The Economic and Social Review, Vol. 29, No. 2, April, 1998, pp. 157-178

Married Women in the Irish Part-time Labour Market

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Abstract: This paper uses an econometric analysis of the 1987 Economic and Social Research Institute household survey data to assess the sources of the growth which has occurred in part-time employment in the last decade. The models used allow both for the possibility that the hours of work choice is a discrete one, and for the influence of the demand side of the labour market on a woman's choice between part-time and full-time work. The results confirm the impression gained from descriptive statistics that the growth in part-time employment has been supply-led, but that the growth of the Services sector has facilitated this increase.

I INTRODUCTION

Although, as Rodgers (1989) points out, "atypical" forms of work have rarely been absent from systems of wage employment and regular, protected jobs came to dominate industrial society only after the Second World War, there has been, in recent years, increasing comment on the persistence and growth of non-standard forms of work. Part-time work[1] is the most widespread form of several atypical employment practices, which

*This paper is based on my M.Litt. thesis, written while at Trinity College, Dublin. Thanks are due to my supervisor, Martin O'Donoghue, to two anonymous referees and to Tim Callan for providing the data. Any errors are my own.

1. It is useful to note how part-time work is defined. The International Labour Office defines it as *regular, voluntary work, carried out during working hours distinctly shorter than normal*. This is the definition used in statistics collected in the EU, but at a legislative level, the definition of part-time varies widely. For example, it is defined in France as any working time which is one-fifth less than normal, as two-thirds of the working time usually required in an activity in Spain and in Britain, as less than thirty hours per week.

include home-working, temporary and contract work.

But it is not only as the most usual form of atypical employment that part-time work is interesting. Part-time work is done, to a disproportionate extent, by women, and may therefore be a vehicle for indirect wage discrimination. This occurs where a job done by (female) part-time workers is not also done by full-time workers, so that while direct discrimination is not an issue, the firm discriminates by paying a higher hourly wage to full-time workers in another job of equal worth. By facilitating indirect wage discrimination, part-time work may in turn be a tool of labour market segmentation and sex segregation of the labour market, a point that has become a matter of concern in discrimination cases that have come before the Labour Court.

In Ireland, in 1991, employee protection legislation which had previously applied only to those working more than eighteen hours per week was amended to extend protection to those working at least eight hours per week. This protective legislation included the Redundancy Payment Acts; the Minimum Notice and Terms of Employment Acts; the Unfair Dismissals Act; and the Maternity Protection of Employees Act. The Holidays (Employees) Act was extended to give those working at least 120 hours per month annual holidays on a *pro rata* basis with full-time employees. Finally, social welfare regulations were changed so that social insurance contributions became payable at the full rate of 12.2 per cent of pay by employers and 7.75 per cent by employees for those earning over £25 per week; previously the rates had been 0.5 per cent and 2.25 per cent respectively for those working less than eighteen hours per week. An estimated 12,000 extra employees were covered by protective legislation on the introduction of the 1991 legislative changes.

The extension of such legislation raises the question of its likely effect on the level of part-time employment in Ireland, given that it clearly increases the costs of employing individuals working between eight and eighteen hours per week. This effect will depend on the extent to which part-time working is determined by the demand-side and the supply-side of the labour market.

The argument that the demand-side determines the extent of part-time work is based on the premise that part-time workers are cheaper to employ than full-time workers, at least in some sectors or occupations, because of the nature of the work involved, so employers offer these jobs on a part-time basis, as for example in the use of part-timers to cover peak hours in the Services sector. In this case, the size of the part-time labour force is determined by the number of such jobs in the economy. On the other hand, it may be that there is an over-supply of individuals wishing to work part-time, driving down the wages of part-time workers and causing employers to offer jobs on a part-time basis. Here, the extent of part-time working is determined by the number of individuals wishing to work part-time, the extent to which

their excess drives down the wage and the wage elasticity of demand for labour.

Section II of this paper describes the part-time labour market in Ireland. In particular, it details the growth in part-time work since the 1980s, and illustrates the dominance of women, especially married women, in part-time working in Ireland. Many of the points made here indicate a supply-led market. On this basis, and because of the high level of married women among part-time workers, the remaining sections of the article comprise an analysis of the labour supply of married women in Ireland, using micro-econometric models which allow for the possibility that the choice between part-time and full-time work is a discrete one, and for the presence of demand-side constraints on the part-time/full-time choice. Section III outlines the appropriate econometric models, Section IV reports their results and Section V concludes.

II DESCRIPTION OF THE IRISH PART-TIME LABOUR MARKET

Table 1 shows the extent of part-time labour supply in Ireland between 1983 and 1997, the years for which comparable data are available. There has been a steady increase in the proportion of workers who are employed on a part-time basis. Notably, the largest increases have occurred since the introduction of the 1991 legislation.

Table 1: *Part-time Labour Supply in Ireland, Males and Females*

Year	*Part-timers as Percentage of All Workers*	*Seeking Part-time Work as Percentage of Unemployed*
1983	6.7	–
1984	6.0	–
1985	6.2	9.7
1986	6.1	11.9
1987	7.0	10.4
1988	7.8	10.0
1989	7.4	10.5
1990	8.0	12.7
1991	8.3	12.6
1992	9.0	10.5
1993	10.8	10.7
1994	11.3	11.6
1995	12.0	13.5
1996	11.5	15.5
1997	12.3	14.1

Source: Irish Labour Force Surveys.

