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Unemployment, Welfare Benefits and the Financial Incentive to Work*

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Abstract: Although disincentive effects associated with payments have been regulaly found in research in the US and UK, the UK research is disputed and effects have been notable by their absence in studies from Continental Europe. However, much of this research has been hindered by inadequate models of the structure of payments and estimates of in work incomes. In this paper we explicitly model the structue of benefit payments over time and estimate in work income using the *SWITCH* tax/benefit model. We find that the hazard of exit from unemployment is negatively related to unemployment payments, but distinctive effects appear to influence only those receiving Unemployment Benefits (UB) and are small when compared internationally. Moreover, the exit rate increases for this group as exhaustion approaches at 15 months duration. We find no significant distinctive effects amongst those receiving Unemployment Assistance (UA).

I INTRODUCTION

The general rise and persistence in unemployment throughout Western Europe in the late 1970s and 1980s led many economists to see levels of unemployment compensation as at least contributory to the situation. The prevailing wisdom was that unemployment benefits "created substitution

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effects in favour of [a] greater frequency and longer duration [of] periods of unemployment" (Lindbeck, 1981, p.38). Indeed, the evidence, mostly from Great Britain and the United States did seem to suggest that there was a relationship between unemployment benefits and the duration of unemployment (Danziger, Haveman, and Plotnick 1981; Nickell, 1979a; Lancaster and Nickell, 1980; Narendranathan, Nickell, and Stern, 1985). Although there has been relatively little work on the effect of benefits on unemployment durations in the Irish context, that which does exist suggests that rates of exit from the Live Register and thus the average duration of spells on the Register are affected by changes in the unemployment insurance programme (Hughes and Walsh, 1983; O'Mahony 1983). However this seemingly well established pattern was undermined by a series of articles by Atkinson and Micklewright (1991) and Atkinson, Gomulka, and Micklewright (1984) which argued that such evidence was built upon shaky methodological and theoretical foundations and was less than robust. Atkinson and Micklewright showed that previous papers had taken a very limited view of the labour market and its relationship to the benefit system and regulatory structure. Moreover, by varying the period covered by their analysis, using different benefit variables and varying the specification of the replacement rate, Atkinson and Micklewright found much weaker, or even negative effects for benefits on unemployment duration. More recent work from Germany and the Netherlands has also cast doubt on many of the US and British results by finding no significant effect from unemployment insurance benefits (for a review see Pedersen and Westergård-Nielsen, 1993).

In this paper we examine the lessons that can be drawn from previous literature on the disincentive effects of unemployment payments before attempting to assess whether and to what degree such effects can be said to exist in the Irish context. Using the first Irish unemployment duration data for a general population we specify a structural model of exit from unemployment. The paper develops thus: in the first section of the paper we review findings from different national contexts on the effects of unemployment compensation before outlining the criticisms that Atkinson and Micklewright (1991) have made of previous research on this subject. The next section then outlines the data and variables that we use to examine possible disincentive effects, including the different specifications that can be constructed of disincentive effects themselves. In the third section we begin the empirical analysis of unemployment duration data from the Republic of Ireland using descriptive techniques before applying more analytical techniques in the fourth section. In the final section we attempt to draw together the findings of the paper and draw out some of their implications.

II REVIEW OF INTERNATIONAL EVIDENCE

The general rise in unemployment in OECD countries in the late 1970s has spawned a great deal of research on the possible effect that unemployment compensation may have on transitions in the labour market and particularly on the duration of unemployment. Given the weight of evidence one would have expected some consensus about the impact of compensation on transitions, but this has not been forthcoming, primarily because of different model specifications and assumptions and the difficulties in transferring results between different national contexts. The former have been discussed and criticised at length by Atkinson and Micklewight (1991), but before we turn to these issues we should briefly review the main international findings to date.

In the US and UK a number of studies have found a small, but significant negative relationship between replacement rates and unemployment duration (c.f. Fallick, 1991; Katz and Meyer 1990; Lancaster 1979; Meyer 1990; Moffitt 1985), but this effect has been shown in the UK to depend upon the duration of unemployment (Narendranathan, Nickell and Stern 1985; Narendranathan and Stewart, 1993; Narendranathan and Stewart, 1995; Nickell, 1979b; Nickell 1979a). Research in Continental Europe on the other hand has not produced consistent results with research using Dutch and German data and finding no significant effects for Unemployment Insurance benefits (UI) (c.f Berg, 1990; Hujer and Schneider 1989; Groot, 1990; Wurzel, 1990), while more recent research in Spain has found small, but negative effects among the short-term unemployed (Jenkins and Garcia-Serrano, 2000).

How do we reconcile these contradictory results, particularly given the more generous benefit systems in Continental European states which standard search theory would predict even stronger disincentive effects for? Several factors have been suggested which may account for this paradox (Pedersen and Westergård-Nielsen, 1993). First, the maximum duration of benefits is longer in European countries compared to the US and those who exhaust their entitlement of UI can usually transfer onto a means-tested programme of unlimited duration. US research has shown that unemployment exit rates increase as benefit exhaustion approaches (c.f. Ham and Rea, 1987; Katz and Meyer, 1990; Bratberg and Vaage, 2000). Second, the persistently higher rates of unemployment and particularly long-term unemployment in Europe may limit the relationship between duration and compensation since research shows that benefit effects tend to be concentrated among the short-term unemployed. Lastly, the absence of minimum wage legislation and greater variance in the US wage distribution may make it easier to get a job by lowering one's reservation wage, a more limited option in many European Countries.

Atkinson and Micklewright (1991) have suggested a number of other dimensions that may well contribute to the range of results that have been found. First, the factors associated with exit may well vary with different exit states, thus it is essential to differentiate exits to employment from those to education, retirement or full-time caring. Similarly, employment itself can be heterogeneous in a number of ways. Korpi (1991) has differentiated between exits to temporary and permanent positions and Jensen and Westergård-Nielsen (1990) have compared differences between recalls to previous jobs and to new jobs.

It is also argued by Atkinson and Micklewright (1991) that unemployment compensation itself cannot be summarised simply as the level of benefit. We have already seen that the duration of benefit entitlement has been shown to be important in the US context, but the duration of benefits is often related to the type of benefits offered, thus they argue that different types of benefit, their durations and relative value should be assessed.

