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COMPETITIVE AND SEGMENTED
LABOUR MARKETS AND
EXCLUSION FROM RETIREMENT
INCOME

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Competitive and Segmented Labour Markets and Exclusion from Retirement Income

Introduction

Interest in the causes and consequences of low pay is, understandably, primarily focused on the mechanisms which bring about social exclusion and their immediate effects on inequality and poverty. There are, however, lifetime consequences of employment in low paying jobs which result in exclusion of certain categories of employees from employer provided occupational pension schemes. The effects of this exclusion will not be felt by individuals in these groups until it is impossible, or too late, for them to make their own pension arrangements. In these circumstances a significant minority of employees who work in low paid jobs may be almost totally dependent on the State for an income during old age. If the social exclusion which many of them suffer during their working lifetime is not to continue into old age it is critical that the State should put in place arrangements, either in its own pension schemes or through private schemes, which will provide an adequate income for the elderly.

A strong commitment to social solidarity, high fertility rates, and long-term economic growth over the last half century or so have ensured that most States in Europe developed pension systems which resulted in dramatic reductions in poverty among the elderly in the two decades after World War II. Despite some economic and social difficulties in the 1970s and 1980s most governments in Europe have continued to emphasise the importance of social solidarity and the need for the elderly to share in the benefits of continuing economic growth. Now circumstances are beginning to change. Fertility rates are falling, Europe's population is projected to age significantly in the next twenty years or so, and the commitment to social solidarity is threatened by conservative ideologies which prescribe a very limited role for the

State. If action is not taken soon to address the ageing problem there is a distinct possibility that population ageing and reductions in social security benefits could lead to the re-emergence of levels of poverty among the elderly in Europe and the United States which have not been seen for a generation or more (see Delhausse, Perelman, and Pestieau (1996)). Even in countries like Ireland where the demographic profile of the population is more favourable than in other countries, there is a possibility of an increase in poverty among the elderly. The ESRI survey of poverty in the 1990s by Callan, Nolan, Whelan, Whelan, and Williams (1996) shows that an increasing proportion of households headed by a pensioner are living in poverty. The main reason for this is that State pension benefits have not been indexed in line with increases in earnings in recent years.

Economists often treat pensions as a form of deferred pay. However, it is clear from surveys of pension coverage that there are certain groups of employees who are far less likely than other groups to benefit from deferred pay arrangements. It is also clear that there is a very strong interaction between pay during the working lifetime and membership of an occupational pension scheme. Since belonging or not belonging to such a scheme will ultimately decide eligibility for an occupational pension it is necessary to investigate what factors determine pension entitlement.

There are two main theories of pay determination which claim to explain the interaction between present and deferred pay. The theory of compensating pay differentials suggests that employees with a preference for future over present consumption can trade off lower wages now in return for deferred pay in the form of a pension in the future. The theory of segmented labour markets suggests that differences in rates of time preference have limited influence on membership of occupational pension schemes because employees are constrained in the exercise of their preferences by the structural characteristics of the industry in which they work and its employment practices. Segmentation theory predicts that it is the kind of jobs which employers offer that will determine membership of occupational pension schemes.

Competitive labour market theory suggests that in the first case workforce characteristics (supply side variables) will be important determinants of whether employees belong to occupational pension schemes. Segmented labour market theory

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suggests that in the second case demand side variables such as industry, duration of employment, type of employment (full-time/part-time), degree of unionisation, sex composition of the workforce, and size of employer are likely to be the important determinants of pension entitlement (see Ghilarducci (1992, pp. 59-60)).

Elliott (1991, p. 313) points out that the competitive theory of pension provision implies that "the employer's only concern is with the level, not the composition, of compensation." Employees who wish to join an occupational pension scheme will finance it by contributing part of their current pay towards the cost of a future pension. The competitive theory, therefore, suggests that wages and pensions are substitutes and that the coefficient of a pension entitlement variable in a wage equation ought to be negative.

Ghilarducci (1992, pp. 59-60) notes that under segmented labour market theory firms in sectors with the worst jobs (typified by high turnover, low pay and atypical employment) do not compensate for poor terms and conditions of employment by providing generous pension plans while firms in sectors with the best jobs (typified by low turnover, high pay, and permanent employment) attract workers by providing good terms and conditions of employment which include generous pension plans. Pension coverage will therefore be strongly influenced by industry of employment. Where labour markets are segmented pension entitlement will be poorest in sectors offering the worst jobs. Segmented labour market theory, therefore, suggests that pensions and wages are complements and that the coefficient of a pension entitlement variable will depend on the sector in which someone is employed.

Our objective in this paper is to investigate which of the main theories of pay determination best explain membership of occupational pension schemes. We will begin by describing our data and will present a series of cross tabulations of pension coverage (which we also refer to as pension entitlement) on age, sex, occupation, industry, and earnings. Next, we will outline our tests of competitive and dual labour market models and of a four sector segmentation model which we have adapted for work with Irish data. Finally, we will consider some of the implications of our results for the development of the national pension system in the light of the recent report by The Pensions Board (1998) on *Securing Retirement Income*. This report

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proposes a framework for the future development of pension provision in Ireland. If its proposals are implemented in full it will represent a fundamental reform of the existing approach to pension provision.

