Review of Income and Wealth
Series 36, No. 4, December 1990

GENDER WAGE DIFFERENCES IN AUSTRALIA, SWEDEN AND THE UNITED STATES

BY SHELLEY A. PHIPPS

Dalhousie University

In this paper I use microdata from the Luxembourg Income Study to investigate the contributions of industrial structure, occupational mix and personal and family characteristics to observed gender differences in wages in Australia, Sweden and the United States. A particular effort is made to analyse differences in distribution as well as level of wages. The conclusion reached is that different factors determine the wages of low- and high-wage workers. For higher-wage workers, personal and family characteristics are important explanations for wage variation. For lower-wage workers, occupation plays a more significant role.

In Australia, the average woman's wage is 71 percent of the average man's wage; in Sweden, the corresponding figure is 78 percent; in the United States, 62 percent.[1] In all three countries, the average woman earns less than the average man, but women living in Sweden are relatively much better-off than women living in the United States. Why is this so? Why do women earn less than men? Why do women in Sweden fare better than women elsewhere?

In this paper I make use of the Luxembourg Income Study, a set of internationally comparable microdata sets, to examine the possible contributions of industrial structure, occupational mix and personal/family characteristics to observed gender differences in wages in Australia, Sweden and the United States. Particular effort is made to sort out the possibly different implications of these factors for low-wage as opposed to simply "average" women and men. Comparing gender differences across three reasonably similar industrialized countries which have different industrial structures, occupational mixes and social policies is a useful strategy for assessing the importance of these factors not typically available to researchers studying individual countries.

Note: I would like to thank D. Blades, P. Burton, M. Manser and L. Osberg for helpful comments. Special thanks are also due to John Whalley for help with all the calculations and to the Social Sciences and Humanities Research Council of Canada for financial support. Earlier versions of this paper were presented at the American Council on Consumer Interests annual meetings in Baltimore, Maryland, March 30, 1989 and at the Twenty-first General Conference of the IARIW.

[1]These numbers are calculated using the Luxembourg Income Study. See Smeeding, *et al.*, 1985, for detailed description of this data source. The LIS dataset for Australia is the 1981/82 Income and Housing Survey with a total sample size of 17,000 observations. Of these, 2,886 women and 4,989 men were selected for analysis. The dataset for Sweden is the Swedish Income Distribution Survey with a total sample size of 9,600 observations. Of these, 2,512 women and 2,582 men were selected for analysis. The U.S. dataset is the Current Population Survey with a total of 65,000 observations. Of these, 3,542 women and 4,662 men were selected for analysis.

The remainder of the paper is divided into four sections. The first examines the hypothesis that differences in industrial structure explain gender wage differences across the three countries studied. In the second section the possible contribution of occupational differences, controlling for industry is explored. In the third section, the role of family and personal characteristics is examined. Conclusions and policy implications are offered in the final section.

Industrial Structure

Distributions of employment across industrial sectors for women, for men and for all employed workers are presented in Table 1. Calculations are based on samples of men and women between the ages of 25 and 55 with positive wage rates drawn from the relevant Luxembourg Income Study data files.[2] As shown in Table 1, over half of all women work in the non-financial service sector in each country. While the service sector also provides employment for a large proportion of men, manufacturing is (roughly) equally important and men are generally well-represented in all sectors. Assuming available capital varies across industrial sectors, can these differences in the sectors where men and women work help to explain differences in observed gender wage gaps across countries?

In Table 2 three sets of wage ratios are presented. First, the ratio of the average male wage in a particular sector to the over-all average male wage is calculated. Second, the ratio of the average female wage rate in each industrial sector to the overall mean male wage is presented. It is clear that men are better-paid in some sectors than others and that women earn higher wages in some sectors than others. However, the sectors with relatively high women's wages do not necessarily correspond, within a country, to the sectors in which men receive relatively high wages. Also, there is no consistency across countries in the industrial sectors with the highest wage rates (for either men or women). This suggests that inherent characteristics of an industry (e.g. capital requirements) are not the major explanation for the observed pattern of wages.

Moreover, differences across countries in the distributions of men and women across industrial sectors do not explain cross-country differences in gender wage gaps. Wage ratios were re-calculated for Australia and the United States using own-country male and female wage rates, but the Swedish distributions of men and women across industrial sectors. This procedure had very little impact on wage ratios. In Australia, the gender wage ratio increased from 0.71 to 0.72 (1.4 percent) while in the United States, the wage ratio was unchanged. The third set of wage ratios in Table 2 shows ratios of average female to average male wage rates for each industrial sector. Not surprisingly, there is considerable heterogeneity across sectors in observed gender wage gaps.

All of the ratios presented in Table 2 are ratios of mean wages. However, comparing the average woman's wage in a sector with the average man's wage

[2]Younger and older workers are excluded to avoid students and semi-retired workers. The self-employed and farmers are excluded to focus on differences in wages received by paid employees. Details of the industrial classifications employed throughout this analysis are available from the author. Categories were chosen to be as comparable as possible across the countries, given different classification practices within countries.

