Labour Force Participation and the Growth of Women's Employment, Ireland 1971-1991

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Abstract: This paper studies changes in labour force participation rates and in the structure of the Irish labour force over the period 1971-1991. The rise in participation rates among females aged 25-54 and the decline among older and younger people of both sexes altered the demographic structure of the labour force significantly. The reasons for these changes are explored using time series of annual participation rates. It is shown that participation rates among those aged 15-24 and males aged 65 and over, although dominated by exogenous negative trends, are also responsive to the returns to labour force participation which in turn depend on wage rates, unemployment benefits and the rate of unemployment. Participation rates among women aged 20-54 are responsive to the returns to entering the labour force and the sharp fall in the birth rate during the 1980s, argued here to be largely exogenous. The marked decline in labour force participation among males aged 55-64 is difficult to explain with the available data. The effect of increases in women's labour supply on the rate of unemployment is discussed.

I INTRODUCTION

T he Irish labour force increased by 240,000, or 21.6 per cent, between 1971 and 1992. The female labour force grew by 54.6 per cent, but the male by only 10.2 per cent. As a result women accounted for almost two-thirds (65 per cent) of the total increase and the share of women in the labour force rose from 25.8 per cent to 32.8 per cent. Even more striking is that all of the growth in the male labour force was due to increased unemployment. The number of males at work *fell* by 4.8 per cent, while the number of women at

work rose by 40.8 per cent. The contrast between the rates of growth of the
male and female labour forces was due mainly to the marked increase in
labour force participation rates (LFPRs) among women aged 20-54 at a time
when male LFPRs at all ages were declining. Despite the faster growth of
women's employment, the female unemployment rate rose from 3.9 per cent
to 12.4 per cent over the period, and increased from 65 to 66 per cent of the
male rate. These trends are summarised in Table 1.

Table 2 shows labour force flows by gender for the periods 1971-1981 and
1981-1991. Whereas a significant net inflow of population augmented the
growth of the working-age population in the 1970s, in the 1980s more than
half the potential growth was offset by a net outflow of population. Female
employment increased strongly over the whole period, but male employment
increased by only 10,100 in the 1970s and declined sharply during the 1980s.
The sharp increase in the number of males aged 15-64 classified as "not in the
labour force" contrasts with the slight decline in the number of women in this
category between 1981 and 1991.

This paper examines the factors associated with the changing pattern of
labour force participation in the main population groups. Section II contains a
summary of the effect of changes in LFPRs on the growth and structure of the
Irish labour force over the period 1971-1991. Section III presents a brief
summary of the economic influences on labour force participation and Section
IV reviews previous Irish research on this topic. In Section V the results of
estimates of time series models of age- and gender-specific LFPRs are pre-
sented. In Section VI some implications of the findings are discussed.

II PARTICIPATION RATES AND THE CHANGING STRUCTURE OF THE LABOUR FORCE

This study relies heavily on Labour Force Survey (LFS) data, which
provide the basis for the only available annual time series on employment
and unemployment for the whole economy. In the LFS individuals are
assigned to a "principal status with respect to employment" on the basis of
the information obtained in a household interview. The labour force is the
sum of the employed and the unemployed. All who report working for pay or
profit for one hour or more in a week are classified as "employed", and those
who are actively looking for employment are classified as "unemployed". The
problems associated with applying these demarcations to school-leavers,
students, women who are not in permanent employment and the elderly are
well-known. However, the LFS is explicitly designed to provide reliable and
internationally comparable data on these topics.

Table 1: *Employment and Unemployment in 1971 and 1992*
('000)

	1971			1992		
	Employed	*Unemployed*	*Total Labour Force*	*Employed*	*Unemployed*	*Total Labour Force*
Males	773.8	49.6	823.4	737.0	170.0	907.0
Females	275.5	11.1	286.6	388.0	55.0	443.0
Both sexes	1,049.3	60.7	1,110.0	1,125.0	225.0	1,350.0

Sources: Trend of Employment and Unemployment, 1979-85, Table 1 and Labour Force Survey 1992, Preliminary Estimates, Tables 1, 2 and 3.

Table 2: *Labour Force Flows, 1971-91*
('000)

	Growth of Working Age* Population					Change in Numbers		
	Natural Increase**	*+/−*	*Net External Migration*	*=*	*Total*	*= Employed*	*+ Unemployed*	*+ Not in Labour Force*
					1971-81			
Males	134.7	+	24.7	=	159.4	= +58.8	+51.9	+49.0
Females	140.2	+	13.8	=	154.0	= +63.9	+20.2	+70.0
					1981-91			
Males	177.9	−	102.8	=	75.1	= −48.7	+52.7	+70.8
Females	169.9	−	97.4	=	72.5	= +50.9	+22.4	−1.0

 * = aged 15-64 years.
** or potential growth (in the absence of net external migration).
Sources: Census of Population and Labour Force Surveys.