Pension Coverage

The Living in Ireland Survey, the Irish element of the European Community Household Panel survey, provides data for Ireland for 1994 which enables us to explore the extent to which competitive and segmented labour market hypotheses can account for individual pension entitlement. The survey provides data for 4,048 households. The response rate for the survey was 62.5 per cent of valid addresses contacted. The responding households were reweighted for analysis to correct for the individual nature of the sampling frame (the electoral register) and for non-response bias. This ensures that the sample for analysis agrees with the Labour Force Survey in terms of the number of adults in the household, urban/rural location, socio-economic group, and age of household head. The sample households contained 3,300 employees for whom information is available on pension entitlements and personal and employment characteristics.

Table 1 shows the age distribution of employees with pension entitlement in 1994 classified by age and sex. Just over half of all employees have pension entitlement and this is positively related to age. Less than one-fifth of those aged under 25 were covered by a pension scheme. The proportion covered increases to over half for the age cohort 25-34 and to two-thirds for those aged 35-44. It stabilises at this level for the remaining cohorts in the working ages 45-54 and 55-64 and falls to about one-seventh for those aged 65 and over who continue to work after normal retirement age. There are significant differences in the pattern of coverage for men and women. Almost three-fifths of men have a pension entitlement while less than two-fifths of women have. Entitlement for both men and women increases from a low level for the youngest age cohort to around 50 per cent for the cohort aged 25-34. It increases to around 75 per cent for men but falls back to around 40 per cent for women for the remaining working age cohorts.

Table 1: *Percentage of Employees with Pension Entitlement by Age and Sex, 1994*

Age	Per cent with pension entitlement		
	All	Men	Women
under 25	16.8	13.6	20.4
25-34	52.1	53.9	50.0
35-44	64.6	74.4	47.3
45-54	64.2	79.2	37.1
55-64	63.7	75.6	42.1
65+	13.5	30.6	0.0
All	51.0	58.7	39.8

Source: Living in Ireland Survey 1994

The percentage of employees with pension entitlement classified by major occupational group is shown in Table 2. There are significant differences in entitlement by occupational group. Agricultural and sales workers have very low pension coverage with only 20 and 27 per cent respectively belonging to a pension scheme. Producers and transport and communication workers have moderate coverage ranging from 44 to 50 per cent. Professional workers have good coverage with almost 70 per cent having pension entitlement.

Table 2: *Percentage of Employees with Pension Entitlement by Occupational Group, 1994*

occupational group	% with pension entitlement
agricultural workers	20.1
producers etc.	44.2
Labourers	43.4
transport & communication workers	50.2
clerical workers	57.1
sales workers	27.5
service workers	33.3
professional etc. workers	69.6
Others	85.7
All	51.0

Source: Living in Ireland Survey 1994

Coverage classified by the major industrial sector in which the employee is working is shown in Table 3. There is considerable variation in coverage by industry. The lowest coverage rates are in personal services, agriculture and retail services where only 9, 16, and 17 per cent of employees respectively have pension entitlement. Moderate coverage is provided in the building and other production sectors where approaching half of the employees have a pension entitlement. The

highest coverage occurs in the public administration sector with almost 95 per cent of employees belonging to a pension plan.

The percentage of employees in each decile of the earnings distribution who are covered by a pension scheme is shown in Table 4. There is a very strong positive relationship between the percentage covered in each decile and the level of earnings. Employees in the bottom two deciles of the earnings distribution have virtually no pension entitlement while virtually all of those in the top two deciles have such an entitlement. In the remaining six deciles the percentage of employees with a pension entitlement increases steadily with earnings from 20 per cent for those in the third decile to almost 78 per cent for those in the eighth decile.

Table 3: *Percentage of Employees with Pension Entitlement by Sector, 1994*

sector	% with pension entitlement
agriculture	16.3
Building	46.6
other production	47.3
Wholesale	37.2
Retail	17.0
insurance, finance & business services	70.1
transport, communication & storage	71.1
professional services	39.8
teaching etc.	76.0
Health	60.9
public administration	94.2
personal services	9.2
Others	31.1
All	51.0

Source: Living in Ireland Survey 1994

Table 4: *Employees Ranked by Hourly Gross Earnings Showing the Percentage with Pension Entitlements by Deciles, 1994*

Decile	% with pension entitlements
First	3.2
Second	6.7
Third	20.3
Fourth	41.4
Fifth	51.6
Sixth	57.7
Seventh	72.4
Eight	77.8
Ninth	88.9
Tenth	88.7

Source: Living in Ireland Survey 1994

The variations in employees' pension entitlements classified by age, sex, occupation, industry, and level of earnings are striking. Are these variations the product of differences in the age composition of the labour force across occupations and sectors or are the variations produced by differences in industrial sector with pension entitlement determined by industry of employment? A multivariate approach in which the effects of these and other factors on pension entitlement are allowed for is needed to identify the influence of employee preferences associated with the competitive model and job characteristics associated with the segmented labour market model (see Piore (1970) and Doeringer and Piore (1971)).

