

A Micro-Economic Study of Earnings in Ireland

B.M. WALSH
B.J. WHELAN

Précis: This article, which is a first attempt to analyse Irish earnings data at the level of the individual, is based on a human capital approach. It shows that about half the variance in individuals' earnings can be accounted for by their age, education, occupation, urban/rural residence, trade union membership, marital status and state of health. It also demonstrates the divergence between male and female earnings, and examines some of the factors underlying this divergence. Returns to education and training are derived and returns to males are shown to be considerably above those to females.

Studies of the determinants of earnings at the individual level play an important rôle in many areas of economics. They enhance our understanding of such issues as poverty, income distribution, unionisation and labour market discrimination, and hence improve the policy decisions made about these questions. In Ireland, discussions of these issues have to date been conducted without the benefit of detailed studies of earnings. This paper presents some results from a first attempt to analyse Irish earnings data at the micro level.

Much of the growing volume of research on this subject is based on the human capital approach summarised by Mincer (1970). The basic premise of this theory is "that individual wage differences depend on the magnitude and timing of investments in schooling, training, information and other forms of human capital" (Flanagan, 1974, p.521). This approach also helps to elucidate the possible rôle of institutional factors such as seniority or trade

union membership; labour market imperfections such as the existence of "dual" labour markets; and random factors such as luck and inherited wealth.

These theoretical developments have been used to give a precise meaning to the concept of "discrimination" in labour markets, since they provide estimates of the proportion of differentials in observed earnings that remain after the influence of other factors has been controlled. These differentials can be attributed to discrimination. Flanagan's recent study of racial discrimination was based on this approach and led to the conclusion that "the single most important source of racial hourly wage rate differential is . . . the lower level of and returns to black schooling investments". (Flanagan, 1974, p. 529). A study of male/female differentials in academic salaries concluded that over half the observed differential was due to the labour market's reaction to voluntary decisions by women concerning part-time employment and career interruptions, rather than to pure "discrimination" (Johnson and Stafford, 1974). In this paper, we attempt to perform a similar decomposition of earnings differentials between males and females in Ireland.

The objectives of the present study were therefore:

- (i) to explore the effect on earnings of such factors as age, work experience, occupation, education, industry, trade union membership and area of residence;
- (ii) to establish whether a significant difference exists between the weekly earnings of men and women; and,
- (iii) to examine the sources of any such difference, in so far as the data at our disposal would allow. In particular, we were able to study the question of whether the differential was due to differences in characteristics such as education and experience between men and women or whether men and women with the same characteristics were paid differently.

Data Used in the Present Study

The data on which the present study is based were derived from 1,670 records obtained from the Department of Labour's Redundancy Section and relate to the earnings of workers who qualified for payments under the Redundancy Payments Acts during the first quarter of 1972. These data were supplemented by information obtained from the Department of Social Welfare and by interviews with a randomly selected stratified sub-sample of 504 of the workers. A list of all the variables used in the study is given in the Appendix and a detailed discussion of the data will be published in Whelan and Walsh (forthcoming).

It is important to note that there may be systematic differences between the earnings in a sample of redundant workers and in the labour force as a whole. First, only workers who are insured under the Social Welfare Acts are eligible for redundancy payments. Thus, our data, like the regularly published

unemployment figures, refer only to the insured labour force. This may cause problems if there exist differences between the proportions of men and women in insured and uninsured employment, and if earnings differ significantly between insured and uninsured employment. However, the Social Welfare Acts at the time of our study covered about 60 per cent of the labour force and the majority of those excluded were farmers and the self-employed in the non-agricultural sector. We believe therefore that our data are representative of the employee labour force whose income was under the limit specified in the Acts (£1,600 a year at the time of the study).

A second feature of our data which requires comment is that a person must have completed two years' service with the same employer before becoming eligible for redundancy pay. This means that people who change jobs frequently will tend to be excluded from our sample. Such people are likely to have lower earnings than others. It also seems probable that females change jobs more frequently than males, partly because of the lower modal age of the females in the labour force and partly because of family commitments. Thus, our data are likely to exclude a disproportionate number of badly paid females. This will have the effect of making our estimates of male/female wage differentials "conservative", i.e., they will err on the low side.