Table 3 contains age- and gender-specific LFPRs for 1971 and 1991. It may be seen that LFPRs declined among males of all ages, and among girls aged 15-19 and women aged 55 and over. However, among women aged 20-54 LFPRs rose significantly, due primarily to the rise in participation among married women. The divergent trends in male and female LFPRs over this interval reduced the difference between the genders with regard to participation in the labour force, while married and single women's LFPRs also came closer together. Finally, the pattern of Irish LFPRs moved closer to that found in more economically developed countries. However, it may be seen from Table 4 that even in 1989 LFPRs among women aged 25-64 were still much lower in Ireland than the average for the European Community (EC).

Even in 1991 women comprised slightly less than one-third of the Irish labour force, compared with an EC average of 40 per cent. It is also striking that Irish LFPRs among both males and females aged under 25 were lower than the EC average. Only among older males were Irish LFPRs above the EC average.

Table 3: *Labour Force Participation Rates, Ireland, 1971 and 1991*
(Proportion of demographic group economically active)

| | Males | | Females | | | | | |
| | | | Total | | Married | | Single | |
Age Group	1971	1991	1971	1991	1971	1991	1971	1991
15-19	54.1	29.3	47.3	21.1	11.1	23.4	45.6	21.1
20-24	88.7	81.1	65.1	73.4	15.3	46.7	87.4	77.5
25-34	96.1	96.2	28.3	57.4	8.8	44.7	85.1	87.1
35-44	96.3	95.9	18.8	35.4	6.7	29.7	72.5	78.3
45-54	94.0	91.6	20.4	28.8	7.3	22.5	64.3	72.4
55-59	92.1	79.8	21.5	22.1	7.1	16.6	55.1	55.6
60-64	86.9	59.4	20.5	14.0	5.8	8.8	46.2	36.8
65 & over	43.9	15.8	11.3	3.0	3.0	2.1	22.3	6.8
15 & over	80.7	70.9	27.9	32.9	7.5	26.9	59.0	50.0

Source: Census of Population, 1971, Vol. V and *Labour Force Survey*, 1991.

Table 4: *Labour Force Participation Rates in Ireland and the European Community, 1989*
(Percentage of population group economically active)

| | Males | | Females | |
Age Group	EUR 12	Ireland	EUR 12	Ireland
14-24	53.6	49.0	47.3	42.3
25-49	95.3	94.6	63.7	45.0
50-64	67.4	74.7	32.5	21.0
65 & over	6.8	17.6	2.3	3.3

Note: The data in Table 1 are based on slightly different definitions of the labour force than those in the *EURO-STAT* publication on which this table is based.
Source: EURO-STAT, Labour Force Survey, Results 1989, Table 0.3.

In 1991 a relatively small proportion, 15.5 per cent, of working women were in "regular part-time employment" according to the LFS classifications. However, there is no continuous series on participation that distinguishes between full- and part-time working, which is a serious limitation in connection with the study of female employment.

Table 5: *Decomposition of Changes in the Labour Force, 1971-91*
('000)

Age Group:	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65+	15+
				Males					
Total change in LF:	−22.4	18.0	68.7	79.2	13.0	−16.9	−19.6	−39.1	81.0
Due to: Change in population:	21.4	28.8	68.5	80.1	17.2	−8.4	−1.2	9.2	206.2
Changes in LFPRs:	−43.8	−10.8	0.2	−0.9	−4.2	−8.5	−18.4	−48.3	−134.7
Interaction:									9.5
				Married Women					
Total change in LF:	−0.1	2.6	59.5	48.9	22.6	4.7	1.8	0.0	140.0
Due to: Change in population:	−0.2	−2.5	3.4	4.8	1.6	0.1	0.5	0.6	10.8
Changes in LFPRs:	0.1	5.1	56.1	44.1	21.0	4.6	1.3	−0.6	131.7
Interaction:									0.0
				Single Women					
Total change in LF:	−22.8	24.6	27.1	−1.0	−6.9	−4.1	−3.8	−7.1	6.0
Due to: Change in population:	18.5	35.9	25.7	−2.3	−8.3	−4.1	−2.9	−0.5	47.0
Changes in LFPRs:	−41.3	−11.3	1.4	1.3	1.4	0.0	−0.9	−6.6	−55.9
Interaction									0.1
				Females					
Total change in LF:	−26.1	27.4	89.9	52.4	17.2	−1.2	−3.7	−13.4	142.5
Due to: Change in population:	18.3	16.5	21.5	14.6	2.6	−1.7	0.8	5.9	77.7
Changes in LFPRs:	−44.4	10.8	68.5	37.8	14.6	0.4	−4.5	−19.2	64.0
Interaction:									0.9
				Both Sexes					
Total change in LF:	−48.5	45.4	158.6	131.6	30.2	−18.1	−23.3	−52.5	223.5
Due to: Change in population:	39.7	45.4	90.0	94.7	19.8	−10.0	−0.4	15.1	283.9
Changes in LFPRs:	−88.3	0.0	68.7	36.9	10.3	−8.1	−22.9	−67.5	−70.8
Interaction:									10.4

