

Differences in occupational earnings by sex

Derek ROBINSON *

The question of whether gender bias is a cause of differences in pay is important, persistent and still unresolved.¹ A critical element in examining that question is the precise measurement of pay differentials, which in turn requires specification of components determined by differences in education, experience and occupation, inter alia. This article reviews some of the major research findings concerning the female/male wage gap, looking first at questions addressed in attempting to measure wage gaps and some methodological issues. It then introduces some analyses of the female/male occupational wage gap based on data from the ILO's 1996 October Earnings Inquiry (OEI).² In order to approach an understanding of possible discrimination the categories are first discussed, then empirical findings given for two major groupings of occupations — in medicine and in public service, banking and insurance. Some suggestions as to national trends and international differences are offered, and a final section concludes.

Considerations in measuring gaps in earnings

Some common questions are taken up in examinations of differential earnings by sex. One is whether there are differences in the average pay of men and women, and if so to what extent. All studies show that though in some situations women may earn more than men in certain narrowly-defined occupations, overall there is a general gap between the average pay of men and women in broad occupational or multi-occupational groupings, with women earning on average less than men. Evidence of the existence of such an overall

* Institute of Economics and Statistics, University of Oxford.

¹ Some relevant studies are Blau and Beller (1988); Cain (1986); England (1992); Fields and Wolff (1991); Groshen (1991); Macpherson and Hirsch (1995); Moulton (1986); O'Neill (1985); Sorenson (1989), (1990).

² See ILO: *Statistics on occupational wages and hours of work and food prices: October Inquiry results, 1994 and 1995*. Special supplement to the *Bulletin of Labour Statistics*, Geneva, 1996. This publication lists 159 occupations, but occupation 139 (government executive official) provides data for (a) central government, (b) regional or provincial government, and (c) local government, making a total of 161 occupations. Some of the occupations are differentiated by sector or sub-sector of industry.

average gap does not of course indicate whether or not gender-based discrimination underlies that difference. It is possible that men and women in each occupation are paid exactly the same wage but, as pay differs according to occupation, if the distribution of men and women across occupations varies there will be a difference in the overall average pay of men and women. It is well established that as a result of variations in the occupational distribution of men and women, there is an “overcrowding” of women in certain occupations and under-representation of women in others.³

The next questions then are the extent of the difference, its causes and the degree to which it is constant or changing. Various definitional problems immediately arise in this connection. Is the comparison between men and women doing exactly the same work in the same place or, at the other extreme, between all male and all female workers across the whole economy?

The simplest question to address is whether men and women performing the same work in the same place or establishment are paid the same or not. Yet in practice, even this is difficult to answer comprehensively, as to do so really requires detailed information on every worker in every establishment. And, though equal pay legislation largely prevents this obvious form of discrimination, such legislation does not require every woman in an establishment to be paid exactly the same as every man doing the same work in that establishment. Salary scales stipulating a range of pay for a job can satisfy legal requirements regarding equal pay despite differences in the pay actually received by men and women, provided that the reasons for these differences are not gender related. For example, equal pay legislation is not infringed by salary scales which have automatic increments based on length of service, although these may result in differences in the pay of men and women doing the same job in the same establishment.

Pay systems

Certain practices or elements in a payment system may have a wage-differentiating effect for men and women. For example, performance-related elements in pay may permit gender discrimination in their award or size. However, some studies have shown that women do better under incentive schemes based on results rather than on subjective evaluation (e.g. Gunderson, 1975) — a possible indicator of discrimination in pay systems without them.

Some allowances may automatically be paid to men, inflating their measured earnings: for example, in the case of both spouses employed by the civil service, payment of a child allowance may be made only to the man. Or the payment basis may lead to differences in earnings: if men work longer hours on average than women, men’s average *weekly* or *monthly* earnings will be

³ For a good introduction to some problems of measurement of women’s wage disadvantage see Gonzalez and Watts (1995). A recent analysis of crowding of women in certain occupations and the effects of this on their pay is Grimshaw and Rubery (1998). Anker (1997) provides a recent survey of occupational segregation.

higher even if they are paid the same hourly rate. Men's average *hourly* earnings are also usually higher than women's, but to a lesser extent, as any overtime premium is spread over all the hours worked. Men may also have higher average hourly wages because of the greater proportion of women working part time — work which is typically paid at lower hourly rates.

Methodological questions – main approaches

Currently there is little evidence of significant differences in wages for men and women in the same narrowly-defined occupations in the same establishment. Because of difficulties involved in analysing men's and women's pay for performing the same tasks, most studies compare the average pay of a group of men and a group of women. Two very different methods of analysis are used in practice.

The first method consists simply of comparing the average or the median earnings of male and female full-time employees. There are obvious weaknesses in this relatively crude aggregate approach. It ignores any differences in productivity as it does not seek to compare the pay of men and women doing the same or similar work. Because this approach generally compares earnings of all workers in specified labour markets (national, sectoral, etc.) it may well not compare the earnings of men and women in the same broad occupations. Since the proportions of the male and female labour forces obviously vary from one occupational group to another, as already mentioned, then even where men and women are paid exactly the same wage within each occupation there will be differences between the average wage of men and women and, most probably, in their median wages, too.

The second method seeks to explain the differences by adjusting the data to take account of features which might explain differing productivity or marginal product of men and women by including in regression analysis measurable work-related characteristics which can be tested to see whether the returns to them are different for men and for women. This does not change the measured wage gap but can provide explanations for the size of the gap or for changes in it over time. Thus, years of education can be expected to affect productivity and, so, value of marginal product (Mincer and Polachek, 1974; Mincer and Ofek, 1982; Hill and O'Neill, 1992); so can years of work experience (Mincer and Polachek, 1974; Lofstrom and Gustafsson, 1991).

Other analyses test whether men and women with the same presumed productivity-influencing characteristics receive the same pay. One such characteristic is education measured by years of schooling. Others may be years of experience (both within a given establishment and in employment generally) and marital status. Some studies consider these variables to be indicators of relative productivity. But this is not necessarily the case: they may be indicators of possible or potential productivity, and it does not follow that all individuals use their potential productivity to the same extent. Some studies show that women may choose not to use their full productive potential, because of placing greater importance on other aspects of employment, such as convenient hours, or a need to change jobs when their spouses have to move.

Researchers in this area who seek to include the personal characteristics of male and female employees in their analysis adopt a different approach from that of researchers seeking merely to examine the relative wage disadvantage of women without differentiation of productivity-influencing characteristics. Because of differences in men's and women's average pay resulting from the varying rate of reward for the possession of measurable productivity-influencing characteristics, the overall male/female wage gap will be influenced by the general level of wage differentials or the wage structure in an individual country (Blau and Kahn, 1996). The prevailing level of wage inequality within occupations involving different skills is very important in explaining the overall female wage gap.

Occupational pay differentials by sex are present in every economy, although their size and on occasion their direction, for pairs of occupations, change. Comparing groups of men and women of different occupational compositions will therefore reveal differences in average earnings which are caused by differences in the structure of employment and the size of occupational differentials, and not only by differences in pay for men and women in the same occupation.

Structural changes in the economy can also affect the wages of both men and women, leading to changes in the measured male/female wage gap (Borooah and Lee, 1988). Changes in technology and production methods can variously affect demand for skills, thus modifying occupational pay differentials. Changes in world trade can affect some industries adversely and occupations in those industries may suffer a relative wage decline compared with the same occupations which are expanding elsewhere. While those changes are only a relatively minor contributing factor, blue-collar workers in traditional heavy industries and in consumer-goods industries in a number of industrialized market economies have experienced declining demand for their labour with a consequential reduction in their pay relative to blue-collar workers in other occupations or in the same occupations in other industries.

Equal pay for work of equal value

In a number of countries legislation now requires equal pay for women performing work of equal value or of comparable worth to that performed by men in the same establishment. The aim is to prevent management, or trade unions and management acting together in collective bargaining, from discriminating against women in female-dominated jobs by fixing lower relative wage levels for them, whether or not some form of job evaluation exercise has already been carried out. In effect, comparable worth analyses are checks against gender bias in the determination of the internal wage structure, even though these internal wage structures may themselves have been based on some form of job analysis and evaluation.

The comparisons are confined to the same establishment, as establishments may have different pay levels for every occupation for any of a number of legitimate reasons, perhaps because they are in a different product market

with greater opportunities for excessive or supra-normal profits and so can afford to pay higher wages, sharing the rents from market imperfections with the labour force. It would therefore be inappropriate to compel a company in one product market to pay women wages which include the rent-sharing of men in a company in another product market. Similarly, wage levels may differ from one local labour market to another because of variations in labour supply and demand. Again, it would be inappropriate to compel an establishment to pay higher wages to women in jobs similar to those of men in different localities if the reason for the wage difference was the location in another labour market, for in those circumstances men in the two localities would probably also be paid different wage levels.