A final difficulty is the fact that the earnings of those who become redundant are likely to be lower than average due to factors such as reduced overtime in employments threatened with redundancy. The mean earnings in our sample was £24.90 weekly for males and £14.80 weekly for females. This compares with average weekly earnings of £28.79 for adult males, and £14.40 for adult females in transportable goods industries in March 1972 (Census of Industrial Production data). Thus the male earnings in our sample were some 15 per cent below the average in industry but the female earnings were about 3 per cent above average. In our analysis of the redundancy data we draw attention to the very much older age of women in our sample compared with those in the labour force as a whole, due, we believe, to the requirement of two years' continuous employment with an employer in order to qualify under the Redundancy Acts, and the concentration of female employment among teenagers in some industries. This may account for the contrast between male and female earnings in our sample compared with the transportable goods industries.¹

For our analysis of wage differentials we are not concerned that the means of our sample of males and females should be close to those found in

1. Of course the coverage of our sample was much broader than that of the transportable good industries: only 54 per cent of the males and 64 per cent of the females in our sample were in transportable goods industries (no official data are available on adult earnings in other industries or services).

the population: what does concern us, is that the factors giving rise to earnings differentials should not differ between our sample and the population. We have no evidence on this point, as our data constitute to our knowledge the only source of information on earnings in Ireland cross-classified by sex, age, industry and occupation. There is, however, no reason to believe that the determinants of earnings differ significantly between our sample and the population.

Our earnings data relate to the employee's "normal weekly earnings" prior to redundancy. The Redundancy Payments Acts define "normal weekly earnings" as inclusive of "regular" overtime. In the case of shift workers, an averaging formula is used to arrive at the relevant figure. (More details of these definitions are provided in Department of Labour, 1971.) The other information available to us from the Department of Labour's records included the employee's age, sex, industry, and an approximate description of occupation. Unfortunately, this last item proved of greatly diminished value because large numbers of workers (especially women) were vaguely described as "factory workers" or "operatives".

In addition to the data available from the redundancy records, the Department of Social Welfare provided information on area of residence and the number of weeks in the years 1972-73 for which workers claimed disability benefits. Expressed as a proportion of the two-year period, this was taken as an indicator of the individual's general state of health during the period *prior* to redundancy.

The main defect of the data for our present purposes lies in the absence of information on hours worked per week by which to convert normal weekly earnings to earnings per hour. The latter is the usual dependent variable in studies of this type rather than earnings per week. Thus, the variable we set out to explain contained differences in both hourly earnings and in hours worked, each of which would merit an explanation in its own right. In terms of independent variables we were better placed. The Department of Social Welfare provided us with information on the marital status of the females in our sample. This variable is likely to be highly correlated with part-time working, which is far more common among married women than among single women or among men. Further information was provided by the interviews with the random sub-sample which yielded details of the respondents' education and training, number of dependent children and trade union membership.

Earnings Functions

In Table 1 we set out the results of fitting a regression equation to male and female earnings separately and to earnings for both sexes combined. The specification of the natural logarithm of earnings as a function of age and age

squared is by now standard, following the theory described by Mincer (1970). This theory predicts a non-linear pattern over time in the returns to education, training and experience, thus justifying the logarithmic specification and the inclusion of the age squared term. By including variables to measure education and experience in the equation, it is possible to estimate the rates of return to these factors.

The units in which the variables were measured will now be briefly described. We used calendar years as a measure of age. Ill-health was measured as the proportion of the two years following redundancy for which the individual claimed disability benefits. All other measures used in the regressions were dummy variables, assuming a value of one if the individual belonged to a category, zero otherwise. The inclusion of specific occupational and industrial variables was designed to test whether earnings differentials exist between employments, as well as whether occupational and industrial segregation is strong enough to give rise to wage differentials for workers with similar education and experience.

Let us first of all consider the overall determinants of earnings by examining the third equation in Table 1 (for both sexes combined). In this equation we constrain the coefficients of all our explanatory variables to equality for both men and women, and force all the explanation of the differential between the sexes on a single dummy variable, which equals 1 if respondent is male. It may be seen that this variable is extremely significant and positive, indicating that all other factors held constant males earn significantly more than females. (The interpretation of the 0.49 coefficient is that male earnings are on average $e^{0.49}$ or 1.63 times female earnings.)

The age variable is highly significant and displays the expected non-linear pattern, the linear term having a positive coefficient and the squared term a negative one. This implies that earnings rise to a peak sometime in middle age and fall thereafter². Residence in certain regions exerts an appreciable influence on earnings, since the coefficients for Dublin and other urban areas are positive and significant. These coefficients probably reflect a more buoyant labour market in the cities. Workers in ordinary and supervisory clerical positions and those in supervisory manual occupations tend to earn more than other workers, but shop assistants earn significantly less. Earnings in certain industries tend to be higher than in others, notably Food, Drink and Tobacco, Building and Construction, and Engineering. However, as we shall discuss below, it is *male* earnings rather than female earnings which tend to be high in these industries. The variable measuring ill health has the

2. Our data refer to a cross-section of individuals at a point in time. Care should be taken not to interpret our findings (or the situation shown in Fig. 1) to be necessarily representative of any individual's experience over his life.

expected negative sign and is significant. The highly significant, negative coefficient for married women may be interpreted as reflecting a tendency for married women to work a shorter work-week than single or widowed women, or men, as well as the possibility that married women have less continuous career structures than others of the same age. The size of this coefficient is relatively small compared with that of the illness variable, for example.

