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AN ECONOMY-WIDE
INVESTIGATION OF SEX
DIFFERENCES IN WAGE RATES

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1. Introduction

On average, women engaged in paid work earn less than their male counterparts, in Ireland as in many other countries. The persistence of such a gap between male and female hourly earnings despite the introduction of a range of anti-discrimination measures has given rise to widespread concern. Does it mean that existing legislation has not been fully effective, or that new legislative measures or more stringent enforcement of legislation are required? Or can it be explained by differences in the average age, experience, qualifications and other relevant characteristics of male and female employees? These are the issues which this paper seeks to address.

The analysis of such issues in the Irish context has been subject to considerable constraints. The limitations on available data have tended to focus attention on the average hourly earnings of production workers in industry. But fewer than 1 in 3 of all employees belong to this group, and fewer than 1 in 5 female employees. Furthermore, detailed analyses of the relationship between wages and gender, controlling for such important factors as educational qualifications and labour market experience has been limited to rather special sub-samples of the population.

This paper reports some of the results from a new project in this area, sponsored by the Employment Equality Agency and the Department of Labour. It draws extensively on data from the ESRI Survey of Income Distribution, Poverty and Usage of State Services (1987) to analyse the size, structure and nature of male-female wage differentials in Ireland. Section 2 presents some descriptive material on the gap between men's and women's hourly earnings, and describes the structure of this differential in terms of the characteristics of jobs and job-holders. Section 3 quantifies the extent to which differentials are due to differences in the characteristics of male and female employees (such as educational qualifications and past labour market experience) and how much is a "residual", possibly attributable to discrimination. Section 4 discusses some of the strategic policy issues which arise in this area, including the definition of policy objectives.

2. Trends and Structure of the Female-Male Wage Ratio

Figure 1 shows the trend in the female-male wage ratio in an international context. In 1955, most OECD countries recorded wage gaps[1] among manual workers in manufacturing industries of between 30 and 50 per cent. Over the last three decades female relative earnings have increased in most of these countries, causing wage gaps in some countries to fall to 10 or 15 per cent by 1989.

Each country differs in its initial starting point, the size and timing of changes in the wage gap, and the length of time over which the changes occurred. As illustrated in Figure 1, wage ratios in Ireland and the UK have behaved rather similarly over the last three decades. Along with Japan and the Netherlands, they recorded values of less than 60 per cent in 1955, falling well below those of close to 70 per cent observed in the Scandinavian countries. In addition, while wage ratios began to show an upward trend in the late 1950s in Germany and the Netherlands, and in the early 1960s in most other countries, no such changes are observed in Ireland and the UK until the 1970s. Relative earnings grew fairly strongly in both countries during the 1970s, but remained more or less constant throughout the 1980s at just below 70 per cent.

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1 The wage ratio is defined, in percentage terms, as 100 times the ratio between the average female wage and the average male wage; the "wage gap", in percentage terms, is simply 100 minus the wage ratio.

Figure 1: *Ratios of Female to Male Hourly Earnings of Manual Workers in Manufacturing Industries for Selected Countries*
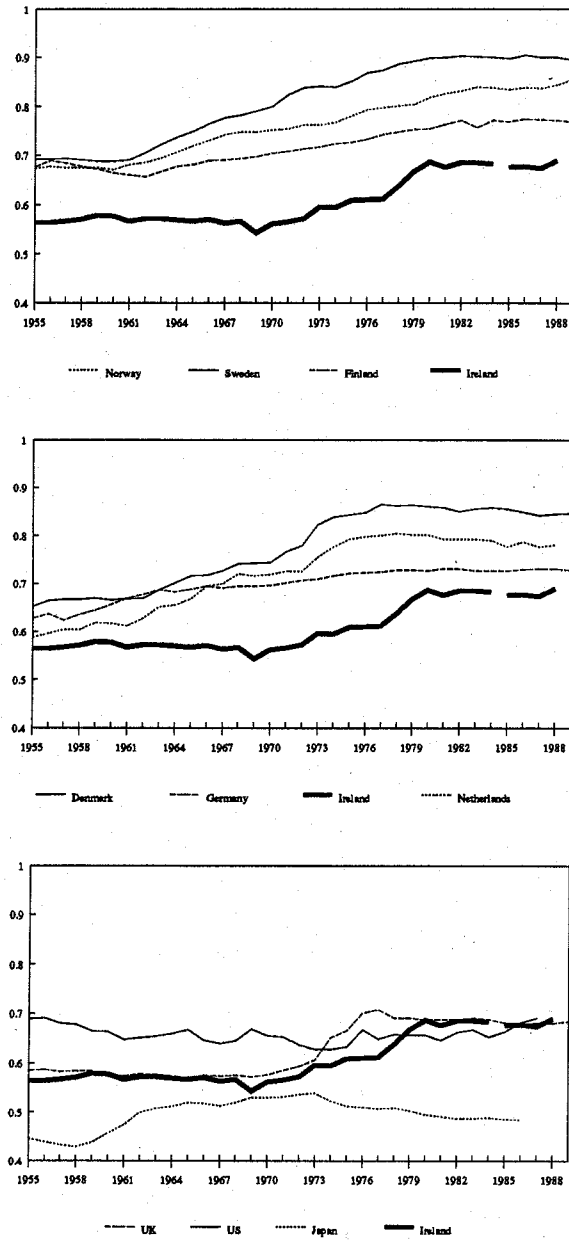
The growth of relative earnings seems to have come to a halt in most countries in the late 1970s, with only a few countries (e.g., Norway, Greece, France, and the US) recording increases in the last decade. By the end of the period shown, wage gaps in some of the Scandinavian countries were between 10 and 15 per cent and most of the other countries shown recorded gaps of between 20 per cent and 30 per cent. In spite of the sharp increases in

female earnings relative to males during the 1970s, however, aggregate wage gaps for production workers of over 30 per cent persisted in Ireland and the UK. A similar gap persisted in Switzerland, and a larger one in Japan; the aggregate wage gap had declined only minimally in each of these countries over the entire period.

