Disability and Labour Force Participation in Ireland

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Abstract: The extent and nature of participation in the labour market by persons affected by disability has a multitude of direct and indirect effects on their living standards and quality of life, and so is a critical area for investigation and policy concern. This paper seeks to quantify the effects of disability on labour force participation in Ireland for the first time. Using data from the Living in Ireland Survey, 2000 and the Quarterly National Household Survey Disability Module 2002, we look at the relationship between participation and self-reported disability. The results show that those individuals reporting a severely limiting condition have a much lower probability of participation in the labour force than others, and this continues to be the case having controlled for other characteristics such as age, education and marital status. The reporting of such conditions itself may not be exogenous, however, and this is a priority for further research.

I INTRODUCTION

Persons with a disability face many barriers to full participation in society, not least in the labour market. The extent and nature of participation in the labour market in its turn has a multitude of direct and indirect effects on living standards and quality of life, and is thus a critical area for investigation and policy concern. While the likely linkages between disability, non-employment and poverty have been highlighted in an Irish policy context (see for example, Combat Poverty Agency/Forum of People with Disabilities/ National Rehabilitation Board, 1994), this has been on the basis of very little direct representative evidence about disability and the labour market. Helping to fill this gap, this paper analyses for the first time the factors associated with participation or non-participation in the labour market by people with

disabilities in Ireland, using cross-section data from two recent large-scale representative household surveys.

Our econometric analysis of the relationship between disability and labour force participation incorporates a range of socio-economic characteristics into the analysis, in order to isolate insofar as possible the impact of disability itself. The results suggest that individuals reporting a limiting disability have a substantially lower probability of participation in the labour force than others. Further insights into the scale and nature of these effects could be provided by analysis of longitudinal data, and the paper concludes by discussing both the implications of the results presented here and the priorities for further research. The implications for labour market and social protection policy are also discussed.

II THEORETICAL AND EMPIRICAL BACKGROUND

Disability might well influence both an individual's labour supply behaviour and the demand for their labour in the market. Depending on the nature of the disability, it might restrict the range of tasks the person can carry out, increase the costs of working, and affect the incentives faced – most obviously via receipt of disability-related state transfers. On the demand side, employers may be reluctant to employ individuals with a disability, either because of concerns about their productivity or because of additional costs associated with accommodating certain types of disability.

Evidence for other countries does indeed suggest that employment rates for working- age individuals with a disability are lower than those for the rest of the working-age population. The motivation for trying to understand exactly why this comes about and how best to address it is straightforward, given the range of direct and indirect implications it has for income and living standards and for social participation more broadly. Indeed, there has been a recent surge of interest in this topic in countries such as the UK, the USA and Germany, and in comparative analysis in an OECD and EU context.[1] This reflects *inter alia* a dawning realisation of the scale of spending on disability-related programmes – on average, OECD countries spend at least twice as much on such programmes as they do on unemployment programmes (OECD 2003). Disability benefit recipiency rates have been increasing in many countries, and such programmes typically account for at least 10 per cent of social spending. Furthermore, evidence from these countries suggests that disability-related benefit receipt is very likely to be long lasting.

[1] See especially European Commission (2001), OECD (2003).

So understanding the relationship between disability and labour force participation is critically important, but it also gives rise to analytical challenges. The first complication, as in many other instances where one is trying to quantify the factors affecting labour market behaviour, is that individuals may differ in many respects other than presence or severity of disability, and it may be difficult to disentangle their effects. The second complication, specific to this application, is that the way in which disability itself is captured may be problematic, in that it may not be independent of labour market participation itself.

Internationally, the first generation of econometric studies on the effect of disability on labour force participation emerged around the late 1970s. To give some US examples, Bartel and Taubmann (1979) estimated an OLS model of weekly hours worked to analyse the effect of health on earnings and labour supply, whereas Chirokos and Nestel, (1985) estimated a Tobit model relating annual hours worked to health history by looking at the degree of poor, good, improved or deteriorating health over the previous ten years. More recent research has emphasised the importance of the way health and limitations are captured, with the type of health status variable used leading to different patterns in terms of labour force participation. Wolfe and Hill (1995), for example, measure health status using an index of limitation in daily activities. Madden and Walker (1999) measure health in terms of those who report a longstanding illness or disability in the UK Family Resources Survey, 1995, and find that poor health does significantly reduce the hours worked for both men and women. Using the UK Labour Force Survey, Kidd, Sloane and Ferko (2000) analyse the effect of health limitations on the kind of paid work possible. They confirm the presence of substantial wage and participation rate differences between disabled and non-disabled individuals.