It is necessarily a matter of judgment whether two jobs are of comparable worth or require the same skills and abilities. An element of subjective or value judgment will always be involved and on occasion the application of comparable worth analysis means imposing one set of values for the components of different jobs dissimilar to the values adopted by the persons who set the original pay levels. Nevertheless, it has been known for some time that techniques of comparability can be devised which minimize the subjective elements of comparability and produce results which command wide acceptance (see, e.g., Aldrich and Buchele, 1986; Blau, 1977; Ehrenberg and Smith, 1987). Yet, legislative provisions generally seek to cover only cases of possible discrimination against one sex in pay levels in relation to the content and requirements of their jobs compared with those of the other sex rather than establishing internal pay equalities for jobs of comparable worth *per se*. This may be because of the belief that if there is no gender-based discrimination or (in some cases) no discrimination based on race, religion or ethnic origin, the State should not seek to become involved in relative pay determination.

Economic theory would conclude that in the absence of any market imperfections or demand-side discrimination, the pay gap between men and women with the same value of marginal product in the same location would be zero. Even in this highly restrictive case, however, a comparison of male and female pay may not be sufficient to establish the existence of discrimination. There can be real differences in the value of marginal products of men and women doing the same work: this has long been recognized as typically true for jobs which require physical strength. The presence of an occupational wage gap can therefore only be regarded as a first indication that wage discrimination may be being practised against women.

Effects of job segregation on pay

It has been established that female-dominated jobs or occupations pay relatively lower wages than male-dominated ones, so that both men and women in an occupation are paid less the greater the proportion of women employed in that occupation. This crowding effect is more marked for men than for women (Bergmann, 1974; O'Neill, 1985; Blau and Beller, 1988; Sorensen, 1990; Killingsworth, 1990; Groschen, 1991). Some of the effects of job segregation

which can influence women's average pay relative to men's should not be present in a study of the average pay of men and women in a narrowly-defined occupation, unless there are distributional differences between men and women in the various product or local labour markets. Average pay for both men and women in one occupation might be lower relative to average pay in occupations with a larger proportion of male workers, but within each occupation the crowding hypothesis should have no impact on the relative pay of men and women within that occupation. Discrimination theory seeks to explain whether, and if so why, employers choose *not* to employ women in certain jobs where they could have the same value of marginal product as men and presumably at wages lower than those men are currently paid, despite the probable concomitant increase in effective or acceptable labour supply and reduction in wages of both men and women.

If there is discrimination in hiring into certain occupations, the determination of a wage gap will depend on the coverage chosen for the comparison of male and female pay. If a narrow occupational basis is selected, there may be no apparent wage gap. If there is occupational crowding, the choice of a broader group coverage might well identify a wage gap but, the result of crowding into certain occupations resulting in lower wages there for both men and women, that would reflect discrimination in hiring rather than wage discrimination as such.

Such a discussion is not just an academic exercise. If appropriate remedial policies are to be developed, it clearly matters whether the discrimination is practised in the wages paid to people doing the same work in the same tightly-defined occupations, or whether it is practised at the point of entry into certain occupations or jobs. The existence of a wage gap when a broader coverage of occupations is used might therefore indicate that either wage or hiring discrimination exists, or both.

Legislation to ensure equal opportunity may lead to reductions in the wage gap if it enables more women to be admitted into occupations previously dominated by men and thus, typically, paying higher wages. This tendency is strengthened if legislation requires affirmative action or positive discrimination in favour of women.

Value of narrow occupational categories for detecting gender bias

It is clear that the larger the occupational coverage of the group of workers, the greater the possibility that the measured relationship will be misleading given the greater variety included. Even if men and women in the same establishment are paid exactly the same wage, differences in their average pay will emerge if the two sets of workers are employed in different proportions in different establishments. The narrower the occupational coverage of the comparison, the more likely it is that any genuine underlying difference in the pay of men and women will be displayed and the smaller the possibility that distortions will appear as a result of including workers who, despite their ident-

ical occupational title, have different jobs, levels of productivity or human capital endowments (e.g. labourer, salesperson). Of course, it is quite possible that men and women with different levels of human capital, ability and/or education are influenced by the presence of discrimination, or by some other factor entirely, in their choice of or entry into that narrowly-defined occupation. However, there is some evidence that differences in the occupational distribution of men and women are a more important cause of the pay gap when narrower rather than broader occupational groupings are used (Treiman and Hartmann, 1985). The effects of women being crowded into lower-paid jobs can be diluted if broader groupings are used for the purposes of comparison since women in higher-paying jobs will thus be included. Much also depends on the particular occupations that are grouped together and the female percentage wage gap in each of them. Female percentages, or wage gaps of broader groupings, are in effect no more than weighted averages of the female percentages of all the narrower occupational groupings included in the larger aggregate, so there will be some occupations with larger and some with smaller female percentages than that for the overall average.

There are difficulties in matching job requirements with occupational titles and job classifications. Classical economic theory removes these difficulties, or ignores them, by assuming homogeneous labour for a given occupational title. In reality — a reality recognized by more recent economic reasoning as embodied in the efficiency wage hypothesis — labour is not homogeneous but heterogeneous, even as regards each individual worker and the effort-inputs supplied by an individual worker at different times and in different circumstances, in response notably to the relative wage paid compared with that which he/she believes might be paid in another job. It is also possible that the same nominal occupation has different job requirements with different effort-inputs depending on the industry or sub-sector of economic activity. Thus the breadth of industrial coverage of the classification for wage surveys can affect the average pay of men and women even when the analysis appears to be confined to narrowly-defined occupations.⁴

This difficulty is also raised by Gunderson (1989) in a literature survey. He found, *inter alia*, that factors originating outside the labour market, such as differences in household responsibilities, type of education, or career interruptions, are important component causes of the overall wage gap. Differences in occupational distribution account for a substantial part of that gap. Pay differences within narrower occupations, however, at least in some establishments do not lead to large differences in average male and female wages. Differences between establishments account for a substantial part of the female wage gap. The productivity-adjusted wage gap is smaller in the public than in the private sector, and is smaller in the private sector the more competitive the product market. The longer the length of employment of women within an establishment, the smaller the wage gap.

⁴This can be inferred from the analyses by Malkiel and Malkiel (1973), who used publications as a measure of productivity for a study on one (unnamed) profession.

Approaches to measuring occupational earnings by sex

The occupational definitions used in the ILO's October Earnings Inquiry (OEI)⁵ make it possible to study the specific questions of whether there is a wage gap between men and women in the same occupation, the direction and size of the gap, and whether it is changing. That is what is addressed here.

Three main measurements of pay

Pay scales or job rates

Basically, this approach measures the amount of pay that males and females in a given job or post are entitled to receive, rather than the average amount of pay actually received by groups of male and female workers. In many types of employment, particularly in the public sector or in non-manual occupations, individual workers are classified in a job grade to which a pay scale is applied. The scale usually consists of a basic pay range which may be supplemented by various types of allowances or additions based on specified factors such as location of work, type of work, changes in the cost of living, qualifications, number of dependent children, age, or years of service. The last two factors are often transcribed into specified incremental steps so that progression from the minimum to the maximum rate on the scale occurs automatically according to predetermined conditions; however, there has recently been a tendency to introduce a discretionary element into the award of such predetermined increments, based perhaps on some form of personal or merit assessment.

It is now rare for gender-based differences to appear in the pay scales applicable to men and women in the same job, post or grade in either the public or the private sector. Although the OEI provides details of some scale minima and maxima, particularly for public service occupations, these have not been used in this study as they are always the same for both sexes.

However, if the basis for the analysis changes from posts, jobs or grades to individuals in those posts, jobs or grades, gender-based differences may emerge. For example, if all members of a specified grade are paid on the same pay scale consisting of a given minimum salary with annual increments based on length of service up to a specified maximum salary applicable to all, it is possible for female workers in that grade to have a lower (or higher) average salary than the male workers in that grade. In the conditions specified, this

⁵The occupational classification helps to separate occupations in different sectors of industry. While there may well be some differences in the actual definitions of occupation applied in various countries, each individual country uses the same occupational definitions for men and women. For that reason international comparisons are difficult. Because the OEI provides no details of the number of men and women employed in each occupation, it is not possible to recalculate weighted average pay for different groupings; nor is there any information about discrimination at the point of entry.

would mean that on average women had fewer (or more) years of service in that grade than men did.