While the series shown provide a valuable picture of historic trends in the wage gap for comparative purposes, it should be noted that the restriction of the figures used to manual workers in manufacturing means that it cannot reflect accurately the *level* of the *economy-wide* wage gap between men and women. Until now, suitable data for the estimation of the economy-wide figure has not been available. Blackwell's (1986) analysis, for example, was based on two main sources: statistics on the earnings of industrial workers regularly published by the Central Statistics Office, and statistics on the structure and distribution of earnings for 1974 and 1979 published by Eurostat. The CSO's regular series concentrates on the earnings and hours of work of workers in industry. It excludes agriculture, building and construction, public administration, retail and wholesale distribution, finance, and professional and personal services. Overall, about one-third of all employees are to be found in industry; but only about one-fifth of all female employees. Furthermore, the average industrial earnings series, which has been used to derive the male-female wage ratios shown in Figure 1, does not include all employees in industry: only "industrial workers"[2] are included. Information on clerical and managerial staff has only been published in recent years.

The other main sources of data on male-female wage differentials are the Surveys of the Structure and Distribution of Earnings, undertaken in 1974 and 1979; and the Labour Costs Surveys of 1981, 1984 and 1988. The 1974 survey covered only wholesale and retail distribution, banking and insurance; the later survey also included industry. Thus, the 1979

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2 Industrial workers include operatives, maintenance workers, storekeepers, packers, cleaners, basic supervisory staff and apprentices.

survey offered fuller coverage than the CSO's regular series; but it still excluded almost two-thirds of employment in the total services sector, in which much female employment was concentrated. The coverage of the Labour Costs Surveys is similarly limited.

This paper presents an analysis of male-female wage differentials based on a recent and more comprehensive data source: the ESRI Survey of Income Distribution, Poverty and Usage of State Services. The information provided by the survey has allowed us to obtain a more comprehensive measure of the economy-wide gap between male and female hourly earnings than was previously possible. In addition it has enabled us to carry out the sort of detailed analysis of the relationship between wages and gender, controlling for factors such as educational qualifications and labour market experience, which has previously been limited to rather special sub-samples of the population.

The survey is based on a random sample of 3,300 households and includes information on almost 1,800 male and over 1,000 female employees. The information gathered by the survey included a wealth of detail on the labour market activity of individuals, and their personal characteristics, which are extremely useful from the point of view of the present study. For individuals aged 15 and over, who were not in full-time education, a detailed individual questionnaire included questions on current labour market status, current earnings and other income, occupation and industry, highest educational qualification achieved, marital status, and labour market experience since leaving education. For those who were currently employees, detailed information on current gross earnings, deductions and net earnings were obtained. The number of hours worked was also requested, with overtime hours requested separately. Hourly wage rates are calculated for the present study on the basis of usual pay and usual hours worked including overtime.

Table 1:   Average Hourly Earnings of Men and Women: Industrial Workers (CSO) and All Employees
            (ESRI), 1987.

		(1) Women	(2) Men	(3) F/M
		Average hourly earnings		Ratio (1)/(2)
CSO:	Industrial workers in industry	£3.59	£5.31	67.6
ESRI[1]:	All employees	£4.27	£5.33	80.1

Sources: Irish Statistical Bulletin, December 1990 and ESRI Survey 1987.
Note: 1. The ESRI estimates are based on a sample of 2,763 employees.

It was noted earlier that, for several reasons, the economy-wide wage gap between men and women might differ from the wage gap between production workers in industry. Table 1 illustrates this point quite strikingly, comparing the results from the more comprehensive ESRI data set with those from the CSO statistics in Industrial Earnings and Hours Worked. The average wage of men in all occupations and industries, estimated from the ESRI Survey, is found to be almost identical to the hourly earnings of male production workers in industry. But hourly earnings for women in other industries and occupations are found to be significantly higher than for female production workers in industry. Average hourly earnings of all women employees taken together are about 19 per cent higher than those for female production workers in industry. As a result, the gap between the average hourly earnings of all women is 12.5 percentage points less than the gap between male and female production workers. The gap is about 20 per cent, rather than the commonly quoted figure of 30-33 percentage points.

The ESRI Survey results can be disaggregated to show how male and female wages, and the ratio of women's to men's wages, vary with different characteristics. While the overall sample sizes are substantial (almost 1,800 men and over 1,000 women employees), it is inevitable that this process will lead to rather small sample numbers in particular cells. In order to guard against over-interpretation of data based on small numbers, no results are reported if they would be based on less than 25 cases; while an asterisk is used to denote results based on between 25 and 50 cases.

It is important to realise that the overall female-male wage ratio reported at the bottom of each table is *not* a weighted average of the wage ratios for each sub-section of the population. Rather the overall wage *levels* reported on the bottom line of each table are a weighted average of the average *wages* in each subsection.[3] The overall female-male wage ratio is the ratio between these two overall average wage levels.