Tests of Competitive and Dual Segmentation Models

In testing competitive and segmented labour market models of pension entitlement we will follow the approach used in our earlier work on earnings (Hughes and Nolan, 1997) and pensions (Hughes and Nolan, 1996). We begin by testing the relationship between earnings and pension entitlement. We estimate regression models for our sample of employees which include variables that are key determinants of earnings according to competitive and segmentation theories. In these regressions the dependent variable is the log of average gross hourly earnings of employees. The independent variables are those suggested by competitive and segmented models to be important determinants of earnings: age, sex, marital status, education, occupation, industry, type of employment (part-time/full-time), and trade union membership. We also include a pension entitlement variable to test whether earnings and pension entitlement are postively related, as the segmentation theory suggests, or negatively related, as the competitive theory predicts.

We recognise that the test of the competitive theory is an imperfect one. Ideally we would like to test whether the total compensation packages which employers offer to workers of equal productivity are equalised over the working lifetime. The most straightforward way to test this would be to use Schiller and Weiss's (1980) approach in which the wage rate in the standard earnings function:

$$\log W = a + bX$$

is replaced by total compensation (W + P), where W is the wage rate, X is a vector of productive characteristics and P is the value of the occupational pension. Making the substitution and rearranging gives:

$$\log W = a + bX - c \log (1+p)$$

where p = P/W is the ratio of the value of the occupational pension contribution to the wage. If wages and pensions are perfect substitutes, as predicted by the competitive theory, the elasticity of the wage with respect to the pension wage ratio should be equal to -1. Unfortunately, our data set does not provide any information on the value of each employee's occupational entitlement. In the absence of such data our strategy is to use a set of control variables which are believed to affect the lifetime values of both pay and pension entitlement and to insert a dichotomous variable for pension coverage. The competitive theory predicts that the coefficient on the pension coverage variable should be negative because members of pension schemes who receive the same total compensation and who have the same personal characteristics as employees who are not members should have lower earnings. Segmentation theory predicts that the coefficient of the pension coverage variable will be positive because employees in good, well paid, jobs will be more likely to be members of occupational pension schemes than employees in poor, badly paid, jobs.

Following our earlier work we first test a basic dual version of the segmentation model rather crudely, by dividing major industry groups into those which would generally be thought of as in the primary versus the secondary sector. The relevant allocation is shown in Table 5, and in the 1994 survey this would categorise 34% of employees as in the secondary sector. According to the dual version of segmented labour market theory the primary and secondary sectors should differ in terms of the sex composition of the workforce, unionisation, the proportion working part-time, the provision of fringe benefits such as pensions, the existence of earnings ladders, and the duration of employment. Table 6 shows that the secondary sector does have significantly higher proportions of part-time employees and lower proportions of trade union members than the primary sector (though not many more female employees). It also has fewer with pension entitlement. Evidence from a

similar survey carried out by the ESRI in 1987 reported in Hughes and Nolan (1996) also showed the secondary sector (defined in this way) to have fewer employees on incremental scales than the primary sector, as well as considerably less stability of employment (with an average length of job of only five years compared with more than eight years in the primary sector).

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

Primary sector	Secondary sector
Industrial group	
Other production	Agriculture
Insurance	Building and Construction
Transport	Wholesale
Professional service	Retail
Teaching	Personal service
Health	Other industries
Public administration	

Hence, our rough division of industries into primary and secondary sectors looks to be consistent with segmentation arguments that the primary sector offers employees more stable jobs with good conditions and terms of employment, while the secondary sector offers more precarious employment, with few fringe benefits and limited opportunities for advancement up the earnings ladder.

Table 6: *Characteristics of primary and secondary labour markets in Ireland*

Sector	% female	% union members	% part-time	% with pension entitlement	% on incre-mental scale (1987)	Average length of job (1987)
Primary	40.0	52.9	4.6	64.1	42.8	8.5
Secondary	41.9	19.7	11.6	25.7	18.5	5.3

Source: Living in Ireland Survey 1994, Hughes and Nolan (1996).

Table 7 presents three earnings equations for all employees in the 1994 Living in Ireland Survey. Equation 1 explains almost two thirds of the variation in employees' average gross hourly earnings. The number of years an employee has been employed has the expected positive effect on earnings although it decreases as the number of years employed increases. Time spent out of employment has the expected negative effect on earnings with the effect declining as the number of years

out of employment increases. Being female reduces earnings relative to being male, while for both sexes being married increases earnings relative to being single.