We now go on to compare the effects of these variables on the earnings of males with their effects on the earnings of females. These effects are shown in the first two equations of Table 1 in which we allow the male and female coefficients for each variable to differ. The most striking contrast between the equation for males and that for females lies in the slopes of the age and age squared variables³. Whereas both age and age squared make a very significant contribution to explaining male earnings, their significance for women is marginal and the size of the coefficients indicates a much flatter age/earnings profile.

In order to highlight the contrast in age/earnings profiles between men and women, the regression results have been used to illustrate typical age/earnings parabolas for men and women (Figure 1). It may be seen that the curve for male earnings is consistently higher and steeper than that for females.

This flatter age/earnings profile for females could be due to a number of factors. There is the possibility that at each age women have consistently less formal education than men, and hence the difference in slopes reflects the returns to the larger amounts of male education and formal training. The effects of education and training are further explored below where we analyse the data from the sub-sample of workers whom we interviewed. In the specification shown in Table 1, however, the inclusion of occupational and industrial variables should control for the influence of differences in training and education at least to some extent. A second explanation for the flatter female age/earnings profile is that women interrupt their careers more frequently than men, and hence at each age they have accumulated less on-the-job experience and training than men. While we have no direct evidence on this point, the inclusion of a variable for married women should control for the main differences in the number and duration of career interruptions. Finally, there is the possibility that due to genuine discrimination and occupational segregation between men and women, women's on-the-job training for each year of work experience is less than men's and moreover their chances of benefiting from routine advancement and

3. A Chow test showed that the age and age squared coefficients for men were significantly different from those for women at the 99.9 per cent level.

TABLE 1: *Regressions of log of average weekly earnings for males, females and both sexes based on total sample of 1670 cases (t-values are given in parentheses)*

<i>Independent Variable *</i>	<i>Males</i>	<i>Females</i>	<i>Both Sexes</i>
Age	0.03887 (11.62)	0.01273 (1.99)	0.03084 (10.06)
Age Squared	-0.00044 (11.53)	-0.00016 (2.06)	-0.00036 (10.03)
Dublin	0.21974 (11.07)	-0.01212 (0.27)	0.18600 (10.13)
Urban	0.09806 (5.13)	0.10134 (2.23)	0.10338 (5.65)
Ordinary Clerical	0.04696 (1.04)	0.06539 (1.40)	0.14326 (4.87)
Supervisory Clerical	0.17114 (3.58)	0.14563 (1.62)	0.15940 (3.64)
Shop Assistant	-0.01774 (0.25)	-0.29188 (4.47)	-0.11340 (2.45)
Supervisory Manual	0.21087 (6.93)	0.21592 (2.21)	0.21497 (7.06)
Food, Drink, Tobacco	0.26239 (12.68)	-0.13647 (3.14)	0.18624 (9.75)
Textiles etc.	-0.04207 (1.52)	-0.19056 (4.47)	-0.03102 (1.34)
Personal Services	0.02239 (0.56)	-0.35621 (5.44)	-0.05209 (1.49)
Building and Construction	0.20265 (9.11)	0.06920 (0.54)	0.17093 (7.56)
Engineering	0.16472 (6.65)	-0.00459 (0.07)	0.12902 (5.38)
Distribution	0.06608 (1.64)	0.00799 (0.13)	0.06805 (2.01)
Ill Health	-0.10289 (1.99)	-0.16129 (1.84)	-0.11664 (2.53)
Married Woman	-	-0.07154 (2.23)	-0.14682 (5.05)
Sex (Male = 1)	-	-	0.49407 (24.69)
Constant	2.17521	2.51200	1.88178
R ²	0.345	0.233	0.532
S.E.	0.250	0.269	0.265

*Definitions of these variables are given in the Appendix.

promotion lower. For the reasons we have given, we suspect that the main impact of the first two possible explanations have been netted out, and hence we attribute most of the contrast in age/earnings profiles to this third factor.

Living in an urban area other than Dublin has approximately the same effect on male as on female earnings. However, residence in Dublin has a

strong positive effect for male earnings but a weak negative effect for those of females. The most obvious inference which could be drawn from this result is that the Dublin labour market is considerably more buoyant for male than for female jobs. This implies a high degree of job-market segmentation between males and females. This in turn may be due to the occupational structure of the Dublin labour market or to the relatively abundant supply of women available for work in Dublin. This is a topic that requires further study.

Being in an ordinary or supervisory clerical position has the same effect on male as on female earnings, as does being in a supervisory manual occupation. However, female shop assistants appear to be much worse paid than male shop assistants.