A range of other institutional features may also be important. For instance, in the British benefit system, claimants need to show that they are making efforts to find a job and fulfil contribution conditions to obtain certain types of benefits. These dimensions of benefit systems mean that levels of benefits may change considerably over time (c.f. Jenkins and Serrano, 2000) both as a direct result of duration, but also because of the economic activities of other household members. It is extremely important then to be able to control for both the structure of the benefit system and the interaction of this with the household structure of claimants in assessing the impact of disincentive effects.

Most empirical research in this area has tended to use a combination of the standard theory of job search (job offers come at a constant rate and the first offer above the reservation wage is accepted) plus an extremely simplified model of the unemployment compensation system. Thus, they make no distinction between unemployment insurance benefits and those gained through means tested or minimum income schemes and most assume that benefits are of indefinite duration, are not monitored and subject to withdrawal (say if job offers are rejected) and do not depend on past contributions. The typical practice is to consider the benefits received by a hypothetical or "representative" person, or use the average benefits received by the unemployed. These are then compared to the average earnings of the employed to derive a replacement rate. In reality levels of benefit can vary enormously across claimants and across time because of the factors mentioned above, as of course, can in-work incomes. Atkinson and Micklewright (1991, p. 1708) argue that it is essential that analyses should take into account the diversity of individual receipt of unemployment benefit and recognise that "*hypothetical calculations based on a reading of the social security manuals are highly misleading*".

Taking these points into account it seems plain that the accurate estimation of disincentive effects requires a more fine-grained approach to the estimation of both benefit receipt and the in-work counterfactual. As we will go on to see in Section III, we have access to detailed individual level data on benefit receipt, but we also make use of micro-simulation methods to estimate the in-work income of individuals and tax units taking into account the activity status of the partner.

It is also clear that we should explicitly model the structure of the benefit system in terms of the type and duration of benefits available. In the Irish context this means the important distinction between Unemployment Benefits (UB) and Unemployment Assistance (UA) and the restriction of the former to a period of 15 months duration. Given the emphasis placed on the heterogeneity of processes by Atkinson and Micklewright (1991) we should make distinctions between different destination states when modelling the process of exit. It is highly likely that different states will be associated with very different processes. Lastly, it has been widely shown that the relationship between unemployment exit rates and the duration of the spell ("pure" duration dependence) is not usually monotonic, thus it is important to use flexible specifications of the baseline hazard function (c.f. Jenkins and Serrano, 2000).

In the next section we describe the empirical model used to estimate the probability of exit from unemployment. After describing the structure of the model we outline the data to be used from the Living in Ireland Panel Survey and how variables are defined. Though there has been some research in the Irish context on the duration of unemployment spells and the possible contribution of compensation levels, this has either been through the use of aggregate data (Hughes and Walsh, 1983) or descriptive techniques (O'Mahony, 1983), thus this paper contributes one of the first attempts to model exits from unemployment in the Irish context using individual level duration data.

III DATA AND VARIABLES

The data used here come from four waves of the Living in Ireland Panel Survey (LIPS): those carried out in 1994, 1995, 1997 and 1998. The LIPS is the Irish component of the European Community Household Panel Survey (ECHP) – an initiative organised by the Statististical Office of the European

Union (EUROSTAT). As its name suggests, the ECHP is a fully harmonised survey of individuals and households carried out in 12 EU states each year since 1994. The aim of the survey was to produce comparable data over time (the panel aspect) on the economic, financial and other circumstances of households throughout the EU. The novel feature of the ECHP is its longitudinal design where the same sample of households and individuals were reinterviewed in each successive year. This allows researchers to examine changing characteristics and socio-economic circumstances over time and thus get a clearer picture of the processes in operation.

As information is gathered at both the household and individual level we are able to link individual characteristics to household circumstances and also to other individuals within the household. This is particularly important in the context of this paper since we are able to link individuals to “tax-units”. Tax-units are the groupings of individuals within households whose incomes will be interdependent through the workings of the social welfare or tax systems. This issue will be discussed in greater detail below when we describe the in and out-of-work incomes simulated using the *SWITCH* micro-simulation model. The ability to link individuals to household circumstances also means that we can examine the way in which the incentive structure faced by individuals is related to the level of household “needs” in terms of the number of dependants such as children or other compositional factors. More indepth information on both the ECHP and LIPS can be found in (Callan *et al*., 1997, Chapter 3).

The LIPS Survey was designed to provide a nationally representative sample of the population resident in private households and was drawn using a two-stage clustered process using the ESRI’s RANSAM software. In 1994, of the 7,252 households originally selected for the sample, 166 were institutions or were ineligible for interview leaving an effective sample of 7,086 households. Of these households, contact could not be established with 609 households leaving 6,477 valid addresses that were contacted and 4,048 where actual interviews took place (28.2 per cent refused). This meant that 57.1 per cent of the effective sample were interviewed and 62.5 per cent of the valid contacted addresses. A total of 14,583 persons were members of these 4,048 households, 10,411 of which were eligible for interview and 9,905 of whom completed the full interview questionnaire (964 on a proxy basis). The 506 eligible people who did not respond represent less than 5 per cent of eligible persons in responding households. The rate of subsequent non-response was heaviest in 1995, but continued to occur through to the final year used in this paper 1998. In 1995, 89 per cent of the original completed households (3,584) and 86 per cent of the original individuals (8,532) were reinterviewed, although some households and individuals were rerecruited in subsequent years. However, by 1998 the number of individuals interviewed had fallen to 6,324 (63 per cent of 1994) and households to 2,729 (67 per cent). Attrition effects are always a worry with panel surveys, but tests have shown (Watson and Healy, 1999) that this attrition to the original sample has not been skewed in any particular direction, thus the data remain a reliable source of nationally representative information. However, even in 1994 the LIPS survey needed to be reweighted to be a true sample of the population and these weights were subsequently adjusted in the light of attrition.

The Sample of Unemployed

Many studies of the effects of unemployment compensation have used duration data derived from unemployment claimant registers. However, this has the inherent problem that many that could be described as unemployed do not claim benefit and are thus not available for analysis. The LIPS survey has detailed information on current activity status from which we can construct different definitions of unemployment. Since we are modelling exit from unemployment a definition based on subjective primary economic status may lead to excessive spell lengths, thus here we adopt the International Labour Office (ILO) definition of unemployment based on the three factors of not being employed that week, searching for work in the last four weeks and being available to begin work in the next two weeks. For the models used in Section VI of this paper we select those that are ILO unemployed at interview in 1994 and 1997 and use information from the following year to establish whether and when these individuals left unemployment between interviews. If not the unemployment spell is censored at the date of the second interview. This sampling procedure has two effects. First, this is a stock sample and thus estimates of average duration of unemployment spells will be biased upwards and we will need to adjust our modelling strategy accordingly. Second, our individual information (including income) relates to the person at interview, not from the start of the spell. Nonetheless, the survey provides us with information on the total length of the spell before either censoring or exit from unemployment and the period prior to interview can thus be controlled for in the model. Descriptive statistics of the sample of the unemployed in 1994 and 1997 can be found in the Appendix.