Our aim in this paper is to produce estimates of the relationship between disability and labour force participation in Ireland for the first time. We are able to do so using two independent sources of cross-section data, which is very valuable in allowing the results to be compared and in that sense validated. The results allow us to see first the extent to which those reporting chronic illness or disability limiting them in varying degrees are actually participating in the labour force. Second, we are able to control for a range of other socio-economic characteristics of the individual that might be expected to affect his or her labour force participation, thus isolating insofar as possible the impact of disability itself.

There is however an important caveat to be noted. The possible endogeneity of self-reported health, which we have to rely on, has been noted in a number of studies (see for example, Bound and Burkhauser, 1999). Those not active in the labour market might be more likely than others (with the

same actual disability status) to report themselves as disabled, for several reasons. One is that the presence of a limiting disability provides a justification for not being in work that is less open to stigmatisation. Another is that the individual may be in receipt of benefits that are linked to the presence of disability or incapacity to work, which could well affect their reporting behaviour. This could bias the results of an analysis which treats self-reported health as exogenous, as we do. We return to the implications in our concluding section.

III DATA

Two sources of survey data on disability and labour force participation in Ireland are used in this paper: the Living in Ireland Survey, 2000 (LIIS) and Quarterly National Household Survey, 2002[2] (QNHS). The Living in Ireland Survey is the Irish component of the European Community Household Panel, conducted by the The Economic and Social Research Institute (ESRI) for Eurostat. The survey commenced in 1994, and has been carried out each year up to 2001; in this paper we analyse the cross-sectional data from the 2000 survey, when the size of the sample was enhanced. We wish to focus on individuals of working age, so we exclude those aged 65 years or over. The youngest individuals in this sample are aged 16 years and the number of males and females are 3,315 and 3,362 respectively.

In the Living in Ireland Survey, detailed information on current labour force status was obtained, and for current purposes the crucial distinction this allows us to make is between those who were at work or unemployed but seeking work – whom we will count as active in the labour force – and all others, whom we will count as inactive. A measure of disability can also be constructed from the Living in Ireland Survey on the basis of individuals responding to the following question:

Do you have any chronic physical or mental health problem, illness or disability?

It may well be that not only the presence of such an illness or disability but also the extent to which it limits or restricts a person may be important, so it is also important that the survey allows us to distinguish

(a) those reporting a chronic illness or disability and saying that it limits them severely in their daily activities,

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[2] A study carried out for the Equality Authority, entitled *Disability and Labour Market Participation in Ireland* (Gannon and Nolan, 2004), uses these sources to provide a descriptive account of the employment status of people reporting long-standing or chronic illness or disability.

(b) those who report a chronic illness or disability and saying it limits them to some extent, and

(c) those who report such a condition but say it does not limit them at all in their daily activities.

The extent to which respondents say they are limited relates to their daily activities rather than work, but similar measures have been shown to have significant discriminatory power in terms of labour force participation in research elsewhere (e.g. Malo, 2002). Furthermore, in Table 1 we see that there are different rates of employment and inactivity for each sub-group, suggesting it will be important to distinguish between the different levels of disability in our analysis of labour force participation.

Table 1: *Labour Force Status by Level of Restriction for those with Chronic Illness or Disability, Aged 15-64 years, Living in Ireland Survey, 2000*

	Severely Limited	Limited to Some Extent	Not Limited	No Chronic Illness or Disability
Employed	18.9	35.9	57.1	68.1
Unemployed but seeking work	4.0	8.4	9.6	7.1
Inactive	77.1	55.7	33.3	24.8
N	153	548	294	5,622

The effects of disability on labour force participation may differ among individuals depending on other characteristics for example, age or education. We therefore include measures of age, education, region, unearned income, age of youngest child and marital status in our analysis. These variables are defined in detail and summary statistics are provided in Table A1.

Our other data source is a special module on disability included with the Quarterly National Household Survey in the second quarter of 2002, which focused on the extent and nature of restriction of activities for people with disabilities and their labour force status. The data provides a detailed description of any long-standing health condition. The sample is also based on working age 15 to 64 years and the number of males and females used in this analysis are 35,115 and 35,495 respectively.

In classifying individuals by labour market status the QNHS adopts various approaches, but here we once again distinguish those in employment or unemployed (available for and actively seeking work) versus those who are inactive. In the QNHS survey, illness and disability is identified from a question framed as follows:

Do you have any longstanding health problem or disability?
and follow-up questions allow us to distinguish

(a) those reporting a longstanding illness or disability that restricts them
    severely in the kind of work they can or could do,
(b) those reporting such an illness or disability that restricts them to some
    extent in the kind of work they can or could do, and
(c) those reporting a longstanding illness or disability but saying it does not
    restrict them in the kind of work they can do.