The omitted occupation and industry variables are "labourer" and "other production". It will be seen from Table 5 that labouring occupations are allocated to the secondary sector and that other production industries are allocated to the primary sector. Hence, earnings in primary sector occupations should be higher relative to the omitted occupation variable while earnings in secondary sector industries should be lower relative to those in the other production sector. These hypotheses are generally borne out by our regression results. Earnings in the primary sector occupation groups producer, clerical, professional, and other occupations are higher relative to labouring occupations. In addition, the higher coefficients of the professional and other occupation groups conform with prior expectations about the relationships between earnings for these occupations and such occupations as clerical and sales which generally require lower level educational qualifications. The coefficients of the industry variables in equation 1 also generally accord with expectations generated by the segmented model. Earnings in agriculture, building, wholesale, retail, personal service, and other industries, which are in the secondary sector, are lower than in the omitted other production sector. Being a trade union member increases earnings and being part-time also does so. The latter result is somewhat surprising as we expected the association between earnings and part-time employment to be negative. Finally, having a pension entitlement is positively related to the level of earnings - the higher an employee's earnings the more likely that he or she will have a pension entitlement. This suggests that earnings and pensions are complements, as the segmented model predicts, rather than substitutes, as the competitive model suggests.

Equation 2 in Table 7 examines the effect on our results of including education variables which human capital theory predicts will have a strong effect in explaining

Table 7: *OLS regression of earnings level on pension entitlement and other variables*

Variable	(1) Coefficient	(1) t-ratio	(2) Coefficient	(2) t-ratio	(3) Coefficient	(3) t-ratio
constant	1.14	32.66	0.94	22.90	-0.81	0.98
age	-		-		0.05	11.93
age^2	-		-		-0.01	9.56
years employed	0.03	12.20	0.03	15.03	-	
years employed^2	-0.05	9.62	-0.05	10.44	-	
years out of employment	-0.02	4.61	-0.01	2.29	-	
years out of employment^2	0.04	9.62	0.02	2.06	-	
female	-0.07	3.42	-0.08	3.64	-0.06	2.94
married man	0.17	7.41	0.14	6.68	0.17	7.06
married woman	0.09	3.71	0.07	3.10	0.06	2.28
group certificate	-		0.06	2.07	0.14	4.60
intermediate certificate	-		0.13	4.57	0.23	7.71
leaving certificate	-		0.22	7.70	0.37	12.99
diploma/third level	-		0.26	7.97	0.45	13.74
university degree	-		0.57	15.70	0.92	29.77
Occupational Group:						
agricultural worker	0.08	1.92	- 0.21	3.23	-	
producer etc.	0.11	3.35	0.10	3.06	-	
transport etc.	0.02	0.51	0.01	0.21	-	
clerical	0.27	7.23	0.18	4.91	-	
sales	0.13	3.00	0.04	1.06	-	
service	0.08	1.92	0.02	0.46	-	
professional, etc.	0.56	14.67	0.32	8.21	-	
other	0.49	11.73	0.34	8.24	-	
Industrial Sector:						
agriculture	-0.38	6.12	-0.37	6.19	-	
building	-0.11		-0.09	2.96	-	
wholesale	-0.07	2.13	-0.04	1.20	-	
retail	-0.24	7.01	-0.20	5.90	-	
insurance	0.09	2.77	0.09	2.63	-	
transport	-0.03	0.89	-0.03	0.97	-	
professional	-0.14	2.18	-0.20	3.26	-	
teaching	0.31	9.37	0.18	5.45	-	
health	-0.10	3.30	-0.06	1.94	-	
public administration	-0.13	4.41	-0.11	3.80	-	
personal service	-0.29	8.59	-0.24	7.33	-	
other	-0.11	3.38	-0.10	7.33	-	
part-time	0.13	4.32	0.13	7.33	0.01	0.36
trade union member	0.12	7.67	0.14	9.17	0.18	11.05
pension entitlement	0.27	15.12	0.24	14.02	0.34	19.01
number of observations	3,288		3,270		3,270	
Adj R^2	0.65		0.68		0.59	
F	200.89		197.81		367.60	
Std. Error of regression	0.37		0.35		0.39	

Source: See text

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variation in earnings. The omitted variable in this case is no formal education qualifications. As human capital theory predicts, an increase in the level of education has a strong positive influence on earnings. Thus, employees with low level educational qualifications have higher earnings than those who have no qualifications while those with high level qualifications have the highest level of earnings relative to those without qualifications. The inclusion of the education variables improves the performance of the regression. It increases the variation in earnings explained from 65 to 68 per cent. Their impact on the coefficients of the other variables is noticeable but relatively minor in most cases. In the case of the pension entitlement variable, for example, the coefficient is reduced from 0.27 to 0.24 but it remains highly significant, as indicated by its t-value.

Equation 3 shows what happens if the occupation and industry variables are omitted from the regression. The percentage of the variance explained falls from 68 to 59 per cent so that the overall performance of the regression deteriorates. In addition the coefficient of the part-time variable becomes insignificant while the coeffcents and significance of the trade union and pension entitlement variables increases. Thus, these variables "pick up" some of the explanatory power associated with the excluded segmentation variables.