The novel feature of the Living in Ireland Survey is that as a panel survey, respondents have been reinterviewed every year since 1994 where at all possible. This gives us the rare opportunity to follow the same individuals and households over almost six years within which all respondents are asked for details of their principle economic activities *in each month* both in the current year and in the previous year thus building up a dynamic picture of their labour market status throughout the period from 1993 to the last interview on a monthly basis. To get a descriptive picture of some of the factors associated with the duration of unemployment we will use this self-reported information on unemployment spells in the next section.

Income Estimates Using Micro-Simulation

The LIPS survey gathers detailed information on current income sources from which we can calculate individual and household incomes among the unemployed. This is a major advantage over research that posits a “representative” unemployed person since we have the actual level of household and “tax-unit” income for those defined as unemployed at interview and the elements from which it is formed.[1] However, to fully understand the possible disincentive effects associated with unemployment compensation we need a counterfactual in-work income. In previous research this has been estimated using wage functions including variables such as age, sex and education, but such estimates do not take into account the interaction of the individuals counterfactual income with the current income of their spouse or other household members. For example, though we may be able to generate an in-work income for a presently unemployed individual, their actual in-work income would effect any means tested benefits received by their partner. To this end, we used the micro-simulation tax-benefit model *SWITCH* (Callan, Richardson, and Walsh, 1997) to estimate in-work incomes.

Using data from the 1994 Living In Ireland Survey, gross earnings for the presently unemployed are predicted using separate wage equations for married and single men and women using those currently employed. These wage equations establish a relationship between personal characteristics (such as level of education and length of labour market experience) and the wages received by those in employment. The *SWITCH* micro-simulation model then uses this information to estimate the social welfare entitlements and tax liabilities of each tax unit in the 1994 LIPS survey under the actual tax and social welfare policies in force in 1994. This same process is repeated for 1997 so that disincentive effects can be estimated for the two time periods.

Measuring Disincentive Effects

The financial incentive for an individual to move from unemployment into employment can be seen as depending on the disposable income of the income

[1] However, unlike information drawn from claimant registers we do not observe any changes in levels of benefit between waves of the LIPS survey and thus rely on the assumption that incomes are stationary.

unit (which here is the nuclear family or tax unit) when the individual is unemployed compared to their disposable income when employed. The incentive effect should be seen in the context of the family unit to take account of the possible impact of an individual's move to employment on the social welfare entitlements and tax liabilities of others in the family since living standards tend to be the product of family total net income. The replacement rate summarises this relationship by taking out-of-work income as a proportion of in-work income.

However, there are also other summaries of this relationship that have been put forward. Pearson and Whitehouse (1997) have suggested that while replacement rates have advantages, they are affected by many factors such as the incentives inherent in the tax/benefit system. As such they argue for the use of "average tax rates" (ATRs) as a way of focusing on the impact of the tax and benefit system on the financial incentive to work. The ATR is calculated as the in-work net income minus the out-of-work net income divided by the gross income. The ATR thus measures the amount that employees lose in tax, social insurance and reduced benefits when taking up employment. The last summary measure that we will use here is the cash gap between income in employment and out-of-work income. This gives the absolute difference between the two amounts as the basis of the incentive. Given that we have no a priori distributional assumptions about the effect of the disincentive measures, all measures are used in linear format.

Control Variables

Research shows that in the Irish context the female unemployment rate is lower and that women leave unemployment quicker than men. In the models we control for this using a dummy variable representing whether the respondent is female. Age has also been shown to have a negative relationship with the probability of leaving unemployment thus here we use a linear age term in tandem with a quadratic parameter.

In assessing disincentive effects we need to take account of the living arrangements of the person and whether this would have an impact on their benefit entitlement. The presence of a partner in the household would increase benefit levels, but only if their earnings are below a specified level. The situation is made more complicated by the fact that the presence of a partner in the household may influence levels of compensation differently depending on the type of benefit being claimed by the respondent and this may change during a spell of unemployment. The earnings of a partner would not impact on personal levels of Unemployment Benefit (though this would influence the receipt of qualified adults allowance), but could impact severely on levels of Unemployment Assistance, the means tested benefit. Thus as Unemployment Benefit exhaustion approaches at fifteen months duration the presence of a working partner could alter the search behaviour of individuals.

We also need to control for the number of children when assessing disincentive effects since although taking care of children can be costly, having larger numbers of children can lead to high replacement rates because in-work incomes, unlike benefit levels are not adjusted to take account of needs. We thus enter a variable that measures the number of children under eighteen in the household that can vary with the month of unemployment.

As just discussed, the restriction of UB payments to those who have experienced 15 months or less of unemployment (and who fulfil the contribution requirements) means that this should be entered explicitly into the model. As such we use a linear quantitative variable to represent the time to benefit exhaustion in the month in question (the variable is thus time varying) and guard against endogeneity by giving this variable the value zero once benefit is exhausted.

Education is likely to have a significant impact on whether respondents leave unemployment, either positively if to employment, or negatively if to inactivity. To control for education, we use a four-fold classification from no qualifications or primary education only, through Junior Certificate, Leaving Certificate and tertiary or third level education. This variable is entered as a time varying variable.

As outlined earlier, there is evidence that past unemployment may lead to state dependence, either through decreased search intensity, or a decrease in the offer rate due to employers' statistical discrimination against unemployed people who are seen as having lower levels of productivity. Past unemployment may thus have a "scarring" effect on the current probability of employment. To account for this we enter a variable to represent whether the person has experienced a spell of unemployment other than the current spell in the previous five years.

UA levels may be affected by the economic status of partners, thus we control for this using a four level variable differentiating between no partner present and one who is employed, unemployed and inactive using a time varying variable. Finally, the data on unemployment spells was drawn from two waves of the Living in Ireland Panel Survey 1994 and 1997.