Again, we include measures of age, region, marital status, and education. The definitions are similar to those used in the Living in Ireland Survey, and we provide summary statistics in Table A1. The percentage of individuals reporting an illness or disability in the Living in Ireland Survey is rather higher than the percentage reporting a longstanding illness or disability in the QNHS special module – at 16.6 per cent versus 10.8 per cent.

Several factors may contribute to this difference. The first and most obvious is that the questions themselves are different – the Living in Ireland Survey refers to "any chronic, physical or mental health problem, illness or disability", and the QNHS to 'any longstanding health problem or disability'. Second, the term "longstanding" in the QNHS is intended to be taken as having a disability for at least 6 months; when we look in the Living in Ireland Survey at those reporting that duration the figure falls to 15 per cent. Third, the lowest age in the two surveys is different, with the QNHS interviewing people aged 15 years or over, and the Living in Ireland Survey interviews those aged 16 years and above. Finally, and perhaps most importantly, 40 per cent of the QNHS individual questionnaires were answered by proxy. Those responding directly about themselves appear to be more likely to report a longstanding health problem or disability than those answering on a proxy basis in respect of another family member, which is perhaps not surprising. This apparently innocuous difference could contribute significantly to the gap between the two surveys in the overall percentage seen as having a chronic illness or disability.

The difference between the two surveys also highlights that the underlying concept of disability is itself an imprecise one. It encompasses a range of heterogeneous conditions and variation in the precise details of how a survey seeks to capture them can make a significant difference to the outcome. This should be kept in mind while interpreting results in this paper. Using these two substantial sources of data on disability and labour force participation we now look at the overall effects of disability on employment status in a cross-sectional context, applying appropriate econometric methodology as discussed in the next section.

IV METHODOLOGY

We assume that an individual's labour force participation decision is determined by a comparison of the offer wage and their reservation wage, where they will participate if the offer wage is higher. We do not directly observe the reservation wage, but we do know the outcome of their participation decision, so our dependent variable LFP (Labour Force Participation) is a dichotomous variable distinguishing participants (those in work or unemployed but actively seeking work) from non-participants. Unemployed individuals who are not seeking work are counted as non-participants. The structure of the error term in the labour force participation model determines the appropriate model of estimation. We assume that the error is normally distributed, and use a maximum likelihood probit model to predict the probability of participating in the labour force.

The dependent variable is $y_i=1$ if $Y_i^* > 0$ or $y_i=0$ if $Y_i^* \leq 0$, and the latent variable equation is

$$Y_i^* = X_i'\beta + u_i. \tag{1}$$

Y_i^* is the underlying latent variable that indexes the measure of labour force participation, u_i is the normally distributed stochastic error term, X_i' is a column vector of explanatory variables, and β is a column vector of parameters to be estimated.

The estimated co-efficients from the probit model provide an indication of the direction of effect of an explanatory variable on this probability. In order to determine the change in predicted probabilities in percentage points, that are associated with changes in the explanatory variables, we present also the partial effects. Marginal probability effects are the partial effects of each explanatory variable on the probability that the observed dependent variable equals 1. First, we determine the probability of labour force participation as

$$P(LFP_i = 1 \mid X_i) = F(X_i'\beta) = \Phi(X_i'\beta). \tag{2}$$

If the explanatory variable is continuous, then we calculate the marginal probability effect with respect to X_{ik} as:

$$\frac{\partial P(LFP_i = 1)}{\partial X_{ik}} = \frac{\partial \Phi(X_i'\beta)}{\partial X_{ik}} = \phi(X_i'\beta)\frac{\partial X_i'\beta}{\partial X_{ik}} = \phi(X_i'\beta)\beta_k, \tag{3}$$

where k is the k-th element in X_i, and ϕ is the standard normal density function and the X_i' is calculated at the means of the independent variables.

Most of our explanatory variables are dichotomous dummy variables so the marginal probability effects may be interpreted as the change in probability of labour force participation resulting from a change in one category of a variable to another, and we calculate these effects for a discrete variable X as $P(LFP_i = 1|x_{ik} = 1) - P(LFP_i = 1|x_{ik} = 0) = \Phi(X'_{1i}\beta) - \Phi(X'_{0i}\beta)$, where X'_{1i} is a vector of explanatory variables with $X_{ik} = 1$, and X'_{0i} is a vector of explanatory variables with $X_{ik} = 0$. X'_{1i} and X'_{0i} are calculated at the means of the independent variables.