The reason why the overall wage ratio is not simply a weighted average of wage ratios for the different categories can be seen clearly in Table 2, which shows how men's and women's wages vary with age, and how male and female employees are distributed over the age categories. For both men and women, wages rise with age until the middle age-bracket (35-44); men's hourly earnings then plateau, while women's hourly earnings dip and then peak. But the most striking feature of the table is that the gap between men's and women's wages is much lower when age is taken into account. This arises from the fact that female employees tend to be concentrated in the youngest age groups, who tend to have lower wage rates irrespective of sex.[4] These younger wage groups will, therefore, be more heavily weighted in calculating the average female, than the average male, wage rate. In effect, the overall wage gap is comparing the wages of younger women with those of older men.

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3 Hence the overall female wage is a weighted average of the wages reported for each category, with weights equal to the proportion of female employees in each category. The overall male wage is, similarly, a weighted average of the wage in each in each sub-section of the population of male employees, with weights equal to the proportion of males in each sub-section.

4 It can be seen from the table that 71 per cent of female employees compared with only 52 per cent of males were concentrated in the two youngest age groups, which tend to have lower wages irrespective of sex.

Table 2: *Average Hourly Earnings of Men and Women Classified by Age Category, 1987*

| | (1) Women | (2) Men | Women | Men | (3) F/M |
	Average hourly earnings		% in age category		Ratio (1)/(2)
15-24	£3.03	£3.25	36.1	17.8	93.2
25-34	£4.79	£5.16	34.8	34.8	92.8
35-44	£5.36	£6.26	13.4	21.7	85.6
45-54	£4.84	£6.22	9.4	16.1	77.8
55-64	£5.89	£6.20	5.0	9.2	95.0
All Ages	£4.27	£5.34	1.4	0.4	80.0

Sources: ESRI Survey 1987.

The fact that the overall gap is larger than the wage gaps observed in all but one of the individual age categories, therefore, indicates the likely significance of the absence of older and more experienced women from the labour market as a factor influencing the size of the overall wage gap. The simple descriptive tables which we present in this section are chiefly of use in identifying possible explanatory factors of this sort. They are limited in that they examine one such factor at a time. Multivariate cross-tabulations would soon run into the problem that particular cells would contain very small numbers of observations. The multiple regression analysis of Section 3 helps to circumvent this problem, and provides a more systematic analysis of the relative significance of the factors influencing the overall gap.

It is of interest here to consider what underlies the relatively higher wage ratios in the lower age groups. Is it simply that a higher proportion of these women are single, childless and have uninterrupted labour market experience? Or is there a generational difference between the two groups - i.e in educational levels, occupations, labour market attachment etc. - which might offer hope that these higher wage ratios might in time be observed at all age levels? Unfortunately, however, in the absence of longitudinal data, it is impossible to track changes

in the wage ratio as more recent cohorts move into the older age groups and hence this question cannot be conclusively answered, although an examination of the characteristics of the different age groups does provide some clues.

In the youngest age group, for example, 93 per cent of women and 94 per cent of men are single. As one would expect, the proportion of both sexes who are married increases with age, with 62 and 71 per cent of females and males respectively in the 25 to 34 year-old age group, and 70 and 86 per cent of females and males respectively in the 35 to 44 year-old age group married. Table 3 shows how the wage ratio varies with marital status at each age level. Of most interest here is the difference between those in the 25 to 34 and 35 to 44 year-old groups. The wage ratio amongst married people falls by 7 percentage points between these two groups. The lower wage ratio in the older age group may be closely related to decisions about both the level and extent of labour market participation amongst females - the percentage of female part-timers doubles in each age category between 15 and 44. In addition the continuity of labour market experience is likely to be a significant factor. The higher wage ratios and smaller proportion of part-timers in the younger age group may reflect increased labour market attachment. On the other hand it is possible that child-related interruptions to labour market careers become more dominant in the older age group and hence that the same effect will be observed as the younger cohorts pass through the equivalent stage of their life-cycles. It remains unclear on the basis of this evidence, therefore, whether wage ratios might be expected to increase in the older age groups as the younger cohorts move into them.

Table 3:   *Wage Ratios Classified by Age and Marital Status, 1987*

Age	Married	Other
15-24		95
25-34	92	98
35-44	85	109*
45-54	70	
All Ages	82	97

Sources: ESRI Survey 1987.

Note: 1. Single, widowed or separated.
              * denotes an estimate or one element of a ratio based on fewer than 50 cases.
              Estimates based on less than 25 cases are not reported.

Such an expectation might have more foundation if there was evidence in the data of a conclusive shift, in the educational or occupational characteristics of women between the age groups. No such evidence appears to exist, however. Females possess a relative advantage in educational levels in both the 15 to 34 and the 34 to 54 age groups and there is no evidence to suggest that this advantage is greater for the younger age group. We have been unable to find any evidence in the data of a shift towards better paid occupations amongst younger women.

Table 4:   *Average Hourly Earnings of Men and Women Classified by Length of Work Experience, 1987*

| | (1) Women | (2) Men | (3) F/M |
	Average hourly earnings		Ratio (1)/(2)
Less than 5 years	£3.10	£3.30	93.9
5 to 15 years	£4.54	£5.21	87.1
15 to 25 years	£5.17	£6.17	83.8
25 to 35 years	£6.39*	£6.09	104.9*
All Experience Levels[1]	£4.44	£5.58	79.6

Sources: ESRI Survey 1987.

Note: 1. The estimates in this table differ slightly from those presented in other tables; this is because they are based on 2,055 cases for which data on experience are available.
      * denotes an estimate or one element of a ratio based on fewer than 50 cases.