TABLE 1

PROPORTIONAL DISTRIBUTION OF MEN AND WOMEN ACROSS INDUSTRIES
(in percents)

	Australia	Sweden	U.S.A.
Primary			
Women	1.0	0.4	0.9
Men	4.5	2.4	2.9
Both	3.0	1.0	2.0
Manufacturing			
Women	14.8	12.7	19.0
Men	24.9	30.2	28.7
Both	21.0	22.0	25.0
Commercial			
Women	12.4	11.4	13.5
Men	15.3	11.7	13.1
Both	14.0	12.0	13.0
Services (NF)			
Women	52.9	61.1	52.1
Men	24.7	25.9	29.9
Both	35.0	43.0	39.0
Financial			
Women	11.3	8.9	8.1
Men	11.0	9.3	4.4
Both	11.0	9.0	6.0
Utilities			
Women	7.0	4.3	5.3
Men	15.3	10.1	10.3
Both	12.0	7.0	8.0
Construction			
Women	0.1	1.3	1.3
Men	4.2	10.4	10.6
Both	3.0	6.0	7.0

Source: Computed using Luxembourg Income Study data.

TABLE 2

WAGE RATIOS BY INDUSTRY

	Australia	Sweden	U.S.A.
Mean Wage Rate by Industry (Men)/ Mean Wage Rate (All Men)			
Total	1.00	1.00	1.00
Primary	1.26	0.77	1.04
Manufacturing	0.95	0.97	0.99
Commercial	0.90	1.03	0.93
Services (NF)	1.07	1.07	1.00
Financial	1.03	1.21	1.11
Utilities	1.00	0.87	1.06
Construction	0.91	0.87	1.00

TABLE 2—continued

	Australia	Sweden	U.S.A.
Mean Wage Rate by Industry (Women)/ Mean Wage Rate (All Men)			
Total	0.71	0.78	0.62
Primary	0.71	0.76	0.64
Manufacturing	0.62	0.70	0.57
Commercial	0.64	0.74	0.54
Services (NF)	0.75	0.80	0.64
Financial	0.71	0.79	0.61
Utilities	0.64	0.78	0.75
Construction	0.83	0.70	0.84
Mean Wage Rate by Industry (Women)/ Mean Wage Rate by Industry (Men)			
Total	0.71	0.78	0.62
Primary	0.56	0.99	0.61
Manufacturing	0.65	0.72	0.57
Commerical	0.71	0.72	0.58
Services (NF)	0.70	0.75	0.64
Financial	0.70	0.65	0.55
Utilities	0.65	0.89	0.70
Construction	0.92	0.81	0.84

Source: Computed using Luxembourg Income Survey data.

does not provide a complete description of relative male/female experiences in the marketplace. Two wage distributions with the same mean may have very different distributions. For example, Distribution A, {5, 5, 5, 5, 100}, and Distribution B, {24, 24, 24, 24, 24}, both have mean wage rates of 24, but the two distributions clearly describe very different market outcomes. A major goal of this paper is to study gender differences in the distribution as well as the level of wages. To analyse gender differences in wage distributions, a summary statistic to describe both the male and the female wage distributions is required. Drawing on the literature concerned with measuring income inequality (Atkinson, 1970), one possible choice is a "distributionally-sensitive" mean wage (Phipps, 1988).

A distributionally-sensitive mean wage rate is calculated as:

$$(1) \qquad w^* = \left\{ 1 \Big/ n \sum_{i=1}^{n} w_i^r \right\}^{1/r} \qquad r \leq 1,\ r \neq 0$$

$$= \prod_{i=1}^{n} w_i^{1/n} \qquad r = 0$$

where r is a weighting parameter. When $r = 1$, the distributionally-sensitive wage is just the mean wage ($w^* = \bar{w}$). As the value of r falls, more weight is attached to individuals with low wage rates. Returning to the five-person wage distributions *A* and *B* illustrates the difference between mean wages and distributionlly-

sensitive wages. For $r = 1$, $w^* = \bar{w} = 24$ for both distributions. For $r = -5$, $w^* = \bar{w} = 24$ for Distribution *B*. However, for Distribution *A*, $w^* = 5.23 < \bar{w} = 24$. If there is any inequality in the distribution of wages, the distributionally-sensitive wage falls as more weight is placed on low-wage individuals.