Pension Entitlement and Labour Market Segmentation

Our regression results suggest that further consideration should be given to the segmentation model's arguments about pension entitlement. In this section we will consider the explanatory power of these arguments by directly testing the relationship between pension entitlement and dual and multi-segment versions of the segmentation model. We begin by testing the two-sector version of the model. Table 8 presents the results of three logit regressions of the probability of having pension entitlement. The dependent variable in these regressions is the dichotomy "has/has not a pension entitlement". It takes a value of 1 for those who have an entitlement and 0 for those who do not. The independent variables are generally the same as those included in the earnings equations in Table 7.

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In equation 1 in Table 8, pension entitlement is strongly associated with increasing age. The probability of having pension entitlement rises with age but at a decreasing rate as the stock of employees who need to make such arrangements falls. While the coefficient on the female variable is negative it is not significantly different from zero. This contrasts with our earlier finding that being female did result in a lower probability of having a pension entitlement, as suggested by the segmentation model (see Hughes and Nolan, 1996). Being married and female results in a lower pension entitlement whereas being married and male leads to a higher entitlement. These results accord with our expectation that marital status should have a different effect for men and women. The primary sector occupation variables have the expected signs relative to the omitted group "labourers". Relatively, earnings are higher in clerical, professional and other occupations or are not significantly different from the control group in the case of producer and transport occupations. Similarly, the coefficients of the industry groups agriculture, retailing, personal service, and other industries in the secondary sector are lower than in the primary sector control group. Finally, trade union membership has a strong positive influence on pension entitlement. Overall, the influence of the segmentation variables in equation 1 appears to be exercised in the direction predicted by the segmented labour market model. Industries which have relatively stable product demand have a higher probability of offering their employees a pension entitlement than industries in the secondary sector where product demand is more uncertain. The explanatory power of the first regression equation in Table 8 is quite high with almost 81 per cent of the individual cases of pension entitlement being predicted correctly.

As noted earlier in connection with the dual version of the segmented model, part-time workers are more likely to be found in the secondary sector while high pay is associated with the primary sector. In equation 2 in Table 8, therefore, we include two variables, part-time employment and hourly earnings, which help to differentiate between employment in the two sectors. The inclusion of these variables increases the explanatory power of the regression from 81 to 85 per cent of cases predicted correctly. The coefficient of the hourly earnings variable suggests that the higher the employee's earnings the greater the chance that he or she will have a pension entitlement. The coefficient of the part-time variable suggests that working less than the standard number of hours is likely to result in a significant reduction in the

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probability of having pension entitlement. The inclusion of the part-time and earnings variables reduces the coefficients of the married woman variable and all but two of the occupation variables to insignificance. However, almost all of the industry variables which were significant in equation 1 remain significant in equation 2. This suggests that industry is a more important determinant of pension entitlement than occupation. This accords with an implication of the segmented model that since firms in the primary sector generally have higher recruitment and training costs they are more likely to offer fringe benefits such as pensions as an incentive for employees to remain with them.

Equations 1 and 2 in Table 8 show that pension entitlement is positively related to age. In order to test whether age or labour market experience, with which of course age is closely related, is the more useful predictor of pension entitlement we substitute employment experience variables in equation 3 for the age variables. The effect of employment experience on the probability of having a pension entitlement is little different from age. However, it is preferable to use the employment experience variables in the regression instead of age to allow them to have a direct impact on the dependent variable rather than an indirect effect through the age variable.

A Four Sector Segmentation Model

The two sector segmented labour market model is a simple dualist version mainly used for expository purposes. More advanced treatments of the model posit multiple segments (see Gordon, Edwards, and Reich (1982) and McNabb and Whitfield (1998)) rather than two segments consisting of primary and secondary labour markets. In earlier work on earnings and labour market segmentation in Ireland (Hughes and Nolan (1997)), we tried to take account of this diversity by applying Gordon's (1986) procedure for the allocation of industry and occupation groups to four labour market segments: independent primary professional and technical, independent primary craft, subordinate primary, and secondary. Details of how the

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Table 8: *Estimates of Logit Model for Probability of Having Pension Entitlement*

