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PENSIONS AND THE STRUCTURE  
OF THE LABOUR MARKET:  
EVIDENCE FROM IRISH DATA

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# **PENSIONS AND THE STRUCTURE OF THE LABOUR MARKET: EVIDENCE FROM IRISH DATA**

## **1. Introduction**

A national survey of occupational pension schemes in Ireland carried out for the Department of Social Welfare in 1985 by Keogh and Whelan (1985) showed that the extent to which employees are entitled to a pension on retirement from work varies considerably by occupation, industry of employment, age and sex. Firms rather than individuals were questioned and the primary focus of the survey was on collecting information on the coverage, structure, and financing of occupational pension schemes from a representative sample of firms in industry and services. Limited information was collected on the characteristics of employees who belong to occupational pension schemes, and on the importance of different factors in producing variation in pension coverage.

Individuals were questioned in a survey of income distribution, poverty and usage of State services which was carried out by the Economic and Social Research Institute in 1987. This survey collected information on employees' pension entitlements. It provides information on characteristics which distinguish those who are covered by occupational pension schemes from those who are not. An advantage of the ESRI survey is that it gives direct information on pension entitlements. This facilitates an analysis of the relationship between the structure of the labour market in Ireland and the provision of occupational pensions. This relationship has been examined in a small number of studies in the United Kingdom. However, they have been constrained by the indirect nature of the evidence on pension provision, as Disney and Whitehouse (1990) point out, because membership of a pension scheme has had to be inferred from data on individual contributions or the contracted-out rate for the National Insurance contribution.

## **2. The Data**

The 1987 survey was designed to provide a national sample from the population resident in private households. Responses were obtained from a total of 3294 households, a response rate of 55%. The responding households were reweighted for analysis to correct for non-response bias. The reweighting ensured that the sample for analysis accords with the (much larger) Labour Force Survey in terms of four key characteristics: the number of adults in the household, urban/rural location, socio-economic group, and age of household head. The sample households contained 2,800 employees. Each employee was asked if he or she was entitled to a pension from their work because of their own or their employer's contributions to a private pension scheme? They were also asked to specify the kind of pension benefit which they expected to receive, the indexation arrangements for their scheme, and the number of years they have been in the scheme. Responses to these questions were obtained from 2,081 employees. The remaining employees completed an abbreviated questionnaire only, which did not include the information on pension entitlements. Those completing an abbreviated questionnaire were disproportionately (though not exclusively) in the younger age groups, and would have been less likely to have pension entitlement than those for whom full information was obtained. Concentrating on the 80% for whom full

information was obtained may therefore over-estimate the overall percentage of employees with pension rights, but should provide a reliable guide to the characteristics which are associated with having/not having pension entitlement.

### 3. Characteristics of Employees with Pension Entitlements

Overall, just over half, 51.4%, of the employees in 1987 for whom full information is available said that they were entitled to a pension from their work. Table 1 shows that the percentage with this entitlement is much lower for those aged under 25 than for the rest of the sample, at 20%, and reaches 66% for those aged between 55 and 64. The percentage

Table 1: Percentage of Employees with Pension Entitlement by Age and Sex

age	all	men	women
	%	%	%
under 25	19.5	17.6	20.9
25-34	58.8	63.2	51.9
35-44	58.4	64.8	41.9
45-54	62.1	70.6	42.6
55-64	65.9	73.0	47.2
65+	14.8	47.5	1.8
All	51.4	59.0	39.0

Sources: ESRI Survey 1987

with pension rights from their current job is also low for the very small number of employees aged 65 or over. The percentage with cover also varies by sex: 59% of male employees compared with 39% of females have pension rights. The age profiles of male and female workers differ, but Table 1 also shows that within each age group except the under-25s the percentage of men with pension entitlement exceeds the figure for women by a considerable margin.

Table 2 shows that there is a great deal of variation across occupations in the percentage of employees having pension entitlement. Only about 20% of agricultural workers and sales workers have pension rights, compared with about half of production, labouring and clerical workers and over 70% of professionals.

**Table 2: Percentage of Employees with Pension Entitlement by Occupational Group**

occupational group	% with pension entitlement
agricultural workers	23.1
producers etc.	45.3
labourers	47.3
transport & communication workers	61.7
clerical workers	53.8
sales workers	21.5
service workers	34.8
professional etc. workers	72.7
others	84.0
all	51.4

Sources: ESRI Survey 1987

Similarly, Table 3 shows that there is wide variation across industrial sectors in employees' pension entitlements. Only 9% of those working in personal services and 15% of those working in retailing have pension rights. By contrast, half those working in production industries, 77% of those working in finance/insurance, and 83% of those employed in public administration have such rights. These results flesh out the broad finding in earlier studies, (Department of Social Welfare (1976) and Keogh and Whelan (1985)), which reported that membership of occupational pension schemes is much higher in the public than in the private sector. In 1974 about three-quarters of those working in the public sector were covered by an occupational pension scheme while only just over a quarter of those working in the private sector belonged to an occupational scheme. By 1985 virtually all of those working in the public sector were covered by an occupational scheme whereas only one-third of those working in the private sector were.