Ratios of distributionally-sensitive mean wages by industry, for four values of the weighting parameter, r are presented in Table 3. This provides information

TABLE 3

DISTRIBUTIONALLY-SENSITIVE WAGE RATIOS BY INDUSTRY

(W_f / W_M^*)

	Australia	Sweden	U.S.A.
$r = 0.5$			
Total	0.68	0.78	0.61
Primary	0.52	0.96	0.60
Manufacturing	0.63	0.71	0.57
Commercial	0.70	0.72	0.57
Services (NF)	0.68	0.75	0.63
Financial	0.67	0.66	0.56
Utilities	0.63	0.88	0.71
Construction	0.90	0.81	0.81
$r = -0.5$			
Total	0.61	0.76	0.59
Primary	0.40	0.82	0.56
Manufacturing	0.57	0.65	0.57
Commercial	0.64	0.71	0.56
Services (NF)	0.61	0.74	0.61
Financial	0.56	0.71	0.62
Utilities	0.56	0.90	0.73
Construction	0.81	0.84	0.80
$r = -1.5$			
Total	0.47	0.76	0.54
Primary	0.27	0.65	0.52
Manufacturing	0.45	0.50	0.57
Commercial	0.56	0.61	0.47
Services (NF)	0.49	0.72	0.48
Financial	0.34	1.23	1.01
Utilities	0.49	1.28	1.07
Construction	0.66	1.14	1.07
$r = -5.0$			
Total	0.69	0.93	0.30
Primary	***	0.96	0.39
Manufacturing	0.70	0.64	0.59
Commercial	0.85	0.56	0.27
Services (NF)	0.64	0.56	0.18
Financial	***	6.90	3.07
Utilities	0.76	5.40	6.13
Construction	***	4.15	7.09

Source: Computed from Luxembourg Income Study data.
*** Indicates unavailable.

not available in Table 2 which focused only on *mean* wages. Heterogeneity across industrial sectors in patterns of distributionally-sensitive wage ratios indicates that male and female wage distributions are different across industrial sectors. Consider, for example, distributionally-sensitive wage ratios for the non-financial service sector, in which the largest number of women are employed. For all countries, wage ratios fall (wage gaps increase) as more weight is placed on lower-wage workers. This indicates more inequality in the distribution of women's than men's wages within the sector. As indicated in Table 3, male and female wage distributions vary substantially across countries and industrial sectors. Explanations for this variance are investigated in the remainder of this paper.

Occupational Structure

To what extent do differences across sectors and countries in the types of work performed by men and women within the sector explain gender differences in the level or distribution of wages? Distributions of men and women across occupations, over-all and within each industrial sector are presented in Table 4. In Australia and the United States, the largest number of women are employed in "clerical" occupations (32 and 34 percent, respectively). In Sweden, more women work in "professional" (38 percent) than "clerical" (22 percent) occupations. "Service" occupations are the other most likely type of employment for women in all three countries.

Men, on the other hand, are most likely to be found in "blue-collar" occupations. Forty-seven percent of men in Australia, 31 percent in Sweden and 45 percent in the United States are blue-collar workers. Large numbers of men are "professional" workers in all countries. "Administrative" occupations are particularly important in the United States (16 percent) while "service" occupations (27 percent) are particularly important in Sweden. Overall, it is clear that men and women do rather different jobs.

This is particularly striking when occupational distributions are examined at the industry level. Within the Australian manufacturing sector, for example, 56 percent of women have blue-collar occupations while 32 percent have clerical jobs; 71 percent of men have blue-collar jobs, 19 percent have professional or administrative jobs. These patterns of employment for men and women closely resemble those found in the United States. In Sweden, patterns are similar, except that service occupations are more important, especially for men (professional and administrative occupations are correspondingly less important).

To understand how the occupational mix within an industrial sector can contribute to the observed average wage, it is necessary to know which occupations are relatively highly-paid. Ratios of average male wages by occupation to the over-all average male wage are presented in Table 5. Similarly, ratios of average female wages by occupation to the over-all average male wage are calculated. In both cases, professional and administrative occupations fare relatively well in all countries; blue-collar and service occupations fare relatively poorly. Finally, it is again striking that even within occupational groups, women on average never receive more than 92 percent of the *average* male wage (Administrative workers in Sweden).