For those unemployed and seeking part-time work, no trend is discernible. The point can be made, however, that the level of part-time unemployment was higher than the level of part-time employment in almost all years, so that individuals seeking part-time work were over-represented among the unemployed. This may indicate that supply-side factors have been at work in increasing part-time working, the excess supply causing the quality-adjusted wage of part-timers to fall below that of full-timers.

Table 2 shows a comparison of part-time working in Ireland with that of other OECD countries; using more than one year of data allows some comparison of the trends over time in part-time working across countries.

Table 2: *Part-time Employment in OECD Countries*

Country	*Proportion of Workers in Part-time Employment*		
	1979	*1986*	*1991*
Australia	15.5	20.0	24.1
Belgium	6.0	9.4	13.3
Canada	12.5	15.2	–
Denmark	22.7	23.7	24.1
Finland	6.7	8.1	7.2
France	8.2	11.8	12.2
Germany	11.2	12.9	15.0
Greece	–	5.8	2.8
Ireland	**5.1**	**6.2**	**9.0**
Italy	5.3	5.0	5.1
Japan	15.4	16.6	–
Luxembourg	5.8	6.6	7.7
The Netherlands	11.1	25.3	32.0
Norway	22.2	23.1	–
Portugal	–	4.1	3.6
Sweden	23.6	25.2	–
United Kingdom	16.4	21.6	23.3
United States	16.4	17.3	–

Source: For 1979 and 1986, *OECD Employment Outlook 1987*; for 1991, *OECD Employment Outlook, 1992*. Because of differences in definitions, comparisons over time for a given country are unreliable and the figures for Ireland differ slightly from those in Table 1.

It is clear from the table that Ireland has had a low level of part-time employment by international standards. In 1979, it had the lowest level of part-time working among the eighteen countries included, although its position relative to other countries has changed in the meantime.

In an Irish context, these points raise the following interesting questions: Why has Ireland had such a low level of part-time working by international standards? Has the increase in the last decade in the level of part-time work been the result of supply-side or demand-side influences? What is the likely effect of extending protective legislation to more part-time employees?

Table 3: *Sex and Marital Status of Part-time Workers in Ireland, 1991*

Marital Status	*Proportion (%) of Part-timers in Group*		*Proportion (%) of Voluntary Part-timers*	
	Women	*Men*	*Women*	*Men*
Never-married	14.1	13.6	70.1	62.8
Married	52.5	13.4	92.6	59.4
Widowed/Separated	5.5	1.1	88.5	80.0
All	72.0	28.0	87.9	61.9

Source: Irish Labour Force Survey, 1991.

From Table 3, it is clear that married women constitute the single largest group of part-time workers, with more than half of part-timers being married women. Moreover, the second set of columns in Table 3 shows that the large majority of all part-timers, and particularly of married women working part-time, are working on a part-time basis voluntarily; they are not working part-time because they cannot find full-time work. This contradicts a common perception of part-time work as a "second best" alternative to the full-time option. Rather than causing labour market segmentation, part-time work may be valuable in introducing flexibility into the labour market for workers as well as for employers.

Evidence does exist that part-time hourly wages are low. Table 4 confirms that in countries for which data are available, part-timers tend to earn less than full-time workers. For Ireland, Blackwell (1990) reported that about 40 per cent of part-timers were paid hourly wages lower than £3.50 per hour, while only 10 per cent of full-timers earned less than this level.[2] For the US, Hotchkiss (1991) reports that between 1978 and 1988, wages paid to part-timers were between 11 per cent and 44 per cent less than those paid to full-time workers. However, the data in Table 4 also indicate that this gap applies to a lesser extent to women than to men, so that the overall difference in hourly earnings which remains between men and women in most countries

2. Using data from the 1979 *Structure of Earnings Survey*. Note, however, that such tabulations do not provide conclusive evidence of the lower quality-adjusted wage mentioned above, as it is also possible that women who wish to work part-time are also less educated/skilled.

does not apply to the same extent in the part-time labour market, at least in the countries shown.

Table 4: *Hourly Earnings of Part-time Workers*

Country	*Part-time Hourly Earnings as Percentage of Full-time Hourly Earnings*	
	Men	*Women*
Australia (1979)	104.0	103.4
Belgium (1972)	85.0	99.7
France (1972)	91.8	92.8
Germany (1972)	81.8	95.2
Italy (1972)	93.9	96.5
Japan (1977)	–	81.4
Luxembourg (1972)	80.1	80.5
Netherlands (1972)	83.5	119.0
United Kingdom (1981)	–	91.9

Source: OECD, 1983.

As to the type of work part-timers do, Table 5 shows that for both male and female workers, the proportion of part-timers who work in the Services sector is higher than the proportion of all workers in that sector, and there is a corresponding under-representation of part-timers among workers in Agriculture and Industry.