Table 4 shows that for employees in the 1987 sample the probability of having pension rights is strongly correlated with the level of gross hourly earnings. Less than one in ten of those earning less than £3 per hour have pension entitlements, and the percentage with such rights rises steadily with hourly earnings to reach 80% for those earning £5 per hour or more. Some of those towards the bottom of the hourly earnings distribution are working part-time, and part-time employees are less likely than full-time ones to have pension rights - 55% of those working 30 hours or more per week in the sample, compared with only 29% of those working fewer hours, have pension entitlements. However, even excluding part-time workers, there is a strong relationship between pay level and the probability of having pension rights.

Table 3: Percentage of Employees with Pension Entitlement by Sector

sector	% with pension entitlement
agriculture	19.8
building	38.0
other production	47.9
wholesale	37.2
retail	14.8
insurance etc	77.1
transport etc.	75.8
professional	31.3
teaching etc.	70.8
health	58.5
public administration	83.1
personal services	9.5
others	19.0
all	51.4

Sources: ESRI Survey 1987

Table 4: Percentage of Employees with Pension Entitlement by Hourly Earnings Range

hourly gross earnings (£)	% with pension entitlements
< 2.00	3.8
> 2.00 < 2.50	11.0
> 2.50 < 3.00	9.2
> 3.00 < 3.50	24.2
> 3.50 < 4.00	42.0
> 4.00 < 4.50	50.0
> 4.50 < 5.00	63.7
> 5.00	80.6

Sources: ESRI Survey 1987

#### 4. Labour Market Structure and Pension Provision

The cross-tabulations which we have presented are informative and suggestive, but it is difficult to be clear about the nature of the underlying relationships governing pension entitlements. For example, is the variation in pension coverage across industrial sectors simply a product of differences across the sectors in the age composition of the labour force, with age being highly correlated with probability of having pension rights, or is variation across the sectors produced simply by differences in occupational structure, with pension entitlement determined by occupation? Are the differences shown by the survey data on pension entitlement in Ireland due to the equalisation of lifetime compensation for employees who choose higher fringe benefits in the future in return for lower wages now, as suggested by the modern dynamic version of Adam Smith's competitive "theory of equalising differences"? Or are they due to the segmentation of labour markets into primary and secondary sectors providing predominantly "good" and "bad jobs" in which firms in the primary sector can reduce their staff recruitment and turnover costs by offering a total compensation package which provides inducements through an occupational pension scheme for their employees to remain in their employment.

An implication of the competitive theory for pension provision which Elliott (1991, p. 313) stresses is that "the employer's only concern is with the level, not the composition, of compensation". If employers or employees desire an occupational pension scheme it will be provided by trading wages for pensions. Thus, the competitive theory suggests that wages and pensions should be substitutes and the coefficient of a pension entitlement or pension value variable in a wage equation ought to be negative.

There are two crucial elements of segmented labor market theory, as Dickens and Lang (1992, p. 7) point out:

First, the labor market can usefully [be] thought of as being made up of several distinct segments with different rules for wage determination and employment policies. Second, access to jobs in at least some sectors at some times is limited in the sense that more people want jobs than there are jobs offered. Thus there may be queuing for these jobs either in the form of unemployment or job queues among employed workers or both.

Segmented labour market theory has roots which may be traced back to the work of Mill (1885) and Cairnes (1874) on "non-competing groups". Its modern development by Doeringer and Piore (1971) in the theory of internal labour markets owes much to the work of the American institutionalists Kerr (1954) and Dunlop (1957) on the balkanization of labour markets. This view of the labour market has recently been used by Ghilarducci (1992, pp. 59-60) to explain differences in the distribution of pension entitlements and pension benefits in the United States. She notes that:

In segmented labor markets, in theory, almost every factor that distinguishes "good jobs" from "bad" is correlated with having a good pension plan. A good pension benefit requires a plan that is internally generous, and a good plan also depends on external factors such as favourable "pension relevant" employment experiences including high pay, long service, full-time status, union representation, a large employer, and sufficient health to live long enough to collect a pension"

and that

Under the segmented market theory, the likelihood of bad employment experience is coupled with the likelihood an industry will have stingy plans. This means pension income would be more highly skewed than if markets worked according to the neoclassical theory of compensating wage differentials. This theory assumes that persons with low pay are compensated with higher pensions. If firms in sectors with the worst jobs (high turnover, low pay, and part-time jobs) compensated for the bad conditions with generous pension plans and firms with high-paid, long-term workers did not have to attract workers by offering generous pensions, then pension benefit levels and coverage would converge. But because markets are segmented, the worst plans are provided in the industries where workers have the worst pension-relevant employment experience. Pensions are complements to high wages rather than substitutes.

If this view of pension provision is valid the coefficients of pension entitlement, primary sector occupation and industry, and trade union variables in a wage equation ought to be positive.

The segmentation theory provides only a general guide to what could be considered primary versus secondary, so there is plenty of scope for disagreement and different approaches to classification: the division is not necessarily clear-cut in practice because occupations and industries are probably better seen as falling along a continuum rather than into two quite distinct groups. The classifications of primary and secondary sectors and occupations which have been used vary across countries because of differences in institutional arrangements, product markets, degree of unionisation and other factors, although there is a considerable degree of overlap between broad classifications which have been developed for the United States and the United Kingdom.