In light of the tendency for female labour market participation to be interrupted, it is perhaps of more relevance to examine wage ratios taking actual labour market experience rather than age into account. Table 4 shows a wage ratio of almost 94 per cent amongst males and females with less than five years labour market experience. For those with between 5 and 25 years experience, wage ratios are lower, but still somewhat above the overall average of 80 per cent. It is important to note here, however, that the survey data does not allow account to be taken of the timing or duration of employment interruptions and thus a straightforward interpretation of the data as indicating unequal rewards for identical levels of experience should be avoided. The jump in the wage ratio to over 100 per cent amongst those of between twenty-five and thirty-five years experience should also be interpreted with caution as there are only 44 women contained in this sample group.

What is clear from the table is that the wage gap at each experience level is smaller than the total wage gap. This results from the fact that 72 per cent of the women in the sample had less than 15 years labour market experience, compared with only 40 per cent of males. As wage rates tend to be lower for both sexes in these two lowest experience groups, this has the effect of pulling the overall wage ratio downwards.

Table 5:   *Average Hourly Earnings of Men and Women Classified by Level of Education, 1987*

	(1)	*(2)*	*(3)*
	Women	*Men*	*F/M*
	Average hourly earnings		*Ratio (1)/(2)*
No Secondary Qualifications	£3.03	£4.47	67.8
Group/Intermediate Cert	£3.18	£4.53	70.2
Leaving Cert/Diploma	£4.30	£5.82	73.9
University Degree	£8.30	£9.48	87.6
All Education Levels	£4.27	£5.35	79.8

Sources: ESRI Survey 1987.

Note: 1. The estimates in this table differ slightly from those presented in other tables; this is because they are based on 2,743 cases for which data on education are available.

Table 5 shows a steady decrease in the size of the wage gap as levels of education increase. Wage ratios for all levels of education below university level are below the average. The average hourly earnings of university graduates of both sexes are significantly higher than those at all other levels of qualification; this contributes significantly to the overall wage ratio, despite the fact that graduates account for only 10 per cent of the sample.

Table 6: Average Hourly Earnings of Men and Women Classified by Occupation, 1987

| | (1) Women | (2) Men | (3) F/M |
	Average hourly earnings		Ratio (1)/(2)
Producers, makers & repairers	£3.36	£4.71	71.3
Transport, communication & storage workers	£3.48*	£4.45	78.2*
Clerical workers	£4.06	£6.27	64.8
Commercial, insurance & finance	£2.69	£4.69	57.4
Service workers	£2.81	£4.85	57.9
Professional & technical	£7.32	£8.80	83.2
All Occupations	£4.27	£5.33	80.1

Sources: ESRI Survey 1987.

Note: * denotes an estimate or one element of a ratio based on fewer than 50 cases.

Estimates based on less than 25 cases are not reported.

The distribution of wage rates by occupational category (Table 6) shows that in most of the broad occupational groups the wage gap is *larger* than the average for all occupations. This implies that the distribution of men and women across occupational groups does not, in total, explain much of the average differential between men and women: most of the differences occur *within* each broad occupational group. It cannot be claimed, therefore, that the wage gap arises as a result of the segregation of women in certain broad occupational groups. If it is to be explained by occupational differences, they must be at a finer level of detail.

Analysis of a more detailed occupational classification, distinguishing between 21 occupational groups, finds quite similar results to those reported here. The distribution over 21 occupational groups does not contribute to an explanation of the overall wage gap; once again, most of the differences occur within these occupational groups.

It is quite likely that these results could be reversed at a sufficiently fine level of detail. But it is important to realise that such a reversal would do no more than establish whether the limited goal of equal pay for identical jobs is being achieved. If, in addition, we wish to answer questions regarding equality of opportunity, however, the inclusion of such a fine level of detail on occupations is not appropriate. Occupational attainment, especially within a very finely detailed classification, may reflect discrimination within or outside the labour market, as well as voluntary choices.

Table 7:   Average Hourly Earnings of Men and Women: Full-Time and Part-Time Employees, 1987

	(1)	(2)	(3)
	Women	Men	F/M
	Average hourly earnings		Ratio (1)/(2)
Full-time[1]	£4.21	£5.31	79.3
Part-time[1]	£4.52	£6.42[*]	70.4[*]

Sources: ESRI Survey 1987.

Note: 1. Part-time workers are defined as those working less than 30 hours per week; except that teachers who report 24 or more hours of work per week are regarded as full-time. UK evidence suggests that this is close to what would be found as self-reported answers to a question on part-time versus full-time working.
* denotes an estimate or one element of a ratio based on fewer than 50 cases.

It is sometimes argued that hourly pay rates for part-time working will tend to be lower, other things being equal, than for full-time work, as a result of both supply and demand factors. With almost 20% of the women sampled working part-time, compared with only 3% of men, this thesis is clearly of relevance to the analysis of overall wage differentials. The aggregate picture of wages in full-time and part-time employments presented in Table 7 above lends no support to the thesis, however: both men's and women's hourly earnings in part-time work appear to be higher than in full time work on average. It should be borne in mind, however, that the condition that other things be held equal is not being met in this simple crosstabulation.

Table 8:   *Average Hourly Earnings of Men and Women: Full-Time and Part-time; Teachers and Non-Teachers, 1987*

		(1) Women	(2) Men	(3) F/M
		Average hourly earnings		Ratio (1)/(2)
Non-Teachers	Full-Time[1]	£3.81	£5.21	73.1
	Part-Time[1]	£3.41	£4.61*	74.0*
Teachers	Full-Time[1]	£8.84	£9.57*	92.4*
	Part-Time[1]	too few	too few	too few

Sources: ESRI Survey 1987

Notes: 1. As defined in Table 7.
         * denotes an estimate or one element of a ratio based on fewer than 50 cases.
         Estimates based on less than 25 cases are nor reported.