IV DESCRIPTIVE DURATION ANALYSES

Before going on to specify and present the results of the hazard rate model in the next section, it would be useful first to examine some descriptive statistics on the durations of unemployment. As we have access to five waves of the Living in Ireland Panel Survey it would be interesting to examine the structure of spells of unemployment that occurred during this period as this will give us a context within which to place the multi-variate analyses which we turn to next. However, unlike in the next analysis, the spells used here are based on a self-definition of unemployment and this has implications for the distribution of spells among men and women that should be borne in mind.[2] To avoid the problem of left hand censoring, we select spells of unemployment that began after January 1993.

In Table 1 we show Kaplan-Meier estimates of the mean duration of unemployment in bivariate relationship with a number of different variables with estimates for transitions to both employment and inactivity.

The first three rows of Table 1 show that the mean length of unemployment spells during this period was almost seven months, but that the mean for women was almost two months less than for men. Women exited from unemployment faster whether that be to employment or inactivity, though if we look at the survivor curve in Figure 1, we can see that the difference in the rate of exit to inactivity is rather close until after one year at which point the female survivor curve takes a steeper track. For exits to employment on the other hand there is a clear difference in the rate of exit between men and women with the level of female unemployment being 10 per cent lower after eighteen months.

Other individual characteristics also contributed to quicker exits from unemployment. As we would expect a priori, those with higher levels of education have shorter durations, thus those with tertiary education exit unemployment almost 50 per cent quicker than those with primary education alone, but they also exit 35 per cent quicker than those with Leaving Certificate level education.

Figure 2 shows this graduated effect well using survivor curves derived from Kaplan-Meier estimates. This shows that whereas 68 per cent of those with Primary education are still unemployed after one year, this is true of 48 per cent of those with Junior Certificates, 37 per cent of those with Leaving Certificates and only 14 per cent of those with a third level qualification.

Age also appears to have an impact on the duration of unemployment spells with older age groups having longer durations, but this relationship only holds for those spells that end in a transition to inactivity. For spells leading to employment, the age relationship is if anything reversed with those over 45 making the transition quicker.

2. Women are far more likely than men to define themselves as inactive in the labour market, even when searching for work, whereas the opposite applies to men (c.f. Layte and O'Connell, forthcoming).

Table 1: *Kaplan-Meier Estimates of Mean Unemployment Duration by Destination and Various Characteristics*

	Destination State					
Group	*Employment*		*Inactivity*		*All*	
	Mean	*Weighted N*	*Mean*	*Weighted N*	*Mean*	*Weighted N*
All	6.98	817.92	10.86	498.66	8.45	1316.58
Men	7.83	447.36	11.43	296.44	9.26	743.80
Women	5.97	370.56	10.02	202.22	7.40	572.78
Highest Education:						
Primary Only	8.35	128.11	13.03	175.27	11.06	303.39
Junior Certificate	8.19	273.84	10.86	166.32	9.20	440.16
Intermediate Certificate	6.43	294.03	8.99	123.69	7.19	417.71
Tertiary	4.18	121.95	6.36	33.38	4.65	155.32
Age Group:						
17-24	7.15	389.34	9.92	155.48	7.94	544.82
25-34	6.88	196.93	9.89	127.22	8.06	324.15
35-44	7.46	98.91	11.25	89.45	9.26	188.36
45-54	6.27	98.14	11.80	68.55	8.54	166.68
55-64	6.36	34.60	13.79	57.96	11.02	92.56
Year Unemployment Began:						
1993-4	8.75	363.80	12.67	238.93	10.30	602.74
1995-6	6.37	307.06	10.07	197.93	7.82	504.99
1997-8	3.90	147.06	6.37	61.79	4.63	208.86

Individual characteristics are not the only factors however, that have an influence on the duration of unemployment. The level of labour demand in the economy has a crucial effect, never more so than in the period covered by this data which begins before the start of the Irish economic boom of the 1990s and finishes after four years of sustained growth. The tightening of the labour market that this brought is clear in the mean durations at the bottom of Table 1 that decrease significantly across the period.

Figure 1: Kaplan-Meier Estimate of Exit from Unemployment by Sex and Destination

Figure 2: Kaplan-Meier Estimate of Exit from Unemployment by Sex and Destination

V EMPIRICAL ESTIMATION

The most common way in which unemployment duration is modelled in the literature is using continuous-time hazard rate models with explanatory variables entered into the model either by assuming a distribution of durations, or by adopting a semi-parametric form with assumptions of proportionality. As we have already seen, these models tend to assume a common and unchanging level of unemployment compensation. In this paper however, we aim to use detailed information on the actual incomes and circumstances of the unemployed at a particular point in time (i.e. interview) to develop measures of the incentives that they face and the impact that this has on their subsequent probability of leaving unemployment. This introduces complexities that make the estimation of standard models difficult.

Unlike in the last section where we used "flow" data on unemployment spells to examine unemployment durations, in this section we draw upon a "stock" sample who are observed over a fixed period made up of those people ILO unemployed at interview in 1994 and 1997 and followed for approximately one year. In drawing a stock sample we inevitably bias the average length of unemployment spells upward since long spells are more likely to be sampled than shorter spells. In itself, a stock sample does not present too many difficulties and models have been proposed which adjust the likelihood function accordingly (Lancaster, 1992, p. 183), but the models do not allow the use of time-varying covariates, which is a serious drawback, and are not easy to estimate using standard statistical software.

On the other hand, Jenkins (1995) has suggested an easy method for estimating the hazard of leaving unemployment using discrete-time duration models that take account of stock samples and we use this type of model here. Using the Living in Ireland Survey waves for 1994 and 1997[3] we select those respondents who are ILO unemployed and collect a range of information including the date at which the current spell of unemployment began and the date at which the spell ended, censoring the spell if it had not ended before interview in 1995 or 1998. We then estimate the probability of making a transition from unemployment and its dependence on time. We thus measure the conditional probability that the transition will occur, given that it has not already occurred up to *t*. This can be expressed as a discrete-time hazard rate h_{it}:

$$H_{it} = \Pr[T_i = t \mid T_i \geq t, X_{it}]$$

[3] These two years were chosen as micro-simulation estimates of various disincentive measures were available.

Where the hazard of individual *i* making the transition to employment at time *t* is dependent upon them not having reached the end of the spell (T_i) and a set of covariates X_{it} which may or may not vary with time.