Differences in the average pay of men and women should not necessarily be regarded as gender-based pay discrimination, as each individual remaining in that grade will receive the same rate of pay irrespective of sex. The extent of the difference in average pay for men and women could be attributable to the distribution of men and women across the various incremental steps in the scale and to the difference in pay between each step. But payment system rules may include conditions which in practice militate against women reaching the higher levels within that single scale. This could happen if on average women have a lower retirement age than men and if all workers entered the grade and salary scale at an age which, combined with the total possible number of increments, meant that women reached their normal retirement age before they attained the maximum on the salary scale. Alternatively, women may have had fewer opportunities to progress up a pay scale with a large number of increments because of breaks in their working careers as a result of family responsibilities. If no such discriminatory conditions apply, differences in average female and male pay from a single salary scale with increments based only on seniority within the grade would be determined by seniority distributional differences between men and women.

Variations in average male/female pay arising from seniority distributional differences could still suggest the presence of gender-based discrimination in the grade. However, they might be due to the fact that more women than men had recently been recruited, which would be consistent with positive hiring practices in favour of women. It could also be consistent with positive discrimination favouring women's promotion to the next highest grade, if the grade in question is one from which members of the higher grade are recruited. If the grade is one to which members are recruited from lower grades within the same establishment, a higher proportion of women with lower seniority than men could be consistent with positive discrimination favouring women's promotion from the lower grade.

If, however, the salary scale or job rate contains discretionary elements, such as merit pay or performance awards, or elements which may themselves be gender based or gender influenced, e.g. payment of rent or housing allowances according to rules differentiating between men and women, then differences in average payment could indicate gender-based discrimination. If there were differences in the distribution of men and women by seniority in the grade and elements of gender-based difference in payments, it would be necessary to obtain detailed information both about the distribution of men and women by seniority and location in the incremental salary scale as well as the distribution and size of gender-based pay elements.

Average wage or salary rates

The OEI defines average wage or salary rates as the rates paid for normal time of work, comprising: basic wages and salaries, cost-of-living allowances and other guaranteed and regularly paid allowances. The following should be excluded:

overtime payments, bonuses and gratuities, family allowances, other social security payments made by the employer directly to employees and *ex gratia* payments in kind supplementary to normal wage and salary rates (ILO, 1996).

This definition is similar to that just discussed if the average salary scale payment considered is based on actual pay received rather than on entitlements. Similar differences in average pay thus defined can then emerge if no pay is received for time not worked because of lateness, absenteeism or sickness and if there are differences between men and women in the average time not worked for these reasons.

However, in many countries employment conditions, especially in the public service, may allow full pay during sickness; or there is little (if any) absenteeism and lateness is overlooked; or, because of severe worsening of real pay, pay system controls and the enforcement of rules regarding attendance and timekeeping degenerates so far that no sanctions are taken or even official records kept. In those cases, even where there are differences in time lost by men and women there is no difference in the average salary or wages they actually receive other than for reasons of occupational distribution.⁶ Private sector employment conditions may be different, with less advantageous sick pay provisions and a more rigorous enforcement of timekeeping, so that differences may emerge in average wages and salaries for men and women even when there are no seniority distributional effects.

The OEI gives details of normal hours of work, which are defined as those set out in regulations, laws or collective agreements (see also ILO, 1997). These are the number of hours that should be worked by full-time workers before overtime premium is paid. Where there is a significant number of part-time workers (disproportionately female), converting average weekly or monthly wages into hourly wages by dividing by the number of normal hours will understate average female hourly wages and thus overstate the female disadvantage. Similar types of distortion may occur when average weekly or monthly wages of men and women are compared, as those for women may reflect a lower number of average normal hours worked. The data provided by the OEI do not allow the necessary adjustments to be made. However, some countries (e.g. Costa Rica, Estonia, Finland, Lithuania, Republic of Moldova and the United Kingdom) report the average number of normal (non-overtime premium) hours actually worked, not the number of normal hours set out in collective agreements. In such cases, there are no problems in converting average weekly wages into average hourly wages, even if there are proportionately more part-time women workers. And a few countries report average or prevailing hourly wages for some, if not all, occupations. Average actual hourly wages are obviously the best measure of wages as they take into account any differences in hours worked and can be used to estimate equivalent weekly or monthly wages by using normal hours as set out in collective agreements.

⁶ There are various studies of declining managerial performance in public service employment in developing countries where public service pay has suffered severe reduction in real terms and where even the drastically reduced real pay has not been paid for several months. A good recent collection of studies is in Colclough (1997).

Average earnings

The OEI defines earnings as the remuneration in cash and kind paid to employees, as a rule at regular intervals, for time worked or work done, together with remuneration for time not worked, such as for annual vacation, other paid leave or holidays, and including those elements of earnings which are usually received regularly, before any deductions are made by the employer in respect of taxes, contributions of employees to social security and pension schemes, life insurance premiums, union dues and any other obligations of employees (ILO, 1996, p. 3). Excluded are employers' contributions to social security and pension schemes and any benefits received by employees from these schemes. Also excluded are severance and termination pay, irregular bonuses such as year-end and other one-time bonuses which accrue over a period longer than a pay period.

It is clear that overtime payments, comprising elements of average wages or salary as well as the premium itself, should be included, as these are payments for time worked or work done. Differences in average earnings for males and females on the same salary scale can arise from differences in average hours worked and possibly from differences in the average overtime premium per hour worked.

Average female pay as a percentage of average male pay

The OEI provides details of average male and female pay for some occupations in some countries. This enables one to calculate the *female percentage* — average female pay as a percentage of average male pay for the same occupation. In this section, comparisons of male and female pay are analysed for two important and contrasting occupational groupings – medical occupations, and public service, banking and finance.

Medical occupations

The results of comparing male and female pay in six medical occupations in a number of countries based on details from the 1996 October Earnings Inquiry are summarized in table 1. Four different measures of pay are shown; changes in the female percentages among them arise from differences in the countries covered as well as smallish differences due to modifications in the measurement of pay. Some countries provide appropriate information for certain occupations only. Column (3) shows the number of countries included, column (4) the lowest or minimum female percentage, column (5) the highest, and column (6) the unweighted average of the female percentages for the countries covered.

The table also shows in column (7) the range of the female percentages, which is the maximum country percentage as a ratio of the lowest female percentage for that occupation. The coefficient of variation (CV) in column (8) is a measure of the differences in the female percentages in all the countries

Table 1. Women's average wages and earnings as a percentage of men's in selected medical occupations

OEI number	Occupation	Number of countries	Minimum	Maximum	Average ¹	Range ²	CV ³	>100% ⁴
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Average hourly wages								
152	General physician	10	49.1	130.5	92.7	2.659	20.89	3
153	Dentist	8	57.8	169.3	106.6	2.930	28.86	3
154	Professional nurse	10	92.9	105.3	98.6	1.134	4.12	4
155	Auxiliary nurse	10	84.6	114.3	98.9	1.350	7.57	4
156	Physiotherapist	6	74.5	128.6	97.7	1.726	18.79	3
157	X-ray technician	9	80.3	145.7	103.5	1.814	19.05	3
Countries examined: Bahrain, Bolivia, Cyprus, El Salvador, Estonia, Finland, Ghana, Honduras, Republic of Moldova, Nigeria, Romania, Tajikistan, United Kingdom.								
Average monthly wages								
152	General physician	12	57.3	120.8	93.6	2.110	15.30	3
153	Dentist	8	57.8	169.3	105.8	2.930	27.96	4
154	Professional nurse	11	86.3	114.1	99.8	1.323	7.24	5
155	Auxiliary nurse	11	75.1	114.3	99.5	1.521	9.25	5
156	Physiotherapist	7	74.5	128.6	100.3	1.726	18.54	4
157	X-ray technician	9	80.3	145.7	101.4	1.814	19.34	3
Countries examined: Bahrain, Bolivia, China, Cyprus, El Salvador, Estonia, Finland, Ghana, Honduras, Republic of Moldova, Nigeria, Romania, Singapore, Tajikistan, United Kingdom.								
Average hourly earnings								
152	General physician	9	48.6	128.5	92.4	2.643	21.97	3
153	Dentist	5	67.5	136.6	95.7	2.023	26.51	3
154	Professional nurse	11	67.1	105.1	96.9	1.567	10.32	6
155	Auxiliary nurse	9	91.8	124.2	101.2	1.353	8.99	4
157	X-ray technician	6	82.6	139.5	98.8	1.689	19.08	2
Countries examined: Australia, Costa Rica, El Salvador, Estonia, Finland, Ghana, Republic of Moldova, Nigeria, Norway, Romania, Sri Lanka, Tajikistan, United Kingdom.								
Average monthly earnings								
152	General physician	10	55.6	170.1	92.0	3.062	31.87	2
153	Dentist	5	60.6	129.4	90.6	2.136	27.57	1
154	Professional nurse	12	61.2	107.8	91.4	1.761	15.79	3
155	Auxiliary nurse	10	83.1	114.4	98.9	1.377	7.90	4
157	X-ray technician	6	82.6	104.2	93.2	1.262	6.95	1
Countries examined: Australia, Costa Rica, El Salvador, Estonia, Finland, Ghana, Republic of Moldova, Nigeria, Norway, Romania, Tajikistan, United Kingdom, United States.								