Notes: The decomposition is based on the following calculations performed separately for males, females, married women and single women:

LF91−LF71   Total change in Labour Force
= (LFPR71)(POP91−POP71)   due to change in population
+ (LFPR91−LFPR71)(POP71)   changes in LFPRs
+ (LFPR91−LFPR71)(POP91−POP71)   interaction

The figures for "both sexes" are the sum of the male and female figures.
No account is taken of the changed distribution of population by marital status.

The change in the labour force in a population group between two dates can be attributed to components due to the change in the population, the change in the LFPR and to an interaction between these two factors. Using initial year population and LFPRs as weights, the decomposition is:

$$\Delta LF_i = Pop_{i0}(LFPR_{i1} - LFPR_{i0}) + (Pop_{i1} - Pop_{i0})LFPR_{i0}$$

$$+(LFPR_{i1} - LFPR_{i0})(Pop_{i1} - Pop_{i0}) \tag{1}$$

where Pop_{i0}, $LFPR_{i0}$ = the population and labour force participation rate in the ith population group in year 0, etc.

Table 5 applies this approach to the changes in the Irish labour force since 1971. (The interaction terms for individual population groups are relatively small and only the sum for each gender is shown.) If there had been no changes in LFPRs, the growth of population would have added 283,900 (or 25.5 per cent) to the labour force; the female labour force would have grown by 27.1 per cent, the male by 25.0 per cent and there would have been little change in the gender composition of the labour force. But, as we have seen,
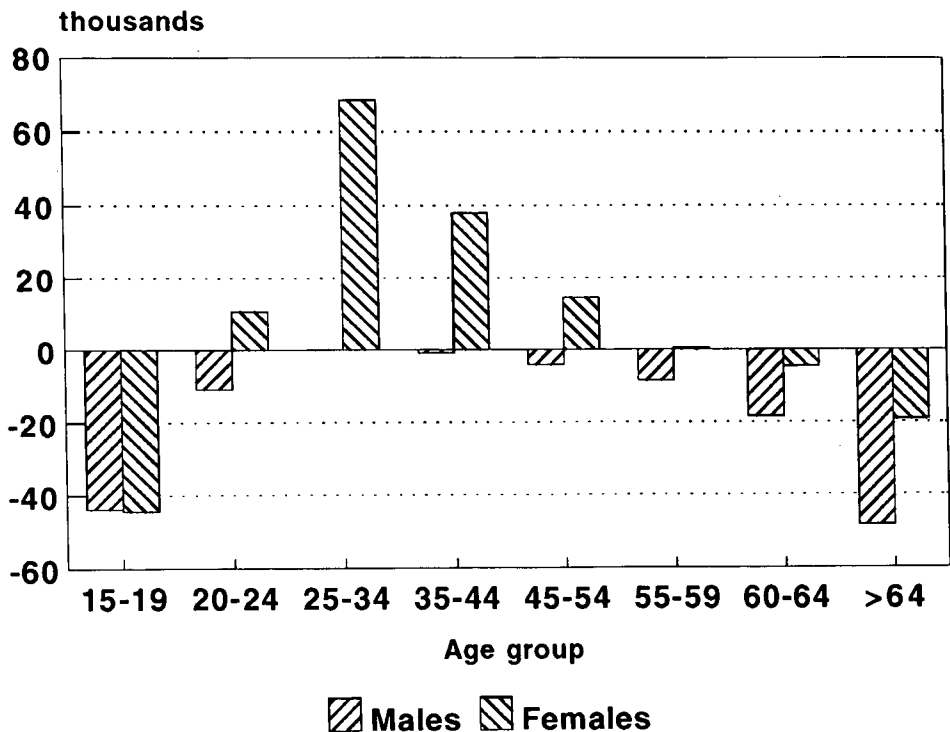

Figure 1: *Labour Force Effects of Changes in Participation Rates, 1971-91*

LFPRs changed quite significantly. Among teenagers and those aged 55 and over the fall in LFPRs reduced the labour force by 186,800, but rising LFPRs among married women increased it by 131,700, and the net effect of these changes was to offset about one-fifth of the growth in the labour force that would have resulted from population growth on unchanged LFPRs. As a result of the combined effect of changes in population structure and in LFPRs the labour force grew by 223,500 or 20.1 per cent. Figure 1 brings out the importance of the increase in participation among women aged 25-44 and the decrease among teenagers and men aged over 64. There was also a significant reduction in the labour force due to the fall in LFPRs among men aged 45-64, a trend that has attracted attention in the US (Juhn, 1992).