Variable	Equation					
	(1)		(2)		(3)	
Constant	-6.14	10.01	-7.70	10.01	-5.89	16.12
age	0.21	6.83	0.10	2.75	-	
age^2	-0.01	5.75	-0.01	2.25	-	
years employed	-		-		0.08	4.25
years employed^2	-		-		-0.10	2.55
Years out of employment	-		-		-0.12	4.04
Years out of employment^2	-		-		0.37	2.98
Female	-0.14	0.84	0.15	0.84	0.19	1.07
married man	0.88	5.48	0.44	2.55	0.31	1.79
married woman	-0.61	3.64	-0.57	0.19	-0.35	1.83
Occupational Group:						
Agricultural worker	0.60	1.07	0.49	0.81	0.44	0.71
producer, etc.	-0.09	0.36	-0.46	1.93	-0.55	2.26
transport, etc.	-0.44	1.50	-0.54	2.45	-0.65	2.15
clerical worker	1.09	3.97	0.33	1.13	0.24	0.83
sales worker	0.57	1.87	0.19	0.59	-0.10	0.33
service worker	0.08	0.26	0.02	0.08	0.02	0.06
Professional, etc.	1.54	5.61	0.02	0.08	0.01	0.04
Other	1.74	5.38	0.27	0.77	0.19	0.53
Industrial Sector:						
Agriculture	-1.87	3.60	-1.19	2.13	-1.28	2.26
Building	0.29	1.41	0.46	2.14	0.43	1.96
Wholesale	-0.20	0.87	-0.11	0.45	-0.15	0.62
Retail	-0.90	3.45	-0.38	1.37	-0.51	
insurance	0.79	3.45	0.62	2.44	0.62	2.40
transport	0.71	3.21	0.73	3.08	0.72	3.00
Professional	-0.37	0.87	-0.11	0.23	-0.16	0.31
Teaching	0.38	1.60	-0.19	0.73	-0.14	0.52
Health	0.58	2.76	0.93	3.91	0.95	3.90
public administration	2.28	7.50	2.95	8.19	2.92	8.02
personal service	-1.36	4.52	-0.82	2.48	-0.85	2.57
Other	-0.75	3.27	-0.48	1.94	-0.54	2.19
trade union member	1.99	18.84	1.53	13.39	1.50	12.92
part-time	-		-4.53	9.56)	-4.54	9.43
hourly earnings	-		2.57(15.15	15.15	2.44	14.29
number of observations	3,289		3,289		3,289	
% of cases correctly predicted	80.7		84.9		84.8	
-2 Log-likelihood	2,713.9		2,288.8		2,251.1	

employees in our sample are allocated to these segments are given in Hughes and Nolan (1997).

Table 9 compares the distribution of the workforce across the four segments in Ireland and the United States. The distribution across the four sectors is remarkably similar in the two countries. About a quarter of employees in both countries work in the secondary sector, around a third work in the subordinate primary sector and a quarter and a tenth respectively work in the independent primary professional and technical and independent primary craft sectors.

The characteristics of the four sectors in Ireland in terms of gender, unionisaton, type of employment, pension entitlement, earnings ladders, and duration of employment are shown in Table 10. As described in the literature on labour market segmentation the secondary sector has a higher percentage of women in its labour force than sectors in the primary labour market and a higher percentage of part-time employment. In addition it has lower levels than the primary sectors of unionisation and pension entitlement and lower percentages of its employees on incremental scales and in jobs with a long duration of employment.

Table 9: *Distribution of employment in four labour market segments in Ireland in 1994 and in the United States in 1987*

Labour market segment	Ireland (%)	United States (%)
Independent primary professional and technical	29.4	29.3
Independent primary craft	11.4	10.8
Subordinate primary	30.9	33.9
Secondary	28.3	26.0

Source: Living in Ireland Survey 1994 and Fichtenbaum, Gyimah-Brempong, and Olson (1994).

Table 10: *Percentage female, unionised, part-time, with pension entitlement and average length of job in four labour market segments in Ireland in 1994*

	% female	% union members	% part-time (18 hours)	% with pension entitle-ment	Average length of job (1987)
Independent primary professional and technical	40.2	45.9	4.3	70.0	9.95
Independent primary craft	13.3	43.5	0.8	47.4	7.43
Subordinate primary	38.2	55.7	3.5	63.6	7.05
Secondary	55.9	20.8	16.2	18.9	6.16

Source: Living in Ireland Survey 1994, Hughes and Nolan (1996).

The results of testing the four segment version of the model are given in Table 11. Being female increases an employee's chance of having a pension entitlement

Table 11: *Logit regression of pension entitlement on marital staus, years in and out of the employment, trade union membership, hourly earnings and labour market segment*

Variable	Whole sample
Constant	-6.49
	(22.49)
Female	0.41
	(2.59)
Married man	0.22
	(1.33)
Married woman	-.30
	(1.68)
Years employed	0.09
	(4.95)
Years employed^2	-0.12
	(3.11)
Years out of employment	-0.12
	(4.13)
Years out of employment^2	0.37
	(3.20)
Part time	-4.12
	(8.59)
Trade union member	1.41
	(13.45)
Hourly earnings	2.45
	(16.02)
Independent primary prof. & technical	0.68
	(4.21)
Independent primary craft	0.39
	(2.25)
Subordinate primary	0.99
	(7.18)
No. of observations	3,289
% of cases predicted correctly	82.9
-2 Log likelihood	2,457.9

relative to being male. This result is unexpected as segmentation theory suggests the opposite. Being a married man or a married woman does not effect the probability of pension entitlement relative to being a single man. Employment experience, as measured by years in and out of employment, has the expected positive impact on pension entitlement. The more years an employee has been employed the greater the likelihood that he or she will have a pension entitlement. However, the squared employment experience variable shows that the rate of increase diminishes over time. Conversely, the more years an employee has been without a job the greater is the probability of not having a pension entitlement. Being a part-time worker has a strong negative impact on pension entitlement while being a trade union member and having high hourly earnings have strong positive effects on entitlement. In the case of

the segmentation variables the reference group is the secondary sector and we expect the coefficients of the primary sector variables to be higher relative to this control group. The results in Table 11 show that this expectation is borne out with all three coefficients of the primary sector variables being higher relative to the secondary sector.