¹ Average is the unweighted arithmetic mean of the percentages for the number of countries shown in column (3). ² Range is the maximum in column (5) divided by the minimum in column (4). ³ CV is the standard deviation as a percentage of the average (coefficient of variation). ⁴ The number of countries where average female pay was higher than average male pay.

included in the analysis.⁷ The larger the CV the more the various national female percentages for that occupation differ. For example, comparing average hourly wages for general physicians and dentists, the CV for physicians (20.89) is lower than that for dentists (28.86), showing that the female percentages for physicians are grouped more closely together and there is relatively less difference between them than between those for dentists. The range for physicians is also smaller than for dentists, showing that the difference between the two extreme female percentages for dentists is greater than that for physicians. The occupation with the largest range need not necessarily have the largest CV, as the range compares only the two extreme female percentages while the CV takes them all into account. For example, the range for average monthly wages of X-ray technicians is 1.814 and that of general physicians 2.110, yet X-ray technicians have a larger CV (19.34) than physicians (15.30).

Finally, column (9) shows the number of countries where the female percentage is larger than 100, i.e. where average female wages are higher than average male wages.

Results from applying the different measures

Overall, as regards *average hourly wages*, although the unweighted female average as a percentage of male average hourly wages for physicians for the ten countries concerned is 93 per cent, there is a wide range of average percentages for average hourly wages. There are three countries where the average hourly wages of female physicians are higher than those of male physicians, yet female physicians in Nigeria receive less than half the average hourly wages of male physicians. In Bolivia, women's average hourly wages are 30 per cent higher than men's. There is very little difference in the female percentage for professional nurses in the ten countries, and the range and CV are quite small, as they are for auxiliary nurses. For both of these occupations, women have higher average wages than men in four of the ten countries, and the range of female percentages is so small that it is clear men and women are on the same salary scale in each country.

The two occupations where the unweighted average is larger than 100 are dentists (107 per cent), for whom only three out of eight countries have female percentages greater than 100, and X-ray technicians (104 per cent), for whom three out of nine countries have female percentages greater than 100.

There is perhaps slightly greater diversity in the female percentages for *average monthly wages*. Physicians and dentists are the exception where both the range and the CV are lower, with the CV very slightly lower for physiotherapists. With physicians the lowest figure, again for Nigeria, is higher than for hourly wages, as the fact that women physicians have longer normal hours of work (56) compared with men (48) has no effect in reducing women's percent-

⁷ The coefficient of variation is the standard deviation as a percentage of the unweighted mean of the observations. So $CV = 100(SD)/\text{mean}$. It is therefore a measure of the variation in the average female percentage of the different countries included.

age for monthly wages but does for hourly wages. Similarly, the women's percentage excess over average male monthly wages in Bolivia is reduced to 21 per cent, as the effect of men's average normal hours of work (just over 44) compared with women's (41) is removed. The unweighted average for dentists and X-ray technicians continues to be larger than 100 although slightly lower than for average hourly wages, and that for physiotherapists rises to just over 100.

For both professional and auxiliary nurses the ranges and CV for average monthly wages are slightly larger than for average hourly wages and in five out of eleven countries women have higher average monthly wages.

With physiotherapists and X-ray technicians the range is the same for both hourly and monthly wages, with the CV falling very slightly for physiotherapists in monthly wages and rising a little for X-ray technicians.

There are rather more female percentages in excess of 100 if average monthly as opposed to hourly wages are used, but some of these changes may be due to differences between the countries included.

The variation between countries is much the same for *average hourly earnings*, with the spread of female percentages being a little greater for average hourly earnings for professional and auxiliary nurses. There is a noticeable increase in the CV for professional nurses and the number of countries with female percentages greater than 100 rises to six out of eleven, compared with four out of ten for hourly wages. The only instance of a female percentage exceeding 100 for either measure of earnings is for auxiliary nurses' average hourly earnings.

With *average monthly earnings* the spread for physicians is much larger than for monthly wages, with the CV doubling. In Costa Rica the very high female percentage for average monthly earnings (170 per cent) is due in part to the fact that women physicians work an average of 60 hours a week compared with a male average of only 45 hours. The excess for average hourly earnings was only 29 per cent. For dentists, however, though the range is considerably reduced, the CV falls only a little, indicating that while there has been a marked reduction in the highest female percentage and a small rise in the minimum, the others have widened; in only one country is the female percentage for monthly earnings larger than 100.

The female percentages for average monthly earnings are more varied than for average hourly earnings for physicians, dentists and professional nurses. They are a little less dispersed for auxiliary nurses and considerably less differentiated for X-ray technicians, where the CV is less than half that for hourly earnings. The unweighted average female percentage is, however, less than 100 for both average hourly and monthly earnings and, on the whole, women do less well than men in average monthly earnings. This may well be because men work longer hours and so presumably receive more overtime pay which has a greater effect on monthly than on hourly earnings.

In general, the results for medical occupations are not surprising. While the overall female percentage for the two nursing occupations for wages and the associated occupations of physiotherapists and X-ray technicians are slightly below 100, the overall difference is very small and totally compatible with

men and women being on a common salary scale with the difference attributable to seniority differences. The size of the minimum and maximum female percentage is also compatible with a not excessively broad common salary scale.

With physicians, the overall average female percentage is consistent with common salary scales but the low minimum percentages in Nigeria raise some question as to whether male and female physicians there are even on the same salary scale. Even so, in three countries average female wages are higher than average male wages. With dentists, the overall female average percentage of both hourly and monthly wages is greater than 100.

Women dentists, professional nurses and X-ray technicians do less well when hourly earnings are measured and even less well with monthly earnings. For all occupations there are fewer countries with female percentages greater than 100 for monthly earnings.

Inter-country variation

With both physicians and dentists the wide range and CVs indicate that there is considerable variation between the different countries and that the use of a single overall average female percentage of male pay would be misleading. Using slightly different data, for example, the United Kingdom data for 1996 rather than for 1995, similar results are found by using the *standard error of the mean (sem)* as a percentage of the mean or overall average female percentage.⁸ The *sem* is a measure of how far the overall average female percentage obtained from a sample is a good estimate of the overall average female percentage of the whole population of all countries. It estimates the reliability of the sample overall average female percentage by taking into account the variation of the different countries' female percentages and the number of countries included, i.e. the size of the sample. Expressing the *sem* as a percentage of the overall average female percentage obtained from the different countries covered by the OEI data gives another measure of how far the female percentage varies from country to country for a given occupation and for different measures of pay. The smaller the *sem* percentage, the more closely the countries' individual female percentages bunch together.

To avoid complications and possibly misleading results from very small samples, most analysis was limited to occupations and pay measures for which there were at least ten countries. Three medical occupations satisfied this criterion: general physicians, professional nurses and auxiliary nurses. General physicians have relatively large *sem* percentages, compared with both professional and auxiliary nurses. The smallest of all is for average hourly wages for professional nurses, with a *sem* percentage of 1.372. With the exception of monthly wages and earnings for auxiliary nurses, the *sem* percentages for average earnings are always larger than the corresponding figures for average

⁸The standard error of the mean is calculated as a one-sample t-test which is then expressed as a percentage of the unweighted mean of the different countries' female percentages.

wages. Auxiliary nurses have the lowest *sem* percentages for both hourly and monthly earnings of any of the three medical occupations.

For the two nursing occupations there is much less variation between countries, with the exception of average monthly earnings for professional nurses. The situation is similar for auxiliary nurses. There is relatively small variation between countries, the average of the female percentages is close to 100 and is 101.2 per cent for average hourly earnings. Somewhat unusually, average monthly earnings are less dispersed than average hourly earnings.

Average hourly wages for female physiotherapists are higher than for males in three of the six countries examined although the unweighted average of all the percentages is only 98 per cent. For monthly wages, the female percentages in four of the seven countries are higher than 100 and the average is 100.3 per cent. Even so, the female percentages range from three-quarters of male wages to more than a quarter as high again.