III FACTORS INFLUENCING LFPRs

Changes in LFPRs reflect the interaction of a complex set of forces acting on the supply and demand sides of the labour market. An individual's labour force status depends on the costs and benefits attached to the alternatives open to him or her. The opportunity cost of entering the labour force is the value of the household production, education and leisure foregone, which in turn depends on factors such as the returns to education, and the number and ages of children to be cared for. The demand for leisure, including the enjoyment of retirement, is influenced by the income available when not working, such as pensions, disability benefits and other transfer payments, and the income of other members of the household. The returns to seeking employment depend on the probability of obtaining offers of employment and the wages attached to these offers, and any unemployment benefits to which a job seeker is entitled. Before exploring the behaviour of Irish LFPRs over the past two decades in detail, some general comments on these issues are in order.

On the demand side of the labour market, the key determinant of the number of jobs on offer is the growth of the economy and the rate at which new jobs are being created. The rate of unemployment is usually taken as a measure of availability of jobs for those seeking employment. However, recall that U, unemployment, equals the difference between the supply of labour, L, and the numbers employed, E:

$$U \equiv L - E$$

$$\frac{dU}{dE} = \frac{dL}{dE} - 1$$

hence   (2)

$$\frac{dL}{dE} > 1 \Rightarrow \frac{dU}{dE} > 0$$

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$$\frac{dL}{dE} > 1 \Rightarrow \frac{dU}{dE} > 0$$

This simply formalises the obvious point that if an increase in employment leads to a greater increase in the supply of labour, the result is higher rather than lower unemployment. This is relevant to a situation where there is a sizeable hidden reserve of labour, such as the population classified as "not in the labour force" or emigrants, which might enter the labour force in response to the growth of employment opportunities. As may be seen from Figure 1, higher LFPRs among women resulted in a major increase in the Irish labour force since 1971. The numbers of employed and unemployed women increased proportionately more rapidly than the numbers outside the labour force and, as was noted in the Introduction, the female unemployment rate rose proportionately slightly more than the male rate.

A recent study of trends in the occupational pattern of employment in Ireland concluded that

> ... changes in the industrial structure of employment have had a more widespread influence on occupational change over the last few decades than have changes in the occupational structure of employment within industries (Corcoran, Sexton and O'Donoghue, 1992, p. 49).

The correlation between the proportion of females in 1971 and 1991 in the 41 occupations used in the study is +0.97. Thus, the industrial or sectoral structure of the economy is the main determinant of the relative abundance of employment opportunities for males and females. There were, however, marked increases in the share of females in some managerial, engineering and professional occupations where few had been employed in 1971. The only sectors where there was a fall in the proportion of females employed were textiles and clothing, and personal services. This was probably due to a shift in the composition of employment within these sectors, rather than to the substitution of men for women in particular occupations. Within the Personal Services sector, the almost all-female "private domestic service" sub-sector virtually disappeared, while employment in the more male-intensive "hotels and restaurants" sub-sectors increased.

Table 6 shows the distribution of the employed labour force by sector in 1971 and 1991 and the proportion of women in the employment in each sector.[1] An index of the demand for female labour based on the initial proportions of women and the growth in the total engaged in each sector may be defined as:

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1. The Census of Population employment figures used in this table differ very slightly from the Labour Force Survey data used in the rest of the paper.

$$F_t = 100 \times \frac{\sum\limits_{1}^{n} f_{i0} E_{it}}{\sum\limits_{1}^{n} f_{i0} E_{i0}}$$

(3)

where

f_{it} = the proportion of employment in sector i consisting of women in year t,

and E_{it} = the total number employed in sector i in year t.

An analogous index, Mt, may be constructed for the demand for male labour.

The value of these indexes in 1971, 1981 and 1991 is shown in Table 7.[2] The contrast between the growth of employment opportunities for women and the virtual stagnation of those for men is striking. The decline in the numbers engaged in Agriculture, where over 90 per cent of the labour force is male,[3] is the main reason for this contrast, but females also benefitted from the expansion of employment in sectors such as Retail Distribution, Insurance and Finance, Professional Services, and Personal Services (other than Private Domestic Service), all of which had above average proportions of females employed in 1971. In fact, the only relatively female-intensive sector in which employment declined after 1971 was the Textiles and Clothing industry. It is striking that the demand for female workers continued to rise during the 1980s, when total employment declined.[4]

Among the other factors that would be expected to have affected the employment opportunities open to women over the last two decades are the 1975 Anti-Discrimination (Pay) Act and the 1977 Employment Equality Act. It has been argued that anti-discrimination legislation resulted in a marked upward shift in the demand for female labour in Britain (Zabalza and Tzannatos, 1985, p. 693). The rise in the proportion of women employed in many sectors over a period when female rates of pay were rising relative to male rates could be taken as evidence of a similar development in Ireland. Faced with an unchanged or slow-growing supply, an increased demand for women in the labour force would have raised the female wage rate and lowered the female unemployment rate, encouraging higher labour force participation by women. While female weekly earnings in manufacturing industry rose from

2. It is not possible to construct a continuous time series for these indexes because detailed data on the labour force by sector are not available for all years.