As explained, the stock sample means that we need to take account of the fact that the probability of leaving at each *t* is actually conditional on having not left unemployment before interview in either 1994 or 1997 (the sample selection criterion). Jenkins (1995, p. 132) shows that this can be handled relatively simply via the "cancelling" of terms that means that the conditional survivor probability depends only on the hazard rates and data for the months at risk between sample selection and the end of the period of observation. Nonetheless, maximising the "sequence" likelihoods derived from these conditional probabilities is still difficult, but Jenkins (1995, p. 133) using Allison (1982) outlines an easy estimation method which relies upon the reorganisation of the data from a spell centred unit of analysis to one based upon the spell month which allows the data to be analysed using standard regression techniques for binary variables. If τ is the interview month and $t=\tau+s_i$ indexes the month that the spell finishes for each individual, Jenkins defines a binary variable y_{it} which is 1 if $t=\tau+s_i$ and 0 otherwise. This means that $y_{it}=0$ for all spell months except that month where exit actually occurs in which case $y_{it}=1$. Using this variable, the log-likelihood function can be written as (Jenkins, 1995, p. 133):

$$\log L = \sum_{i=1}^{n} \sum_{t=\tau}^{\tau+S_i} \text{yit.}\log[h_{it}/(1 - h_{it})] + \sum_{i=1}^{n} \sum_{t=\tau}^{\tau+Si} \log(1 - h_{it})$$

Given this specification of the likelihood function we still require an expression (among the many) for the hazard rate. Given that we have no strong theoretical expectation regarding the distribution of durations we chose to use three commonly used specifications and decide amongst these according to an established empirical yardstick. The three specifications are the weibull, the complementary log-log and lastly a non-parametric piecewise constant specification. We chose the weibull distribution because this is the most commonly used distribution in models of unemployment duration, whereas the complementary log-log was chosen as this is the discrete-time counterpart of the continuous-time proportional hazards model (Prentice and Gloeckler, 1978; Jenkins, 1995). The piecewise constant allows for a very flexible specification of the baseline hazard through the use of a number of dummy variables that represent portions of the duration period. To decide among the models we adopt the Akaike information criterion (AIC) (Akaike, 1974) which penalises each log-likelihood to reflect the number of parameters being estimated in a particular model.[4] Models are estimated using a combination of time-varying and fixed covariates as listed in the previous section and we estimate competing risk models with exits to either employment or inactivity.

The generalised logistic hazard specification is thus:

$$\text{Log}[h_{it}/(1-h_{it})]=\theta(t)+\beta'\chi_{\text{it}}$$

However, this specification does not take account of any unobserved heterogeneity and could lead to an over estimation of negative duration dependence. To take account of this, an unobserved individual-specific error term ε_{i} with a zero mean and normal (Gaussian) distribution is added to the models. In the tables to come we report the standard deviation of the heterogeneity variance (σ_v) and the ratio of this variance to one plus the variance (ρ). If ρ is significantly different from zero then individual heterogeneity in the models is important.

VI RESULTS

Before we go on to examine the effects of the predictor variables in the model, we first need to assess the fit of the different model specifications and choose the most appropriate on the basis of the Akaike information crtiterion (AIC). Table 2 shows the AIC values for the three models and shows that the weibull model has the lowest value, though the piecewise constant model actually had the lowest log-likelihood showing that the non-parametric specification of the log-likelihood is the most flexible. In terms of the AIC value however, the piecewise constant is penalised for the added parameters in the model.

Table 2: *Model Fit*

Hazard Distribution	*AIC Value*
Complementary Log-Log	125,277.86
Weibull	92,643.356
Piecewise Constant	118,387.92

[4] The AIC is defined as AIC=-2(LL)+2(c+p+1) where c is the number of model covariates and p is the number of model specific ancillary parameters. The preferred model is that with the lowest AIC value.

On the basis of the AIC value we choose the weibull model as the most appropriate and use this specification in the tables below of model estimates and levels of significance. Our primary interest here is in the effect of the variable representing the disincentive faced by the respondent, but we are also interested in the way in which the probability of exit from unemployment may change depending on the benefit being claimed and the proximity of benefit exhaustion. We therefore estimated three models for each exit destination (employment, inactivity): an overall model, a model for those claiming UB and one for those claiming UA. Given the discussion above our theoretical expectation is that the time to benefit exhaustion should only be significant in the case of those claiming UB, and should also be negative (i.e. the closer the person is to exhaustion the higher the probability) for these respondents.

First of all however, we examine the results for the full model using the total sample in Table 3. The test of whether rho is significantly larger than zero shows that there is no significant unobserved heterogeneity in either the model of exit to employment or inactivity, though the figure comes close to 5 per cent significance in the inactivity model. There are a number of strong results in Table 3, the first being the significant negative relationship between duration of unemployment spell and hazard of exit to either employment or activity. This meets theoretical expectations based on the premise of decreasing job offers and search intensity over time controlling for other factors.

We also see a negative relationship between our chief variable of interest – the replacement rate and hazard of exit, though only in the model of exit to employment. The size of the effect is also extremely small at -.008, which at the mean is an elasticity of less than -.005. Such effects are much smaller than previously found, even in Continental Europe. For instance, two studies from the UK, Lancaster and Chesher (1983) and Narendranathan and Nickell (1985), found elasticities between benefits and duration of between 0.08 and 0.2. Using Spanish data Jenkins and Garcia Serrano (2000) found elasticities of 0.16. However, it should be remembered that these studies used samples of respondents claiming unemployment insurance benefits whereas the data used here is from a general population of ILO unemployed respondents.

The time to UB exhaustion is significant and negative on transitions to employment and thus in line with expectations, though we expect that this effect should only occur among UB claimants and may well underestimate the true effect.

If the month of unemployment was in 1997 this has a positive effect on exit compared to 1994 as we would expect given the differences in the labour market conditions in the two years, but the effect is only significant in the case of exits to employment (though positive in both). Age has a significant negative effect on transitions from unemployment, but this effect is greater for those exiting to inactivity. Education on the other hand has a positive effect, but only in the case of those with tertiary qualifications.