McNabb and Ryan (1990, p. 167) use a factor analysis of sector attributes in Britain to distinguish between a 'core' composed of heavy industry, transport and communications, business services, and public administration and a 'periphery' dominated by light manufacturing, construction, distribution, and personal services. For the United States Dickens and Lang (1992, pp. 13-14) report that, typically, construction, mining, durable goods manufacturing and some non-durable manufacturing, transportation, utilities, and finance, insurance, and real estate are classified as being primary sector while agriculture, textiles and apparel, retail trade, and most services are allocated to the secondary sector. Occupations more likely to be represented in the primary sector include managerial and professional, technical, sales, and administrative, precision production, craft, and repair, operatives, and transportation and materials moving while service, farm, forestry, fishing, retail, food preparation, handling, equipment cleaning, helping, and labouring occupations are more likely to be found in the secondary labour market. A classification of broadly based occupation and industry groups into primary and secondary sectors may, of course, result in some people being allocated to the wrong sector. Dickens and Lang have examined the degree of misclassification in four industrial classification schemes used in the U.S. literature. Their results "suggest that all four schemes are broadly consistent with the data. Sectors classified as periphery or secondary contain a higher fraction of secondary workers and fewer primary workers", although "all four schemes also misspecify many workers" (Dickens and Lang (1992, p. 46)).



The classifications in the literature on segmented labour markets of occupation and industry groups to primary and secondary sectors enable us to allocate respondents to the ESRI survey to the primary and secondary sectors shown in Table 5. The occupation and industry groups used to classify respondents are derived from classifications used in the *Census of Population of Ireland*. The Census classifications are based on international standard classifications of occupations and industries. The primary and secondary sector classifications can be used with multivariate regression analysis of the factors associated with pension entitlement to explore the extent to which competitive and segmented labour market theories can explain the differences which exist in occupational pension entitlement in Ireland.

Table 5: Allocation of occupational and industrial groups in Ireland to primary and secondary labour market segments

Primary sector	Secondary sector
Occupational group	
Producers, Makers and Repairers	Agricultural
Transport, Communications and Storage	Labourers
Clerical	Sales
Professional and Technical	Service
Other occupations	
Industrial group	
Other production	Agriculture
Insurance	Building and Construction
Transport	Wholesale
Professional service	Retail
Teaching	Personal service
Health	Other industries
Public administration	

Sources: ESRI Survey 1987

### 5. Are Pensions and Wages Substitutes or Complements?

A straightforward approach to testing the competitive "compensating differential" model of pension provision is to estimate an earnings function in which the individual wage rate or average hourly earnings are a function of productive characteristics and the value of the occupational pension relative to earnings. Schiller and Weiss (1980) use this approach

with data from a panel of pension plans offered by 133 large firms in the United States to test the competitive model. Their maintained hypothesis is that the coefficient on the pension variable will be equal to minus 1 because wages and pensions should be perfect substitutes.<sup>1</sup> They partitioned their sample by age group and found some support for the competitive hypothesis. However, Schiller and Weiss (1980, p. 537) note that their F-statistic test for the cohort aged 45-54, for which they obtained their strongest results, "suggests that the pension variable coefficients, taken together, are not significantly different from zero". Disney and Whitehouse (1990) draw attention to a number of other problems with the study by Schiller and Weiss. Omission of crucial control variables such as education, for example, biases their results. Disney and Whitehouse (1990, p. 17) suggest that these problems can be by-passed by adopting an analytical framework in which "a set of control variables ... are assumed to affect the values of both lifetime pay and deferred pay, plus a dichotomous variable for pension coverage..."

We present in Table 6 three earnings equations for all employees in the ESRI survey. These equations contain variables relating to personal characteristics, education, occupation, industry of employment, employment status (full-time or part-time), trade union membership, and pension entitlement. The dependent variable is the log of average hourly earnings. The trade union variable is included to capture the union mark-up. The mark-up has been shown by Callan and Reilly (1993) to be over 20 per cent in Ireland for male workers. The data for their study are drawn from the same ESRI survey as we are using for our analysis. Any respondent reporting in the ESRI survey that trade union dues or subscriptions were deducted directly from last pay is categorised as belonging to a trade union. This could understate trade union membership somewhat as there may be respondents who have paid their dues directly to the union or by standing order rather than have them checked-off by their employer. The pension variable is the dichotomy "has/has not an entitlement". Apart from age and earnings, the independent variables are entered in the equation as dummy variables, the omitted categories being male, unmarried, labourer (for occupation), other production (for industry), working full-time, and not in a trade union.<sup>2</sup>

Equation 1 in Table 6 explains 60 per cent of the variation in individuals' hourly earnings. An increase in the number of years employed increases hourly earnings although at a decreasing rate whereas time spent out of employment has the expected negative impact on earnings. Being female reduces earnings relative to males while being married increases them relative to single people. Working in an agricultural or transport occupation has little effect on earnings relative to the labourer control group whereas working in any other occupation is likely to lead to higher earnings.

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<sup>1</sup> Their earnings function is written as  $\log W = B_0 + B_1X + B_2 \log(1+p)$  where  $W$  is the wage rate,  $X$  is a vector of personal characteristics associated with productivity, and  $p = P/W$ , where  $P$  is the cost of the pension. By differentiation, if wages and pensions are perfect substitutes the elasticity of the wage rate with respect to the pension/wage ratio,  $B_2$ , should be equal to  $-1$ .