The divergence of male and female earnings in Food, Drink and Tobacco may be due to a contrast in the distribution of male and female workers within this branch of economic activity, with men concentrated in the more highly paid sectors (such as brewing) and women in less remunerative industries (such as confectionery). Building and construction, traditionally a sector of unstable employment, appears to compensate males with above average earnings.

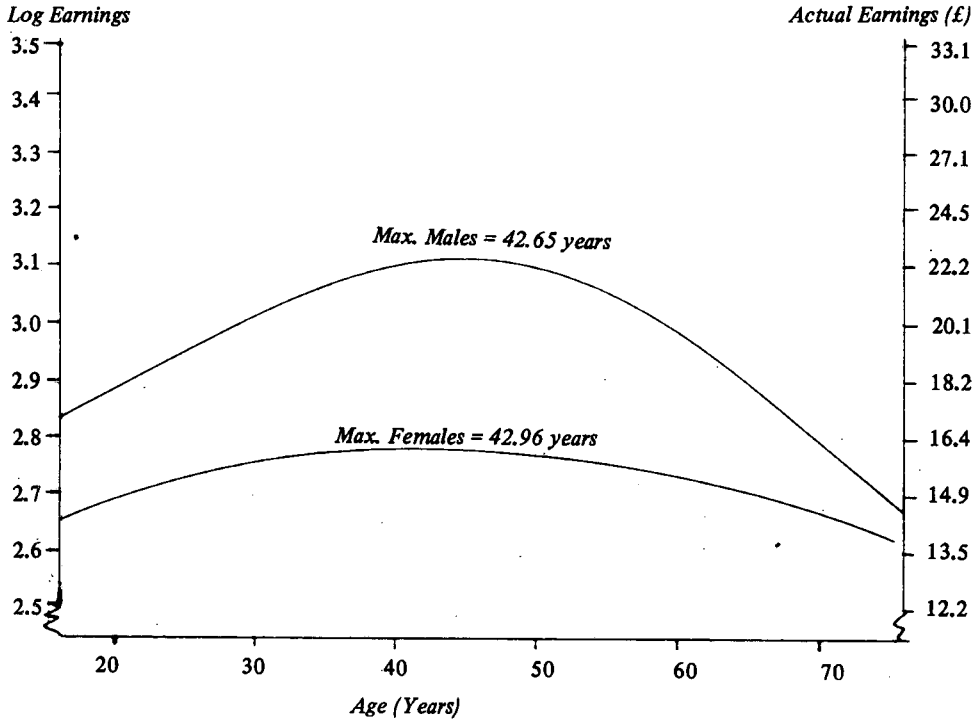
The variable measuring the time spent on disability benefits has the expected effect for both males and females, indicating significantly lower earnings in the previous year among workers who were ill after redundancy. This presumably reflects a tendency for the less healthy to work less overtime, to gravitate towards lower paid occupations, and to experience slower promotion etc.⁴.

The R^2 obtained for all three equations is quite high for this type of regression. The much higher value for the equation for both sexes combined is due to the overwhelming importance of the dummy variable for sex.

It was possible to separate the effects of formal education from those of on-the-job training (experience) by analysing data from interviews with the sub-sample of the redundant workers. This sub-sample, which contained 378 males and 125 females, provided information on highest type of full-time education last attended, number of years of full-time education and whether or not the respondent had served an apprenticeship or received any other form of special training. It also included information on the number of dependent children and on whether or not the respondent was a member of a trade union.

4. We cannot, however, ignore the possibility that the causation runs in the other direction, and that those in lower paid jobs experienced greater health problems after redundancy than was the case for those with better jobs.

FIGURE 1: *Age/Earnings profiles for Males and Females (all dummy variables assumed = the reference category and the Health variable evaluated at mean)*



In the sample, marital status was recorded for all the respondents, and not simply for the females as was the case with the data from the Department of Social Welfare. Flanagan (1971) found that married males earned more than single males, possibly due to the greater marginal utility of income to the former. As was mentioned above, married females are likely to have lower weekly earnings than single females due to the greater prevalence of part-time working among married women. Thus, the influence of the marital status variable is likely to be in opposite directions for males as compared with females.

Table 2. shows a regression of earnings on experience⁵, number of dependent children, marital status, education, training, trade union membership, certain industry dummy variables and area of residence.

5. It should be noted that experience was defined as "present age less age when left school". It did not therefore make allowance for career interruptions such as unemployment or temporary departure from the labour force.