TABLE 4

OCCUPATIONAL DISTRIBUTION BY INDUSTRIAL SECTOR

	Australia						Sweden						U.S.A.				
	Prof.	Admin.	Sales	Clerk	Blue	Serv.	Prof.	Admin.	Sales	Clerk	Blue	Serv.	Prof.	Admin.	Sales	Clerk	Blue	Serv.
Total																		
Women	0.26	0.02	0.07	0.32	0.11	0.22	0.38	0.03	0.07	0.22	0.07	0.23	0.19	0.07	0.05	0.34	0.19	0.16
Men	0.18	0.11	0.05	0.10	0.47	0.09	0.20	0.07	0.10	0.05	0.31	0.27	0.19	0.16	0.06	0.06	0.45	0.08
Primary																		
Women	0.10	0.00	0.00	0.43	0.20	0.27	0.09	0.09	0.00	0.18	0.55	0.09	0.07	0.00	0.00	0.57	0.37	0.00
Men	0.13	0.04	0.01	0.05	0.74	0.03	0.06	0.13	0.00	0.20	0.63	0.16	0.13	0.10	0.01	0.02	0.70	0.04
Manufacturing																		
Women	0.04	0.01	0.03	0.32	0.56	0.04	0.10	0.01	0.02	0.28	0.46	0.13	0.06	0.03	0.02	0.25	0.63	0.01
Men	0.09	0.10	0.03	0.05	0.70	0.02	0.07	0.04	0.08	0.03	0.50	0.27	0.15	0.11	0.03	0.05	0.64	0.02
Commercial																		
Women	0.01	0.05	0.28	0.48	0.11	0.07	0.04	0.07	0.59	0.09	0.16	0.06	0.04	0.31	0.23	0.03	0.38	0.01
Men	0.04	0.21	0.19	0.04	0.51	0.01	0.04	0.07	0.59	0.09	0.16	0.05	0.04	0.31	0.23	0.03	0.38	0.01
Services (NF)																		
Women	0.45	0.02	0.01	0.21	0.01	0.30	0.58	0.00	30.0	0.12	0.00	0.27	0.32	0.06	0.00	0.28	0.06	0.28
Men	0.43	0.08	0.00	0.14	0.14	0.21	0.55	0.08	0.01	0.02	0.10	0.24	0.40	0.14	0.01	0.09	0.16	0.20
Financial																		
Women	0.05	0.03	0.03	0.59	0.02	0.28	0.10	0.03	0.02	0.67	0.01	0.17	0.04	0.14	0.14	0.66	0.01	0.01
Men	0.19	0.15	0.09	0.24	0.23	0.10	0.27	0.17	0.08	0.12	0.05	0.31	0.10	0.33	0.28	0.13	0.07	0.09
Utilities																		
Women	0.02	0.06	0.36	0.31	0.11	0.14	0.03	0.05	0.02	0.34	0.01	0.56	0.09	0.08	0.02	0.58	0.20	0.30
Men	0.09	0.09	0.02	0.08	0.63	0.09	0.02	0.06	0.02	0.07	0.26	0.57	0.11	0.14	0.01	0.10	0.62	0.20
Construction																		
Women	0.05	0.00	0.00	0.86	0.00	0.10	0.03	0.00	0.03	0.63	0.09	0.22	0.00	0.13	0.00	0.48	0.36	0.02
Men	0.13	0.05	0.00	0.04	0.77	0.01	0.00	0.02	0.00	0.01	0.66	0.31	0.05	0.12	0.00	0.02	0.81	0.00

Source: Computed using Luxembourg Income Survey data.

TABLE 5

WAGE RATIOS BY OCCUPATION

	Australia	Sweden	U.S.A.
Mean Wage Rate by Occupation (Men)/ Mean Wage Rate (All Men)			
Total	1.00	1.00	1.00
Professional	1.22	1.20	1.19
Adminstrative	1.20	1.49	1.21
Sales	0.90	1.11	1.10
Clerical	1.00	0.92	0.93
Blue collar	0.89	0.74	0.88
Services	0.97	0.99	0.74
Mean Wage Rate by Occupation (Women)/ Mean Wage Rate for all Men			
Total	0.71	0.78	0.62
Professional	0.87	0.89	0.81
Administrative	0.80	0.92	0.77
Sales	0.64	0.70	0.56
Clerical	0.71	0.73	0.60
Blue collar	0.54	0.60	0.52
Services	0.60	0.71	0.50
Mean Wage Rate by Occupation (Women)/ Mean Wage Rate by Occupation (Men)			
Total	0.71	0.78	0.62
Professional	0.71	0.74	0.68
Administrative	0.66	0.61	0.63
Sales	0.71	0.63	0.50
Clerical	0.71	0.80	0.64
Blue collar	0.61	0.81	0.59
Services	0.63	0.71	0.67

Source: Computed using Luxembourg Income Survey data.

We might hypothesize that sectors in which a larger than average proportion of the female employees perform relatively highly-paid professional or administrative tasks will have a higher than average gender wage ratio. This hypothesis is investigated by regressing the gender wage ratio for each industrial sector and country on ratios of relative occupational proportions within that sector and country. [Thus, the first independent variable is 0.10/0.13, the ratio of the proportion of women working in the primary sector who have professional occupations to the proportion of men who have professional occupations (see Table 4)].

This procedure differs from the more standard wage-equation approach (following Blinder, 1973 and Oaxaca, 1973). In the Blinder/Oaxaca methodology, estimated wage equations are employed to decompose gender wage differences into components which are "explainable" in terms of human capital differences and into those which are not. (See Phipps, 1988; Rosenfeld and Kahlberg, 1988

or Treiman and Roos, 1983 for applications of this approach in a cross-national context.) While the wage-equation approach is very useful for understanding the determinants of differences in levels of male and female wages, it is more limited in its ability to explain differences in distributions. The methodology adopted in this paper is employed in an attempt to analyse the determinants of differences in gender wage distributions.