Female X-ray technicians have higher average wages than male for both hourly and monthly wages, although in only three of the nine countries do women have higher average wages than men. Fewer countries provide information about average earnings but women tend to do a little worse on earnings than on wages.

It is clear that differences in the occupational pay of men and women vary according to the measure of pay adopted. In some cases it may be reasonable to conclude that differences in average monthly wages of men and women in the same occupation reflect differences in the average seniority or place on an incremental salary scale of men and women. Comparisons of the pay of men and women using average monthly earnings reveal the largest dispersion among countries but cover up significant differences in hours worked. Where women work fewer hours than men involuntarily, and fewer hours explain the gap in earnings, one may infer that women are particularly disadvantaged, and it suggests greater gender-based discrimination than do the other measures.

Public service, banking and insurance

Similar information for certain occupations in public services (e.g. postal services or public administration (PA)) and in insurance and banking is shown in table 2.

The variation for both PA office clerks and bank tellers is usually quite small for both range and CV. The obvious interpretation is that in most, if not all, countries there is a single incremental salary scale for these occupations and differences in men's and women's pay reflect seniority and possibly some location payments. The average monthly wage of female PA office clerks in Ghana is 87 per cent that of males. If a single salary scale applies for Ghanaian male and female office clerks and the scale maximum is more than 15 per cent higher than the minimum, it is possible but not necessarily established that all this difference is due to seniority. The largest difference in favour of women is in Finland where female office clerks earn average hourly and monthly wages 5 per cent higher than those of men. If the pay arrangements for this occupa-

tion include all salary increments, it is possible that this difference in favour of women simply reflects higher average seniority of female PA office clerks.

While the overall female percentages for both hourly and monthly wages are less than 100 for bank tellers and in only two countries is the female percentage larger than 100, the range of the individual female percentages is quite consistent with common salary scales that at the extreme have a spread of 28 per cent between scale minimum and maximum. Both the range and CV are small for bank tellers on all measurements of pay. Though different banks may have a common salary scale for tellers in some countries, this is not the case everywhere. Interestingly, the overall female percentage for average earnings for bank tellers is a little higher than for average wages, and the CVs are lower. This is also the case with the *sem* percentage for average monthly earnings which is lower than that for both average hourly and monthly wages and although only nine countries provide details of average monthly earnings for tellers, the figure has been used for comparative purposes and ought to be reasonably acceptable. Bank teller is not an obviously "female" occupation, yet women do better on average earnings than on average wages. The variation of the female percentages for both average hourly and monthly earnings for bank accountants is somewhat higher than for tellers; this could be because a different salary scale applies in each bank in each country for this occupation, or because different categories of accountants with varying levels of qualifications and/or experience are subsumed under a single occupational heading. The *sem* percentage for bank accountants' average monthly earnings is more than twice as large as that for tellers.

The variation for postmen⁹ and central government executive officials tends to be a little higher, but again could be within the range of the occupation's salary scale, as could the differences for post office counter clerks and telephone switchboard operators. Overall, postwomen have higher average hourly and monthly wages and higher hourly earnings than postmen, and female post office counter clerks have higher overall pay than men on all three measures of pay available, but in only two countries.

Somewhat surprisingly, perhaps, in no country do women executive officials in either central or local government have higher average pay than men. Men and women working for central government should be on the same salary scale and, in a number of countries, those working for local government, too.

The largest differences concern insurance agents, for which two obvious explanations are possible. First, that this occupation is paid substantial proportions of total remuneration on a commission or piecework basis. Second, that different insurance companies have their own payment scales and systems so there is no common salary scale. For both hourly and monthly wages, female insurance agents have a higher average overall percentage than males, even though in only one country for hourly wages and in two for monthly wages do women actually earn higher average wages than men. The overall average is

⁹ The occupation is still listed as "postman" although women are employed in some countries.

Table 2. Women's average wages and earnings as a percentage of men's in selected occupations in the public service, banking and insurance

OEI number	Occupation	Number of countries	Minimum	Maximum	Average	Range	CV	>100%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Average hourly wages								
127	Postman	6	92.6	127.9	103.6	1.382	10.94	2
129	Bank accountant	7	80.7	104.6	90.7	1.296	11.17	2
131	Bank teller	10	78.4	105.9	92.9	1.352	8.72	2
136	Insurance agent	6	58.5	228.8	103.7	3.909	55.78	1
139a	Executive official: central gov't	6	71.1	97.2	82.8	1.367	12.65	0
139c	Executive official: local gov't	4	69.1	92.7	81.9	1.340	12.51	0
142	Office clerk: PA ¹	6	86.8	104.7	96.9	1.205	6.52	4
Countries examined: Antigua and Barbuda, Bahrain, Bolivia, Cyprus, El Salvador, Estonia, Finland, Ghana, Honduras, Romania, Tajikistan, United Kingdom.								
Average monthly wages								
126	PO ² counter clerk	5	74.6	138.6	100.4	1.858	21.34	2
127	Postman	6	92.6	127.9	103.3	1.382	11.13	2
128	PO ² switchboard operator	5	84.6	122.6	95.2	1.450	14.95	1
129	Bank accountant	9	80.7	107.3	89.1	1.329	11.39	2
131	Bank teller	12	78.4	105.9	92.1	1.352	8.13	2
132	Bank machine operator	5	78.5	116.2	93.2	1.480	14.29	1
133	Computer programmer: insurance	5	65.9	102.9	89.2	1.561	14.04	1
136	Insurance agent	8	58.5	228.8	101.7	3.909	49.56	2
139a	Executive official: central gov't	6	71.1	97.2	82.7	1.367	12.64	0
139c	Executive official: local gov't	5	69.3	92.7	79.9	1.337	12.42	0
142	Office clerk: PA ¹	6	86.8	104.7	96.5	1.205	6.59	2
Countries examined: Antigua and Barbuda, Bahrain, Bolivia, Cyprus, El Salvador, Estonia, Finland, Ghana, Honduras, Macau, Romania, Singapore, Tajikistan, United Kingdom.								
Average hourly earnings								
126	PO ² counter clerk	5	87.5	127.2	101.4	1.454	13.50	2
127	Postman	6	89.0	126.6	101.0	1.423	12.09	3
129	Bank accountant	8	82.9	126.0	102.4	1.520	16.61	3
131	Bank teller	8	83.8	102.9	94.2	1.227	7.08	2
136	Insurance agent	5	55.6	228.8	105.5	4.115	59.66	1
141	Punch machine operator: PA ¹	5	74.7	103.8	89.8	1.389	11.09	1
142	Office clerk: PA ¹	5	86.6	98.9	93.3	1.142	5.85	0
Countries examined: Antigua and Barbuda, Australia, Costa Rica, El Salvador, Estonia, Ghana, Kyrgyzstan, Nigeria, Norway, Romania, Tajikistan, United Kingdom.								

Table 2. (Contd.)

OEI number	Occupation	Number of countries	Minimum	Maximum	Average	Range	CV	>100%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Average monthly earnings								
126	PO ² counter clerk	7	87.5	127.2	100.5	1.454	11.63	2
127	Postman	8	88.6	126.6	97.7	1.429	12.01	2
128	PO ² switchboard operator	4	68.3	100.1	84.3	1.466	13.39	1
129	Bank accountant	10	73.4	123.8	96.3	1.688	17.11	3
131	Bank teller	9	81.6	102.9	93.0	1.261	6.66	1
132	Bank machine operator	4	87.8	115.4	104.0	1.314	10.90	2
133	Computer programmer: insurance	4	75.5	102.9	90.1	1.363	10.88	1
135	Punch machine operator: insurance	5	81.0	122.4	96.6	1.511	15.79	2
136	Insurance agent	7	54.5	228.8	98.8	4.201	56.19	2
139a	Executive official: central gov't	5	71.9	97.8	89.3	1.360	10.55	0
139c	Executive official: local gov't	5	69.4	98.0	84.1	1.412	13.55	0
141	Punch machine operator: PA ¹	6	71.5	108.6	90.3	1.518	13.52	2
142	Office clerk: PA ¹	7	86.9	107.5	96.1	1.237	6.91	2

Countries examined: Antigua and Barbuda, Australia, Costa Rica, El Salvador, Estonia, Ghana, Kyrgyzstan, Macau, Norway, Romania, Sweden, Tajikistan, United Kingdom, United States.

¹ Public administration. ² Post office.

pulled up by the very high figure for female insurance agents in Tajikistan, where they are paid 229 per cent of men's wages.