So far we are assuming that each of the explanatory variables has constant differential effects, e.g. we are assuming that if there is a lower probability of labour force participation for the severely disabled, then this is so whether they are young or old. However, it may be the case that for example, individuals aged 45-54 years who are severely disabled may show a lower probability of labour force participation. In other words, there may be interactions between the two variables severely disabled and age 45-54 years. In this case, their effect on our outcome variable, LFP, may not be simply additive, but multiplicative. For this reason, we test several specifications of our models with interactions effects. For example, if we model labour force participation as:

$$Y_i^* = Z'_1\beta_1 + Z'_2\beta_2 + Z'_3\beta_3 + u_i, \text{ where } y_i = 1 \text{ if } Y_i^* > 0 \qquad (4)$$

$$0 \text{ otherwise,}$$

and $Z'_3 = X'_1 X'_2$.

In this model, X_2 affects the impact of X_1 and the partial effect is calculated as:

$$\frac{\partial P(LFP_i = 1)}{\partial X_{i1}} = \frac{\partial \Phi (Z_i'\beta)}{\partial X_{i1}} = \phi(Z_i'\beta) \frac{\partial Z_i'\beta}{\partial X_{i1}} = \phi(Z_i'\beta)(\beta_1 + \beta_3 X_2) \qquad (5)$$

Because the patterns of labour force participation for men and women may be rather different, we estimate separate equations for each. First, we estimate the effect of disability on labour force participation focusing purely on the categories, (1) Ill/Disabled with severe limitation (2) Ill/Disabled with some limitation and (3) Ill/Disabled with no limitation. These effects may be influenced by the age, marital status and educational qualifications of an individual, and these variables are added as a second set of explanatory variables in the second regression we will report. The age of children may have an important influence on the labour force participation decision for women. These variables are included as part of a final set of explanatory variables in the third regression we report. For ease of comparison of the estimates

between men and women, the child variables are included for men also. We then include interaction terms based on education and age.

As noted in Section II, the nature of the variable being used to capture disability is critical. Disability is entirely self-reported rather than externally observed, and the nature of that reporting process may have implications for the weight to be placed on the results. We return below to this issue and its implications for interpreting our results and for further research, having presented the results of estimating the model described.

V EMPIRICAL RESULTS FOR PROBIT MODEL OF LABOUR FORCE PARTICIPATION WITH LIVING IN IRELAND SURVEY DATA

We now present the results of estimating the probit model of labour force participation described in Section III with Living in Ireland Survey data for 2000 – the corresponding results from the Quarterly National Household Survey are then presented in Section V. We look first at results for men, then for women, and then explore possible interaction effects.

(a) Results for Men

The estimation results for men are presented in Table 2. It is interesting to look first at the overall goodness of fit of the model and how it changes as we add explanatory variables, as reflected in the McFadden R^2. Initially, this has a value of 0.1073, meaning that the model using only disability status to explain labour force participation performs 10.7 per cent better than one that specifies the probability of labour force participation as a constant. When we add age, marital status, education and number of children this increases considerably to 0.2465.

Table 2 shows that when only the three variables capturing chronic illness or disability are included as explanatory factors, men with a chronic illness or disability which limits them severely in their daily activities have on average a reduction of 58 percentage points in the probability of being in the labour force, relative to men without a chronic illness or disability. Men with a chronic illness which limits them in their daily activities "to some extent" also have a substantially reduced probability of being in the labour force, though the reduction of about 36 percentage points is a good deal less than for those who are severely limited. Finally, men with a chronic illness that does not limit them in their daily activities have a probability of being in the labour force that is not significantly different to those without such a condition.

These figures take no account of the fact that those reporting a chronic condition may also differ in other ways that could influence their labour force

Table 2: *Marginal Effects from Probit Model of Labour Force Participation, Men Aged 15-64 years, Living in Ireland Survey 2000*

	Marginal Effect with No Controls	Marginal Effect with Controls
Disability with severe limitation in daily activities	−0.5796** (0.0464)	−0.6101** (0.0502)
Disabled with some limitation in daily activities	−0.3599** (0.0313)	−0.2948** (0.0326)
Disabled with no limitation in daily activities	−0.0132 (0.0339)	−0.0117 (0.0297)
Age 15-24 years		−0.0147 (0.0245)
25-34 years		0.1142** (0.0117)
35-44 years		0.1054** (0.0125)
45-54 years		0.0864** (0.0119)
Married		0.0736** (0.0205)
Unearned Income/100		−0.0002 (0.0019)
Secondary education		0.0819** (0.0156)
Third level education		0.0916** (0.0108)
Border, Midlands, West Regions		0.0031 (0.0113)
Age youngest child <4		0.0402 (0.0256)
> = 4 and < 12		0.0156 (0.0221)
> = 12 and < 18		0.0411** (0.0169)
McFadden R^2	0.1073	0.2484
N observations	3315	3315