Regression results are reported in Table 6. When ratios of mean wage rates are used as dependent variables, relative occupational proportions explain none of the observed variation across sectors. On the other hand, when distributionally-sensitive gender wage ratios are used as dependent variables ($r = -1.5$), 38 percent of the variation in wage ratios across sectors and countries can be explained by relative occupational proportions.[3] As the proportion of women employed in administrative occupations within a sector increases (or the number of men falls), the distributionally-sensitive wage ratio increases; as the proportion of women employed in blue-collar occupations increases (or the proportion of men falls), the distributionally-sensitive wage ratio falls. This rather dramatic difference between the results obtained using ratios of mean wages and ratios of

TABLE 6

OLS REGRESSION RESULTS: INDUSTRY WAGE RATIOS AND OCCUPATIONAL MIX

	Mean Wage Ratios			Distributionally-Sensitive Wage Ratios		
	I	II	III	I	II	III
Professional	0.008	0.001	−0.015	0.0004	−0.017	−0.011
	(0.55)	(0.10)	(−1.10)	(0.017)	(−0.67)	(−0.38)
Administrative	0.051	0.007	−0.092	0.368	0.250	0.285
	(0.76)	(0.10)	(−1.28)	(3.00)***	(1.97)*	(1.88)*
Sales	−0.003	−0.0001	0.007	0.008	0.015	0.012
	(−0.28)	(−0.02)	(0.87)	(0.47)	(0.93)	(0.70)
Clerk	0.0001	0.001	0.003	0.005	0.007	0.007
	(0.03)	(0.23)	(0.76)	(0.53)	(0.89)	(0.77)
Blue collar	0.006	−0.004	−0.009	−0.281	−0.306	−0.304
	(0.06)	(−0.04)	(−0.12)	(−1.60)	(−1.91)*	(−1.84)*
Service	0.007	0.008	0.012	−0.003	−0.0006	−0.002
	(0.95)	(1.08)	(1.92)*	(−0.21)	(−0.05)	(−0.16)
Part-time		−0.003	−0.002		−0.008	−0.009
		(−1.24)	(−0.82)		(−1.98)*	(−1.98)*
Sweden			0.22			−0.079
		(2.71)**			(−0.46)	
Constant	0.65	0.72	0.58	0.78	0.85	0.81
	(8.13)***	(7.34)***	(7.69)***	(4.00)***	(4.70)***	(4.47)***
$\bar{R}^2$	−0.18	−0.13	0.24	0.38	0.50	0.46

Source: Calculated using Luxembourg Income Study data. *T*-Ratio's are reported in parentheses.
*** Significant at 1 percent in a two-tailed test.
** Significant at 5 percent.
* Significant at 10 percent.

[3]To avoid confusion, the main body of the text focuses on results for distributionally-sensitive wage ratios calculated with $r = -1.5$. Since the choice of any particular value for the parameter r depends on subjective judgement (see Atkinson, 1970), the sensitivity of results to this choice is illustrated in Table 9.

inequality-sensitive wages indicates that occupation is an important determinant of wage distributions.

Another factor which might be viewed as an important determinant of wage variation across industrial sectors is the prevalence of part-time work. As indicated in Table 7, in all countries, women are far more likely to work part-time than men. In Australia, 43 percent of women and only 2 percent of men work part-time. In the United States, 24 percent of women and 2 percent of men work part-time. Interestingly, part-time work is much more common for *both* men and women in Sweden: 61 percent of women and 12 percent of men work part-time. Across industrial sectors there is enormous variation in the number of part-time workers. Again, we might expect gender wage ratios to be higher in sectors where there are either relatively few women or relatively many men working part-time. Thus, the second equation reported in Table 6 adds a "part-time worker" variable to the set of occupation variables. (The part-time worker variable is calculated as the ratio of the proportion of women within a sector working part-time to the proportion of men working part-time.) Still, none of the variance in mean wage ratios is explained. However, as the relative proportion of women who work part-time within a sector increases, the distributionally-sensitive wage ratio falls. With the addition of the part-time worker variable, 50 percent of the variation in distributionally-sensitive wage ratios ($r = -1.5$) is explained.

Finally, it might be argued that the contribution of occupational mix to gender differences in wages might vary across countries, depending on wage-setting institutions or anti-discrimination practices. To investigate this possibility, tests for country-specific differences in structure were conducted.[4] The only such equation reported in Table 6 adds a dummy variable for Swedish observations. Notice that the Swedish dummy significantly increases the mean wage ratio but does not significantly affect the ratio of inequality-sensitive wage rates. Thus, differences across countries in the average wages received by men and women can be attributed more to differences received by relatively high-wage workers. Women who work in low-wage jobs are not better-off relative to their male counterparts simply because they live in Sweden.