Table 3: *Results of Weibull Discrete Time Hazard Rate Model of Exit from Unemployment by Destination – Total Sample*

	Employment		*Inactivity*	
Variable	β	t	β	t
Log(*t*)	-0.66	-8.14	-0.82	-8.36
Replacement Rate	-0.01	-2.47	0.00	0.17
Time to Benefit Exhaustion	-0.09	-3.82	-0.01	-0.4
No Partner	*Reference*		*Reference*	
Partner Employed	0.13	0.67	0.17	0.72
Partner Unemployed	0.37	1.4	-0.58	-1.26
Partner Inactive	0.05	0.22	-0.25	-0.94
Number of Children	-0.04	-0.68	0.08	1.2
Year of Unemployment 1994	*Reference*		*Reference*	
1997	0.56	4.41	0.17	1.07
Age	-0.07	-2.92	-0.10	-3.48
Age^2	0.00	0.99	0.00	2.86
Female	-0.25	-1.64	-0.34	-1.85
Primary or None	*Reference*		*Reference*	
Junior Certificate	-0.14	-0.85	-0.28	-1.48
Leaving Certificate	0.16	0.91	-0.16	-0.74
Tertiary Education	0.47	2.37	-0.13	-0.51
Unemployed in Last 5 Years	0.02	0.16	0.13	0.66
Claiming Neither UA nor UB	*Reference*		*Reference*	
Claiming UB	0.59	3.18	0.48	2.12
Claiming UA	0.00	0	0.59	2.79
Log-Likelihood	-1471.7		-1102.9	
Unweighted N:	2215		2215	
Std of σ_V	0.000912		0.927725	
$\rho = \sigma_V/1+\sigma_V$	8.32E-07		0.46256	
Significance of ρ	n.s		n.s	

Lastly, for the models using the total sample we see that those claiming UB are more likely than those claiming UA, or neither benefit to exit to employment. In moves to employment we would expect that those with UB, who tend to have more employment experience and less unemployment experience than those claiming UA, to move into employment and this does indeed seem to be true. In Table 4 we turn to the results for the sample of respondents claiming UA at interview either in 1994 or 1997.

Table 4: *Results of Weibull Discrete Time Hazard Rate Model of Exit from Unemployment by Destination – UA Claimants*

	Employment		*Inactivity*	
Variable	β	t	β	t
Log(t)	-0.50	-2.6	-0.58	-2.96
Replacement Rate	-0.01	-0.96	0.01	1.44
Time to Benefit Exhaustion	-0.08	-1.39	-0.01	-0.22
No Partner	*Reference*		*Reference*	
Partner Employed	0.78	1.62	1.01	2.13
Partner Unemployed	0.09	0.09	-33.18	0
Partner Inactive	0.84	1.89	0.18	0.41
Number of Children	-0.22	-1.55	0.17	1.32
Year of Unemployment 1994	*Reference*		*Reference*	
1997	0.77	2.69	-0.60	-1.77
Age	-0.12	-2.12	-0.07	-1.25
Age^2	0.00	1.15	0.00	0.93
Female	-0.22	-0.7	-0.35	-1.01
Primary or None	*Reference*		*Reference*	
Junior Certificate	-0.16	-0.5	-0.51	-1.55
Leaving Certificate	0.55	1.46	-0.39	-0.99
Tertiary Education	1.41	3.22	-0.30	-0.48
Unemployed in Last 5 Years	0.66	-1.83	-0.64	-1.41
Log-Likelihood		-364.697	-382.595	
Unweighted N:		448	448	
Std of σ_V		0.000912	0.927725	
$\rho = \sigma_V/1+\sigma_V$		8.32E-07	0.46256	
Significance of ρ		n.s	n.s	

Our immediate interest is in the parameters representing the spell duration, replacement rate and time to benefit exhaustion. The log duration variable is, as in the total sample model, negative and significant suggesting that the hazard of exit is lower as duration increases, but unlike in Table 3, neither the replacement rate nor the time to benefit exhaustion are significant. Though the lack of effect for time to exhaustion matches theoretical expectations, that for the replacement rate does not and suggests that UA recipients behaviour is rather different from UB recipients.

Table 5: *Results of Weibull Discrete Time Hazard Rate Model of Exit from Unemployment by Destination – UB Claimants*

	Employment		*Inactivity*	
Variable	β	t	β	t
Log(*t*)	-1.36	-3.7	-0.45	-1.28
Replacement Rate	-0.02	-2.33	-0.01	-0.57
Time to Benefit Exhaustion	-0.21	-3.21	-0.00	-0.03
No Partner	*Reference*		*Reference*	
Partner Employed	0.23	0.41	0.24	0.38
Partner Unemployed	1.12	1.7	-0.46	-0.4
Partner Inactive	0.11	0.18	-0.55	-0.8
Number of Children	0.02	0.12	0.07	0.4
Year of Unemployment 1994	*Reference*		*Reference*	
1997	0.27	0.82	0.04	0.09
Age	0.12	1.59	-0.14	-1.72
Age^2	0.00	-2.02	0.00	1.79
Female	-0.48	-1.21	0.20	0.45
Primary or None	*Reference*		*Reference*	
Junior Certificate	0.47	0.97	-0.30	-0.62
Leaving Certificate	0.50	1.01	-0.25	-0.47
Tertiary Education	0.65	1.14	-0.33	-0.47
Unemployed in Last 5 Years	0.18	0.42	0.28	0.58
Log-Likelihood	-212.902		-186.151	
Unweighted N:	177		177	
Std of σ_V	0.000912		0.923819	
$\rho = \sigma_V/1+\sigma_V$	8.32E-07		0.460463	
Significance of ρ	n.s		n.s	

Year of unemployment on the other hand does have a significant effect with months in 1997 being more likely to end in employment than those in 1994, although this is not true for transitions to inactivity. Similarly, having a third level qualification has a strong positive effect on the hazard of transition to employment. Older UA recipients are less likely to make the transition to employment.

Moving on to Table 5 we can see the results for the model for those respondents claiming UB. As in the previous two tables here we see a negative relationship between duration and exit probability, though here the effect is much larger for transitions to employment suggesting that UB recipients, though having rather more advantages than UA recipients, are far more heavily punished for longer periods in unemployment.

Following theoretical expectations the replacement rate and time to benefit exhaustion are both very significant and negative. Although not large compared to the effects for other countries in the literature, the effect in Table 5 is larger than that in Table 3 at -0.0223 (an elasticity of -0.014 at the mean). The result for the total sample was thus driven by that for the UB recipients since there was no effect for those claiming UA, an interesting finding since those claiming UB are far more likely to return to employment and more quickly than those on UA, yet it is among these respondents that we see evidence of a disincentive effect.

So far then we have good evidence that contrary to the arguments of Atkinson and Micklewright (1991) there are disincentive effects associated with unemployment payments, but these are confined to those on UB payments. In finding these effects though we have clearly seen the value of explicitly modelling several dimensions of the welfare system as well as the general level of benefits and the structure of the wage distribution faced by the unemployed. However, do we see similar results for the other measures of disincentives discussed earlier? Table 6 gives the coefficients and significance levels for our three incentive measures – the replacement rate (RR), average tax rate (ATR) and cash gap (CG). Table 6 shows that disincentive effects are confined to those claiming UB irrespective of the disincentive measure used, though only the replacement rate and cash gap measures have a significant effect.