Table 5: *Distribution of Irish Workers by Sector, 1991*

Sector	*Proportion of All Workers Working in Sector*			*Proportion of Part-timers Working in Sector*		
	Men	*Women*	*Total*	*Men*	*Women*	*Total*
Primary	19.0	3.7	13.8	18.0	6.3	9.6
Secondary	33.7	17.9	28.3	16.9	8.5	10.8
Tertiary	47.3	78.4	57.9	65.0	85.4	79.6

Source: Irish Labour Force Survey, 1991.

The fact that there has been a sectoral shift away from Agriculture and towards Services in the last 20 years suggests that a possible reason for the growth of part-time work may be that offering work on a part-time basis is particularly attractive for service sector employers and that as the sector has grown it has dragged the level of part-time working up with it.

III CHOICE OF ECONOMETRIC MODEL

The use of estimation methods such as the Tobit (Tobin, 1958) and Heckman's (1976) selection bias-corrected regression has become standard in the estimation of labour supply functions. These techniques deal with the problems caused by the fact that hours data, particularly for married women, typically show a cluster at zero hours; desired hours of work are not observable, so that those with negative desired hours of work are observed as working zero hours, a form of censoring of the data.

However, for both of these techniques, the assumption is incorporated that the individual chooses her hours of work by maximising her utility subject to a continuous budget constraint,[3] so that unemployment is equivalent to non-participation and all leisure consumed is consumed by choice. But there is evidence that demand-side restrictions generate discontinuities which restrict individuals' choices significantly.

An important source of such discontinuities is where employers offer "take-it-or-leave-it" regimes, where a standard workday or workweek must be worked if the individual accepts a job, reducing the budget constraint to two points. In general under such a regime, the individual, if she does choose to work, is either under-employed or over-employed.

There are reasons to believe that there are individuals who are willing to work at their market wage, but cannot find a job at this wage. On a theoretical level, efficiency wage theories (Shapiro and Stiglitz, 1984; Akerlof and Yellen, 1986) and implicit contract models (Baily, 1974; Bull, 1983) have been developed in which it is not in the employer's interest to reduce the wage to the market-clearing level. On an empirical level, the level of registered unemployment has been high in the last 15 years, and labour force survey responses suggest that a significant amount of this unemployment is involuntary.

Blundell *et al*. (1987) develop a model of female labour supply that allows for individuals being involuntarily unemployed that is based on an intuitively appealing "double hurdle" model. Since two groups of individuals record zero hours of work in the presence of unemployment — those who choose not to work at their market wage and those who want to work at that wage, but cannot, the total probability of an individual having zero hours of work can be expressed as:

3. Although, theoretically, the same variables should determine the participation equation and the hours of work equation for the Heckman model, the sizes of the parameters are not constrained to be equal in the two stages; thus, if there are fixed costs of working which set an effective minimum on the number of hours which can be worked, then this can be reflected in the parameter estimates, so this type of discontinuity is allowed for in the Heckman model. In the presence of fixed costs, Tobit estimates overstate the effect of wages on labour supply.

$$(1-F_i)+(1-P_i^E)F_i$$
$$=1-P_i^E F_i$$

where P_i^E is the probability of finding employment and F_i is the cumulative standard normal distribution of the probability of wishing to work positive hours.

In this model, demand variables affect the probability of having positive hours of work observed through both the effect on wages and the effect on the probability of being able to find employment. Hence, a theoretical justification for the inclusion of demand-side variables in participation equations is provided. This approach is the one followed in Callan and Farrell (1991).

The possibility that demand-side variables also determine the number of hours worked is not addressed in the Blundell *et al.* model, however. This is a common treatment of the effect of the demand side of the labour market, although from the description of the part-time labour market given in Section II above, there is clearly reason to believe that there is a connection between industry/occupation and hours of work.

It must be noted, however, that the issue of endogeneity arises when including demand-side variables in an hours specification; it is certainly possible that individuals may choose an occupation precisely because it offers more opportunities for part-time work. To account for this adequately would require the specification of a multinomial occupational choice model jointly with a discrete-choice hours model, with correlation between the error terms allowed for.

Unfortunately, problems arise in using this approach, because the appropriate model would be a multivariate probit model. Even with grouping of occupations, for example into the three sectors of Agriculture, Production and Services, the multivariate normal integrals that it would be necessary to evaluate make this approach very difficult to implement, and beyond the scope of the present paper.

Because of the difficulties of dealing with the possible endogeneity of the occupational variables in the model of hours worked, the models estimated in this paper should be regarded as of reduced form, rather than structural.

Blundell and Laisney (1988) emphasise the role of demand-side constraints in determining hours of work in a different way to Blundell *et al.* Their model is motivated by the idea that the assumption of a continuous hours distribution is an unrealistic one. Here, hours are grouped into four intervals: non-participation (less than 1.5 hours); part-time (1.5-35.5 hours); full-time (35.5-41.5 hours); and overtime (over 41.5 hours). A further classification of individuals as unemployed is also made, allowing those who record zero hours

of work to have positive but unspecified desired hours of work. The motivation for this particular grouping arose from the observation that hours of work in the sample used were strongly accumulated around 20 and 40 hours.[4] Women are hypothesised to choose among the four regimes described above, but within each regime to have no control over hours of work.