3. This is a reflection of the exclusion of most farmers' wives from the labour force in the Labour Force Survey. For a review of the problems related to measuring the female labour force in Ireland, see Fahey (1990).

4. This trend continued during the current recession: between 1990 and 1992 the number of males at work fell by 17,000 while the number of females increased by 16,000.

Table 6: *Gender Structure of Employed Labour Force, 1971, 1981 and 1991*

Industrial Group:	Total Employment 1971	Female Employment 1971	Female Share 1971	Total Employment 1981	Expected Female Employment 1981	Actual Female Employment 1981	Actual Minus Expected	Female Share 1981
Column:	(1)	(2)	(3) %	(4)	(5)=(3)x(4)	(6)	(7)=(6)-(5)	(8)=100x(6)/(4) %
Agriculture, forestry and fishing	273.1	25.5	9.3	188.6	17.6	12.8	−4.8	6.8
Mining, quarrying and turf production	10.4	0.2	2.1	11.1	0.2	0.4	0.2	3.6
Manufacturing industries:								
Food, beverages and tobacco	51.1	13.3	25.9	57.0	14.8	12.3	−2.5	21.6
Textiles, clothing etc.	54.4	39.9	73.4	38.8	28.5	20.6	−7.9	53.1
Wood and wood products	12.2	1.0	8.1	15.0	1.2	1.0	−0.2	6.7
Paper, printing, etc.	17.4	5.1	29.6	17.8	5.3	5.1	−0.2	28.7
Chemicals, rubber, etc.	15.2	3.9	25.6	19.7	5.1	4.4	−0.7	22.3
Glass, pottery and cement	11.6	1.3	11.3	16.1	1.8	2.4	0.6	14.9
Metals and engineering	31.8	6.4	20.1	57.5	11.6	15.0	3.4	26.1
Other manufacturing industries	12.3	1.9	15.7	16.4	2.6	2.8	0.2	17.1
Electricity, gas and water	14.2	1.0	7.4	14.4	1.1	1.4	0.3	9.7
Building and construction	84.5	1.7	2.0	102.2	2.0	3.1	1.1	3.0
Wholesale distribution	36.9	7.1	19.3	49.0	9.5	10.3	0.8	21.0
Retail distribution	111.4	39.3	35.3	117.1	41.3	44.9	3.6	38.3
Insurance, finance, etc.	24.0	9.6	40.0	41.9	16.8	20.3	3.5	48.4
Transport and communication	60.1	9.5	15.9	69.3	11.0	13.3	2.3	19.2
Public administration and defence	48.9	11.6	23.6	69.4	16.4	20.6	4.2	29.7
Professional services	109.1	64.5	59.2	162.3	96.0	97.3	1.3	60.0
Personal services	54.4	37.7	69.2	53.1	36.8	34.3	−2.5	64.6
Other and not stated	3.4	1.3	38.1	21.2	8.1	6.7	−1.4	31.6
Total	1,036.4	273.5	26.4	1,137.9	327.5	329.0	1.5	28.9

Expected female share 1981: 352.8/1,124.9 = 28.8%

Table 6 continued

Industrial Group:	Total Employment 1991	Expected Female Employment 1991	Female Share 1991	Actual Actual Minus Expected	Female Share 19811
Column:	(9)	(10)=(3)x(9)	(11)	(12)=(11)-(10)	(13)=100x(11) %
Agriculture, forestry and fishing	154.2	14.4	12.3	−2.1	8.0
Mining, quarrying and turf production	6.5	0.1	0.5	0.4	7.7
Manufacturing industries:					
Food, beverages and tobacco	43.1	11.2	10.1	−1.1	23.4
Textiles, clothing, etc.	26.3	19.3	15.1	−4.2	57.4
Wood and wood products	17.8	1.4	1.4	−0.0	7.9
Paper, printing, etc.	17.4	5.1	4.9	−0.2	28.2
Chemicals, rubber, etc.	22.5	5.8	6.3	0.5	28.0
Glass, pottery and cement	15.2	1.7	2.1	0.4	13.8
Metals and engineering	69.3	14.0	20.9	6.9	30.2
Other manufacturing industries	12.0	1.9	2.7	0.8	22.5
Electricity, gas and water	14.0	1.0	1.5	0.5	10.7
Building and construction	78.2	1.6	3.5	1.9	4.5
Wholesale distribution	40.4	7.8	9.3	1.5	23.0
Retail distribution	131.4	46.4	54.5	8.1	41.5
Insurance, finance, etc.	57.3	22.9	28.0	5.1	48.9
Transport and communication	65.2	10.3	12.9	2.6	19.8
Public administration and defence	68.4	16.2	20.2	4.0	29.5
Professional services	187.0	110.6	116.0	5.4	62.0
Personal services	75.3	52.1	46.1	−6.0	61.2
Other and not stated	23.4	8.9	8.8	−0.1	37.6
Total	1,124.9	352.8	377.1	24.3	33.5
Expected female share 1991	352.8/1,124.9 31.4%				