<sup>2</sup> As is customary in estimating earnings functions, age is scaled as  $(age-15)/10$  and with the quadratic term  $(age-15)^2/1000$ .

Table 6: OLS regression of earnings level on pension entitlement and other variables

variable	Equation		
	(1)	(2)	(3)
constant	0.76 (15.43)	0.74 (14.56)	0.65 (18.55)
age	-	-	0.39 (11.86)
age <sup>2</sup>	-	-	-0.56 (9.36)
years employed	0.33 (11.65)	0.39 (14.14)	-
years employed <sup>2</sup>	-0.58 (9.97)	-0.63 (11.16)	-
years out of employment	-0.26 (4.93)	-0.18 (3.60)	-
years out of employment <sup>2</sup>	0.59 (2.71)	0.45 (2.14)	-
female	-0.11 (3.98)	-0.10 (3.75)	-0.09 (3.56)
married man	0.12 (4.38)	0.10 (3.83)	0.15 (5.51)
married woman	0.06 (1.96)	0.47 (1.57)	-0.01 (0.18)
group certificate	-	-0.15 (4.79)	-0.24 (7.57)
intermediate certificate	-	-0.03 (1.05)	-0.06 (2.16)
leaving certificate	-	0.13 (5.01)	0.15 (5.63)
diploma/third level	-	0.20 (5.43)	0.30 (7.82)
university degree	-	0.39 (9.64)	0.57 (15.60)
<i>Occupational Group:</i>			
agricultural worker	0.75 (0.86)	0.02 (0.28)	-
producer etc.	0.14 (3.03)	0.09 (2.21)	-
transport etc.	0.08 (1.62)	0.03 (0.69)	-
clerical	0.29 (5.89)	0.16 (3.19)	-
sales	0.25 (4.52)	0.14 (2.53)	-
service	0.12 (2.31)	0.06 (1.26)	-

variable	Equation		
	(1)	(2)	(3)
professional, etc.	0.63 (12.33)	0.36 (6.70)	-
other	0.49 (9.07)	0.31 (5.75)	-
<i>Industrial Sector:</i>			
agriculture	-0.11 (1.33)	-0.09 (1.16)	-
building	-0.10 (2.20)	-0.10 (2.24)	-
wholesale	-0.67 (1.12)	-0.63 (1.18)	-
retail	-0.23 (6.14)	-0.20 (5.55)	-
insurance	0.14 (3.27)	0.11 (2.54)	-
transport	-0.61 (1.76)	-0.74 (2.21)	-
professional	-0.15 (0.24)	-0.18 (0.29)	-
teaching	0.44 (1.02)	-0.04 (0.98)	-
health	-0.14 (3.56)	-0.12 (3.25)	-
public administration	-0.75 (2.34)	-0.99 (3.22)	-
personal service	-0.29 (6.67)	-0.26 (6.17)	-
other	-0.77 (1.13)	-0.06 (0.99)	-
part-time	0.22 (6.71)	0.19 (6.13)	0.10 (3.09)
trade union member	0.13 (6.71)	0.14 (7.56)	0.16 (8.62)
pension entitlement	0.27 (12.50)	0.24 (11.62)	0.31 (15.02)
number of observations	2002	2002	2002
R <sup>2</sup>	0.60	0.63	0.57
F	99.22	97.39	205.19
Std. error of regression	0.37	0.35	0.38
D.W.	1.93	1.93	1.89

Sources: ESRI Survey 1987

The sector of employment can have significant positive or negative effects on earnings. Employers in building and construction, retailing and transport, and in the public or service sectors pay less relative to the other production sector. Hourly earnings of part-time workers are likely to be higher than for full-time workers and trade union membership has a significant positive effect on earnings.

The coefficient of the pension entitlement variable is positive and highly significant. This means that, when all the variables which might influence the level of lifetime earnings and deferred earnings in the form of pension on which we have information are included, individuals with pension entitlement have higher current hourly earnings. Contrary to the competitive labour market hypothesis the evidence from the ESRI survey data suggests that wages and pensions are complements and not substitutes. The larger is an individual's hourly earnings the greater is the probability that he or she will have an occupational pension entitlement.

The coefficient of the pension entitlement variable appears to be relatively unaffected by the inclusion or exclusion of other variables. Education variables are included in equations 2 and 3 in Table 6 to see if returns to education are positively associated with level of education. In both cases the coefficient of the pension entitlement variable remains highly significant. The inclusion of education variables shows that the level of earnings has a u-shaped relationship to educational qualifications. Individual's who have only Group or Intermediate Certificate qualifications, which are awarded on successful completion of the junior cycle of secondary school, receive lower earnings than those who have no formal educational qualifications whereas individual's who have a Leaving Certificate or third level qualifications have significantly higher earnings.