The average hourly earnings of part-time teachers as calculated appear to be particularly high. This may be due, in part, to measurement error. If some teachers tend to report lower hours because they take less account of time spent in the preparation of classes and the correction of written work, this will cause their average hourly earnings (calculated by dividing their reported usual earnings by their reported usual hours of work) to be biassed upwards. It should be remembered that the teaching profession has longer holidays than most other occupations, so that the picture of high hourly wages for that profession is not without foundation. However, in order to guard against any possible bias from this source, we present results for teachers and non-teachers separately. The results for non-teachers show male and female part-time workers with lower average hourly earnings than their full-time counterparts. Once teachers are excluded wage ratios amongst full-time and part-timers are more or less equal. For non-teachers, the average part-time wage is about 10 per cent below the average full-time wage.

3. Decomposition of Wage Differentials

The previous section has shown a wage gap of about 20 percentage points between the average male wage and the average female wage. How much of this gap can be explained by differences in personal characteristics such as education and work experience, and how much remains to be explained by other factors, including discrimination? These are the questions which this section attempts to answer. There are many studies of this type in the international literature; but only a small number of Irish studies, each somewhat limited in scope because of the data available. Walsh and Whelan (1976) analysed a sample of redundant workers; Reilly (1987 and 1990) examined differentials in the youth labour market; while Ruane and Dobson (1990) analysed the academic labour market. The data gathered in the ESRI's 1987 Survey, which includes detailed information on employment, education and earnings of men and women, allows us to perform the analysis on a nationally representative sample.

The fact that data on work experience are needed for this analysis means that some cases in the ESRI sample included in the analysis of Section 2 are excluded from the analysis in the present section. The "econometric sample" used here includes only those individuals who provided answers to a full, detailed individual questionnaire: about 3 out of 4 employees in the ESRI sample did so. The remaining employees, for whom more restricted information is available, tended to be young, single and living with their parents. As seen earlier, young single people tended to have lower wages, but a lower wage gap. This leads to a higher wage gap in the "econometric sample" than in the "total sample", as shown in Table 9.

Table 9:   *Wage Gaps for Alternative Samples*

Decomposition		*(1)*	*(2)*	*(3)*
Marital Status	*Sample size*	*All*	*Married*	*Not Married*
ESRI: full sample	2763	20	18	3
ESRI: econometric sample	1994	33	32	9

Memorandum item: Wage gap for industrial workers in industry (CSO) 32 per cent

The basic intuition behind the standard procedures for decomposition of the wage gap into "explained" and "residual" components can be explained quite simply. Looking at male and female employees separately, we estimate relationships between hourly wages and personal characteristics, such as the number of years a person has worked in the labour market and his or her educational qualifications. These relationships tell us, for example, how much an extra year of work experience adds to the hourly wage of an individual, other things being equal. We can use this relationship to estimate how much an average woman would earn if her work experience and educational qualifications were rewarded in the same way as men's characteristics: for simplicity, let's think of this as the wage of a woman rewarded like a man. The difference between the hourly wage that an average man currently gets, and the wage of a woman rewarded like a man, can be explained by differences in characteristics, such as the length of work experience. The difference between the wage of a "woman rewarded like a man" and the actual average wage paid to women is not explained by differences in characteristics - the characteristics are held constant, and only the reward structure is varied. This difference or "unexplained residual" could, therefore, be due to discrimination.

An index based on the size of this residual can be constructed. It measures how much higher an average woman's hourly wage would be if her measured characteristics were rewarded in the labour market in the same way as men's. This is widely termed the "discrimination index". But it is not a precise measure of the true extent of discrimination,

which may be higher or lower than the index. If there is direct discrimination, in terms of lower wages for the same characteristics, this may have an impact on women's choices in terms of educational attainment and continuity of employment. Women may be less likely to invest in education and training, and more likely to leave employment, if their wages are lowered by discrimination. Thus, some of the differences in measured characteristics may be indirectly attributable to discrimination.

The "discrimination index" may, however, overstate the degree of direct discrimination. The measures of work experience typically used do not take into account the amount of on-the-job training or skill accumulation involved. But since women are, at present, more likely than men to plan to interrupt their labour market careers, it would be economically rational for women, on average, to engage in less on-the-job training or skill acquisition per year of employment. Thus, a higher rate of return for men's years of experience might reflect this factor, rather than direct discrimination. On this basis, the index might best be interpreted as an upper bound on the degree of direct discrimination.

A further complication arises because the measured characteristics do not fully explain the variations *within* the male and female groups. While the degree to which measured influences explain the within-group variation depends on the particular dataset, the existence of a substantial unmeasured influence on wages is common to all datasets. It is possible therefore, that men's and women's unmeasured characteristics differ in ways which could help to explain the residual. In this case, the "discrimination index" would overstate direct discrimination. On the other hand, men's and women's unmeasured characteristics, and the way they are rewarded, may result in an increase in the discrimination index.