Note: **$p \leq 0.05$, *$p \leq 0.10$

participation. They could for example be older or less well educated on average, and that could help to explain their lower levels of labour force participation. So the second column of Table 2 shows the estimation results when the full set of explanatory variables is included in the estimated model, controlling for differences in age, education, marital status and number of children. The effect of a severely limiting disability on labour force participation actually rises slightly, although the difference is not statistically significant. That effect falls for those who are ill/disabled with some limitation, from 36 to 30 percentage points, while the effect for reporting illness/disability with no limitation remains insignificant.

In terms of the other explanatory variables, labour force participation increases with age up to 54 years compared to those aged 55-64 years, men with secondary or third level education have a greater probability of participating in the labour market than those with no qualifications, and the probability of participation is slightly higher for men who have children aged between 12 and 18 years.

(b) Results for Women

The estimation results for women in the Living in Ireland Survey are shown in Table 3, and show a similar pattern to those for men. Before controlling for other characteristics, on average women with a chronic illness or disability which limits them severely in their daily activities have a probability of being active in the labour force that is 51 percentage points lower than women with no chronic illness or disability. Women with a condition that is limiting "to some extent" have a reduction of 26 percentage points in their probability of participation. These are slightly smaller negative effects than for men in the same illness/disability situation. Unlike men, though, women with a chronic illness or disability that does not limit them in their daily activities are also less likely to be in the labour force.

When we control for age, education, and other factors, as for men the impact of a severely limiting disability is effectively unchanged, at about a 52 percentage points reduction. For women with a condition that is limiting "to some extent" that reduction is now 22 percentage points. Women with a non-limiting chronic illness or disability are 7 percentage points likely to participate compared to non-disabled women, but this is only significant at the 10 per cent level.

As far as other variables are concerned, the effects of age, education, marital status and the presence of young children all have the impact on the probability of participation that would be expected from previous studies, with participation for example lower for married women and those with young children and higher for those with third-level education.

Table 3: *Marginal Effects from Probit Model of Labour Force Participation, Women Aged 15-64 years, Living in Ireland Survey 2000*

	Marginal Effect with No Controls	Marginal Effect with Controls
Disabled with severe limitation in daily activities	−0.5140** (0.0339)	−0.5245** (0.0379)
Disabled with some limitation in daily activities	−0.2599** (0.0296)	−0.2164** (0.0332)
Disabled with no limitation in daily activities	−0.1259** (0.0405)	−0.0708* (0.0434)
Age 15-24 years		0.1327** (0.0364)
25-34 years		0.3645** (0.0239)
35-44 years		0.3277** (0.0259)
45-54 years		0.2631** (0.0255)
Married		−0.0818** (0.0281)
Unearned Income/100		−0.0060 (0.0029)
Secondary education		0.2233** (0.0244)
Third level education		0.3904** (0.0195)
Border, Midlands, West Regions		−0.0463** (0.0204)
Age youngest child <4		−0.2093** (0.0346)
>=4 and <12		−0.1141** (0.0333)
>=12 and <18		−0.0388 (0.0320)
McFadden R^2	0.0311	0.1481
N observations	3362	3362

Note: **$p \leq 0.05$, *$p \leq 0.10$

(c) Testing for Interactions

The models presented so far have implicitly assumed that the effect of disability on labour force participation is constant across for example different age groups or education levels. However, the impact of disability may in fact be more or less pronounced depending on the age or education level of the individual affected, and this could be important in understanding these effects and framing policies to reduce them. Including interactions between the explanatory variables in our estimated models can capture such inter-relationships, so we test a variety of such interactions with the Living in Ireland Survey data.

Appendix Table A2 shows the estimated interaction terms for education and illness/disability, for both men and women. There are very few individuals in the survey with third level education and a severe limitation (5 men and 5 women), and few women with secondary education and a severe limitation (27 women), so we combine the categories severely and to some extent limited for both men and women and focus on the interaction terms between limited in daily activities and types of education. None of these interaction terms are significant for women, indicating that the effects of disability are similar across all education groups. For men, we find significant effects of secondary education for those with severely or to some extent limiting disabilities. Men with a disability that does not limit them in daily activities who have secondary education are not statistically different to men with no disability.