The coefficients on the occupation variables are all lower in equation 2 than in equation 1 indicating that the education variables account for some of the variation in average hourly earnings picked up by the occupation variables in equation 1. This suggests that level of education and occupation are correlated - a result which one would expect given the role of education in choice of career. The occupation, industry, and employment experience variables are omitted from equation 3 in order to assess the effect which age, sex, marital status, education, part-time, trade union, and pension entitlement variables alone have on the overall fit of the model (years employed is strongly correlated with age and is omitted to avoid multicollinearity problems). Equation 3, in which the latter variables are included, does not account for as much of the variation in earnings as equation 2. The industry variables play a significant role in the superior performance of equation 2. This is an outcome predicted by the segmented labour market model because of the strong correlation in this model between "good jobs" in industries which pay more than the average and "bad jobs" in industries which pay less.

## **6. Pension Entitlement and Labour Market Segmentation**

Our results do not support a competitive labour market interpretation of occupational pension provision in Ireland. An explanation for the observed pattern of pension entitlement has to be sought elsewhere. The segmented labour market hypothesis, outlined earlier, is an alternative which may explain why employees in "good jobs" are far more likely than those

in "bad jobs" to be covered by an occupational pension scheme. In order to test this hypothesis we estimate logit regression models predicting pension entitlement for the sample of employees where the dependent variable is the dichotomy, "has/has not pension entitlement", set at 0 for those without and 1 for those with entitlement. The independent variables are those suggested by the cross-tabulations at the beginning of the paper and the segmented labour market hypothesis as potentially important determinants of pension entitlements: age, sex, marital status, occupational group, industrial sector, part-time/full-time, the level of earnings, and trade union membership.

First, in equation 1 in Table 7, age, sex, marital status, occupation and industry, and trade union membership are included as explanatory variables, but hours worked and earnings are omitted. The probability of having pension entitlement is seen to rise with age but at a decreasing rate (age is significant with a positive coefficient and  $age^2$  is significant with a negative coefficient). As suggested by the segmented labour market hypothesis women have a lower probability of having entitlement than men, having controlled for the other variables included in the model. Since marital status might be expected to have a different effect for men and women, two dummy variables are used, one for married man, the other for married woman: being married has an additional negative impact for women, while for men the corresponding variable is positive but insignificant.

Almost all of the occupation and industry variables are significant. Compared with the omitted labourers occupational group, which we classify as in the secondary labour market, all of the occupation variables, except agriculture, have a significant positive impact on the probability of having a pension. However, the probabilities for employees in sales, service, and agricultural occupations, which are more likely to be found in the secondary labour market, are generally considerably lower than the probabilities for employees in transport, clerical, professional, and other occupational groups which are concentrated in the primary sector. The probabilities that employees in professional and other occupations will have a pension entitlement, *ceteris paribus*, are particularly high.

An important distinction is made in the labour market segmentation hypothesis between industries which face stable product demand and those for which product demand is variable. Firms or organisations in industries which cater for stable product demand can offer jobs with a high degree of security and a compensation package, including occupational welfare benefits such as pensions, which is used to respond to certain organisational requirements rather than to external labour market conditions. Equation 1 in Table 8 shows that industries in the primary sector such as insurance, transport and communications, health and public administration, which face stable product demand, have a much higher probability of offering their employees a pension entitlement than industries in the secondary sector such as agriculture, retailing, personal services, and building for which product demand is variable. The negative coefficient on the professional services sector is surprising. It may be due to the concentration of teachers in this group many of whom work part-time and are not covered by the teachers' occupational pension schemes.

The trade union membership variable turns out to have a strong positive influence on pension entitlement as expected. There are at least three distinct explanations for this association as Disney and Cameron (1990, p.1) point out:

- "i) unionism is associated with firm-specific characteristics, such as plant size or industry, which make the offer of fringe benefits more likely;
- ii) workers in general prefer a greater share of fringe benefits in their remuneration package, and unions offer an effective conduit for these preferences;
- iii) the specific workers who join unions, or union covered sectors, are workers with preferences for a greater share of fringe benefits in their remuneration package."

Since our regressions include industry variables the influence of this firm-specific characteristic on the trade union variable is taken into account. Comparison of equation 1 in Table 7 with an equation which excludes the trade union variable, (this equation is not shown here) indicates that the coefficients of the industry variables in equation 1 in the primary sector are somewhat reduced as there is a positive correlation between trade union membership and employment in primary sector industries.

The segmented hypothesis allows for both supply and demand side influences on labour market outcomes but it attributes most importance to the demand side. It is to be expected therefore that certain groups, such as married women and youths, will find it more difficult to gain access to primary sector jobs because of discrimination or limited substitution possibilities due to the nature of the technology employed (see McNabb and Ryan (1990) and Elliott (1991)). Such groups will generally find employment in the secondary sector where many jobs are part-time and the demand for labour fluctuates in line with product demand.

Two variables, hourly gross earnings and whether the employee is part-time, which help to differentiate between employment in primary and secondary sectors, are included as additional explanatory variables in equation 2 of Table 7. A comparison of the log-likelihood of the two equations shows that the explanatory power of the equation increases markedly. The coefficient on the hourly earnings variable indicates that the higher the level of earnings the greater the probability of having a pension entitlement while the coefficient on the part-time variable shows that the probability of having such an entitlement is strongly reduced for persons who do not participate in the labour market on a full-time basis.