Family and Personal Characteristics

Reference has already been made to differences across sectors in relative numbers of part-time workers. As shown in Table 7, there are also differences across sectors and countries in average ages, in average numbers of children and in average frequencies of marriage for men and women who work in the paid labour market. Particularly in Australia and the United States, men who are employed are more likely to be married and to have more children than women who are employed. However, these characteristics vary across industrial sectors. For example, women who work in non-financial services (where large numbers

[4]Each independent variable was multiplied by a country-specific dummy variable. These new variables were added to the regression equation. Finally, F-tests were used to determine whether sets of the new variables were significantly different from zero. Given limited degrees of freedom, tests were carried out for one country at a time. Results rejected all hypotheses of country-specific differences in coefficient estimates.

TABLE 7

MEANS OF SELECTED DEMOGRAPHIC CHARACTERISTICS BY INDUSTRY

	Age	Part-time	Married	Kids	Age	Part-time	Married	Kids	Age	Part-time	Married	Kids
Total												
Women	38	0.43	0.77	1.1	39	0.61	0.80	1.3	38	0.24	0.66	1.2
Men	38	0.02	0.86	1.4	39	0.12	0.88	1.3	38	0.02	0.82	1.3
Prim.												
Women	35	0.40	0.70	0.9	40	0.73	1.01	1.1	36	0.27	0.73	1.2
Men	37	0.01	0.83	1.4	39	0.15	0.81	1.3	38	0.01	0.88	1.5
Mfg.												
Women	39	0.23	0.82	1.1	39	0.57	0.82	1.2	39	0.11	0.65	1.3
Men	39	0.01	0.88	1.3	39	0.07	0.88	1.3	39	0.01	0.84	1.4
Comm.												
Women	38	0.48	0.80	1.1	40	0.66	0.79	1.2	38	0.35	0.74	1.2
Men	37	0.01	0.85	1.4	39	0.06	0.90	1.2	37	0.01	0.83	1.2
Serv. (NF)												
Women	37	0.45	0.75	1.2	39	0.62	0.79	1.3	38	0.28	0.64	1.1
Men	37	0.04	0.83	1.4	39	0.23	0.88	1.3	38	0.05	0.77	1.1
Fin.												
Women	36	0.42	0.73	0.9	39	0.52	0.83	1.1	37	0.17	0.71	1.0
Men	37	0.01	0.86	1.4	40	0.05	0.88	1.2	39	0.01	0.82	1.3
Util.												
Women	37	0.59	0.79	1.1	40	0.50	0.81	1.1	38	0.16	0.60	1.0
Men	39	0.02	0.87	1.4	39	0.10	0.87	1.1	39	0.02	0.85	1.3
Const.												
Women	36	0.33	0.81	1.0	39	0.66	0.84	1.3	39	0.22	0.76	1.3
Men	37	0.01	0.84	1.3	38	0.13	0.91	1.4	37	0.04	0.83	1.4

Source: Calculated using Luxembourg Income Study data.

of women are employed) are less likely to be married than women who work elsewhere. This is true in all three countries.

The important consequences of family characteristics for wages is stressed in a number of papers (Polachek, 1975; Greenhalgh, 1980; Miller, 1987a). Given the traditionally larger share of household/child-care responsibilities assigned to women, it is argued that they are less able to devote energy to careers and hence receive smaller economic rewards.[5] To explore the importance of personal and family characteristics, industry wage ratios (mean and distributionally-sensitive) were regressed on the ratios of mean female to male ages (AGE), mean female to male numbers of children (KIDS) and fractions married (MARRIED).[6] Results are reported in Table 8. Using just these three variables, 45 percent of the variance in mean wage ratios can be explained.

If the part-time worker variable is added to the equation, explained variance increases to 51 percent. As the number of women who work part-time in a sector increases relative to the number of men who work part-time, the sector wage ratio drops. Notice, at the same time, that the variable "KIDS" is significant in the third specification. As the average number of children in women's families increases relative to the number of children in men's families, the gender wage ratio falls. This is reasonable if women have primary responsibility for childcare. Finally, adding all of the occupational mix variables does not improve the estimated equation. However, since two distributions with different shapes can have similar means (e.g. Distributions "*A*" and "*B*") it is conceivable that two sectors with different occupational composition have similar mean wage rates. This may explain why variation in occupational mix does not explain variation in mean wage ratios.

Regression results using distributionally-sensitive wage rates as dependent variables are once again very different. The variables AGE, MARRIED and KIDS explain none of the observed variation in distributionally-sensitive wage ratios ($R = -1.5$).[7] With the addition of the Sweden dummy variable, only 4 percent of observed variation is explained. (In contrast, the same variables explain 47 percent of the variation in mean wage ratios.) The part-time worker variable significantly reduces distributionally-sensitive wage ratios, but explained variance is still only 17 percent. Finally, adding the occupation variables once again markedly improves the equation (although $\bar{R}^2$ is higher when the personal/family characteristics are excluded).