Sources: *Census of Population*, 1971, Vol. III, Table 2; *Census of Population*, 1981, Vol. 4, Table 6; *Labour Force Survey*, 1991, Table 13.

Table 7: *Indexes of the Demand for Female (F) and Male (M) Labour, 1971, 1981 and 1991*

	1971	1981	1991
F_t	100	119.9	129.2
M_t	100	106.2	101.2
Annual average growth rate	*1971-81*	*1981-91*	
F_t	1.8%	0.7%	
M_t	0.6%	−0.5%	

Note: For derivation, see text and data in Table 6.

48.4 per cent of male earnings in 1971 to 59.1 per cent in 1981, this ratio increased only marginally over the next ten years, to 59.7 in 1991.[5] The slow-down in the move towards equal pay could have been due to a high elasticity of supply of female labour and/or large increases in female labour supply due to exogenous factors.[6]

Several more or less exogenous developments have affected the supply of labour in various population groups since the 1970s. For example, the high LFPR among Irish teenagers in 1971 was due to their relatively low partici-pation rate in second and third level education, which persisted even after the introduction of "free" post-primary education in the late 1960s. As partici-pation in education increased during the 1970s and 1980s the supply of teenage boys and girls to the labour force decreased sharply. At the other end of the lifecycle, in 1971 it was still common for men, especially farmers, to remain in the labour force until a relatively advanced age. The decline in the farm labour force, the gradual lowering of the age of qualifying for the non-contributory old age pension from 70 to 65 and the rise in the real value of state pensions would be expected to have reduced labour force participation among the elderly.

Other developments would have been expected specifically to affect the supply of (married) women to the labour force. The most important is the changing proportion of women with responsibility for young children. That this proportion has been declining is indicated by the fact that total fertility rate[7] fell from 3.9 in 1971 to 3.1 in 1981 and 2.1 in 1991. More refined data show that the proportion of family units where the wife was aged 25-64 and there were no children aged under 5 years old increased significantly between

5. Female hourly earnings also remained unchanged at 68 per cent of male earnings over the 1980s. Comparable hourly earnings data are not available for the 1970s.

6. Geary and Walsh (1971-72) argued that equal pay legislation would result in a significant increase in female labour supply.

7. That is, the sum of the age-specific fertility rates per female.

1981 and 1986 (Table 8).[8] Of course, increased employment opportunities could be part of the explanation for the fall in the birth rate, so that the causation may run from the rising LFPR to the fall in fertility as well as in the other direction. This issue is taken up below.

Table 8: *Proportion of Family Units with No Children Aged under 5*

Age of wife:	Under 25	25-34	35-44	45-64
1981	36.7	26.4	57.9	97.4
1986	36.0	30.3	61.6	98.1

Note: Since the phrase "family unit" refers to couples whether married or not, "wife" simply refers to the adult woman in the unit.
Sources: Census of Population, 1981, Vol. 3, Table K and 1986, Vol. 3, Table H.

Improvements in women's entitlement to social welfare payments over the period might also have increased the supply of women to the labour force. In addition to the upward trend in the real value of these entitlements, there was a marked increase due to the 1986 Social Welfare Act, which abolished the lower rate of benefit for married women and established equality of treatment between men and women claimants. As a result the basic rate of unemployment benefit payable to women rose sharply and their ability to qualify for it also increased. This had the effect of increasing the pay-off to participation in the labour force, taking into account income received during spells of unemployment and when employed, as well as eventual entitlement to a contributory old age pension.

Other aspects of the administration of the social security system may also affect labour force participation. In Ireland, school leavers may qualify for the means-tested unemployment assistance simply by declaring themselves available for and seeking employment, but a housewife with no recent history of insured employment is unlikely to qualify for any compensation when seeking work after an absence from the labour force. However, for a person leaving employment the value of the benefits provide an incentive to remain in the labour force registered as unemployed. The desire to build up paid social insurance contributions to qualify for the contributory old age pension provides an incentive to enter the labour force, but at a later age workers have an incentive to withdraw from the labour force to obtain the old age pension or the recently-introduced Retirement Allowance, for which the long-term unemployed aged 58 or over are eligible. Unemployed workers of all

8. Data on the composition of family units were first compiled in Ireland only in the 1979 *Census of Population*, and were first tabulated in the form shown in Table 8 for the 1981 *Census*. Data from the 1991 *Census* are not yet available.

ages who are coming to the end of their entitlement to unemployment bene-
fits have an incentive to withdraw from the labour force to qualify for an
invalidity pension. Thus the influence of social security variables is complex,
differs between demographic groups and is difficult to model at the aggregate
level.