The preferred likelihood function estimated is in the form of a multinomial discrete choice model:

$$L = \prod_{i \in S} P(H_i \notin I_1) \prod_{i \in J_1 - S} P(H_i \in I_1) \prod_{k=2}^{4} \prod_{i=J_k} P(H_i \in I_k) \qquad (1)$$

Here, I_k, k = 1,...,4 are the four desired hours intervals mentioned above, and J_k is the set of women observed in interval k. The first term is estimated over all those with positive desired hours but zero actual hours, the seekers, S; the second term accounts for "genuine" non-participants; and the third term is estimated over those in the second, third and fourth intervals.

The first model reported in Section IV below is a simple double-hurdle model, with a dichotomous full-time/part-time choice modelled conditional on participation, and with demand-side variables included in both the participation and hours specifications. The second model is a multinomial logit model of five ranges of hours of work.

IV ESTIMATION RESULTS

The data used in this study is the Economic and Social Research Institute's *Survey of Income Distribution, Poverty and Usage of State Services* (hereafter the ESRI Survey). This is a survey of a sample of the Irish population resident in private households which was carried out between February and September, 1987.[5] The number of households surveyed containing married women was 1,719. A detailed description of the survey is provided in Callan *et al*. (1989).

The first step in any analysis of the labour supply of married women must be the estimation of wages for those women who do not work in the labour market. It is usually argued that sample selection bias is significant in wage estimations. Sample selection bias arises if coefficients are estimated over a sub-sample of the population of interest, where unobservables determining whether an individual is included in the sample are correlated with unobservables determining the dependent variable.

4. The sample was of French married women from a 1979 survey.

5. Although other micro-level surveys have since become available, they offer no advantages over the 1987 one for analysing the matter in hand; the ESRI survey gives a snapshot of the labour market before the changes in legislation described in Section I above.

Thus, for example, the wage rate of an individual is a function of observable human capital variables and of unobservable variables such as motivation and ability. In the population,

$$W_i = f(\mathbf{HC}_i, \varepsilon_{Wi}) \quad \varepsilon_W \sim (0, \sigma_W)$$

where ε_{Wi} represents these unmeasured factors and $\mathbf{HC}_i$, the human capital variables. However, it seems likely that those with higher motivation and ability will also have higher wages, so that in the sample chosen, the workers,

$$E[\varepsilon_{Wi} | i \text{ works}] \neq 0.$$

Thus, the regression of W_i on human capital variables such as education and experience, but not on the non-zero conditional mean of ε_W, yields biased estimates of the population wage parameters.

It can be shown that this conditional mean of ε_{Wi} is

$$K_i = \sigma_W \lambda_i$$

where σ_W is the standard deviation of ε_{Wi} in the population and λ_i is the inverse Mills ratio, defined as:

$$\lambda_i = f_i / 1 - F_i.$$

Heckman's procedure involves an OLS regression based on workers only, but including K_i as an independent variable, thus rendering the estimates efficient.

The results of the Heckman wage estimation are shown in Table A1 in the Appendix. These indicate that the higher the level of education of a woman and the more years of labour market experience she has, the higher the wage she receives. Wages were predicted for all individuals on the basis of the parameters shown in Table A1. Descriptive statistics for the variables used in the wage regression and for the estimations reported below are given in Table A2 in the Appendix.

Before proceeding to the discussion of the results of the models of labour supply, some comment on the interpretation of results based on logit models is useful. It is not the case that the coefficient on a variable in these models can be interpreted as the marginal effect, the effect of a one unit increase in the independent variable on the dependent variable. For the logit model,

$$P_i = \frac{e^{\beta X_i}}{1+e^{\beta X_i}}$$

$$\frac{\partial P_i}{\partial X_k} = \beta_k \cdot \frac{e^{\beta X_i}}{1+e^{\beta X_i}} \cdot \frac{1}{1+e^{\beta X_i}} \qquad (2)$$

$$= \beta_k (P)(1-P)$$

Thus a factor of adjustment equal to (P)(1–P) is necessary to obtain the marginal effect of the variable X_k. It is common to calculate the marginal effect at either P = 0.5 or at the sample mean.

For the multinomial logit model, the individual chooses between more than two alternatives, so that the adjustment factor is calculated from:

$$\frac{dP_i}{dX_k} = P_i \left[\beta_{ik} - \sum_j P_j \beta_{jk} \right] \qquad (3)$$

where P_i and P_j are the probabilities of being in state i and j respectively, β_i and β_j are the coefficients on the variable X_k in states i and j and where j indexes the possible states apart from i (Greene, 1993). Note that this adjustment formula implies that the sign on the raw coefficient may not indicate even the direction of the effect. Since dummy variables are not continuous, for both the binomial and multinomial models, the marginal effect of a dummy variable is evaluated by calculating the probability of occupying the relevant state when the dummy equals one, and when it equals zero, and subtracting the latter from the former.

The results reported in Tables 6 and 7 below refer to a two stage model of part-time working; here, working part-time is modelled conditional on having decided to participate.

The model found best to explain the participation of women is reported in Table 6. In these results, the variables representing the personal and household characteristics of the woman have effects on her participation in the expected direction. Thus, the higher a woman's wage, the higher her probability of working, although the negative sign on the square of wage indicates that this probability increases at a decreasing rate.[6] Also, the higher other family income, the less likely she is to work outside the home, while the youngest child being four years old or younger further decreases this probability. Older women are more likely to remain outside the labour force; this is probably an attitudinal effect. Women whose husbands are in

6. Note that the maximum of the quadratic function is well beyond the hourly wage received by all but one individual in the sample.