The parameter for the cash gap measure is however, much smaller than that for the replacement rate suggesting that, although significant it is not as strongly related to actual behaviour.

Table 6: *Weibull Discrete Time Model of Exit from Unemployment – Various Disincentive Measures by Destination and Benefit Type*

Variable	*Estimate and Significance*			
	UA Claimants		*UB Claimants*	
	Employment	*Inactive*	*Employment*	*Inactive*
Replacement Rate	-0.0065	0.0122	-0.0223*	-0.0071
Average Tax Rate	0.0003	0.0013	-0.0001	0.0044
Cash gap	-0.0001	-0.0057	0.0071*	0.0031

Significance: *=P<0.05 **=P<0.01 ***P<0.001

VII DISCUSSION AND CONCLUSIONS

After over two decades of evidence and debate a consensus has yet to emerge over the effect that unemployment compensation has on the duration of unemployment spells and thus unemployment rates. In this paper we have sought to add evidence to this debate by analysing transitions from unemployment in Ireland in 1994-95 and 1997-98 using data from the Living in Ireland Panel Survey. Previous research has found negative disincentive effects of different sizes depending on the region studied, but doubt was thrown over these results by a series of papers by Atkinson and Micklewright (1984, 1991). These suggested that if researchers used more accurate models of the benefit system and more closely modelled the processes at play these effects could quickly disappear or even become positive. In this paper we have attempted to provide a better empirical model of these processes by using high quality duration data from a random sample of unemployed people that includes benefit income information. Moreover, we have attempted to provide more accurate estimates of the in-work incomes of the unemployed using estimates from a tax/benefit micro-simulation package (*SWITCH*). Using these data we have then explicitly modelled the Irish social welfare system.

The Irish labour market and welfare regime is more similar to the UK than Continental Europe (Esping-Andersen, 1990), but the presence of both insurance based and means tested benefits of similar value means that it has some elements of both. By drawing on discussions in Atkinson and Micklewright (1991) we have constructed analyses of unemployment durations that allow us to estimate the effect of alternative disincentive measures whilst controlling for many of the factors that can lead to different results. Modelling the structure of the Irish benefit system we test for increasing exit rates nearer to insurance benefit exhaustion and use competing risk models to examine the processes associated with different exit destinations.

Results show that there is a significant negative relationship between unemployment compensation and duration, but these vary between those receiving different types of benefit and are very small in comparison to those found in other national contexts. Disincentive effects appear to be confined to UB recipients, but even here elasticities are very small at around 0.013 when compared to those found in the UK, Continental Europe and North America. The difference in the size of the effects found could be due to real differences in the national contexts, but may also be due to the better measures used in this study which would give more accurate estimates of effects. Just as interesting is the effect that the approach of benefit exhaustion has on UB claimants with the models showing an increase in the hazard of exit as benefit exhaustion approaches at 15 months duration.

These results show that, contrary to Atkinson and Micklewright (1991), we do find disincentive effects in the Irish context, when using a more realistic model of unemployment durations with structural elements, but the effects are rather small. It is also interesting that the effect is among the group who are relatively more advantaged in the labour market and who thus have shorter average unemployment spells that are more likely to end in employment. When accompanied by the effect of time to benefit exhaustion, this suggests that the correct interpretation of the disincentive effect should be that these respondents are using the resources provided by benefits for more effective job search and thus a better more stable job. Given this, it is interesting that most media, government and academic attention given to the question of disincentive effects is directed at the more disadvantaged portion of the unemployed who tend to receive means tested benefits and who show no sign of disincentive behaviour in this data.

APPENDIX

Unweighted Descriptive Statistics of Sample of Those Unemployed at Interview in 1994 and 1997

Variable		*Year*	
		1994	*1997*
Education			
	Primary	26.0	48.3
	Junior Certificate	43.0	24.0
	Leaving Certificate	22.9	20.4
	Tertiary	8.1	7.4
Age Group			
	17-24	12.0	5.9
	25-34	19.3	16.3
	35-44	26.1	25.6
	45-54	24.2	26.6
	55-64	18.3	25.6
Sex			
	Male	22.2	22.8
	Female	77.8	77.2
Mean Replacement Rate		62.58	63.68
	- UA Claimants	58.39	59.41
	- UB Claimants	61.75	60.1
	Unemployed <12 Months	13.1	16.0
	Unemployed 12+ Months	86.9	84.0
	Mean Number of Children	1.46	1.34
	N	1,866	1,152

REFERENCES

AKAIKE, H. 1974, "A New Look at the Statistical Model Identification", *IEEE Transaction and Automatic Control*, AC-19, pp. 716-723.

ALLISON, P.D. 1982, "Discrete-Time Methods for the Analysis of Event Histories", in S. Leinhardt (ed.), *Sociological Methodology*, San Francisco: Jossey-Bass Publishers, pp. 61-97.

ATKINSON, A. B., J. GOMULKA & J. MICKLEWRIGHT, 1984, "Unemployment Benefit, Duration and Incentives in Britain: How Robust is the Evidence?", *Journal of Public Economics*, Vol. 23, pp. 3-26.

ATKINSON, A. B. and J. MICKLEWRIGHT, 1991, "Unemployment Compensation and Labour Market Transitions: A Critical Review", *Journal of Economic Literature*, Vol. 29, December, pp. 1679-1727.

BERG, G. van den 1990, "Search Behaviour, Transitions to Non-Participation and the Duration of Unemployment", *Economic Journal*, Vol. 100, pp. 842-865.

BLOSSFELD, H. P. and G. ROHWER, 1995, *Techniques of Event History Modelling: New Approaches to Causal Analysis*, New York: Erlbaum.

BRATBERG, E. and K. VAAGE, 2000, "Spell Durations with Long Unemployment Insurance Periods", *Labour Economics*, Vol. 7, pp. 152-180.

CALLAN, T., B. NOLAN, B.J. WHELAN, C.T. WHELAN and J. WILLIAMS, 1996, *Poverty in the 1990s: Evidence from the 1994 Living in Ireland Survey*, Dublin: Oak Tree Press.

CALLAN, T., R. RICHARDSON, and J. WALSH, 1997, *Microsimulation Modelling of Taxes and Benefits: A New Tax-Benefit Model Based on the Living In Ireland Survey 1994*, Report to the Department of Social, Community and Family Affairs, Dublin: The Economic and Social Research Institute.