TABLE 2: *Regressions of log of average weekly earnings for males, females and both sexes, based on interviewed sub-sample of 504 respondents' (t-values are given in parentheses).*

<i>Independent Variable *</i>	<i>Males</i>	<i>Females</i>	<i>Both Sexes</i>
Experience	0.01228 (2.94)	0.00511 (0.57)	0.00906 (2.17)
Experience Squared	-0.00019 (2.55)	-0.00014 (0.85)	-0.00015 (2.05)
No. of dependent children	0.02899 (4.12)	-0.04154 (2.54)	0.00806 (1.11)
Marital Status	0.07589 (2.65)	-0.14168 (2.17)	0.02841 (0.97)
Years Secondary Education	0.02585 (3.86)	0.00611 (0.33)	0.02929 (4.15)
Years Vocational Education	0.01812 (2.19)	-0.00011 (0.0)	0.01223 (1.37)
Apprenticeship or Special Training	0.07746 (2.89)	0.09455 (1.25)	0.09607 (3.30)
Union member	0.15080 (4.94)	0.15574 (2.08)	0.14874 (4.72)
Food, Drink and Tobacco	0.25827 (7.83)	-0.07988 (0.97)	0.16834 (4.90)
Textiles etc.	0.01014 (0.24)	-0.29921 (3.43)	-0.05395 (1.31)
Personal Services	0.04101 (0.56)	-0.60063 (3.63)	-0.09339 (1.25)
Building and Construction	0.22849 (6.21)	-	0.19412 (4.50)
Engineering	0.12222 (3.00)	-0.01827 (0.15)	0.06188 (1.40)
Dublin	0.19074 (5.87)	-0.07587 (1.15)	0.17493 (4.78)
Other Urban	0.05240 (1.70)	-	0.10257 (2.89)
Sex (Male: 1)	-	-	0.54606 (17.39)
Constant	2.52580	2.70281	2.12615
R ²	0.524	0.333	0.566
S.E.	0.218	0.279	0.263

* *Definitions of these variables are given in the Appendix*

The relatively small number of females in the sample (120) gives rise to comparatively large standard errors for the parameter estimates in the female equation. In particular, no women fell into two of the categories, Building and Construction and Rural, so that it was not possible to estimate the co-efficients for Building and Construction and for the regional variables for

the females. However, the Building and Construction and regional variables were retained in the equation for males in order to ensure comparability with the equation in Table 1.

The experience and experience squared variables exhibit the same general pattern as age and age squared in the previous equation. For both men and women, the linear term has a positive sign while the squared term has a negative sign. Both the linear and squared terms are larger (in absolute value) and more significant for males than for females. This implies that the male experience/earnings profile is more peaked than the female and, given the magnitudes of the coefficients, suggests that the return to on-the-job training is greater for males than for females. The variables which measure the number of dependent children and marital status show the expected pattern, both being significant and positive for men and significant and negative for women.

The returns to secondary and vocational education seem considerably greater for men than for women. Indeed, the returns to women for investments in education are not significantly different from zero, when the effects of age and the other variables are controlled for. The low rates of return to females are highlighted in Table 3 which shows the estimated increment in

TABLE 3: *Estimated Returns to Education and Training **

<i>Type of Education</i>	<i>Increment in Weekly Earnings (£)</i>	
	<i>Males</i>	<i>Females</i>
Year of Vocational	0.43	-0.01
Year of Secondary	0.61	0.08
Apprenticeship/Special Training	1.88	1.33
<i>Present Value (£) of Increment to Lifetime Earnings, discounted⁺ at 10 per cent</i>		
	<i>Males</i>	<i>Females</i>
Year of Vocational	241.91	(-8.36)
Year of Secondary	345.69	46.46
Apprenticeship/Special Training	1065.52	753.36
<i>Present Value (£) of Increment to Lifetime Earnings, discounted⁺ at 7½ per cent</i>		
	<i>Males</i>	<i>Females</i>
Year of Vocational	308.60	(-10.66)
Year of Secondary	439.76	59.10
Apprenticeship/Special Training	1359.27	961.05
<i>Present Value (£) of Increment to Lifetime Earnings, discounted⁺ at 5 per cent</i>		
	<i>Males</i>	<i>Females</i>
Year of Vocational	421.77	(-14.57)
Year of Secondary	597.46	80.29
Apprenticeship/Special Training	1857.75	1313.50

* It is assumed that those who attend vocational school or serve apprenticeships work continuously from age 16 to age 65, and that those who attend secondary school work continuously from age 18 to age 65.

+ The increments shown in the first part of the table were converted to annual figures and discounted at the rates shown.

weekly earnings per year of secondary education, per year of vocational education and the total increment in weekly earnings which results from having served an apprenticeship or had special training. The table also shows the discounted present value of these increments at 10, 7½ and 5 per cent. The return to males from each type of education is considerably greater than to females: each year of vocational education yields an estimated 43 pence per week to males, but has a zero return to females; each year of secondary education yields 61 pence per week to males compared with 8 pence to females and having served an apprenticeship or had special training yields £1.88 to males and £1.33 to females. Assuming a three year apprenticeship, the returns to apprenticeship are very close to those from vocational education. A similar picture emerges from the estimated present values.