Half of the occupation variables and the marital status variable are no longer significant. Thus, the level of earnings and part-time employment serve to pick up the variation across occupation and marital status characteristics in the probability of having a pension entitlement. Given the person's age, sex, industry of employment, and trade union membership, the relationship between the level of earnings and the probability of having a pension entitlement is sufficiently strong that the earnings of an employee alone will be a better guide to the likelihood that he/she has pension rights than their marital status and occupation. All of the industry variables that were significant in equation 1 Table 7 remain significant. The differences across sectors in pension coverage for individuals of a similar age at the same level of earnings are therefore largely attributable to the industries in which they are employed. Controlling for these factors and compared with the other production sector, those working in industries in the secondary sector are less likely, and those working in industries in the primary sector are more likely to have pension entitlement.

Table 7: Estimates of Logit Model for Probability of Having Pension Entitlement

variable	(1)	Equation (2)	(3)	(4)
constant	-3.74 (9.70)	-4.64 (11.49)	-4.14 (10.95)	-4.23 (17.60)
age	1.69 (7.36)	1.20 (4.70)	.	.
age <sup>2</sup>	-2.85 (6.67)	-2.02 (4.24)	.	.
years employed	.	.	1.04 (4.74)	0.94 (4.95)
years employed <sup>2</sup>	.	.	-1.75 (3.92)	-1.58 (3.84)
years out of employment	.	.	-0.88 (1.92)	-0.46 (2.67)
years out of employment <sup>2</sup>	.	.	2.35 (1.08)	.
female	-0.81 (3.93)	-0.42 (1.96)	-0.36 (1.64)	.
married man	0.14 (0.77)	-0.17 (0.83)	-0.21 (1.03)	.
married woman	-0.42 (1.97)	-0.19 (0.83)	0.01 (0.06)	.
<i>Occupational Group:</i>				
agricultural worker	0.97 (1.52)	0.83 (1.21)	0.66 (0.96)	.
producer, etc.	0.59 (1.98)	0.16 (0.55)	0.10 (0.35)	.
transport, etc.	1.06 (3.10)	0.84 (2.45)	0.75 (2.19)	0.57 (2.55)
clerical worker	1.70 (5.06)	0.96 (2.78)	0.81 (2.32)	0.47 (2.41)
sales worker	1.00 (2.54)	0.18 (0.43)	0.11 (0.27)	.
service worker	0.66 (1.88)	0.36 (0.99)	0.32 (0.87)	.
professional, etc.	2.27 (6.57)	0.71 (1.89)	0.66 (1.73)	.
other	2.84 (7.36)	1.54 (3.82)	1.42 (3.51)	1.20 (4.03)
<i>Industrial Sector:</i>				
agriculture	-1.11 (1.85)	-0.90 (1.40)	-0.85 (1.33)	.
building	0.01 (0.02)	0.18 (0.56)	0.18 (0.56)	.
wholesale	-0.28 (0.74)	-0.11 (0.29)	-0.08 (0.21)	.
retail	-1.23 (4.12)	-0.74 (2.26)	-0.76 (2.34)	-0.75 (2.77)
insurance	1.03 (3.38)	0.69 (2.01)	0.72 (2.08)	0.76 (2.29)
transport	0.81 (3.47)	0.84 (3.44)	0.83 (3.40)	0.91 (3.89)
professional	-1.07 (2.33)	-1.53 (2.63)	-1.52 (2.57)	-1.33 (2.26)
teaching	0.34 (1.19)	0.59 (1.66)	0.66 (1.89)	0.94 (3.08)
health	0.74 (2.78)	0.98 (3.48)	0.94 (3.31)	1.10 (4.99)
public administration	1.18 (5.20)	1.27 (5.39)	1.28 (5.40)	1.38 (6.47)
personal service	-1.13 (3.10)	-0.99 (2.51)	-0.99 (2.50)	-0.88 (2.52)
other	-0.53 (1.11)	-0.34 (0.63)	-0.46 (0.86)	.
trade union member	1.56 (12.41)	1.23 (9.08)	1.22 (9.07)	1.19 (9.17)
part-time	.	-2.48 (7.07)	-2.31 (6.40)	-2.40 (6.82)
hourly earnings	.	0.48 (11.37)	0.47 (10.73)	0.50 (12.46)
number of observations	2002	2002	2002	2002
% of cases correctly predicted	78.6	82.9	82.7	83.1
Log-likelihood	-909.4	-804.5	-801.5	-807.0
Chi-squared	953.6	1078.8	1169.5	1158.6

Sources: ESRI Survey 1987



Disney and Whitehouse (1990, p.8) found in their study of pension entitlement in the United Kingdom that "all the industry dummies bar one seem to be significant, for no straightforward reason (although firm size, given the control group, may be an implicit determinant)." Viewed from the perspective of the segmented labour market hypothesis the reason for the significance of industry variables is straightforward. Firms in the primary sector are more likely to incur heavy recruitment costs and to invest in their employees. Hence, they are more likely to design a total compensation package which includes pensions to provide incentives for their employees to remain with the firm. Firms in the primary sector are also larger, on average, than firms in the secondary sector. Because of this they can benefit from economies of scale in the provision of fringe benefits such as pensions, as Elliott (1991, p. 342) points out, and this may explain why firm size would be positively related to the probability of having an entitlement to a pension.