The "standard procedure" for analysis of the determinants of the male-female wage gap can be set out more precisely in econometric terms.[5] First, wage equations are estimated for samples of individual men and women separately:[6]

$$\text{(1)} \qquad \log w_m = X_m \beta_m + \varepsilon_m$$

$$\text{(2)} \qquad \log w_f = X_f \beta_f + \varepsilon_f$$

The average differential between men and women can then be expressed as:[7]

$$\text{(3)} \qquad \overline{\log w_m} - \overline{\log w_f} = \beta_m (\overline{X}_m - \overline{X}_f) + (\beta_m - \beta_f)\overline{X}_f$$

The first term on the right hand side represents that portion of the average differential which is explained by differences in average characteristics. The second term represents the portion which cannot be explained in those terms; this residual is due to differences in rates of returns to the characteristics. The "discrimination index" mentioned above can be set out as:

$$\text{(4)} \qquad D_f = 100(\exp(\beta_m - \beta_f)X_f - 1)$$

The wage equations relating personal characteristics to hourly wages are not reported here, for brevity, but are similar to those reported in Callan (1991). The more actual work experience an individual has, the higher the wage he or she is able to command; but the effects additional years of work experience tend to decline. Time spent out of the labour market, on the other hand, tends to depress the wage which an individual can command. Higher educational qualifications are consistently associated with higher wage rates. For example, the

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5 cf. Gunderson (1989), Wright and Ermisch (1991). The notation follows that of Wright and Ermisch.

6 w is the hourly wage rate, X a vector of characteristics such as educational levels and experience, and β the returns to those characteristics. Discussion of the precise specification of the vector of characteristics, X, is deferred until section 3.

7 An alternative decomposition based on $\beta_f(\overline{X}_m - \overline{X}_f)$ and $(\beta_m - \beta_f)\overline{X}_m$ yields similar results, unless otherwise indicated, to those reported here.

predicted hourly gross wage for the average female employee is about £2.80 if she has an Intermediate Certificate; £3.70 if she has a Leaving Certificate. These figures rise to £5.00 if she has a diploma and about £7.20 if she has a university degree.

Occupational control variables are not included in the equations used in this paper, but are considered in other work on this project. The basic message is that classifications by broad occupational grouping do *not* provide much additional explanatory power to the wage equation, *nor* do they help to explain gaps between men's and women's wages. Obviously a more detailed occupational classification might accomplish both of these tasks, and establish that the limited goal of equal pay for exactly equal occupations was being achieved. While this approach may be valuable in establishing the nature of the wage gap, it cannot be regarded as a satisfactory mode of explanation. It may be legitimate to regard differences in broad occupational grouping as reflecting voluntary choices, but differences in occupational attainment, particularly at a highly detailed level, may reflect discrimination. Individuals may choose to become clerical workers rather than production workers; but it is much less likely that they choose to remain at lower-paid levels within their chosen occupational grouping, which is what the use of finer occupational detail as an explanatory variable would imply. The analysis undertaken for this project suggests that the gap between male and female wage rates depends more on differences in pay *within* the broad occupational classification, and less on the distribution across the broad occupational classes. The results in the absence of occupational controls should be interpreted in terms of a concept of equal pay for equal human capital, rather than the narrower concept of equal pay for equal work.

Table 10 below reports the results of the decomposition into "explained" and "unexplained" residuals. The analysis is conducted first on the full sample, and then on married and non-married sub-samples, because of the striking differences between the raw wage gaps for married and other persons. Average wage rates for non-married men and women were very nearly equal; but the average wage rate for married women employees was about

20 per cent below that for men. The analysis here includes a distinction between employees who are married and others, in order to find possible explanations for this combination of circumstances.

Table 10:   *Decomposition of Wage Differential between Married Men and Married Women, Ireland, 1987*

Decomposition	*(1)*	*(2)*	*(3)*
Sample: Marital Status	*All*	*Married*	*Not Married*
Observed wage gap (logs)	0.289	0.279	0.088
of which % due to:			
Years not worked	8.8	21.5	-4.6
Other attributes	40.3	13.6	-21.4
Residual ("discrimination")	50.8	65.0	126.1
$\overline{X}_f(\beta_m - \beta_f)$	0.147	0.181	0.112
ASE^a of $\overline{X}_f(\beta_m - \beta_f)$	0.026	0.043	0.037
D_f	15.9	19.9	11.9

Notes: a.   Calculated as per Stewart (1987).

The average male wage was about 32 per cent higher than the average female wage for all employees in this sample. The analysis suggests that about half of this gap could be attributed to differences in characteristics such as education and length of experience, and to time spent out of the labour market. This leaves a residual of about 16 per cent which cannot be explained in this way. In other words, the analysis suggests that if women's characteristics were rewarded in precisely the same way as men's, their wages would be about 16 per cent higher.

The analysis of married and non-married sub-samples suggests rather different conclusions than those which might be drawn from the simpler descriptive analysis of these groups conducted in section 2. That analysis showed a very small wage gap between

non-married men and women, but a substantial gap between the hourly wages of married men and women. It might be thought, on the basis of these results, that discrimination could not be a significant problem in the younger age groups which dominate the non-married samples; and that the gap between married men and women reflected differences in age, experience, and time spent out of employment. But the econometric analysis undertaken here shows that the qualifications and experience of non-married women are such that they would be expected to gain higher wages than their male counterparts. The fact that they do not, in fact, earn higher wages on average shows, therefore, that discrimination could still be a problem in the younger age groups. The econometric analysis does concur with the simple descriptive analysis in suggesting that the unexplained wage gap (the best available measure of potential discrimination) is lower for the non-married group. This result could be explained by a reduction in discrimination in wages and employment opportunities over time.

The basic reason why non-married female employees would be expected to earn higher wages than their male counterparts is that they tend, on average, to have higher educational qualifications. The highest qualification for 58 per cent of the non-married male employees is the Intermediate Certificate or below; the corresponding figure for female employees is 40 per cent. 44 per cent of female employees have a Leaving Certificate, as against 32 per cent of men; while 16 per cent of women and 10 per cent of men have qualifications above Leaving Certificate level. Despite somewhat shorter average work experience and slightly longer periods out of employment, these higher educational qualifications are enough to suggest that non-married women would gain higher wages than non-married men if their characteristics were rewarded in the same way.