For most of these occupations, especially in the public service, the differences in average male and female pay could result from differences in seniority within a common salary scale. If this is the explanation, the question then arises of why in so many cases women have lower average pay than men, as one would expect to find rather similar numbers of female percentages above and below 100. Short of examining all individuals in each country, a possible answer is that women often have lower average seniority in a given occupation/grade because they have, on average, shorter periods of continuous employment at any particular date as a result of career breaks for child-bearing or child-rearing. But it may not be a result of a difference in seniority. In the banking and insurance occupations, it is also possible that different employers apply different salary scales and that the male/female pay differential reflects structural differences in the composition of employment. However it is also possible that, despite a common salary scale in public service employment, pay includes certain other elements which favour men over women.

Suggestions of relative pay gaps across and within countries

International comparisons

Studies of the overall female wage gap have established that differences between countries are often a function of the general wage structure. For example, if occupational differentials in the United States had been the same as in other countries, the overall female wage gap there would have been reduced to the same size as existed in Sweden and Australia, countries with small wage gaps (Blau and Kahn, 1996). In fact, the constancy of the male/female wage gap in the United States from the end of the Second World War up to 1975 was largely due to the failure of women to increase their skills relative to men's. The rise in women's labour force participation led to more women with comparatively low levels of education and work experience entering the labour market, thus diluting the women's average skill levels compared with men's (O'Neill, 1985; Smith and Ward, 1989; Goldin, 1989; O'Neill and Polachek, 1993). From 1976 the gap declined by an average of 1 per cent a year. About a third of the convergence is explained by measurable work-related characteristics (education and work experience) and the remainder by a relative increase in women's returns to experience, by declining wages in blue-collar work and by other factors.

Complications arising from the overall wage structure and wage inequalities are avoided if a narrowly-defined occupation is examined, as the question of whether it involves high or low skills should not affect the relative pay of men and women. In a number of countries, some female-dominated occupations show very similar female percentages. Thus, both professional and auxiliary nurses have small *sem* percentages compared with the overall female percentages; other

measures of dispersion such as range and CV are also small for the female percentages in the various countries covered. However, the main reason for this is probably a common salary scale for men and women in each country.

There are some marked differences in the distribution of female percentages of pay in different countries. In El Salvador the female percentages for both average hourly and monthly earnings range from 28 per cent for salespersons (wholesale grocery trade) to 208 per cent for journalists, with a CV of 38.63 for average hourly earnings in 20 occupations. Nigeria has a smaller range for both average hourly and monthly earnings percentages but a larger CV. Again in Nigeria, four occupations have female percentages of less than 50 per cent while two are in excess of 150 per cent for average monthly earnings, and sewing machine operators have a female percentage for average hourly earnings of 239 per cent. The CVs for 24 occupations in Nigeria are large for all four measures of pay, ranging from 43.33 for average monthly wages to 49.14 for average hourly wages. At the other end of the spectrum, Finland has a CV for 53 occupations of 8.42 for average hourly wages and of 8.35 for average monthly wages, with a range of only 1.492. Norway with only 20 occupations has a CV of 3.48 for average monthly earnings and a range of only 1.178; 17 of those 20 occupations have a female percentage of between 90 and 100 per cent. Australia with 74 occupations has low CVs for average hourly and weekly earnings but only a few occupations with a female percentage greater than 100.

Broadly, the industrialized market economies have a narrower spread of female percentages and relatively smaller CVs, although the overall average female percentage is usually less than 100. Both Australia and the United States have some low female percentages and neither the United Kingdom nor the United States has an occupation with a female percentage equal to 100. Former centrally planned economies tend to have larger CVs and ranges, with some countries (e.g. Estonia and Romania) having a number of occupations where the female percentage is quite low, below 80 per cent. The exception is the Republic of Moldova which has an overall female percentage greater than 100 for three of the pay measures, but quite large CVs and ranges.

Of the two African countries, Ghana has relatively low CVs and ranges that are about the same as those of Australia and the United States, while Nigeria has large CVs and ranges and seven or eight out of 24 occupations with female percentages less than 60 per cent and one or two greater than 150 per cent.

Three Latin American countries have quite large CVs and ranges, with some very low female percentages. The spread for El Salvador is exceptionally wide, whereas Honduras has a variation somewhere between those of industrialized market economies and former centrally planned economies.

The Asian countries vary. Tajikistan has CVs and ranges as wide as the three Latin American countries and somewhat larger than the former centrally planned economies in Europe. Cyprus and Singapore have CVs which are similar to those of Estonia and Romania, but smaller ranges. China has a wide range and a largish CV.

The higher female percentage for sewing machine operators may result from piecework payment systems with women being more skilled in this occupation. Those for both teachers and office clerks are almost certainly the result of longer seniority of women in these occupations.

Time trends

For a few countries details are available on a consistent basis and over a number of years, so that it is possible to detect changes over time in female pay as a percentage of male pay (see table 3).

Details of average hourly and weekly earnings for occupations in Australia were given for 1990 and 1994. The unweighted average of the female percentages increased only a little, from 85 to 88 per cent for average weekly earnings, and from 88 to 90 per cent for average hourly earnings. There was a tendency for average female earnings to move slightly closer to those of men; in some of the occupations showing the lowest female percentages in 1990 these had moved up by 1994. There was also an increase in the number of occupations where women's average earnings were higher than men's.

Some occupations showed large changes in the female/male wage gap. Female wooden furniture finishers experienced a fall in the female pay ratio for average weekly earnings from 164 per cent in 1990 to 98 per cent in 1994, which was almost entirely due to a reduction in the large amount of overtime worked in 1990. The female ratio for average hourly wages fell by 27 percentage points, from 121 to 94 per cent. The female pay ratio percentage for average weekly earnings of thread and yarn spinners fell from 86 per cent in 1990 to 54 per cent in 1994, mainly because in 1994 men worked an average of 54 hours compared with only 40 hours for women. The ratio for average hourly earnings fell only 16 percentage points from 89 to 73 per cent. The hourly wage percentage also fell.

The female ratio for average hourly wages for automobile mechanics rose from 62 per cent in 1990 to 108 per cent in 1994 and for plumbers from 66 to 96 per cent while the female ratio for average weekly earnings for plumbers rose from 61 to 102 per cent. The ratio for air traffic controllers increased from 83 to 111 per cent for average weekly earnings and from 81 to 114 per cent for average hourly earnings. Australia is somewhat unusual in that women have higher average earnings than men in a number of occupations.

In *Cyprus*, over the period 1985-94 there was a decrease in the female percentage in about half of the 43 occupations examined, so that average female pay as a proportion of male pay fell; there was an increase in about half the occupations examined. The female ratio for both hourly and monthly wages of telephone operators fell from 131 per cent in 1985 to 94 per cent in 1994 and for average monthly earnings from 115 to 94 per cent. The female percentage for hourly and monthly wages of office clerks in electric light and power fell from 86 per cent in 1985 to 54 per cent in 1994 and for average monthly earnings. Such a low female wage percentage as obtained in 1994 is seldom consistent with men and women being in the same occupational grade

Table 3. Changes in the female wage ratio over time ¹

Change in wage gap	Australia	Australia	Cyprus	Cyprus	Cyprus	Finland	Hong Kong	Norway	Singapore	UK	UK	USA
	1990-94 AWE ²	1990-94 AHE ³	1985-94 AME ⁴	1985-94 AHW ⁵	1985-94 AMW ⁶	1985-94 AHW ⁵	1990-94 AHE ³	1990-94 AME ⁴	1990-94 AMW ⁶	1990-95 AWE ²	1990-95 AHE ⁵	1986-95 MedWE ⁷
-69.9 -												
-60.0	1	0	0	0	0	0	0	0	0	0	0	0
-59.9 -												
-50.0	0	0	0	0	0	0	0	0	0	0	0	0
-49.9 -												
-40.0	0	0	0	0	0	0	0	0	0	0	0	0
-39.9 -												
-30.0	1	0	1	2	2	0	0	0	0	0	0	0
-29.9 -												
-20.0	0	1	4	2	2	0	0	0	0	0	0	0
-19.9 -												
-10.0	5	3	7	5	5	4	1	0	5	0	0	1
-9.9 -												
0.0	13	17	8	13	12	26	3	4	16	3	3	5
0.1 - 10.0	35	38	11	13	12	11	7	11	16	11	11	16
10.1 - 20.0	8	4	10	6	8	2	0	1	9	1	1	1
20.1 - 30.0	1	1	1	1	1	0	0	0	2	0	0	2
30.1 - 40.0	1	2	1	0	0	0	0	0	1	0	0	0
40.1 - 50.0	2	1	0	1	1	0	0	0	0	0	0	0
50.1 - 60.0	0	0	0	0	0	0	0	0	2	0	0	0
Total no. of occupations	67	67	43	43	43	43	11	16	51	15	15	25

¹ Change is female pay ratio in last year minus female pay ratio in first year, e.g. in Australia in 1990 female wooden furniture finishers earned \$620 for 54 hours and men earned \$377.40 for 39.9 hours, a female ratio of 164 per cent. In 1994 females earned \$455.1 and men \$466.7, a female ratio of 98 per cent. The difference is -66 per cent. ² AWE = average weekly earnings; ³ AHE = average hourly earnings. ⁴ AME = average monthly earnings. ⁵ AHW = average hourly wages. ⁶ AMW = average monthly wages. ⁷ MedWE = median weekly earnings.

and on the same uniform salary scale. So either two grades are being combined and there are more men in the higher grade, or there are discretionary elements in wages which are more favourable to men. The female percentage for both hourly and monthly wages of auxiliary nurses rose from 72 per cent in 1985 to 114 per cent in 1994, a significant improvement for women on a common salary scale with men.

