage by 0.016 log points (measured at 1990 prices).[13] The equivalent change for females would have been 0.023 log points – indicating that the relative improvement in the quality of the WA workforce was higher for females than males.

Table 5: Actual and Predicted Log Wages, Males & Females employed full-time

	1990	1996	Change 1990-96
WA: Males			
Actual Wage	2.524	2.698	0.174
Predicted Wage (1990 means)	2.524	2.673	**0.149**
Predicted Wage (1990 prices)	2.524	2.540	0.016
WA: Females			
Actual Wage	2.329	2.461	0.132
Predicted Wage (1990 means)	2.329	2.435	**0.106**
Predicted Wage (1990 prices)	2.329	2.352	0.023
Australia: Males			
Actual Wage	2.494	2.667	0.173
Predicted Wage (1990 means)	2.494	2.634	**0.140**
Predicted Wage (1990 prices)	2.494	2.522	0.028
Australia: Females			
Actual Wage	2.349	2.540	0.191
Predicted Wage (1990 means)	2.349	2.500	**0.151**
Predicted Wage (1990 prices)	2.349	2.379	0.030

Summary and Conclusion

Notwithstanding more than 30 years since first endorsing the principle of Equal Pay for Equal Work, females in Australia continue to earn significantly less than their male counterparts. Recent estimates (based on 1996 data) suggest an adjusted gender hourly wage gap of around 10.5 per cent nationally. In WA the corresponding gender wage gap is much higher, equal to 18.5 per cent. In dollar terms this 18.5 per cent gap amounts to around $157 per week.

1990 to 1996 there was no change in the characteristics (e.g. education levels, etc) of females in the sample.

[13] The 'price-constant' predicted log wage holds the rates of pay constant at 1990 levels, but allows for changes in the quality of the workforce over time. The predicted wage is estimated by combining the coefficients from the 1990 wage equation with the means from the 1996 wage equation.

A number of possible explanations may be advanced to explain why females are poorly paid even after controlling for differences in the characteristics of males and females. They include the continued under valuation of women's work and, occupational crowding and sex-segregation; monopsony/oligopsony labour market structures in some highly feminised occupations (e.g. nursing and teaching) and other characteristics of female work such as a high incidence of part-time and casual employment (Pocock, 1999; Nowak and Preston, 2000).

Other researchers highlight the importance of institutional structures (e.g. tribunals and unions) in the determination of female pay. According to Rubery (1992) the position of women's pay "… is influenced more by the overall system of pay determination than by the specific policies for gender equality …" (Rubery, 1992, p.619). In other words, legislative provisions, such as Equal Employment Opportunity Acts, are necessary but not sufficient conditions for the attainment of equal pay. Institutional arrangements, such as minimum wage provisions which raise the bottom of the wage distribution and thus, indirectly assist women (since many are located in low paid jobs), are critical to any policy which has a focus on reducing the gender pay gap (Fortin and Lemiux, 1997).

Since the early 1990s Australia, and WA in particular, have implemented legislative reforms designed to deregulate the labour market and decentralise the level of wage determination. A coinciding labour market development is rising earnings inequality (Borland, 1999a). In climates such as this women may find themselves 'swimming upstream', i.e. unable to close the gender pay gap because of counterbalancing factors, such as changes in the way the market pays for equivalent male and female characteristics. Evidence of this effect in WA is noted in Crockett and Preston (1999).

Accordingly, given that prevailing Australian institutional arrangements (e.g. industrial tribunals and minimum wages) have, in the past, been used to deliver convergence in the gender pay ratio, there are reasons to believe that such mechanisms could again be used to address the gender pay problem in Australia. To this end the New South Wales and Tasmanian state industrial relations commissions have recently established equal remuneration wage fixing principles. The Queensland state government has also recently announced an inquiry to examine the extent of pay inequity in within that state and, relatedly, the adequacy of existing policy and legislative settings (Brady, 2000).

In Western Australia the 'Ministerial Pay Equity Joint Working Party', which is expected to report by the end of the year, is constrained in its sphere of inquiry. Under the terms of reference of the inquiry "The recommended strategies are to be consistent with the existing labour relations institutional arrangements". The current emphasis on deregulation and decentralisation within WA suggests that minimum wage provisions, shown elsewhere to have a significant effect on female pay (e.g. Fortin and Lemiux, 1997; Gregory and Duncan, 1981) are unlikely to feature in the set of recommendations arising out of this working party.

On a more positive front, the forthcoming case in the WA Industrial Relations Commission for a pay equity principle could be expected to deliver some important outcomes for female workers in the state.