The four sector regression results presented in Table 11 contain less than half the explanatory variables used in the two sector results in Table 9 but the explanatory power is greater than that for equation 1 in Table 9, with 83 per cent of the cases being predicted correctly versus 81 per cent.

Predicted Pension Entitlement Probabilities

The implications of the results in Table 11 for the average employee's probability of having a pension entitlement if employed in jobs with characteristics typical of primary or secondary sectors can be considered by using the four sector regression equation to predict the probability of having such an entitlement. This is done in Table 12. As a benchmark we use an employee who has worked for 15 years, earns £5 per hour in a full time job, is a trade union member and works in the subordinate primary sector. This employee has 71 chances out of 100 of having a pension entitlement. If the employee works in the independent primary professional and technical sector the chances are reduced to 64 and to 57 if working in the independent primary craft sector. However, if the employee works in the secondary sector the chances of having a pension entitlement fall from 71 to 47 in a 100. Hence, an employee working in the subordinate primary sector has a 50 per cent greater chance of having a pension entitlement as someone with exactly the same characteristics working in the secondary sector.

Table 12: *Predicted probability of having a pension entitlement based on results for four sector segmented labour market model.*

Characteristics	Predicted probability
Benchmark: employed 15 years, earns £5 per hour, full time, trade union member, working in subordinate primary sector	0.71
as benchmark except: works in independent primary professional sector	0.64
works in independent primary craft sector	0.57
works in secondary sector	0.47

Conclusions and Implications for Pensions Policy

The Living in Ireland Survey data for 1994 for Ireland has allowed us to test the power of the two main labour market theories to explain pension entitlement. The competitive and segmented labour market theories lead to conflicting hypotheses about the relationship between earnings and pension entitlement. The competitive theory suggests that individual preferences for current over future consumption will determine whether an employee is likely to have pension entitlement. In this case the coefficient on a pension entitlement variable in an earnings equation should be negative, reflecting the fact that all other things being equal earnings will be reduced to pay for the pension.

The segmentation theory emphasises the employer's role in making provision for a pension scheme for the employees. The labour market divides into a number of different segments according to the characteristics of product demand curves. In the dual version of the model there is a primary sector in which good jobs are generally provided and a secondary sector in which the jobs offered are mainly of poor quality. Employers in the primary sector have stable product demand curves so continuity of supply of labour of the quantity and quality they desire is important to them. Having an occupational pension scheme gives them an instrument with which they can reward employees who give long service to the firm or punish employees who quit the firm's employment. Such an instrument is, generally, not required by employers in the

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secondary sector because the demand for their products is less stable and they need to be able to hire and fire staff in response to fluctuations in demand. The segmentation theory predicts that having pension entitlement will be positively related to the level of earnings. Hence, in an earnings equation the coefficient of a pension entitlement variable should be positive.

Our tests of these two theories favour the segmentation model over the competitive model. The coefficient of the pension entitlement variable in our earnings equation is positive and significant, contrary to the competitive hypothesis. Logit regressions testing both dual and multi-sector versions of the segmentation model show that pension coverage conforms to the patterns predicted by the segmentation model. In the four sector version of the model, those employed in primary sectors of the labour market are far more likely to have a pension entitlement than those working in the secondary sector. An analysis of the factors which are likely to result in differences in pension entitlement shows that an employee in the subordinate primary sector has a 50 per cent greater chance of having a pension entitlement than an employee working in the secondary sector.

These results strongly suggest that most employees in the secondary sector and a significant minority of employees in primary sectors are excluded from occupational pension schemes because it is not in the interest of their employers to provide such schemes. Previous research, in which we were able to test only a dual version of the segmented labour market model, provided similar results and we concluded that "employers throughout the economy are unlikely to extend employer-provided pension cover on a voluntary basis to all employees" (Hughes and Nolan, 1996, p. 182). A recent survey of trends in occupational pension coverage provides evidence which supports these arguments (see Hughes and Whelan (1996)). The survey shows that coverage of occupational pension schemes fell from over 54 per cent of public and private sector employees in 1985 to 52 per cent in 1995 despite strenuous efforts by the pensions industry to increase coverage during those years.

The trend in coverage in Ireland is in line with experience in other countries which have relied on occupational schemes to provide an earnings-related pension during retirement. Private sector coverage in Canada, the United Kingdom, and the

United States has peaked at around 50 per cent or less of the labour force. Efforts to push private sector coverage above 50 per cent in these countries have not been successful. In our view this is largely due to the existence of segmentation in the labour market. Labour market segmentation means that the great majority of workers in the secondary sector and a significant minority of workers in primary sectors will have to rely on the State to provide an income in retirement. The nature of their jobs, their low pay, and their broken employment histories make it extremely difficult for them to accumulate enough savings during their working lives to provide even a modest earnings-related supplement to the State pension. This has significant implications for the proposals which the Pensions Board (1998) has made recently for the future development of pensions policy in Ireland.