In *Finland*, 30 of the 43 occupations examined showed a decrease in the female percentage for average hourly wages between 1985 and 1994. But the changes were relatively small — only four of the decreases were larger than ten percentage points; only two of the 13 increases were larger than ten percentage points. The female percentage for bank tellers fell from 105 per cent in 1985 to 92 per cent in 1994, which is compatible with shifts in the seniority composition on a common salary scale or with some shifts in employment between banks if there are differences in salary scales between banks. The female ratio for insurance agents declined from 94 to 81 per cent, which is also compatible with a longish salary scale.

In *Singapore*, rather more than half of the 51 occupations showed an increase in the female percentage. The largest gains were for secondary-level teachers in mathematics where the female ratio for average monthly wages rose from 92 per cent in 1990 to 151 per cent in 1994. This seems a rather large change but, although no details of average hours worked are given, it seems unlikely that changes in hours could explain much of the increase. The wage gap was also reversed for waiters when the female percentage rose from 87 per cent in 1990 to 120 per cent in 1994. It is probable that some of this is due to a shift in the distribution of men and women working for employers applying different wage rates. Large changes in female percentages for private sector occupations can be explained more easily in terms of shifts in the distribution of men and women between higher- and lower-paying establishments.

There were only small changes in *Hong Kong SAR*, even though seven of the eleven occupations showed an increase. The largest was only from 87 per cent in 1990 to 91 per cent in 1994 in the average earnings of office clerks in printing, publishing and allied industries. The largest decrease was from 81 to 70 per cent for electronic equipment assemblers.

In *Norway*, 12 of the 16 occupations examined showed an increase in the female percentage, but the changes were all relatively small. The largest improvement was for average monthly earnings of secondary-level technical teachers where the ratio rose from 87 per cent in 1990 to 97 per cent in 1994. None of the other occupations showed changes of more than three percentage points.

In the *United Kingdom*, three of the 15 occupations showed a widening of the female/male wage gap. The largest was a fall in average hourly earnings of executive officials in local authorities from 77 per cent in 1990 to 69 per cent in 1995; this could be due as much to shifts in occupational/grade employment as to shifts in the seniority composition of men and women. There is room for some discretion in the pay levels and grading and salary scales applied by local authorities in the United Kingdom, and men may be on higher scales than women for reasons of geographical location, size of local authority, or

because grades and salary scales favour men. The largest improvement was for the average hourly earnings of general physicians, where the female ratio rose from 71 per cent in 1990 to 88 per cent in 1995, with a smaller improvement of 12 percentage points for average monthly earnings.

In the *United States*, 19 of the 25 broad non-industry-differentiating occupations showed an increase in the female ratio and six showed decreases. The largest decrease in median weekly earnings was for insurance agents where the ratio fell from 70 per cent in 1986 to 58 per cent in 1995; it could well have been due to differences in earnings from commission as well as to shifts in employment between employers applying different levels of pay. For both office clerks and salespersons, the female ratio rose by 21 percentage points but this could have arisen from changes in sex distribution among office clerks in different sectors or industries.

Overall, on the basis of the few countries for which usable data are available, there was some tendency for average female pay to improve relative to male pay in that the female percentages often increased, but this still left women earning lower average pay than men in the same occupation. Even with this general trend, there were some occupations in each of the eight countries examined where the female percentage fell and women's average pay came to represent a lower proportion of their male counterparts' average pay.

Conclusions

There can be no definitive, generally applicable conclusions even as to the extent of differences in pay between men and women, let alone whether those differences are a result of discrimination. But what has been shown is that even when pay by occupation is precisely defined, to compare comparable jobs, there tend to remain some significant differentials.

The use of occupational pay rather than averages for broad groups of occupations allows a more detailed examination of differences in male and female pay for similar work, as it avoids complications arising from occupational distributions and the associated issues of segregation, overcrowding and discrimination in hiring or promotion. Differences in the average pay of men and women in the same occupation can arise from a number of causes. Some may result from the use of different measures of pay. Women typically work fewer hours than men and are less likely to receive shift premia as they usually do less shift-work than men. Average monthly or weekly earnings may therefore differ because men work more or different hours than women; average hourly earnings will also be affected, though to a lesser extent, as premia are then spread over both normal and overtime hours. Average hourly wages for hours actually worked is the measure least likely to be affected by the number of hours worked or by shift premia. However, it may still indicate some gender bias if pay includes allowances related to family circumstances, as these may be paid only to men if both spouses are employed. If average hourly wages include components based on payment by results, there may be differences between men's and women's average wages if they have different average productivities.

Even if the same hourly wage is paid to men and women in the same occupation in the same establishment, differences may emerge in their average hourly wages because of variations in the wage rates applied by different establishments and if the distribution of men and women varies from one establishment to another. The emergence of a female wage gap on a narrowly-defined occupational basis may therefore reflect features other than gender-based wage differentiation in an establishment.

Women earn lower average wages and average earnings than men in most occupations in most countries for which the OEI provides details. In some cases it is reasonable to infer that women's lower average pay is because they have, on average, lower seniority in the occupation/grade than men. This is most obviously the case where there is a single salary scale applicable to both men and women with increments received solely on the basis of seniority, as is likely in the public service in many countries. In a number of cases the lower average female wage seems to be within the range covered by the salary scale so that seniority could be the explanation for the differences.

Comparison of *sem* percentages provides two indicators of the female wage gap. First, where there are enough examples to provide a satisfactory test, the data on occupations show that generally there is more similarity in female percentages for wages than for earnings, with exceptions for certain occupations. Second, the evidence is consistent with the conclusion that female percentages are more likely to be closely bunched together if men and women are paid on a common salary scale, as in public service employment. Though some of the occupations displaying greater similarity in female percentages are "female-dominated", e.g. nursing, the single salary scale effect is probably a more important explanation.

Even in public sector occupations with common salary scales there are still many examples of a female wage gap in the same narrowly-defined occupation. Unless a common salary scale includes supplementary elements which favour men, the only explanation for the female/male wage gap is the recent recruitment of far more women than men which has lowered their average seniority compared with men in those occupations. If not, then there should be more instances of female percentages greater than 100. Such an explanation seems less likely in other cases, especially in occupations where a common salary scale does not apparently apply. There may be gender-based reasons why women achieve lower seniority in the grade but these raise issues that are distinct from gender-based differentiation in pay.

In other cases it is not clear from the pay data why women have lower average wages than men. It could be that there is straightforward gender discrimination in the same establishment, but there is little evidence from other sources to suggest that this is currently a significant factor except where some form of payment by results is in operation. Equal pay legislation usually ensures that men and women in the same grade or occupation receive the same wages. If workers are paid according to piecework or output-based payment systems, differences in average wages may reflect differences in average productivity.

Another possible explanation is the different proportions of men and women employed in higher- and lower-paying establishments. Establishments often pay different wage levels to members of the same occupational classification. This may reflect variations in average skill levels within the same nominal occupation or may illustrate some version of efficiency wage theory. There may also be geographical differences in nominal wages depending on the proportions of men and women employed in different locations. This can lead to differences in average wages even if men and women in the same establishment are paid exactly the same wage; it is more likely to occur in the private than in the public sector.

Some differences in average wages and earnings are so large as to suggest either some form of gender discrimination in pay levels, or that occupational classification covers such a wide range of skills and abilities that dissimilar or unequal jobs and skill requirements are classified as being in the same occupation.

There are marked inter-country differences in female percentages. In some countries, the tendency is for women to be paid less than men almost irrespective of occupation, e.g. Nigeria, Ghana, Cyprus, Estonia, Finland, the United Kingdom and United States, where relatively few, or no, occupations have female percentages greater than 100.