Table 6: *Logit Analysis of Participation. Asymptotic t-Statistics Shown*

Dependent variable: At work		*Pseudo* $R^2 = 0.35$
Sample size: 1,719		*Log Likelihood = –542.97*
Variable	*Coefficient*	*t-Statistic*	*Marginal Effect**
Predicted Log Wage	5.0325	6.27	0.7745
(Predicted Log Wage)^2	–0.6341	–2.02	–0.0976
Family Income if Wife Not Employed	–0.0026	–3.54	–0.0004
Youngest Child Aged 0-4	–1.5726	–7.69	–0.1175
Age	-0.0797	–7.81	–0.0123
Husband on Means-Tested Benefits	–0.6080	–2.10	–0.0440
Occupation:			
Producers	1.0367	3.59	0.1171
Transport, Communication, Storage	0.8464	1.92	0.0995
Commerce, Insurance, Finance	0.8325	3.20	0.0924
Professional/Technical	1.2786	5.52	0.1481
Industry Female Unemployment Rate	–0.0881	–4.03	–0.0136
Constant	–1.4136	–1.97	–

*Calculated at P = 0.19, since that is the proportion of the sample at work. The factor of adjustment is therefore 0.15.

receipt of a means-tested benefit are also less likely to participate in the labour force; since a woman's labour supply determines whether her husband receives a means-tested benefit or not, this variable is endogenous and should not be thought of as indicating causality. This point is discussed further below.

As to demand-side variables, the results show that affiliation to only four occupations is important in determining participation. For those in production; transport/communication/storage; commerce/insurance/finance and professional/technical occupations, the probability of working is higher than for those in other occupation groups. This relationship holds even when the unemployment rate of women in the relevant industrial group is accounted for.

In Table 7, the results of modelling the decision as to the number of hours supplied by a married woman as a dichotomous choice between part-time and full-time work using a logit model are shown. The choice of part-time work is

estimated across those who work only, so that the parameters estimated must be interpreted as being conditional on having chosen to work at an earlier stage.

Table 7: *Logit Model of Full-time / Part-time Choice*

Dependent Variable: Part-time Worker		*Pseudo* R^2 = 0.23
Sample size: 326		*Log Likelihood = –170.43*
Variable	*Coefficient*	*t-Statistic*	*Marginal Effect**
Predicted Log Wage	–5.549	–3.47	–1.3518
(Predicted Log Wage)^2	2.3105	4.43	0.5628
Youngest Child Aged 0-4	0.892	2.51	0.2148
Youngest Child Aged 5-12	1.017	2.85	0.2471
Years Not at Work	1.978	3.52	0.4818
(Years Not at Work)^2	–4.157	–1.94	–1.0127
Husband on Means-Tested Benefits	–1.260	–2.12	–0.2464
Occupation:			
Producers	–1.969	–3.01	–0.3414
Commerce, Insurance, Finance	0.966	2.23	0.2367
Constant	1.033	0.81	–

*Calculated at P = 0.42.

It may be seen from these results that the higher the wage, the less likely is a woman to work part-time, with the size of the marginal effect indicating an elastic response to an increase in the wage. However, beyond an hourly wage rate of £3.30 per hour, which applies to over 50 per cent of those observed to be working, the probability of working part-time increases with the wage rate.

A woman's youngest child being no older than four years old makes it more likely that she will work part-time, as will her youngest child being aged between 5 and 12 years old. It is interesting that the coefficient on (and marginal effect of) having a youngest child of less than 4 years is smaller than that for having a youngest child in the older age bracket. This may be because the choice is conditioned on participation, so that those women who stay working while they have such young children are particularly attached to the labour market, and this works against their choosing part-time work to some extent. Alternatively, it may be because of the fixed costs of child-care which make it more likely that a woman will work full-time, if she works, in order to cover these child-care costs.

It is also interesting that the experience variables that were retained in the model were "years out of the labour force" and its square. The positive

coefficient on this variable confirms the common perception that women use part-time work as a way to re-enter the labour force after an absence for child rearing. Of course in the absence of a separate variable for age, this variable also captures any age effects, such as the lower tastes of older women for labour market work, and thus a preference for part-time over full-time work. However, this explanation seems less likely than the "returning to work" explanation. For women who were out of the labour force for more than 24 years, the effect of this variable is negative. This result is difficult to explain, but the fact that just nine of those working had been out of the labour force for more than 24 years makes this result less worrying.

Finally on the supply side, a woman's husband being in receipt of a means-tested benefit makes it less likely that she will work part-time and hence more likely that she will work full-time. This result is in the direction that theory would predict for the effect of means testing, since if a woman does decide to work when her husband is on a means-tested benefit, she is better off working full-time in order to offset as much as possible the effect of her husband's benefit being withdrawn. In this case, however, the variable is measured inappropriately to capture the means testing effect; it measures the receipt of benefits, and since women working full-time earn on average more per week than women working part-time, it might be expected that receipt would be recorded for fewer households in which the wife worked full-time. This result can only be explained as an "added worker" effect if some women are not being affected by the means-test due to working in an "undeclared" job in the black economy. The small number involved who are working full-time, but whose husbands are none the less receiving a means-tested benefit (17 of 239 women) makes this explanation plausible.