Pension coverage is positively related to age. Information is also available in the ESRI survey on years spent in employment and years spent out of employment through unemployment or in home duties. Labour market experience variables may serve as more meaningful indicators of the probability of having a pension than the age variable (with which of course they are strongly correlated). Equation 3 in Table 7 shows the results when these variables (with quadratic terms) are substituted for age. Years employed have the expected positive though declining impact on the probability of having a pension, years out of employment have a significant negative effect (the quadratic term being insignificant). The marital status variables remain insignificant and the sex variable becomes insignificant. Equation 4 in Table 7 shows the estimated model when the insignificant sex, marital status occupation and industry variables are dropped. Years spent in/out of employment, trade union membership, earnings, whether part-time or not, and employment in a primary sector occupation and industry are the significant predictors of the probability of having a pension.

## **7. Predicted Pension Entitlement Probabilities**

The implications of the size of the estimated coefficients on these variables for the probability of having a pension entitlement if employed in jobs with characteristics typical of primary and secondary labour markets can be investigated by taking as a benchmark an individual in the primary sector who has been employed for 15 years, spent no time out of employment, works full-time in the omitted other production sector, is a member of a trade union, and earns £5 per hour (the sample mean). Equation 4 in Table 7 is used to estimate this probability.

It shows that such an individual has a 0.62 probability of having a pension entitlement (see Table 8). The strength of the relationship between the level of earnings and pension coverage is shown in Table 8 by the prediction that a similar individual but earning £7 per hour would have a 0.82 probability, while one earning only £3 would have a probability of only 0.38. The influence of work experience is shown by the fact that varying from the benchmark to someone who has worked for only 5 years (but spent no time out of employment) produces a predicted probability of 0.47. Spending time out of work - either in unemployment or home duties - is associated with employment in the secondary sector and results in a reduction in the probability of having a pension. For example, someone who currently earns £5 and has worked 15 years in total but spent 5 out of employment has a

predicted probability of only 0.14. Working part-time has a very substantial negative impact on pension coverage: someone working part-time and earning £5 per hour, who has 15 years employment experience and no time out of employment, still only has a 0.13 probability of having a pension. Someone who is earning £3 per hour has a 0.38 probability, but if working part-time that falls to only a 0.05 probability.

Table 8: Predicted Probability of Having Pension Entitlement

characteristics	predicted probability
Benchmark: employed 15 years, earns £5 per hour, full-time	0.62
as benchmark except:	
earns £7 per hour	0.82
earns £10 per hour	0.95
earns £3 per hour	0.38
employed 5 years	0.47
spent 5 years out of employment	0.14
part-time	0.13
earns £3, part-time	0.05
in public administration	0.87
in personal services	0.41
not in a trade union	0.33

Sources: ESRI Survey 1987

The importance of employment in an industry which is in the primary or secondary sector may be illustrated by contrasting the probability of having a pension entitlement if employed in public administration, where stability of employment is virtually guaranteed, with the probability if employed in personal services, where there is considerably less stability of employment. If the only variation from the benchmark is that the employee works in public administration, the predicted probability is 0.87, whereas for a similar employee in personal services the figure is less than half that. An employee working in an industry in the primary sector therefore has twice as great a chance of having a pension entitlement as someone with exactly the same characteristics working in an industry in the secondary sector. The importance of trade union membership to pension entitlement is shown in Table 8 by comparing the probabilities for employees who are union members and those who are not. The benchmark employee who is a member of a trade union has a 0.62 probability of having a pension entitlement. If the employee is not in a trade union the probability is virtually halved to 0.33.

These results cover employees of all ages, whether full-time or part-time. High proportions of part-time employees and the under-25s do not have pension entitlement. It is of particular interest to focus on full-time employees aged 25 or over, then, in order to highlight the characteristics of the minority of this group (just over one-third) who do not have pension entitlements. When the logit models are estimated for full-time employees aged 25 or over, earnings, industrial sector, and trade union membership remain significant while most of the occupation variables and sex and marital status remain insignificant, as shown in Table 9. The major difference between these results and the full sample is that age or years in the labour force are no longer significant, though years out of the labour force continues to have a significant negative effect. Thus, if one has not found employment in a job with pension entitlement by the age of 25 further years of employment do not in themselves add to the likelihood of having such an entitlement. As far as the size of the estimated effects is concerned, the coefficient on earnings is little changed from the full sample, while some of the industry categories and trade union membership have slightly smaller coefficients but the general pattern is unchanged.

## 8. Conclusions

The data for a sample of Irish employees for 1987 has allowed us to identify the key correlates of entitlement to a pension. We have presented the two major labour market theories which are used to explain the relationships between personal and industry characteristics and pension entitlement - the competitive and segmented labour market theories. The competitive hypothesis was tested by regressing the log of average hourly earnings on pension entitlement to see if the coefficient on the pension variable is negative, as predicted by this hypothesis, after allowing for the influence of other variables. This test showed that the coefficient on the pension variable is positive rather than negative. Thus, wages and pensions appear to be complements and not substitutes as hypothesised by the competitive theory.