One might expect that the effects of disability on labour force participation would vary with age so another interesting interaction is disabled/limitation with age group (all interaction results are available from the author on request). For women, we find that two interactions are significant – limited to some extent and age either 25-34 years or 35-44 years and the marginal effects are –0.23 and –0.17 respectively. This means that women aged 25-34 years would see a further reduction in their labour force probability due to a somewhat limiting disability, of 23 percentage points. For women aged 35-44 years, this further reduction is 17 percentage points compared to women in other age categories. We also find that women aged 45-54 years who are disabled but not limited in daily activities are more likely to participate, the marginal effect of the interaction is 21 percentage points. For men, there are two significant interaction effects. Men who are aged 35-44 years and are severely limited have a further reduction in labour force probability of 25 percentage points, compared to other individuals in other age groups and also with a severely limiting disability. For those who are limited to some extent, they are 9 percentage points more likely to participate if aged 15-24 years.

VI EMPIRICAL RESULTS FOR PROBIT MODEL OF LABOUR FORCE
PARTICIPATION WITH QNHS DATA

We now describe the results obtained when a similar analysis was carried out with the data from the QNHS special module. The set of variables used to capture illness or disability now reflect what the respondent said about its impact on their capacity to work as opposed to their daily activities, as already described. The other explanatory variables are similar to the previous analysis, except the age of the youngest child and unearned income was not available in this dataset.

(a) Results for Men

The estimation results for working-age men in the QNHS are shown in Table 4. We see that men with a longstanding illness or disability that restricts them severely in the amount or kind of work they can do have on average a probability of being in the labour force that is 62 percentage points lower than men without an illness or disability. Controlling for age, education and marital status actually increases that impact slightly, to 66 percentage points. This is of the same order of magnitude as the reduction seen in the Living in Ireland Survey for men severely limited in their daily activities, and also consistent in that controlling for socio-economic characteristics if anything increases the estimated effect.

The reduction for men with a longstanding illness which limits the amount of work they can do "to some extent" is very much less than for those who are severely restricted. That is only a reduction of 13 percentage points after controlling for other factors and the inclusion of those controls once more increases rather than reduces the estimated impact. So there is an even sharper divergence between those restricted "severely" versus "to some extent" than we saw with the illness/disability measures in the Living in Ireland Survey.

Finally, for men reporting a longstanding illness that does not limit the amount or kind of work they can do, there is no significant impact on labour force participation – with or without the inclusion of the other control variables.

(b) Results for Women

The results for women from the QNHS are presented in Table 5. Women with a longstanding illness or disability that restricts them severely in the amount of work they can do have a probability of being in the labour force that is 43 percentage points lower than women without an illness or disability. Controlling for age, education and marital status makes little difference to

Table 4: *Marginal Effects from Probit of Labour Force Participation for Men in the Quarterly National Household Survey 2002*

	Marginal Effect with No Controls	Marginal Effect with Controls
Disabled with severe limitation in kind or amount of work	−0.6179** (0.0093)	−0.6565** (0.0106)
Disabled with some limitation in kind or amount of work	−0.1100** (0.0172)	−0.1227** (0.0171)
Disabled with no limitation in kind or amount of work	−0.0085 (0.0123)	−0.0125 (0.0119)
Age 15-24 years		−0.1525** (0.0101)
25-34 years		0.1415** (0.0459)
35-44 years		0.1492** (0.0043)
45-54 years		0.1260** (0.0043)
Married		0.0691** (0.0072)
Secondary education		0.0989** (0.0049)
Third level education		0.1425** (0.0044)
BMW		0.0012 (0.0045)
McFadden R²	0.0895	0.3119
N observations	35115	35115

that effect, and it is once again of the same order of magnitude as the reduction seen in the Living in Ireland Survey for women severely limited in their daily activities.

Women with a longstanding illness which limits the amount of work they can do "to some extent" have a reduction of 14 percentage points in the probability of labour force participation after controlling for age, education and other factors. There is little difference to the impact for men of that level of illness or disability. Finally, for women reporting a longstanding illness that

does not limit the amount of work they can do, the estimated impact without the inclusion of control variables is a modest reduction of only 7 percentage points in labour force participation. After the inclusion of the control variables this impact is even lower. The effects of the control variables themselves are similar to those seen in the LII data.