The evidence from available studies of the effects of social security vari-
ables on labour force participation is mixed.[9] For example, Parsons (1980)
claims that the rise in Social Security disability benefits accounts for much of
the post-war decline in male LFPRs in the US since the Second World War.
Juhn believes that this factor was important in the late 1960s and early
1970s, but not during later years. However, Barr (1992, p. 773) cites evidence
that is ambiguous as to the effects of Social Security on labour force partici-
pation. Callan and Farrell report that Irish women whose husbands are in
receipt of social welfare (including unemployment) benefits are less likely to
be employed than others; a similar finding has been reported in Britain
(Davies, Elias and Penn, 1992).

IV PREVIOUS RESEARCH ON IRISH LFPRs

Although research has been constrained by the limited amount of data
available, several studies of Irish labour force participation have been
published. Many of these studies have, however, reflected interest in specific
issues such as the low LFPR of women in general and married women in
particular, and the effects of changes in the financing of the educational
system; other topics, such as the decline in participation among older males,
have received little attention. Before looking at further results, a brief review
of previous research is presented.

A. Cross Section Studies

Most early work on Irish participation rates was based on cross-section
county data. Walsh (1968), using 1961 Census of Population data, found a
highly significant negative relationship between a county's unemployment
rate and the LFPR among males aged 14-24. A negative, but statistically non-
significant, relationship was also reported in some other demographic groups.
This was interpreted as supporting the "discouraged worker" hypothesis
(Dernburg and Strand, 1966) according to which workers withdraw from the
labour force due to high unemployment and the difficulty of obtaining suit-
able employment. It was found that older men's LFPRs tended to be higher,
and those of married and single women lower, the larger the share of agricul-
ture in the local labour force. This analysis was replicated and extended using

9.   See the recent survey by Atkinson and Micklewright (1991).

1966 Census of Population data (Walsh, 1970-71). Once again, a highly significant negative association between the unemployment rate and LFPRs was reported for males aged 14-19, and a weaker relationship for men in other age groups and for women. Female LFPRs, standardised for the marital status structure of the population, were found to be quite sensitive to the local employment structure, with counties that had a "female-intensive" economic base having significantly higher female LFPRs. Among younger women a significant negative relationship was also found between labour force participation and the net emigration rate. Some tests were performed for the "additional worker" hypothesis, that is, the possibility that higher male unemployment led to higher female LFPRs, but the evidence did not support this. The emphasis in these studies was on the effect of job availability on labour supply, against a background of concern at an incipient shortage of women in the labour force.[10] It was concluded that "there will be a sharp rise in labour force participation by women, especially married women" in response to the growth of employment opportunities for them (Walsh, 1970-71, p. 106).

B. Microeconometric Studies

There have been two studies of women's LFPRs using data from Irish household surveys. Walsh and Whelan (1973-74) used data from a sample of 1,200 married women collected in 1971; Callan and Farrell (1991) used data from a sample of 2,555 married women collected in 1987. Both studies found that the probability of a married woman being in the labour force increased with potential earnings (estimated for non-participants on the basis of their education, work experience and related variables) and the local availability of suitable jobs, and decreased with age, the presence of children, and husband's earnings. Both studies concluded that rising women's educational levels and declining family size would lead to higher LFPRs. Callan and Farrell derived estimates of the elasticity of married women's labour force participation with respect to the wage rate varying between 1.3 and 2.7. Using these to "predict" the rise in the LFPR from 1971 to 1988 they concluded that at least half the observed rise in the LFPR could be attributed to the increase in the wage rate. They believe that when the influence of the decline in the fertility rate is taken into account, other factors (such as changing attitudes, anti-discrimination legislation etc.) have a relatively minor rôle to play. No direct rôle is assigned to factors such as the rate of unemployment or changes in the structure of employment, but these would have an indirect effect through the wage rate. It is also relevant to the findings reported below that they assign

10.   This concern arose from projections of the labour force by gender that took account of the changing pattern of employment.

no direct rôle to changes in the level of social welfare benefits or women's entitlement to these benefits.