The startling divergence between rates of return for the two sexes is a particularly disturbing finding, and one which merits further research with a larger sample. Several factors may be responsible for this divergence: discrimination in the labour market may force women into lower-paying jobs (discrimination is further discussed below); the labour market may not utilise women's skills effectively; or the type of education which women receive may not be economically productive. It is interesting to note that the divergence is proportionately lowest in the case of the more job-specific types of training, namely, apprenticeships and special training. If this finding is valid, then it implies that increased emphasis on such training for women will do more to reduce earnings differentials than will increasing the number of women in secondary education.

Membership of a trade union has a highly significant positive effect for both sexes. This is not necessary a causal relationship, since trade unions may not cause high wages: it may simply be that the better paid occupations are more thoroughly unionised. Johnson (1975) shows that the proportionate increase in earnings due to trade union membership may be estimated as $\lambda = \exp. (b) - 1$ where b is the coefficient of a dummy variable denoting trade union membership in an equation such as that shown in Table 3. For the present data $\lambda = \exp. (0.1487) - 1 = 16$ per cent. This is towards the low end of the range of values of λ discussed by Johnson from American studies, which derived values of between 10 and 52 per cent. Johnson also points out that in equations of this sort the trade union membership variable may not be completely exogenous since it may be reflecting the influence of certain omitted variables highly correlated with unionisation, such as specific training. Our equations included a wider range of variables likely to influence earnings than did some of the American studies (and hence omitted fewer of the correlates of unionisation) and this may account for the relatively low value of λ . The effects of trade union membership are further explored below (see Table 4).

TABLE 4: *Earnings Functions of Unionised and Non-unionised Males*
(t-values are given in parentheses)

<i>Independent Variable</i>	<i>Unionised</i> <i>(n = 276)</i>	<i>Non-Unionised</i> <i>(n = 91)</i>
Experience	0.01511 (3.46)	0.01752 (1.68)
Experience Squared	-0.00022 (2.87)	-0.00030 (1.64)
No. of dependent children	0.02071 (3.10)	0.07589 (3.37)
Marital Status	0.06452 (2.18)	0.08283 (1.13)
Years Secondary Education	0.01204 (1.75)	0.06000 (3.71)
Years Vocational Education	0.00895 (1.14)	0.06697 (2.58)
Apprenticeship or Special Training	0.07622 (2.90)	-0.04970 (0.58)
Food, Drink & Tobacco	0.23330 (7.32)	0.12617 (0.95)
Textiles	-0.09340 (1.99)	0.16904 (1.76)
Personal Services	0.10877 (1.40)	-0.10072 (0.63)
Building and Construction	0.16188 (4.15)	0.29375 (3.41)
Engineering	0.11387 (2.90)	*
Dublin	0.17854 (4.99)	0.16703 (2.45)
Other Urban	0.06191 (1.90)	*
Constant	2.69827	2.44363
R ²	0.469	0.524
S.E.	0.190	0.266

* *There were too few individuals in these cells to permit the calculation of coefficients.*

The variables which reflect the influence of industry and region have coefficients of about the same size and sign as they did in Table 1. An exception is the negative sign for Dublin in the equation for women. This (insignificant) coefficient may be accounted for by the fact that our sample did not include any women from rural counties, so that the reference category for the regional variable had in this case to be re-defined as Other Urban. Thus, the coefficient of -0.07587 represents a shift relative to wage rates in "Other Urban" counties, not in "Rural" counties.

The data in Table 3 may be used to calculate *rates* of return to education. This rate is usually defined as the discount factor which will equate the present value of the stream of earnings attributable to the investment in a year's further education with the present value of the cost of making this investment. The major cost to a private individual of a year's additional schooling is the income foregone while at school. We can make a rough estimate of this for an Irish teenager in 1972 as £750.00 (based on an average weekly earnings for males of £15.00 a week, reflecting the probability of some unemployment while seeking work). On the basis of this assumption, the rate of return to a year's additional vocational education is about 2 per cent, while a year's additional secondary schooling yields about 3 per cent (for males).

Table 4 gives a more detailed picture effect of trade union membership on earnings. It contrasts the earnings functions of unionised with those of non-unionised male workers. It may be seen that experience, number of dependent children and marital status have substantially similar effects in both sub-groups. Secondary and vocational education have a much stronger influence on the earnings of the non-unionised, while having served an apprenticeship or had special training has a higher return to the unionised workers. This suggests that unions reduce the influence of secondary and vocational education on the earnings of their members. In general, the industry variables seem to have a more significant effect for the unionised than the non-unionised workers.