Table 5: *Marginal Effects from Probit of Labour Force Participation for Women in the Quarterly National Household Survey, 2002*

	Marginal Effect with No Controls	Marginal Effect with Controls
Disability with severe limitation in kind or amount of work	−0.4276** (0.0099)	−0.4165** (0.0117)
Disability with some limitation in kind or amount of work	−0.1736** (0.0171)	−0.1428** (0.0186)
Disability with no limitation in kind or amount of work	−0.0741** (0.0139)	−0.0342** (0.0150)
Age 15-24 years		−0.0887** (0.0114)
25-34 years		0.2728** (0.0085)
35-44 years		0.2425** (0.0084)
45-54		0.2222** (0.0085)
Married		−0.1950** (0.0072)
Secondary education		0.1684** (0.0073)
Third level education		0.3910** (0.0065)
BMW		−0.0162** (0.0065)
McFadden R^2	0.0237	0.1652
N observations	35495	35495

(c) Testing for Interactions

Once again, we also looked at possible interactions between for example education and disability using the QNHS data (with detailed results available on request). In the case of men, unlike the Living in Ireland data we find no significant interaction effects for having secondary rather than primary education. For women, as in the results from the Living in Ireland Survey data, none of the interaction terms between secondary education and disability are significant. The interaction between third level education and having a severely limiting illness/disability is, however, now significant but negative for both men and women, which seems implausible. As far as interactions with age are concerned, we find that men and women aged 15-24 years are more likely to participate than those aged 55 years or over even with a severely or somewhat limiting condition, whereas the opposite is true for men aged 35 years and over.

VII CONCLUSIONS AND IMPLICATIONS

People with disabilities face many barriers to full participation in the labour market, with serious implications for living standards and quality of life. This paper has analysed the factors associated with participation or non-participation in the labour market by people reporting chronic illness or disability in two Irish large-scale representative surveys. The results of this cross-section analysis shows a substantial impact on labour force participation of having a long-standing illness that limits the individual severely in their work or daily life.

Working-age men reporting such a condition had a labour force participation probability of 60 percentage points lower than those without a condition, having controlled for other characteristics such as age and education, while for women the corresponding reduction was over 40 per cent. Since the labour force participation rate for women is much lower than men, this means that the predicted participation rate for men and women severely limited by a longstanding illness or disability is only 25 per cent and 10 per cent respectively on average. For those reporting a longstanding illness which limited them to some extent though not severely, there was also a significant though much smaller impact on the likelihood of participating in the labour force. For those reporting a longstanding illness or disability that did not limit them in their work or daily activities there was no statistically significant effect on labour force participation.

The results presented in this paper are broadly similar to the findings in similar studies using the same methods, for example in the UK (Madden and

Walker, 1999) and in the US (Chirokos and Nestel, 1985 and Stern, 1989). Research on the topic elsewhere also highlights a number of ways in which investigation of this issue could usefully be developed in the future. These include allowing for unobserved heterogeneity among individuals with a disability and measurement error in the self-reported disability variable. In particular, methods recently applied elsewhere using panel data go beyond what can be achieved with cross-sectional analysis. For example, Bardasi, Jenkins and Rigg (2000) using data from the British Household Panel Survey find that becoming disabled is indeed associated with a very sharp decline in employment there. Panel data from the Living in Ireland Survey will allow this dynamic perspective to be adopted in further work on this topic for Ireland. The results presented in this paper thus represent a foundation on which more complex models of participation can be built.

Further research is also required on the factors underpinning the impact of disability on employment, and on the implications of the low employment rates of those with disabilities for living standards and policy. Research elsewhere suggests that disability-related income support may be structured in ways that discourage people from returning to work, and the incentives built into the Irish income support system and their effects in that context merit in-depth investigation. More broadly, the impact of low employment rates for living standards and participation need to be empirically assessed. Bardasi *et al*'s. (2000) study for Britain suggests for example that the reduction in income for those observed to become disabled from one year to the next is less than a cross-sectional comparison of those with versus without a disability would suggest, because previously low-income individuals are more likely to become disabled. (On the other hand this does not take into account the additional costs which may be associated with disability, investigated in the Irish context in a recent study for the NDA.)[3] In the same vein, disability may affect participation in the ordinary life of society both through its impact on employment and more broadly. Investigation of these issues with representative survey data, including from a dynamic perspective, will provide a much firmer base for understanding the implications of disability for those affected and framing policy responses.

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[3] See National Disability Authority (2004).