In order to test for a sample selection bias in the estimation of the above results, the preferred specifications of the models of participation and hours were used in a Heckman framework of the type used in the wage estimation described above to estimate an hours of work equation. Here, there are two differences in the assumptions made. The first, which is the motive for using the Heckman model, is that it is possible that the same unobserved characteristics which increase a woman's probability of participation, such as taste for work, will also cause a woman to want to work more hours if she does work. The second is that hours of work are estimated as a continuous variable rather than a dichotomous one, so that any limits on hours of work from the demand side are neglected. No sign changes result from using the Heckman model, but fewer of the variables included in the hours equation are significant. More importantly, the coefficient on the parameter indicating the degree of correlation between the two equations — the selection bias — is not significant. This indicates that self selection is not distorting the coefficient

estimates in the two stage approach reported in Tables 6 and 7.

Table 8 shows the results of the alternative model, a multinomial logit model of the hours of work of Irish married women. Here, the women are divided into those not undertaking paid work, those working less than 30 hours per week ("part-time"), those working between 30 and 39 hours per week ("short full-time"), those working between 39 and 41 hours per week ("full-time") and those working over 41 hours per week ("overtime"). The cut-off values were chosen after inspection of the distribution of hours worked by women in the sample, which showed a strong peak at 40 hours per week and another concentration of workers in the 25-30 hours per week range. It was not possible to treat women seeking work separately, as Blundell and Laisney (1988) did because of the small number (38) in the sample who described themselves as seeking work. Apart from the practical difficulties associated with estimation over so few individuals in a category, the number describing themselves as unemployed is almost certainly an understatement, given that the female unemployment rate was over 13 per cent in 1987.

The marginal effects columns require some explanation. It is important to remember that coefficients are calculated relative to the omitted group,[7] so all the marginal effects reflect the effect of a one unit increase in a variable's value on the probability of being in the relevant category relative to the probability of not working. The marginal effects are calculated according to Equation (2) above, using the probabilities at the sample mean.[8] Thus, for example, having a youngest child in the 0 to 4 age group reduces the probability of working part-time rather than not working by about 6 per cent for a woman who has the average probability of working part-time.

These results show coefficients of expected signs and relative magnitudes for most of the variables. The higher a woman's wage, the higher her probability of working, with stronger effects for higher hours (except "overtime"). The wage squared variable, where significant, indicates that the effect of wages becomes less strong at higher wages. The higher "other household income" and the woman's age, the lower the probability of working. Having a youngest child of less than 4 years reduces the probability of working in all hours categories with bigger effects for higher hours, except "overtime"; the same holds true for the effect of having a youngest child aged between 5 and 12 years, apart from the effect on the probability of part-time work, which has a positive coefficient. Since this result is not significant at any reasonable level of confidence, the hypothesis that having a youngest

7. One group must always be omitted in estimating a multinomial logit for identification purposes; in general the largest group is the one left out.

8. Thus, the probability of working part-time is 0.08, that of working "short full-time" is 0.03, that of working full-time is 0.06 and the probability of working overtime is 0.02.

Table 8: *Multinomial Logit Model of Labour Supply. Asymptotic t-Statistics in Brackets*

Dependent Variable: Hours of Work — 5 Categories — *Pseudo* $R^2 = 0.31$
Number of Observations: 1,719 — *Log Likelihood = -857.9*