The results reported in Table 10 should be qualified, to take into account the fact that some information required for the econometric analysis on which it was based was not available for all cases in the survey. If the decomposition of the wage gap in the wider ESRI sample was similar to that found for the "econometric" sample, one would find that about half of the 20 percentage point gap was explained by differences in characteristics. This would leave a gap of about 10 percentage points still unexplained, and possibly due to discrimination.

The "discrimination index" measuring the rise in wages which an average woman would experience if rewarded in the same way as men would also be about 10 per cent. However, the fact that a greater proportion of the differential was explained for the married as against the unmarried group suggests that this simple adjustment is not sufficient: further work on this issue will be required.

4. Policy Objectives and Strategies

The discussion of policy issues in this paper will be at quite a general level. We wish to clarify the possible goals of policy, and the broad policy strategies available to achieve such goals. More detailed consideration of policy instruments will be given in our main report. We do not attempt, at this stage, to relate the discussion of policy at this general level to the Irish policy experience.

What are the objectives of policy in this area? Elias and Purcell (1988) comment that "The concepts of equality and equality of opportunity are difficult to define, and even among individuals, organisations and governments aspiring to pursue these elusive ideals, there is considerable variation in both the goals aimed for and the means perceived as appropriate to achieve them" (p. 196). Unequal labour market outcomes could be due to unequal opportunities, unequal incentives to participate in the labour market, or to differences in tastes and preferences between the sexes. Equality of labour market outcomes represents one possible goal. It would require that each of these possible causes of unequal outcomes be tackled; but this implies that policy measures would offset any possible difference in preferences as between work in the labour market and work in the home as between the sexes. Equality of labour market opportunity represents a more limited goal, which allows for differences in preferences. It can be seen as underpinned by a philosophy of meritocratic individualism, whereby individuals have the right to be treated no worse than others with the same qualifications and experience (Townshend-Smith, 1989).

Unequal incentives could, in principle, also be responsible for differences in labour market outcomes. This can be demonstrated most clearly by an extreme, and hypothetical, example. Consider a tax/transfer system which allowed women *equal* labour market opportunities, and *greater* non-labour market opportunities than men, thereby offering them lower incentives to participate in paid work. This would be the case, for example, if women were offered a cash payment for caring full-time for their own children, but no similar offer were made to men. In principle it is possible that under such a system, women would have equal labour market opportunities with those faced by men; but women would have *greater* opportunities outside the labour market. This could result in women having *lower* wages than men, because women's participation and average work experience would tend to be lower, even with equal opportunities and identical tastes and preferences. Thus, it could be argued that equality of incentive as well as equality of labour market opportunities would be needed for equality of outcome.[8]

There is a rough correspondence between these alternative policy objectives and the distinction between that part of the wage gap explained by differences in education and work experience, and the unexplained residual. A policy objective of equality of opportunity would tend to focus on elimination of the "unexplained" discrepancy between men's and women's wages. Reduction of the "unexplained" gap could also be expected to have the indirect effect of inducing greater investment by women in human capital, leading to a reduction also in the "explained" gap. A policy objective of equality of outcome would, in addition, focus on measures aimed directly at reducing the explained gap. Since most of the "explained" discrepancy arises from differences in length of work experience, this would require measures to promote greater labour market attachment, such as the subsidisation of childcare, greater flexibility in working arrangements, and facilitation of re-entry into the labour market.

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8 Elias and Purcell view this as "a fundamental incompatibility between equality of opportunity and being given special treatment in a way which reinforces the idea that childrearing and housekeeping are essentially women's responsibility" (p. 209). But the example shows that equality of labour market opportunity and equality of incentive can, instead, be regarded as separate dimensions.

How do the policy measures actually adopted in different countries relate to these alternative objectives? Building on the classification of Gunderson (1989), we may distinguish several different types of policy aimed at reducing the male-female wage gap.

1 (a) Traditional "Equal Pay" policies, designed to prevent wage discrimination for the same job in the same establishment.

   (b) "Comparable Worth" or similar policies, designed to prevent the undervaluation of traditionally "female" jobs (where "equal pay" provisions were hampered by the absence of male comparators) by guaranteeing "Equal Pay for Work of Equal Value". They tend to be based on systematic job evaluations in which all jobs within an establishment are uniformly rated according to the level of human capital and skills and the working conditions involved. While no standardised system of job evaluation exists, the same four basic "compensable factors" are usually considered - skills and knowledge required, effort, responsibility, and working conditions - with the weighting assigned to each chosen by the system designer.

2 (a) Equal Employment Opportunity legislation, which attempts to prevent the discriminatory relegation of women to low-paid jobs. Elimination of direct discrimination of this type would also have indirect effects: women would no longer be discouraged from investing in education, training, and on-the-job experience by the prospect of lower rewards than their male counterparts for such investments.

   (b) "Affirmative Action" programmes, designed to overcome the difficulties in monitoring equality of opportunity by ensuring that the results reflect this principle. They are also a response to the perceived need to address the effects of apparently neutral, but effectively discriminatory processes which have built up in the system as a result of a history of inequality. They generally set numerical targets and timetables for hiring and promotions, aiming to ensure that the sex composition of organisations mirrors that of the surrounding relevant labour market.

3   Policies implemented outside the labour market, such as the provision of day-care and flexi-time facilities and relevant education and training, in an attempt to improve female productivity levels and assist the full integration of women into the labour market. This may involve adaptation to the jobs, by the provision of support services (e.g., care for children after school hours, or day-care for younger children), or adaptation of the jobs, making them more compatible with family commitments (e.g., parental leave, flexible hours, job-sharing).