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Appendix Table A1: *Variable Definitions for Dependent and Independent Variables*

Variable	Definition	Living in Ireland, 2000		QNHS 2002	
		Men	Women	Men	Women
LFP	=1 if participating in the labour market, =0 otherwise	84.0	57.8	78.4	56.5
Disabled with severe limitation	=1 if disabled and severely limited in daily activities, =0 otherwise	2.8	1.7	5.5	3.9
Disabled with some limitation	=1 if disabled and limited to some extent in daily activities, =0 otherwise	8.1	8.3	2.2	2.4
Disabled with no limitation	=1 if disabled and not limited in daily activities, =0 otherwise	4.1	4.7	3.3	3.7
	(Base category=No disability)	84.0	85.1	88.9	89.9
Age 15-24 years	=1 if aged 15-24 years, =0 otherwise	24.0	22.4	25.1	24.4
Age 25-34 years	=1 if aged 25-34 years, =0 otherwise	18.6	17.7	20.2	20.2
Age 35-44 years	=1 if aged 35-44 years, =0 otherwise	20.1	21.2	21.5	21.9
Age 45-54 years	=1 if aged 45-54 years, =0 otherwise	20.4	21.2	19.3	19.7
	(Base category=aged 55-64 years)	16.6	16.9	14.0	13.4
BMW	=1 if living in Border, Midlands, West region, =0 otherwise	30.8	28.5	26.5	25.3
	(Base category=Rest of Country)				
Secondary Education	=1 if highest level of education completed is secondary, =0 otherwise	58.5	61.3	46.2	46.6
Third Level Education	=1 if highest level of education completed is third level, =0 otherwise	18.4	18.9	29.8	32.1
	(Base category=No qualifications or highest level of education completed is primary)				
Married	=1 if married or living with a partner, =0 otherwise	55.6	59.8	47.9	50.3
Age Youngest Child<4	=1 if age of youngest child is less than 4, =0 otherwise	10.1	12.2		
Age Youngest Child>=4 and <12	=1 if age of youngest child is greater than or equal to 4 and less than 12, =0 otherwise	14.6	16.9		
Age Youngest Child >=12 and <18	=1 if age of youngest child is greater than or equal to 12 and less than 18, =0 otherwise	12.1	13.3		
	(Base category=No children)				
Unearned Income	=Net Household Income – Net Individual Disposable Income (Net Individual Disposable Income includes net incomes from work, social welfare payments and child benefit. Net Household Income aggregates individual data to household level)	356.49 (309.11)	478.60 (346.91)		

Note: The regional classifications are based on the NUTS (Nomenclature of Territorial Units) classification used by Eurostat.

Appendix Table A2: *Marginal Effects from Probit Model of Participation– with Interaction Effects for Education and Disability, Age 15-64 years – Living in Ireland Survey 2000*

	Men	Women
Not disabled (reference)		
Disabled with severe/some limitation	−0.4654**	−0.3231**
	(0.0451)	(0.0526)
Disabled with no limitation	−0.0985**	−0.1359
	(0.0620)	(0.0914)
Age 55-64 years (reference)		
15-24 years	−0.0142	0.1344**
	(0.0091)	(0.0360)
25-34 years	0.1129**	0.3633**
	(0.0120)	(0.0238)
35-44 years	0.1022**	0.3266**
	(0.0129)	(0.0257)
45-54 years	0.0876**	0.2621**
	(0.0121)	(0.0254)
Single (reference)		
Married	0.0737**	−0.0814**
	(0.0208)	(0.0279)
Unearned Income/100	0.0002	−0.0066**
	(0.0019)	(0.0029)
No Qualifications (reference)		
Secondary education	0.0469**	0.2057**
	(0.0175)	(0.0269)
Third level education	0.0820**	0.3836**
	(0.0131)	(0.0211)
(Remainder of Country-reference)		
Border, Midlands, West Regions	0.0051	−0.0442**
	(0.0114)	(0.0204)
No children (reference)		
Age youngest child <4	0.0375*	−0.2049**
	(0.0259)	(0.0346)
>=4 and <12	0.0103	−0.1116**
	(0.0228)	(0.0322)
>=12 and <18	0.0359*	−0.0379
	(0.0177)	(0.0319)
Disabled limitation/secondary education	0.0655**	0.0856
	(0.0156)	(0.0665)
Disabled no limitation/secondary education	0.1023**	0.0979
	(0.0082)	(0.0945)
Disabled limitation/third level education	0.0572	0.0453
	(0.0310)	(0.1016)
Disabled no limitation/third level education	−0.0334	−0.0682
	(0.0839)	(0.1707)
McFadden R^2	0.2479	0.1440
N observations	3315	3362

*Note: **$p < 0.05$, *$p \leq 0.10$*