The Pensions Board has produced a strategy for the development of the national pension system which has "a particular objective of bringing into supplementary pension coverage groups hitherto not covered such as younger people, lower paid and atypical workers" (Pensions Board, 1998, p. v). These are the groups which the segmentation model predicts are least likely to be covered by an occupational pension scheme. The Board argues that the best way of providing pension coverage for these and other groups is by introducing Personal Retirement Savings Accounts (PRSAs). These accounts would be similar to the Individual Retirement Account plans in the United States or Private Personal Pension plans in the United Kingdom. They would be made available to everyone regardless of employment status, so an employee who quits work or becomes self-employed could continue to make contributions to an individual retirement savings account. It will be mandatory for employers to provide facilities for their employees to contribute to PRSAs through payroll deductions if the employees wish it, but the employer will not be obliged to make contributions.. Significant age-related tax relief would be given on contributions to encourage individuals to take out PRSAs and it is envisaged that they would be marketed by a wide range of providers such as banks, insurance companies, credit unions, and the Post Office.

Having argued that the way to increase coverage for younger people, the lower paid, and atypical workers is by providing PRSAs, the Board seems to expect that not many of them will avail of the opportunity to save for their retirement through an

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individual savings account. It notes that such accounts have high administrative costs and states that:

> " Since those on lower pay are, at best, only likely to be in a position to fund a small pension this additional expense is likely to fall most heavily on those on lower incomes and those working in small employments. Based on the results of the ESRI Survey 1995, this sector experiences very low coverage at present and, in addition, it must be accepted that it is least likely to be in a position to contribute towards a supplementary pension." (Pensions Board (1998, p. 87)).

Experience in the United States and the United Kingdom shows that take-up of individual retirement savings accounts is greatest for middle and higher income groups and least for low income groups (see Sabelhaus (1996). It also shows that such accounts are mainly used by middle and higher income groups as a tax favoured shelter for their savings. This means that they redistribute income from lower to higher income groups and that they result in little, if any, increase in national savings (see Engen, Gale, and Scholz (1996) for evidence that individual retirement accounts do not increase national savings and Poterba, Venti, and Wise (1996) for the contrary view). A striking demonstration of the validity of these points was provided in the United States when the tax reform act of 1986 excluded high income tax payers with employer provided pensions from contributing to Individual Retirement Accounts and "contributions immediately fell by 62 per cent", as Banks (1998, p. 3) points out.

Since the lower paid are unlikely to benefit much from the introduction of Personal Retirement Saving Accounts it will be necessary to ensure that the State's contributory and non-contributory pension benefits are set at levels which are high enough to prevent poverty. It is also necessary that the benefits should be indexed in line with increases in average earnings to ensure that the living standards of the elderly are maintained and that they share in any increase in living standards which occurs. It is encouraging that the Pensions Board recommends this should be done by raising the current contributory old age pension level of 28.5 per cent of average industrial earnings for a single person to 34 per cent over a five to ten year period, that a minimally acceptable income level should be maintained by indexing the pension in line with prices and, if circumstances permit, that the pension should be increased in

line with average industrial earnings to reflect the broadly based commitment in Irish society to social inclusion.

If the Board's proposals to improve Social Welfare pensions are acted upon, lower paid workers in segmented labour markets could look forward to having a flat-rate pension benefit which would provide a high replacement rate and an adequate income during retirement. Not all members of the Board are in favour of this proposal. In a reservation to the report the Department of Finance representative argues that raising the State pension to the level recommended is not necessary to prevent poverty and that to do so would lead to a significant increase in costs which would adversely affect the public finances. The Department's representative expressed no reservations about the cost to the Exchequer of the proposal to introduce Personal Retirement Saving Accounts. In providing estimates of the *long-term cost* of improving Social Welfare pensions and *current* estimates of the cost of tax expenditures on occupational schemes the Pensions Board report leaves an impression that improving Social Welfare pensions is the more costly of the two main proposals for increasing retirement income. In view of the proposals in the report that:

- the current tax reliefs for occupational pension schemes should be extended to Personal Retirement Saving Accounts;
- the tax exempt contributions to these accounts should increase from a minimum of 15 per cent of income at age 30 to 30 per cent at age 60;
- there should be no limit on the earnings on which contributions are payable;

it is not obvious that increasing Social Welfare pension benefits would be more costly than the introduction of a new tax expenditure on Personal Retirement Saving Accounts on terms which are far more generous than the existing arrangements for occupational pensions.

In advance of the preparation of a government Bill to give legislative effect to the proposals for PRSAs an interdepartmental working group is now considering the tax issues raised in the Pensions Board report. In addition, to giving careful

consideration to the technical issue of how these accounts should be treated for tax purposes, this working group should look at two broad questions:

1. How do the long-term costs of privately provided pensions and retirement savings schemes compare with the costs of publicly provided pensions?
2. What gains or losses are different income groups likely to experience if the proposals for PRSAs are implemented?

Until these questions are answered it makes little sense to introduce new pension arrangements which risk imposing additional costs on most taxpayers and redistributing income from the poor to the rich.

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