An alternative hypothesis is that the labour market in Ireland is segmented into primary and secondary sectors providing "good" and "bad jobs" in which pension entitlement depends on personal, supply-side, characteristics of the employee *and* on impersonal, demand-side, characteristics of the jobs offered by employers. A logit model of the probability of having a pension entitlement was used to test this hypothesis. Years spent in/out of employment, trade union membership, earnings, whether part-time or full-time, and employment in a primary sector industry or occupation were shown to be the significant predictors of the probability that an employee has a pension entitlement, as predicted by the segmented labour market model. Given these characteristics, neither sex or marital status add to our ability to predict pension entitlement. For full-time employees aged 25 or over, the level of hourly earnings, trade union membership, and sector of employment are the significant predictors of pension entitlement.

Table 9: Estimates of Logit Model for Probability of Having Pension Entitlement, Full-time Employees Aged 25 or Over Only

variable	Equation		
	(1)	(2)	(3)
constant	-3.14 (5.52)	-2.91 (5.88)	-3.31 (6.88)
age	0.45 (1.21)	.	.
age <sup>2</sup>	-0.80 (1.23)	.	.
years employed	.	0.40 (1.30)	0.27 (0.94)
years employed <sup>2</sup>	.	-0.65 (1.12)	-0.41 (0.73)
years out of employment	.	-0.68 (1.37)	-0.43 (2.34)
years out of employment <sup>2</sup>	.	1.54 (0.65)	.
female	-0.16 (0.55)	-0.07 (0.23)	.
married man	-0.22 (0.96)	-0.25 (1.09)	.
married woman	-0.52 (1.86)	-0.40 (1.41)	.
<i>Occupational Group:</i>			
agricultural worker	-0.82 (0.01)	-0.11 (0.14)	.
producer, etc.	-0.24 (0.75)	-0.27 (0.83)	.
transport, etc.	0.50 (1.32)	0.43 (1.14)	0.62 (2.47)
clerical worker	0.20 (0.50)	0.07 (0.18)	0.23 (0.94)
sales worker	-0.16 (0.33)	-0.20 (0.43)	.
service worker	-0.18 (0.46)	-0.20 (0.49)	.
professional, etc.	0.83 (0.20)	0.04 (0.09)	.
other	0.88 (2.01)	0.80 (1.82)	0.96 (2.99)
<i>Industrial Sector:</i>			
agriculture	-0.47 (0.66)	-0.45 (0.64)	.
building	-0.20 (0.55)	-0.17 (0.48)	.
wholesale	-0.42 (0.96)	-0.38 (0.87)	.
retail	-0.86 (2.34)	-0.87 (2.38)	-0.77 (2.57)
insurance	0.61 (1.48)	0.61 (1.46)	0.65 (1.62)
transport	0.68 (2.47)	0.67 (2.44)	0.75 (2.88)
professional	-1.43 (2.30)	-1.43 (2.28)	-1.21 (1.99)
teaching	0.53 (1.24)	0.59 (1.39)	0.78 (2.04)
health	0.87 (2.60)	0.83 (2.46)	0.92 (3.54)
public administration	0.91 (3.48)	0.92 (3.52)	1.07 (4.59)
personal service	-0.77 (1.77)	-0.78 (1.77)	-0.70 (1.81)
other	-0.69 (0.11)	-0.17 (0.26)	.
part-time	.	.	.
hourly earnings	0.52 (9.92)	0.50 (9.50)	0.51 (10.62)
trade union member	1.07 (6.84)	1.08 (6.90)	1.08 (7.23)
number of observations	1298	1298	1298
% of cases correctly predicted	79.4	79.4	80.0
Log-likelihood	-602.4	-600.3	-603.5
Chi-squared	509.7	514.0	507.5

Source: ESRI Survey 1987

Our results suggest that labour markets in Ireland are divided into primary and secondary sectors and that this largely determines whether occupational pensions will be offered by employers. Such pensions provide employers in the primary sector with an instrument which they can use to maintain continuity of supply of the quantity and quality of labour which they require. Employers in the secondary sector do not need this instrument because continuity of labour supply is far less important.

These results have implications both for research and public policy on pensions. On the research side if the labour market is not fully competitive then models of pension entitlement and of the pension-wage relationship should be developed to take account of non-competitive features of the labour market.<sup>3</sup> On the public policy side our results suggest that coverage of occupational pension schemes is likely to be restricted to certain groups of employees in jobs with particular demand-side characteristics. Employers throughout the economy are unlikely to extend occupational pension cover on a voluntary basis to all employees.<sup>4</sup> The wide gaps which exist in the patchwork of pension arrangements in countries, such as Ireland and the United Kingdom, which have adopted a piecemeal approach to the provision of income during retirement are unlikely to be filled by looking for market solutions in the form of defined contribution or personal pension schemes, which some Governments have begun to do (see OECD (1992)). Such schemes have a role to play for a minority of employees but they do not offer a solution, as Davies (1993) points out, for the substantial number of employees with inadequate pension arrangements who lack the resources to benefit from individual arrangements because they work for low pay, or for small employers, or in temporary or part-time jobs.

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<sup>3</sup> A similar point has been made by Gustman and Mitchell (1992, p. 73) in connection with the lack of concrete evidence of a pension-wage trade off from a number of studies in the United States.

<sup>4</sup> The historical statistics on occupational pension schemes for Canada, Ireland, the United Kingdom, and the United States show that coverage has rarely exceeded half of the employed labour force and that coverage has begun to decline in some of these countries (see Hughes (1992)).

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