	Part-Time		*Short Full-Time*		*Full-Time*		*Overtime*	
Variable	*Coefficient (t-Statistic)*	*Marginal Effect*	*Coefficient (t-Statistic)*	*Marginal Effect*	*Coefficient (t-Statistic)*	*Marginal Effect*	*Coefficient (t-Statistic)*	*Marginal Effect*
Predicted Log Wage	1.880 (*1.99*)	0.0773	6.359 (*3.22*)	0.1661	9.256 (*6.01*)	0.5348	8.865 (*3.34*)	0.1432
(Pred. Log Wage)^2	0.496 (*1.34*)	0.0563	-0.980 (*-1.40*)	-0.0256	-2.289 (*-3.91*)	-0.1383	-1.917 (*-1.97*)	-0.0322
Family Income if Wife Not Employed	-0.002 (*-2.18*)	-0.0001	-0.007 (*-3.47*)	-0.0002	-0.002 (*-2.03*)	-0.0001	-0.004 (*-1.65*)	-0.0001
Youngest Child 0–4	-1.341 (*-3.97*)	-0.0641	-2.395 (*-5.67*)	-0.1318	-1.767 (*-5.45*)	-0.1333	-2.463 (*-4.93*)	-0.0989
Youngest Child 5–12	0.330 (*1.24*)	0.1134	-1.036 (*-2.29*)	-0.0832	-0.720 (*-2.10*)	-0.0688	-0.838 (*-1.55*)	-0.0500
Age	-0.054 (*-3.77*)	-0.0034	-0.094 (*-4.93*)	-0.0025	-0.106 (*-6.69*)	-0.0059	-0.129 (*-5.15*)	-0.0021
Husband on Means–Tested Benefits	-1.313 (*-2.59*)	-0.1345	-0.045 (*-0.07*)	0.0201	-0.044 (*-0.11*)	0.0241	-0.178 (*-0.25*)	0.0011
Occupation:								
Producers	-0.378 (*-0.54*)	-0.0896	-0.038 (*-0.04*)	-0.0293	1.150 (*2.33*)	0.1926	0.313 (*0.32*)	0.0053
Clerical Workers	-0.355 (*-0.65*)	-0.0268	0.627 (*0.79*)	0.1197	-1.029 (*-2.13*)	-0.1051	-1.761 (*-1.81*)	-0.0843
Commerce/Insurance	1.059 (*1.98*)	-0.0057	-0.752 (*-0.71*)	-0.0853	-1.114 (*-1.76*)	-0.1241	0.818 (*0.96*)	0.0631
Professional/ Technical	1.420 (*2.78*)	0.2316	0.631 (*0.74*)	0.0238	0.049 (*0.10*)	-0.0557	0.121 (*0.13*)	-0.0283
Service Workers	-0.062 (*-0.11*)	0.0481	-0.620 (*-0.68*)	-0.0373	-1.076 (*-1.95*)	-0.0993	-0.908 (*-0.91*)	-0.0489
Industry Female Unemployment Rate	-0.082 (*-2.65*)	-0.0056	-0.089 (*-1.95*)	-0.0022	-0.129 (*-3.47*)	-0.0073	-0.075 (*-1.09*)	-0.0010
Urban	0.541 (*2.52*)	0.0663	1.093 (*3.19*)	0.1046	-0.165 (*-0.68*)	-0.0547	-0.154 (*-0.36*)	-0.0320
Constant	-1.841 (*-1.73*)	–	-2.985 (*-1.59*)	–	-2.574 (*-1.92*)	–	-3.140 (*-1.38*)	–

child in this age range has no effect on the probability of working part-time cannot be rejected. However, this may be seen as tentative support for the suggestion that women use part-time work as a means of re-entering the labour market when their children reach school-going age.

A woman's husband being in receipt of a means-tested benefit reduces the probability of her working part-time but has no significant effect on the probability of her working in higher hours categories, again, probably because of the point made above that a man's benefit is withdrawn if his wife earns over a certain amount.

On the demand side, the industry-specific female unemployment rate has a negative effect on the probability of being employed in any of the hours categories, with the largest marginal effects for part-time and full-time work. Living in an urban area has a significant positive effect on the probability of working "short full-time", and a smaller positive effect on the probability of working part-time. For the other hours ranges, the effect of living in an urban area is negative, although not significantly different from zero.

The most interesting results produced by using this model, however, are those for the occupation variables. Five categories were found to be important to the determination of hours of work, in different directions for different hours categories. Thus, belonging to a commerce/insurance/finance occupation makes it significantly more likely that a woman will work part-time. Women who are production workers have a higher probability of working full-time than of not working, with effects insignificantly different from zero for the other hours categories. Clerical workers are significantly less likely to work full-time than not to work, with a marginally significant negative effect for "overtime" work. Professional/technical workers are more likely to work part-time, while service workers are significantly less likely to work full-time. In the two stage model reported above, association with a professional/technical occupation has a positive effect on the probability of participation, but none on the probability of working part-time. Given that the coefficients on this occupation variable are positive for each of the hours of work categories, it seems likely that this is largely a participation effect. However, the marginal effect on the probability of working part-time of this occupation is particularly large.

These results, in particular those for the occupation variables, indicate the value of treating the decision to participate in the labour market as a choice between limited hours regimes. The two stage model of Tables 6 and 7 does not explain the choice between part-time and full-time work as well as this one, particularly from the point of view of demand-side effects. If there are non-linear demand-side effects, so that more than one hours regime is common in an occupation, but these are not specifically allowed for, then the

occupation with which a woman is associated may seem to be unimportant to the hours of work she undertakes; for example, where an occupation is strongly associated with both part-time work and very long hours of work, the effects may "cancel out" in a model where the hours of work choice is modelled either as continuous or as a dichotomous full-time/part-time one.

V CONCLUSIONS

Part-time employment is rising in Ireland, albeit from a low base. To a significant extent, part-time workers tend to be female and married and to work part-time by choice, rather than because of the absence of full-time possibilities. This suggests that part-time work is a choice made in order to cope with child-rearing responsibilities, indicating a supply-led market for part-time labour.

The econometric analysis of Section IV indicates that both supply- and demand-side factors are important to the determination of both participation and hours of work. On the supply side,[9] it was found that financial influences, such as a woman's wage and other household income, and demographic variables such as a woman's age, and the age and number of her children are important to female labour supply. On the demand side, the unemployment rate was found to have a negative effect on a woman's participation, while her hours of work were found to be strongly related to her occupation. In particular, a woman with a commercial occupation, or a professional one is more likely to work part-time, while a woman who works in production is more likely to work full-time.

There are several points which are relevant in attempting to anticipate the future extent of part-time employment in Ireland. First, the part-time labour market appears to be largely supply-driven. Moreover, since the desired participation of Irish women in the labour market is set to continue increasing, as wages rise with the level of education, and as the birth rate continues to fall, the excess supply of part-time female labour is likely to remain for the foreseeable future.