While the number of countries and examples do not permit a more rigorous testing, the industrialized market economies apparently have a narrower spread of female percentages. Former centrally planned economies tend to show a greater variation in female percentages. Of the two African countries with a number of occupations with appropriate data, Ghana is similar to some industrialized market economies while Nigeria shows much greater variation in female percentages. In Latin America some of the percentages are quite low. Cyprus and Singapore have quite varied female percentages; Tajikistan and China are probably more varied.

There is some evidence to suggest an increase in female percentages and a reduction in women's comparative disadvantage, but in most countries there are still large and significant differences in men's and women's average pay in certain occupations.

The size of occupational differentials and the female percentage ratios obviously vary from country to country. The United States has wider occupational differentials than most industrialized market economies (especially for men), and female differentials for the same occupations are lower than those of men in both the United States and Australia. However, both these countries group occupations together making no distinction for sector of industry, so that the female percentages and the occupational differentials are for broad occupational coverage and, for the United States at least, the wider differentials may reflect internal differences in pay rather than differentials between narrowly-defined occupations.

Average hourly wages provide the best measure of relative female pay but these data are available in a few countries only, and only in Cyprus and Finland over any reasonable period. In Finland a majority of occupations

(30 out of 43) had a fall in the female percentage over the period 1985-94, as did a slight majority in Cyprus (22 out of 43). In many cases, taking the occupations as a whole, there are not, in fact, major differences in the female percentages according to different measures of pay, but the percentages for an individual occupation can vary according to the measure used.

The recent continuation or enlargement of female wage gaps in public service employment in some countries may arise from the spread of personal assessment as the basis for granting annual wage increases, since women tend to do less well under this sort of payment system. The continuation of female wage gaps in occupations which are seen as entry grades into strong public service internal labour markets (e.g. office clerks) should give cause for some concern, if the lower average female seniority within the grade is caused by women's greater propensity to leave. If, however, it is caused by women's greater propensity to be promoted, this might be indicative of attempts to redress a past imbalance between men's and women's promotion opportunities.

What this article has shown is that there still are significant pay differences between men and women workers even when considering very comparable categories. Women still tend to receive lower average pay than men in the same occupation.

References

- Aldrich, Mark; Buchele, Robert. 1986. *The economics of comparable worth*. Cambridge, MA, Ballinger Pub. Co.
- Anker, Richard. 1997. "Theories of occupational segregation by sex", in *International Labour Review* (Geneva), Vol. 136, No. 3, pp. 315-339.
- Bergmann, B. 1974. "Occupational segregation, wages and profits when employers discriminate by race or sex", in *Eastern Economic Journal* (Smithfield, RI), Vol. 1, pp. 103-110.
- Blau, Francine D. 1977. *Equal pay in the office*. Lexington, MA, Heath.
- .; Beller, Andrea H. 1988. "Trends in earnings differentials by gender: 1971-1981", in *Industrial and Labor Relations Review* (Ithaca, NY), Vol. 41, No. 4, pp. 513-529.
- .; Kahn, Lawrence M. 1996. "Wage structure and gender earning differentials: An international comparison", in *Economica* (Oxford), Vol. 63, No. 250 (supplement), pp. S29-S62.
- Borooah, V. K.; Lee, K. C. 1988. "The effects of changes in Britain's industrial structure on female relative pay and employment", in *Economic Journal* (Oxford), 98, pp. 818-832.
- Cain, Glen G. 1986. "The economic analysis of labor market discrimination: A survey", in Orley Ashenfelter and Richard Layard (eds.): *Handbook of labor economics*. Vol. 1, Amsterdam, North Holland.
- Colclough, Christopher (ed.). 1997. *Public-sector pay and adjustment: Lessons from five countries*. London, Routledge.
- Ehrenberg, Ronald G.; Smith, Robert S. 1987. "Comparable worth in the public sector", in David Wise (ed.): *Public sector payrolls*. Chicago, IL, University of Chicago Press.
- England, Paula. 1992. *Comparable worth: Theories and evidence*. New York, Aldine de Gruyter.
- Fields, Judith; Wolff, Edward N. 1991. "The decline of sex segregation and the wage gap, 1970-80", in *Journal of Human Resources* (Madison, WI), Vol. 26, No. 4, pp. 608-622.
- Goldin, Claudia. 1989. "Life-cycle labour force participation of married women: Historical evidence and implications", in *Journal of Labor Economics* (Chicago, IL), Vol. 7, No. 1, pp. 20-47.
- Gonzalez, Pablo; Watts, Martin J. 1995. *Measuring gender wage differentials and job segregation*. IDP Women Working Paper No. 24. Geneva, ILO.

- Grimshaw, Damian; Rubery, Jill. 1998. *The concentration of women's employment and relative occupational pay: A statistical framework for comparative analysis*. Labour Market and Social Policy Occasional Papers No. 26, OECD/GD(97)186. Paris, OECD.
- Groshen, Erica L. 1991. "The structure of the female/male wage differential: Is it who you are, what you do, or where you work?", in *Journal of Human Resources* (Madison, WI), Vol. 26, Summer, pp. 457-472.
- Gunderson, Morley. 1989. "Male-female wage differentials and policy response", in *Journal of Economic Literature* (Nashville, TN), Vol. 27 (March), pp. 46-72.
- . 1975. "Male-female wage differentials and the impact of equal pay legislation", in *Review of Economics and Statistics* (Cambridge, MA), Vol. 57, No. 4, pp. 462-469.
- Hill, M. Anne; O'Neill, June E. 1992. "Intercohort change in women's labor market status", in R. G. Ehrenberg (ed.): *Research in labor economics*, Vol. 13. Greenwich, CT, Jai Pr.
- ILO. 1997. "Part-time work: Solution or trap?", in *International Labour Review* (Geneva), Vol. 136, No. 4, pp. 559-581.
- . 1996. *Statistics on occupational wages and hours of work and on food prices: October Inquiry results, 1994 and 1995*. Special supplement to the *Bulletin of Labour Statistics*. Geneva.
- Killingsworth, Mark R. 1990. *The economics of comparable worth*. Kalamazoo, MI, W. E. Upjohn Institute for Employment Research.
- Lofstrom, Asa; Gustafsson, Siv. 1991. "Policy changes and women's wages in Sweden", in *International Review of Comparative Public Policy* (Greenwich, CT), Vol. 3, pp. 313-330.
- Macpherson, David A.; Hirsch, Barry T. 1995. "Wages and gender composition: Why do women's jobs pay less?", in *Journal of Labor Economics* (Chicago, IL), Vol. 13, No. 3, pp. 426-471.
- Malkiel, Burton G.; Malkiel, Judith A. 1973. "Male-female pay differentials in professional employment", in *American Economic Review* (Nashville, TN), Vol. 63, No. 4, pp. 693-705.
- Mincer, Jacob; Ofek, Haim. 1982. "Interrupted work careers: Depreciation and restoration of human capital", in *Journal of Human Resources* (Madison, WI), Vol. 17, No. 1, pp. 3-24.
- .; Polachek, Solomon. 1974. "Family investments in human capital: Earnings of women", in *Journal of Political Economy* (Chicago, IL), Vol. 82, No. 2, Part II, pp. S76-S108.
- Moulton, Brent R. 1986. "Human capital accumulation and trends in male-female wage gap in the United States, 1956-83", in *Eastern Economic Journal* (Smithfield, RI), Vol. 12, No. 3, pp. 265-271.
- O'Neill, June. 1985. "The trend in the male-female wage gap in the United States", in *Journal of Labor Economics* (Chicago, IL), Vol. 3, No. 1, Part 2, pp. S91-S116.
- .; Polachek, Solomon. 1993. "Why the gender gap in wages narrowed in the 1980s", in *Journal of Labor Economics* (Chicago, IL), Vol. 11, No. 1, Part 1, pp. 205-228.
- Smith, James P.; Ward, Michael P. 1989. "Women in the labor market and in the family", in *Journal of Economic Perspectives* (Nashville, TN), Vol. 3, No. 1, pp. 9-23.
- Sorensen, Elaine. 1990. "The crowding hypothesis and comparable worth issue", in *Journal of Human Resources* (Madison, WI), Vol. 25, No. 1, pp. 55-89.
- . 1989. "Measuring the pay disparity between typically female occupations and other jobs: A bivariate selectivity approach", in *Industrial and Labor Relations Review* (Ithaca, NY), Vol. 42, No. 4, pp. 624-639.
- Treiman, Donald; Hartmann, Heidi (eds.). 1981. *Women, work and wages: Equal pay for jobs of equal value*. Washington, DC, National Academy Press.

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