DANZIGER, S., R.H. HAVEMAN, and R. PLOTNICK, 1981, "How Income Transfer Programs Effect Work, Savings and the Income Distribution: A Critical Review", *Journal of Economic Literature*, Vol. 19, No. 3, pp. 975-1028.

ESPING-ANDERSEN, G. 1990, *The Three Worlds of Welfare Capitalism*, Cambridge: Polity Press.

FALLICK, B. C. 1991, "Unemployment Insurance and the Rate of Re-employment of Displaced Workers", *Review of Economics and Statistics* pp. 228-235.

GROOT, W. 1990, "The Effects of Benefits and Duration Dependence of Re-Employment Probabilities", *Economic Letters*, pp. 371-376.

HAM, J. C. and S. A. REA, 1987, "Unemployment Insurance and Male Unemployment Duration in Canada", *Journal of Labour Economics*, Vol. 5, pp. 325-353.

HUGHES, G. and B. M. WALSH, 1983, "Unemployment Duration, Aggregate Demand and Unemployment Insurance: A Study of Irish Live Register Survival Probabilities 1967-1978", *The Economic and Social Review*, Vol. 14, No. 2, pp. 93-118.

HUJER, R. and H. SCHNEIDER, 1989, "The Analysis of Labour Market Mobility Using Panel Data", *European Economic Review,* pp. 530-536.

JENKINS, S. P., 1995. "Easy Estimation Methods for Discrete-Time Duration Models", *Oxford Bulletin of Economics and Statistics*, Vol. 57, No.1, pp.129-137.

JENKINS, S. P. and C. GARCIA-SERRANO, 2000, "Re-employment Probabilities for Spanish Men: What Role Does the Unemployment Benefit System Play?" [2000-17].. Colchester: University of Essex. *ISER Working Papers*.

JENSEN, P. and N. WESTERGÅRD-NIELSEN, 1990, "Temporary Layoffs," in J. Hartog, G . Ridder, and J. Theeuwes (eds.), *Panel Data and Labour Market Studies,* Amsterdam: North-Holland.

KATZ, L. F. and B.D. MEYER, 1990, "The Impact of the Potential Duration of Unemployment Benefits on the Duration of Unemployment", *Journal of Public Economics*, pp. 45-72.

KORPI, T. 1991, "Labour Market Policies, Employment Alternatives and the Probability of Leaving Unemployment in Sweden", Stockholm Research Papers in Demography. Paper No. 65. Stockholm, University of Stockholm.

LANCASTER, T. 1979, "Econometric Methods for the Duration of Unemployment", *Econometrica*, Vol. 47, pp. 939-956.

LANCASTER, T. 1992, *The Econometric Analysis of Transition Data,* Cambridge, Cambridge University Press.

LANCASTER, T. and A. CHESHER, 1983, "An Econometric Analysis of Reservation Wages", *Econometrica*, Vol. 51, No. 6, pp. 1661-1676.

LANCASTER, T. and S.J. NICKELL, 1980, "The Analysis of re-Employment Probabilities for the Unemployed", Journal of the Royal Statistical Society (Part 2), Vol. 143, pp. 141-152.

LAYTE, R. and P. J. O'CONNELL, 2001, *The Dynamics of Unemployment in Ireland, 1994-1998*, Dublin: Combat Poverty Agency (forthcoming).

LINDBECK, A. 1981, "Work Disincentives in the Welfare State", Manz, Vienna, National ökonomische Gessellschaft Lectures.

MEYER, B. D. 1990, "Unemployment Insurance and Unemployment Spells", *Econometrica*, Vol. 58, pp. 757-782.

MOFFITT, R. 1985, "Unemployment Insurance and the Distribution of Unemployment Spells", *Journal of Econometrics*, Vol. 28, pp. 85-101.

MORTENSEN, D. T. 1977, "Unemployment Insurance and Job Search Decisions", *Industrial and Labour relations Review*, Vol. 30, pp. 505-517.

NARENDRANATHAN, W., S.J. NICKELL, 1985, "Modelling the Process of Job Search", *Journal of Econometrics*, Vol. 28, pp 29-49.

NARENDRANATHAN, W., S.J. NICKELL, and J. STERN, 1985, "Unemployment Benefits Revisited", *Economic Journal*, Vol. 95, No. 378, pp. 307-329.

NARENDRANATHAN, W. and M. STEWART, 1993, "How Does the Benefit Effect Vary as Unemployment Spells Lengthen?", *Journal of Applied Econometrics*, Vol. 8, pp. 361-381.

NARENDRANATHAN, W. and M. STEWART, 1995, "The Determinants of Individual Unemployment Durations in An Era of High Unemployment", *Economic Journal*, Vol. 105, pp. 321-332.

NICKELL, S. J., 1979a, "The Effect of Unemployment and Related Benefits on the Duration of Unemployment", *Economic Journal*, Vol. 89, No. 353, pp. 34-49.

NICKELL, S. J., 1979b, "Estimating the Probability of Leaving Unemployment", *Econometrica*, Vol. 47, No. 5, pp. 1249-1266.

O'MAHONY, M., 1983, "The Length of Spells of Unemployment in Ireland", *The Economic and Social Review*, Vol. 14, No. 2, pp. 119-136.

PEARSON, M. and E. WHITEHOUSE, 1997, "Making Work Pay: the OECD Study of Taxes, Benefits, Employment and Unemployment" in T. Callan (ed.), *Income Support and Work Incentives: Ireland and the UK*, Policy Research Series No. 30, Dublin: The Economic and Social Research Institute.

PEDERSEN, P. J. and N. WESTERGÅRD-NIELSEN, 1993 , "Unemployment: A Review of the Evidence from Panel Data", 20 (Spring), OECD Economic Studies, Paris: OECD.

PRENTICE, R.L. and L.A. GLOECKLER, 1978, "Regression Analysis of Grouped Survival Data with Application to Breast Cancer Data", *Biometrics*, Vol. 34, pp. 57-67.

WATSON, D. and M. HEALY, 1999, *Sample Attrition Between Waves 1 and 2 in the European Community Household Panel*, 118/99, Luxembourg: European Commission.

WURZEL, E. 1990, "Staggered Entrey and Unemployment Durations: An Application to German Data," in J. Hartog, G. Ridder, and J. Theeuwes (eds.), *Panel Data and Labour Market Studies*, Amsterdam: North-Holland.