The release of a recently completed (May 2000) ABS survey on award and agreement coverage early next year will also play a critical role in the development of appropriate policy to redress growing levels of gender wage inequality within WA. While we await the release of this survey we have no comprehensive data on the gender coverage (and outcomes) of awards and agreements and are thus constrained in our ability to directly target policy. In the words of Groshen (1991) it is crucial that we understand the determinants of the gender wage gap as "… the potential efficacy of a policy depends on the magnitude of the component(s) targeted."

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Appendix A.

As noted in the body text above, there is some discrepancy in the size of the estimates generated using the Income Distribution Survey (IDS) and those generated using the Census data (i.e. as per Crockett and Preston 1999). The following material in this appendix endeavours to shed some light on the observed discrepancies. As shown the results are sensitive to the nature of the dependent variable (weekly earnings, all sources; weekly earnings, main job; hourly earnings, main job), nature of the model estimated (e.g. level of aggregation of industry and occupational controls); and nature of estimation or decomposition technique used. In many instances the differences are not statistically significant.

Table A1 conducts a sensitivity analysis of estimated gender wage gaps in 1990 and 1996 using different data sets, models and estimating techniques. A comparison of 1996 results suggests that the WA gender wage gap is around 17.6 per cent using Census data (weekly earnings, all sources) and 18.5 per cent using IDS data (hourly earnings main job).

Table A1: Comparisons of estimated gender wage gaps 1996 and 1990

	1996 Census		1996 Income Distribution Survey (IDS)			
	Weekly Earnings (all sources)[a]		**Weekly Earnings (main job)**[b]		**Hourly Earnings (main job)**[b]	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Australia	0.192	-0.141	0.181	-0.132	0.127	-0.105
WA	0.261	0.176	0.305	-0.210	0.237	-0.185
	1991 Census[c]		1990 IDS[d]		1990 IDS[d]	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Australia	0.199	0.145	0.203	0.142	0.146	0.108

Notes:

(a) These estimates were generated from a set of regressions where the dependent variable was weekly earnings (from all sources) and the independent variables controlled for education level (4 dummies), experience and its square, marital status (2 dummies), children (1 dummy), birthplace (2 dummies), sector of employment (public/private dummy), location (rural/urban dummy), industry (1 digit) and occupation (1 digit). The Blinder/Oaxaca decomposition procedure was applied. The results are reported in Preston and Crockett (1999), Table 2.

(b) The set of independent variables in these models controlled for education level (2 dummies), experience and its square, marital status (2 dummies), children (3 dummies), birthplace (1 dummy) and location (1 dummy). There were no controls for industry and occupation. Gender disadvantage is estimated using the simple dummy variable approach.

(c) This estimate is contained in Preston 1997, where industry and occupation are controlled for at the mainly 2 digit level of analysis. The other independent variables are equivalent to those listed at (a) above. The Blinder/Oaxaca decomposition approach was used here.

(d) These weekly and hourly income estimates are based on the 1990 IDS file and calculated using the Blinder/Oaxaca technique. The models used were of a basic specification without controls for industry and occupation. The 1990 estimates are consistent with comparable estimates in the literature. Langford (1995), for example, finds a raw gap of 0.150 and an a Blinder/Oaxaca adjusted gap of 0.092. Langford controls for one digit industry and occupation.

Table A2 examines the changing gender wage gap over the first half of the 1990s. Table 3 in the body of this paper indicates that between 1990 and 1996 the WA gender pay gap deteriorated by 5 percentage points. (Consistent with the patterns revealed in Figure 1). The 5 percentage point estimate is based on a

measure of hourly earnings (main job), calculated using the IDS data. The 5 percentage point change corresponds to the substantially lower 1.1 percentage point deterioration recorded in Crockett and Preston. There are three differences between the Crockett and Preston methodology and the approach used here:

- the dependent variable in Crockett and Preston measures weekly earnings, all sources. The dependent variable in the current paper measures hourly earnings, main job.

- due to coding constraints the focus of analysis in the Crockett and Preston study was Perth rather than the whole of WA (as used in this paper).

- comparisons in the Crockett and Preston study used data from the August 1991 and August 1996 Census data files. Comparisons in this paper use data from the 1989/90 IDS and the merged 1995/96 and 1996/97 IDS. Thus the time periods are slightly different.

Table A2: Sensitivity Analysis of Estimated Gender Wage Gaps for Adults Employed Full-Time. A Study of The Wellington Decomposition Technique Across Different Data Sets and Dependent Variables.