To understand this result, notice that a sector with a large number of low-wage workers and only a very small number of high-wage workers will have a much lower equally-distributed wage than a sector in which everyone receives (roughly) the mean wage. If relative frequencies of high- and low-wage workers are determined by the occupational composition of the sector, it is reasonable that the occupational mix variables explain nearly half of the variation in distributionally-sensitive wage ratios. On the other hand, the fact that distributionally-sensitive

[5]However, see Bielby and Bielby (1988) who find that women may actually devote more energy to careers than men.

[6]The data sets employed do not provide measures of labour market experience or even a comparable measure of education with which to calculate the standard proxy (Age-Education-6).

[7] Again, the sensitivity of these results to level of inequality aversion is reported in Table 9.

TABLE 8

OLS REGRESSION RESULTS: INDUSTRY WAGE RATIOS AND PERSONAL/FAMILY CHARACTERISTICS

	Mean Wage Ratios				Distributionally-Sensitive Wage Ratios			
	I	II	III	IV	I	II	III	IV
Age	1.56	1.72	1.86	2.26	1.16	1.81	2.36	2.22
	(1.69)	(1.87)*	(2.10)**	(1.82)	(0.36)	(0.58)	(0.81)	(0.65)
Married	0.67	0.51	0.55	0.35	−0.11	−0.76	−0.60	−0.35
	(2.95)***	(2.01)*	(2.26)**	(1.17)	(−0.14)	(−0.88)	(−0.74)	(−0.43)
Kids	−0.17	−0.34	−0.55	−0.68	0.69	−0.004	−0.82	−1.35
	(−0.71)	(−1.23)	(−1.86)*	(−1.80)	(0.82)	(−0.004)	(−0.85)	(−1.34)
Part-time			−0.003	−0.004			−0.01	−0.01
			(−1.58)	(−1.95)**			(−1.88)*	(−2.34)*
Professional				−0.02				−0.03
				(−1.68)				(−0.78)
Administrative				−0.08				0.30
				(−1.31)				(1.82)
Sales				0.01				0.02
				(1.50)				(0.93)
Clerk				0.004				0.01
				(1.18)				(10.10)
Blue collar				−0.07				−0.35
				(−1.08)				(−1.93)*
Service				0.002				−0.01
				(0.34)				(−0.61)
Sweden		0.07	0.03	0.14		0.29	0.15	0.002
		(1.23)	(0.59)	(1.64)		(1.53)	(0.80)	(0.007)
Constant	−1.30	−1.19	−1.12	−1.22	−0.96	−0.52	−0.24	−0.15
	(−1.77)*	(−1.64)	(−1.61)	(−1.35)	(−0.38)	(−0.21)	(−0.11)	(0.06)
$\bar{R}^2$	0.45	0.47	0.51	0.50	−0.04	0.04	0.17	0.41

Source: Calculated using Luxembourg Income Study data. *T*-Ratios are presented in parentheses.

*** Significant at 1% in a two-tailed test.

** Significant at 5%.

* Significant at 10%.

TABLE 9

SENSITIVITY OF OLS REGRESSION RESULTS TO WEIGHT USED IN CALCULATION OF DISTRIBUTIONALLY-SENSITIVE WAGES

	$r=1.0$	$r=0.5$	$r=-0.5$	$r=-1.5$	$r=-5.0$
Occupational Mix Regressions					
Professional	0.02	0.02	0.02	0.009	0.049
	(1.29)	(1.37)	(1.67)	(0.31)	(0.19)
Administrative	0.06	0.06	0.09	0.28	2.63
	(0.76)	(0.88)	(1.62)	(1.94)*	(2.09)*
Sales	−0.007	−0.007	−0.005	0.005	0.036
	(−0.74)	(−0.77)	(−0.73)	(0.29)	(0.22)
Clerk	−0.003	−0.003	−0.003	0.001	0.013
	(−0.67)	(−0.72)	(−0.88)	(0.01)	(0.15)
Blue collar	0.05	0.03	−0.04	−0.30	−1.48
	(0.50)	(0.37)	(−0.53)	(−1.46)	(−0.85)
Service	0.01	0.009	0.007	0.008	0.16
	(1.22)	(1.11)	(1.21)	(0.46)	(1.09)
Constant	0.65	0.65	0.64	0.67	0.73
	(7.72)***	(8.21)***	(10.52)***	(3.95)***	(0.50)
$\bar{R}^2$	−0.13	−0.10	0.31	0.30	0.27
Personal/Family Characteristics Regressions					
Age	1.84	1.71	1.54	1.89	25.87
	(2.17)**	(2.00)*	(1.49)	(0.54)	(0.90)
Married	0.55	0.50	0.23	−0.32	−4.91
	(2.65)**	(2.37)**	(0.92)	(−0.38)	(−0.70)
Kids	−0.14	−0.11	0.06	−0.17	−6.03
	(−0.49)	(−0.38)	(0.19)	(−0.15)	(−0.64)
Constant	−1.51	−1.37	−1.14	−0.72	−13.88
	(−2.26)**	(−2.03)*	(−1.39)	(−0.26)	(−0.61)
$\bar{R}^2$	0.53	0.47	0.20	−0.18	−0.14

Sources: Calculated using Luxembourg Income Study data. *T*-ratios are presented in parentheses.