Sources of Male/Female Earnings Differentials

Further light is shed on the magnitude and causes of the divergence between male and female earnings by means of a technique suggested by Flanagan (1971). This is illustrated in Table 5, which shows the difference between male and female earnings broken down into two components. One component is attributable to the fact that women have different characteristics than men (effect of different means) while the other component arises from the fact that males and females with the same characteristics are paid differently (effect of different prices). The latter may (with some reservations, discussed below) be taken as a measure of pure "discrimination".

The derivation of this decomposition is shown in Table 5. First of all, the regression for males is evaluated at the male means (Col. 1) and the female regression is evaluated at the female means (Col. 2). Then, the regression for males is evaluated using the female means, giving the earnings which would be attained by females if they were paid at male rates (Col. 3). The difference between Columns 1 and 3 gives the effect of different means and that between Columns 3 and 2 the effect of different prices.

TABLE 5: *Decomposition of wage differences between the two-sexes
(based on interviewed sub-sample of 504 cases)*

<i>Variables *</i>	<i>Male Regression Male Means</i>	<i>Female Regression Female Means</i>	<i>Male Regression Female Means</i>	<i>Effect of Different Means</i>	<i>Effect of Different Prices</i>
	(1)	(2)	(3)	(1) - (3)	(3) - (2)
Constant	2.52580	2.70281	2.52580	0.0	-0.17701
Experience	0.33892	0.14133	0.33964	-0.00072	0.19831
Experience Squared	-0.18744	-0.13358	-0.13811	-0.04933	-0.00453
No. of dependent children	0.04329	-0.03531	0.02464	0.01865	0.05995
Marital Status	0.05254	-0.05550	0.02973	0.02281	0.08523
Years Secondary Education	0.01947	0.00428	0.01810	0.00137	0.01382
Years Vocational Education	0.01317	-0.00861	-0.00005	0.01322	0.00856
Apprenticeship or Special Training	0.02692	0.01733	0.01420	0.01272	-0.00313
Union Member	0.11480	0.11681	0.11310	0.00170	-0.00371
Food, Drink, Tobacco	0.06919	-0.03129	0.10116	-0.03197	0.13245
Textiles etc.	0.00110	-0.05984	0.00203	-0.00093	0.06187
Personal Services	0.00109	-0.02000	0.00137	-0.00028	0.02137
Building and Construction	0.03393	-	-	0.03393	-
Engineering	0.01654	-0.00122	0.00815	0.00839	0.00937
Dublin	0.05918	-0.04046	0.10172	-0.04254	0.14218
Other Urban	0.02307	-	-	0.02307	-
Total	3.15157	2.59675	3.14148	0.01009	0.54473

* *Definitions of these variables are given in the Appendix.*

It is remarkable that only about 1.8 per cent of the total differential is attributable to the effect of different means. Thus, according to this estimate, practically all of the male/female earnings differential is due to different rates of return and very little to the fact that men have more highly valued characteristics than women. While this result might not emerge quite so markedly if we had had a more detailed industrial and occupational classification, it still seems likely that discrimination is a very important factor in determining women's earnings.

Experience appears to exert a significant influence on male/female differentials, but the signs and magnitudes of the effects require some explanation. The linear and squared terms in experience must be considered together. The effect of different means on the linear term is negative, because the males in our sample tended, on average, to be younger than females. The effect of different prices on the linear term is substantial and positive, suggesting that the return to experience for males is very much in excess of that for females. In contrast, the effect on the squared term of different means is positive while that of different prices is large and negative. This pattern reflects the flatter age/earnings profile of females which was mentioned above.

Being in the Food, Drink and Tobacco industry makes a substantial contribution to the difference between male and female earnings. This may reflect different rates of remuneration between firms whose work-forces are either predominantly male or predominantly female. Remuneration for males and females are also quite different in the Textile and Personal Service sectors. Being resident in Dublin has a marked influence on the difference, and marital status and number of children also have appreciable effects.

Conclusions

This study has demonstrated the usefulness of a model of earnings which concentrates on a relatively small number of variables in analysing a wide range of important topics. We have shown that about half the variance in individuals' earnings in a sample of Irish insured workers can be accounted for by their age, education, occupation, urban/rural residence, trade union affiliation, marital status and health.

Individual results from the study are of particular interest, such as the pronounced differential in earnings in the Dublin area over the rest of the country, the positive association between trade union membership and earnings and the negative association between ill-health and earnings. These results are in addition to our confirmation of the expected relationships between age, experience, education and earnings. Our estimates of the return to different types of education should be of use to those interested in estimating rates of return to education in Ireland.

We explored the question of male/female earnings differentials in some detail. The most striking finding of this part of our study is the contrast in the returns to education and experience between men and women. This result is quite different from that obtained by some other investigators. For instance, Johnston and Stafford (1974) in their study of US academic salaries found that only about two-fifths of the male/female differential could be explained by different rates of return. It should be borne in mind, however, that Johnston and Stafford were dealing with a rather select group (academics with Ph.D's), whereas our data refer to a cross-section of occupations, industries and educational levels.