Equal pay, comparable worth and equal employment opportunity policies can all be seen as reflecting a goal of equality of opportunity. It is less clear whether affirmative action and facilitative policies represent simply an alternative means of achieving that goal or a different goal of equality of outcome. An equal opportunity interpretation of affirmative action policies could depend on it being less difficult and costly to monitor the outcomes of hiring and promotion processes rather than the processes themselves. An equal opportunity interpretation of facilitative policies would view them as necessary for women to compete in the labour market on equal terms. In particular, it would view the provision of subsidized childcare as a *sine qua non* of true equality of opportunity, because of the effects of child-related interruptions to women's labour market participation and earnings. It is to this issue that we now turn.

The role of child-related interruptions to labour market careers in reducing women's labour market participation, and subsequent wages, relative to men's, is quite clear. It seems equally clear that equality of labour market *outcome* cannot be achieved without policy intervention in this area. But does this imply that equality of *opportunity* cannot be attained without state support for childcare?[9] Elias and Purcell suggest that this is true:

> Women in paid work, particularly those who work part-time, are too often relegated to jobs which fail to capitalise on their education, training, experience and potential. The resulting inefficient use of resources is directly related to the inequitable division of non-paid work: not only are

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9 We abstract here from many other arguments for state support of childcare, such as its role in early childhood development, which are considered in Callan and Farrell (1992).

women the major providers of care for children and the elderly, but they also administer and manage most other aspects of domestic life. (Elias and Purcell, 1988, 196-7.)

The key element of this argument is that the division of non-paid labour is regarded as "inequitable". This suggests that either external constraints, or unequal bargaining between a husband and wife, give rise to an unfair burden being placed on the wife in terms of childcare and other responsibilities. Supporting childcare for working parents would, in these circumstances, serve to offset these factors and equalise labour market opportunities.

An alternative perspective would emphasise equal bargaining between spouses, and seek to eliminate external constraints such as direct labour market discrimination which biassed the bargain. It is possible in principle that in such circumstances the opportunities faced by husband and wife would be equal, without any specific support for childcare; sex differences in participation and wages which emerged from such a process could emerge, but would reflect differences in tastes.[10] At present, however, even a couple with identical tastes would be faced with a social pressure to conform with the "woman-in-the-home/ man-in-labour-market" model. The assumption of equal bargaining power is also extremely doubtful. In such circumstances, an intervention to support childcare for working parents can be seen as a means of offsetting such pressures and unequal bargaining power. The intervention to ensure equal ownership rights in a family home could be seen as a parallel.

We have seen that the gap between male and female wages "unexplained" by education and work experience is sometimes used to construct a "discrimination index". As emphasised in the previous section the true extent of discrimination can be either greater or less than this index. It is of interest, however, to consider what factors *other than current discrimination* could give rise to this "unexplained" gap.

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10 Equity between couples with children, and individuals or couples without children might be deemed to require that the state pay some share of the cost of raising children. The amount of such resources provided by the state might be influenced by the costs of pre-school child care, but would also be influenced by other factors.

The results for Ireland suggest a gap of about 10 per cent between the wages of men and women with similar levels of education and experience. Put another way, women with similar educational qualifications and experience to men are working in lower-paid jobs. This could arise for a number of reasons. First, there is a legacy from past discrimination. Women who were forced to leave employment by the marriage bar, or discriminated against in terms of promotion before the introduction of anti-discrimination legislation may now be working in jobs which do not fully reflect their skills and experience. Second, women may suffer from problems in re-entering the labour market after a long break, or may be faced with limited part-time opportunities. They may, as a result, take up employments which do not fully utilise their skills and experience. Third, the measure of human capital employed is an imperfect one. It does not take into account the extent of on-the-job training for each year of work experience; and it does not take into account the timing of work experience. For example, 5 years experience in the computer area is likely to be much more valuable if it is the most recent 5 years than if it was 5 years in the 1970s.

This is not an exhaustive list of the possible sources of the "unexplained" gap, other than current discrimination. But it is sufficient to show that the appropriate policy depends on the balance between different sources of the unexplained discrepancy.

Conclusion

The ratio between women's and men's wages, as represented by the average wages of production workers in industry, increased sharply in Ireland during the 1970s, when anti-discrimination and equal opportunity legislation were introduced. Since then, however, the ratio has been approximately constant at about two-thirds. The pattern shown in Ireland follows that in the UK quite closely; but the ratio in each of these countries is below that of their EC partners, and much below that in the Scandinavian countries.

A substantial majority of employees, and an even bigger majority of female employees are *not* production workers in industry. Analysis of a more fully representative sample of all employees, using the ESRI's Survey of Income Distribution, Poverty and Usage of State

Services, shows that the ratio of female to male wages is about 80 per cent, or four-fifths, as against the widely quoted figure of two-thirds for production workers in industry. Econometric analysis suggest that about half of this gap can be explained by differences in personal attributes other than sex, mainly length of work experience. This leaves a gap of about 10 per cent which cannot be explained in this way. Current discrimination represents one possible source of this discrepancy; but other causes of this gap "unexplained" by education levels and work experience are also possible.

Our discussion of policy issues focussed on the general principles and broad instrument involved, rather than the specifics of legislation. The differences between equality of opportunity, equality of incentive, and equality of outcome were explored. It seems likely that equality of outcome would require specific intervention in favour of childcare for working parents. The case for such an intervention on grounds of equal opportunity depends more on unequal bargaining between spouses, or the impact of pressures to conform with social expectations.

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