Note: 3 observations were dropped to ensure comparability across all equations. Thus, these results differ slightly from those reported in Tables 6 and 8.

*** Significant at 1% in a two-tailed test.

** Significant at 5%.

* Significant at 10%.

wage ratios are unaffected by human-capital variables indicates that market rewards received by those at the bottom of the wage distribution are not affected by the level of skill or effort that the worker brings to the job. This is characteristic of a secondary labour market.

Finally, the differences between the two sets of results are particularly evident in Table 9 where occupational variables become progressively *more* important and family/personal variables become progressively *less* important as more weight is placed on lower-wage workers in the calculation of the distributionally-sensitive wage.

CONCLUSIONS

The first major conclusion of the paper is that personal and family characteristics are important determinants of the variation across countries and industrial sectors in ratios of *average* wages received by men and women; these factors are *not* significant determinants of variation in distributionally-sensitive wage ratios. This indicates that rather different factors may determine the wages of low- and

high-wage workers; we should not look for just one explanation of gender differences in economic rewards. Moreover, this result suggests that the "dual-labour-market" hypothesis may be of some relevance for understanding gender differences in economic rewards (see also Hartmann, 1987). For workers in the "primary" sector of the labour market, differences in levels and rates of return to experience and family responsibilities will be critical to differences in observed male/female wages. Policies to eliminate wage differences in the primary sector should encourage policies such as equal access to promotion and support for family responsibilities (day-care; parental leave). For workers in the secondary sector of the labour market such policies will be of less relevance.

The second major finding of the paper is that occupational-mix variables are important determinants of variation across countries and sectors in distributionally-sensitive wage ratios; occupational mix does not explain variation in mean wage rates. Thus, occupation plays an important role in establishing the *distribution* rather than the level of wages within a sector. Having a "bad job" is probably the major reason for being a low-wage worker. Relative numbers of men and women with "bad jobs" in a sector will significantly affect observed gender differences in economic rewards. Removing gender differences among low-wage workers will thus require more substantial changes in the structure of labour markets to minimize the number of jobs in the secondary sector.

References

Atkinson, A. B., On the Measurement of Inequality, *Journal of Economic Theory*, 2, 244–263, 1970.

Bielby, D. D. and Bielby, W. T., She Works Hard for the Money: Household Responsibilities and the Allocation of Effort, *American Journal of Sociology*, 93, 1031–1059, 1988.

Blinder, A. S., Wage Discrimination: Reduced Form and Structural Estimates, *Journal of Human Resources*, 8, 436–65, 1973.

Corcoran, M. and Duncan, G. J., Work History, Labor Force Attachment; and Earnings Differences between Races and Sexes, *Journal of Human Resources*, 14, 3–20, 1979.

Greenhalgh, Ch., Male-Female Wage Differentials in Great Britain: Is Marriage an Equal Opportunity? *The Economic Journal*, 90, 751–775, 1980.

Hartmann, H. I., Internal Labor Markets and Gender: A Case Study of Promotion, in Brown, C. and Peckman, J. A. (eds.), *Gender in the Workplace*, The Brookings Institute, Washington, D.C., 1987.

Miller, P. W., Gender Differences in Osberved and Offered Wages in Canada, 1980, *Canadian Journal of Economics*, 20-2, 225–244, 1987a.

———, The Wage Effects of the Occupational Segregation of Women in Britain, *The Economic Journal*, 97, 885–896, 1987b.

Oaxaca, R., Male-female Wage Differentials in Urban Labour Markets, *International Economic Review*, 14, 693–709, 1973.

Phipps, S., Measuring Gender Differences in Wage Distributions for Five Countries, Luxembourg Income Study Working Paper #25, 1988.

Polachek, S. W., Potential Biases in Measuring Male-Female Discrimination, *Journal of Human Resources*, 10, 205–29, 1975.

Rosenfeld, R. and Kalleberg, A., The Gender Gap in Earnings: A Cross-National Comparison, Department of Sociology, The University of North Carolina, Chapel Hill, Xerox, 1988.

Smeeding, T., Schmaus, G., and Allegrezza, S., An Introduction to LIS, Luxembourg Income Study Working Paper #1, 1985.

Treiman, D. J. and Roos, P. A., Sex and Earnings in Industrial Society: A Nine-Nation Comparison, *The American Journal of Sociology*, 89, 612–650, 1983.

Zabalza, A. and Arrufat, J. L., The Extent of Sex Discrimination in Great Britain, in Zabalza, A. and Tzannatos, Z. (eds.), *Women and Equal Pay: The Effects of Legislation on Female Employment and Wages in Britain*, Cambridge University Press, Cambridge, 1985.