Our data suffered from the deficiency that we did not have information on the number of career interruptions or the extent of part-time working in our sample. Ideally, we would like to have measured experience as time spent in employment (rather than the number of years since leaving school) and to have analysed hourly earnings rather than weekly. However, we believe that the inclusion of variables to measure marital status and number of children should considerably alleviate these deficiencies. The relative unimportance of these proxy variables in the decomposition of the wage

difference suggests that the crucial factors behind the male/female wage differential in Ireland are the differential returns to experience and education (possibly in the form of restricted promotion for women) and the segregation of women into low-paying occupations and industries. Our finding of an extremely low return to secondary and vocational schooling among women is a particularly disturbing result. It suggests that increasing the proportion of women going on to second level education will not reduce the male/female earnings differential. Presumably changes are required in the type of second level education which women receive and in the labour market's utilisation of educated women.

*The Economic and Social Research Institute,
Dublin*

The authors would like to express their gratitude to Gerard Scully for his comments and suggestions.

*Appendix: List of Variables Used**Variables measured on interval scale.*

Age	Age in years.
Age Squared	Age x Age.
Experience	Age less age when left full-time education.
Experience squared	Experience x Experience
Ill Health	Proportion of the years 1972-74 during which the respondent drew Disability Benefits.
Years' Secondary Education	Number of years spent in full-time Secondary Education
Years' Vocational Education	Number of years spent in full-time Vocational Education.
Number of dependent children	At time of Redundancy.
Log Pay	Natural Logarithm of average weekly earnings.

Dummy Variables

Occupational Dummy Variables (=1 if respondent was in the category, zero otherwise).

Ordinary Clerical	Typists, Clerical Officers, etc.
Supervisory Clerical	Those in charge of ordinary clerical workers.
Shop Assistant	Those serving in shops, etc.
Supervisory Manual	Those in charge of manual workers of all kinds.
The reference category was skilled, semi-skilled and unskilled manual workers.	

Industry Dummy Variables (=1 if respondent was in the category, zero otherwise).

Food, Drink, Tobacco	Bacon Curing; Creameries; Grain Milling; Manufacture of Bread and Sugar; Canning; Malting; Brewing; Distilling; Cigarettes, Cigars, etc.
Textiles, etc.	Woollen Goods; Hosiery; Lace; Flax; Carpets; Tailoring; Dress Making; Boots and Shoes; Skin Dressing; Tanning; etc.
Building	Building; Construction; Painting; Decorating etc;
Engineering	Metal Manufacturers; Machinery; Implements; Jewellery.
Distribution	All Distributive Trades, including Grocery, Clothing, Hardware, Fuel, Chemicals; etc;
Personal Services	Hotels; Restaurants; Laundries; Hairdressing; Domestic Service, etc.

The reference category comprised all other industries (Woodworking and Furniture; Vehicles; Fertilizers; Chemicals etc.; Paper Making; Printing, etc.; Mining and Quarrying; Bricks, Pottery, Glass, etc.; Gas, Electricity and Water; Transport and Communications; Finance; Public Administration; Professions; Entertainment; Agriculture and Fisheries and other Industries).

Regional Dummy Variables

Dublin = 1 if respondent lived in Dublin, zero otherwise.
 Other Urban = 1 if respondent lived in Cork, Louth, Limerick or Waterford.

The reference category comprised all other counties.

Other Dummy Variables

Sex = 1 if respondent was male, zero otherwise.
 Marital Status = 1 if respondent was married, zero otherwise.
 Married Woman = 1 if respondent was married woman, zero otherwise.
 Apprenticeship or Special Training = 1 if respondent served an apprenticeship, or had special training, zero otherwise.
 Union Member = 1 if respondent was T.U. member, zero if not.

REFERENCES

- DEPARTMENT OF LABOUR, 1971, *Guide to the Redundancy Payments Scheme*, Dublin: Stationary Office.
 FLANAGAN, R.J., 1974, "Labour Force Experience, Job Turnover and Racial Wage Differentials". *Review of Economics and Statistics*, Vol. LVI No. 4, Nov. 1974.
 JOHNSON, G.E., 1975, "Economic Analysis of Trade Unionism", *American Economic Review*, Papers and Proceedings, May.
 JOHNSTON, G.E. and F.P. STAFFORD, 1974, "The Earnings and Promotion of Women Faculty", *American Economic Review*, Vol. LXIV No. 6, Dec.
 MINCER, J., 1970, "The Distribution of Labour Incomes: A survey with Special Reference to the Human Capital Approach". *Journal of Economic Literature* VIII, March.
 WHELAN, B.J. and B.M. WALSH, "A Study of Redundant Workers", ESRI (forthcoming).