Second, part-time work is associated with the service sector, and with commercial and professional occupations in particular. These are also the occupations which have shown the most growth during the 1980s. If this growth continues, and there appears to be no reason to expect otherwise, then part-time positions seem likely to continue to be available.

The introduction of the Worker Protection (Regular Part-Time Employ-

9. Although it is convenient to refer to the demand and supply sides of the market, recall that the models used are of reduced form, so the interpretation of the wage as a supply-side variable is not strictly valid.

ment) Act, 1991 has certainly decreased the scope for numerical flexibility in employing on a part-time basis. Moreover, the social welfare regulations which came into effect at the same time as the 1991 Act involve an increase in the relative costs of employing an individual for between eight and eighteen hours per week, which must reduce the demand for part-time labour below that which it would have been in the absence of these regulations. To estimate the extent of this reduction would require a knowledge of the wage elasticity of part-time labour demand by firms, which is beyond the scope of this paper. But it seems unlikely that this reduction in demand will be sufficient to reverse the upward trend in part-time employment, since less than one-third of part-timers work between eight and eighteen hours per week,[10] and it is in this hours region that costs, both direct and in terms of numerical flexibility, have been increased.

On the benefit side of the 1991 Act, it seems that with such comprehensive social protection of the majority of part-timers in place, the fear must be less acute that the growth of part-time work will involve the proliferation of "precarious" jobs occupied mainly by women, with a consequent worsening of the sex segregation of the labour market.

The possibilities for studying the part-time labour market in Ireland in further depth are limited by data availability. This paper has attempted to unravel the factors which affect a woman's static decision to work part-time rather than full-time, but nothing is known of the dynamics of part-time labour supply in Ireland. Do women use part-time employment as a stepping stone back to full-time work after childbirth? Or is it the case that some women choose to work part-time over their entire working life, while others choose to work full-time or not at all? Is experience as a part-timer reflected in a woman's wage rate to the same extent as full-time experience? None of these questions can be addressed in an Irish context, however, since no large scale panel survey suitable for analysis of this kind is available as yet.

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APPENDIX

Table A1: *Selectivity Bias-corrected Wage Prediction Equation*

Dependent variable: Log of usual gross hourly wage

Sample size: 1,719 *Log Likelihood = -710.7*

Variable		*Coefficient*	*t-Statistic*
Wage Equation:			
Years in Labour Force/10		0.527	**3.49**
(Years in Labour Force)^2/100		–0.663	–1.60
Years out of Labour Force/10		–0.337	–3.10
(Years out of Labour Force)^2/100		0.715	1.83
Education:	Group	0.120	**1.36**
	Intermediate	0.318	**3.58**
	Leaving	0.462	**5.49**
	Diploma	0.890	8.92
	Degree	1.171	11.32
	Constant	0.435	2.52
Participation Equation			
Years in Labour Force/10		1.605	7.17
(Years in Labour Force)^2/100		–3.977	–5.77
Years out of Labour Force/10		–1.736	–11.10
(Years out of Labour Force)^2/100		2.914	6.37
Education:	Group	0.070	0.516
	Intermediate	0.070	**0.48**
	Leaving	0.286	**2.17**
	Diploma	0.320	**1.72**
	Degree	1.068	4.90
	Youngest Child Aged 0-4	–0.979	–8.26
	Constant	–0.380	–1.57
λ		0.133	1.76

Note: Omitted education category is primary.

Table A2: *Descriptive Statistics of Variables Used*

Variable	*Mean*	*Std. Dev.*	*Min.*	*Max.*
At Work	0.190	0.392	0	1
Part-time Work	0.080	0.272	0	1
Short Full-time	0.030	0.171	0	1
Full-time Work	0.061	0.240	0	1
Overtime Work	0.018	0.133	0	1
Usual Wage	0.993	3.024	0	76.47
Usual Hours	5.944	13.517	0	80
Family Income if Wife Not Employed	170.216	128.060	−178.63	2143.63
Age	41.271	10.073	18	59
Youngest Child 0-4	0.348	0.477	0	1
Youngest Child 5-12	0.272	0.445	0	1
Number of Children	1.950	1.588	0	9
Education — Primary	0.337	0.473	0	1
Education — Group	0.199	0.399	0	1
Education — Inter.	0.155	0.362	0	1
Education — Leaving	0.208	0.406	0	1
Education — Diploma	0.059	0.235	0	1
Education — Degree	0.041	0.199	0	1
Years at Work	9.324	6.214	0	39
Years Not at Work	15.925	11.081	0	45
Husband on Means-Tested Benefit	0.139	0.346	0	1
Urban Household	0.456	0.498	0	1
Industry Female Unemployment Rate	8.501	4.043	1.96	12.46
Occupations:				
Agriculture	0.010	0.102	0	1
Producers	0.180	0.385	0	1
Labourers/Unskilled	0.008	0.087	0	1
Transport, Storage, Communications	0.037	0.188	0	1
Clerical Workers	0.217	0.412	0	1
Commerce, Finance, Insurance	0.123	0.329	0	1
Professional/Technical	0.221	0.415	0	1
Service Workers	0.130	0.337	0	1
Others	0.073	0.261	0	1