	1991-1996: Census		1990 to 1996, Income Distribution Surveys					
	Weekly Earnings (all sources)		**Weekly Earnings**			**Hourly Earnings**		
	Raw	Net Change (extended model)[(b)]	Raw	Net Change (extended model)	Net Change (basic model)	Raw	Net Change (extended model)	Net Change (basic model)
	percentage points							
Australia	-0.42	0.20	-2.3	-2.3	-2.0	-1.9	-1.5	-1.1
WA	1.11[(a)]	1.21[(a)]	4.3	2.2	3.5	4.2	2.9	4.2

Notes:

(a) The analysis reported here measures the changing *Perth* wage gap. (Perth is the capital of Western Australia).

(b) The 'extended model' is the basic (human capital + demographics) model plus controls for one digit industry and occupation. See note (b) to the above Table for a list of the variables in the basic model.

(c) The Wellington decomposition approach requires estimation of separate male and female wage equations for each period (i.e. 4 sets of results). The WA estimates are based on relatively small samples. It is possible that the results are sensitive to sample size, particularly at smaller levels. Accordingly, the body of this paper opts for the simple dummy variable approach over the above decomposition approach.

Appendix B

Dependent Variable
Natural logarithm of hourly earnings. In the 1996 data set the variable was derived via continuous earnings and hours information. In the 1990 data set the earnings information was provided on a continuous basis, but the hours were grouped as follows:

> 1 “0 to 9 hours per week”; 2 “10 to 19 hours per week”; 3 “20 to 24 hours per week”; 4 “24 to 29 hours per week”; 5 “30 to 34 hours per week”; 6 “35 to 39 hours per week”; 7 “40 to 44 hours per week”; 8 “45 to 49 hours per week”; 9 “50 hours per week or more”.

The mid points of each category were used to construct a continuous measure. In the case of the open-ended upper limit the variable was set at 55 hours.

Education Level
Highest qualification: the omitted or reference category includes persons with a basic qualification, persons who completed secondary schooling, and persons who did not complete school.

Skillvoc: Highest qualification a skilled certificate or diploma.
Degree: Highest qualification a bachelor degree or higher.

Labour Market Experience
Potential Experience: equal to ‘(age of person)-(years of schooling)-5’.

Years of schooling was defined as follows: 16.5 for those with a degree or higher; 15 for those with a skilled vocational qualification (e.g. trade or diploma), 13 for persons completing high school or post-school basic qualifications; and 11 for those with no qualifications.

Age of person – this information was provided in bands.

1996	**1990**
15 through 24: continuous	15 through 17: continuous
25-29 years	18-20 years
30-34 years	21-24 years
35-39 years	25-29 years
40-44 years	30-34 years
45-49 years	35-39 years
50-54 years	40-44 years
55 through 64: continuous	45-49 years
	50-54 years
	55-59 years
	60-64 years

Marital Status
Persons who were single formed the omitted category
Married: married
Wsd: widowed, separated or divorced.

Children
Persons with no dependent children formed the omitted category.
Kids0t4: has dependent children aged between 0 and 4.
Kids5t9: has dependent children aged between 5 and 9
Kid1015: has dependent children aged between 10 and 15

Birthplace
Migrant: equal to 1 if the person was born overseas. Australians form the reference group.

Geographic location
Metro: equal to 1 if the person resides in a capital city.

Gender
Female: equal to 1 if the person is a female.

Table B1: WA/Australia Female and Male Relativities, 1996

	Females			Males		
Variable	Coefficient	t-statistic	Mean	Coefficient	t-statistic	Mean
Constant	2.089	106.789		2.087	114.354	
SKILLVOC	0.133	8.575	0.213	0.153	13.269	0.38
DEGREE	0.404	27.119	0.205	0.411	23.805	0.156
EXP	0.035	15.358	17.445	0.036	18.053	19.194
EXP^2	-0.078	-13.26	4.336	-0.069	-15.051	4.97
MARRIED	0.058	3.842	0.554	0.119	7.39	0.684
WSD	0.09	3.895	0.112	0.094	3.661	0.056
KIDS0T4	0.037	1.539	0.066	-0.023	-1.41	0.181
KIDS5T9	-0.039	-1.782	0.085	-0.009	-0.597	0.178
KID1015	-0.105	-5.61	0.129	-0.025	-1.576	0.185
MIGRANT	-0.07	-4.412	0.238	-0.039	-2.985	0.257
METRO	0.076	5.475	0.736	0.052	4.268	0.686
WA	**-0.068**	**-3.356**	**0.133**	**0.038**	**2.357**	**0.149**
R^2adj	0.266			0.225		
Breusch-Pagan	160			169		
Sample Size	3202			5866		
Mean Dep Var	2.54			2.667		