C. Time Series Studies

Even though, as is clear from Table 5, changes in LFPRs have significant implications for the aggregate supply of labour, the behaviour of Irish LFPRs over time has not been studied intensively. Tussing (1976) found a significant shift from the labour force to post-primary schooling among 14 to 19 year-olds over the period 1968-1970 as a result of the introduction of "free" post-primary education in 1968. He concluded that the full effect of this change was evident by 1970 (p. 298). This claim is interesting in light of the fact that the proportion of 15-24 year-old males in education rose from 27.7 per cent in 1971 to 46.1 per cent in 1991, and of females from 28.2 to 49.8 per cent.[11]

No time series studies of LFPRs disaggregated by age and gender have been published. In the frequently-cited HERMES macroeconometric model of the Irish economy (Bradley *et al*, 1989) the aggregate LFPR is either exogenised or made a function of participation in full-time education by those of working age. Research on the causes of the trend in unemployment has led to the development of more detailed models of the labour market. Newell and Symons (1990) use a Harris-Todaro model of labour supply in which the decision to participate in the labour force depends on *expected* income, w*, which is a weighted average of earnings from employment (w) and unemployment benefits (b), with unemployment (u) and employment (1–u) rates as weights:

$$w^* = w(1-u) + bu.$$

However, in their statistical analysis they make the aggregate LFPR a function of (1-r)u, where r=b/w, the replacement ratio. They report a significant negative coefficient for this variable. An intercept-shift dummy variable for the effects of the "free" post-primary school scheme was included from 1969.[12] In addition to a lagged dependent variable, a non-linear trend was also found to be significant, but the authors are uncertain about its interpretation. Barry and Bradley (1991) adopt the Newell and Symons specification of the aggregate LFPR in their study of the causes of the rise in Irish unemployment. The LFPR equation plays an important rôle in both studies in apportioning the increase in unemployment between different factors. Newell and Symons attribute 1.2 percentage points of the rise in unemployment between 1979 and 1986 to the effects of the replacement ratio

11.   Comparing the 1971 *Census of Population* with the 1991 *Labour Force Survey* returns. The latter does not give details of economic status separately for the 15-19 and 20-24 age groups.
12.   Note that Tussing dates the effects of this measure from 1968.

and a further 1.7 points to the rise in participation. Although they use the same aggregate LFPR equation, Barry and Bradley attribute a smaller proportion of the rise in unemployment to the behaviour of the LFPR.

In view of its widespread use in time series models, the rationale for specifying $(1-r)u$ as the relevant measure of the influence of social security (unemployment) benefits on labour force participation merits further consideration. The derivation of this expression is as follows. Since:

$$b = rw,$$

$w^* = w(1-u) + ub$ can be expressed as

$$w^* = w - w(1-r)u,$$

and

$$(1 - r)u = 1 - w^*/w.$$

Thus, the use of $(1 - r)u$ implies that the participation decision is determined by the shortfall of the expected income of those not in the labour force from the actual income of the *employed*. As $r \to 1$, $(1 - r)u \to 0$, which implies that the negative effect of unemployment on participation is modified by a rising replacement ratio and falls to zero if social welfare fully replaces net earnings. However, it is usually expected that the level of r affects the willingness to accept job offers as opposed to the decision to participate in the labour force. Moreover, because b and w enter only as a ratio, the absolute level of wages and benefits has no effect on the decision to participate. This specification of the participation equation is therefore unsatisfactory and caution must be exercised in interpreting results that have relied on it.

V TIME SERIES RESULTS FOR LFPRs BY AGE AND GENDER

The behaviour of LFPRs over time is expected to be affected by labour market conditions such as wages, unemployment rates and unemployment benefits and supply-side considerations such as the birth rate. The effects of the changing structure of the economy and changing attitudes towards the employment of (married) women are assumed to affect the outcome indirectly through their effects on wages and unemployment rates.

Data

The dependent variables used in this study are annual time series for the LFPRs in the population groups shown in Table 3. These rates were derived from the LFS, which was conducted at two-yearly intervals from 1975 to 1983 and on an annual basis since then. The Census of Population results were used to supplement the LFS data for the years 1971, 1979, 1981, 1986 and

1991. For years in which neither a Survey nor Census of Population was conducted LFPRs have been interpolated by the Central Statistics Office using indicators of changes in the labour force.[13] No account is taken of work outside the formal economy, and farmers' wives are not generally included in this measure of the labour force. No distinction is made between part- and full-time participation. As may be seen from Figure 1, LFPRs in several demographic groups have varied little since 1971 and their influence on the labour force was relatively minor. For this reason, the LFPRs for males aged 25-55 and females aged 55-64 were not analysed further.

The principal explanatory variables used are the unemployment rate, the real level of unemployment benefits and the real, after-tax wage rate. The rate of unemployment used is derived from LFS definitions. Time series of age-specific unemployment rates are not available, so just one series each was used for males and females.

Earnings net of taxes and social insurance contributions were calculated separately for men and women. For males average industrial earnings were used and, because the effect of marital status on the trend in after-tax income is relatively unimportant for males, only one case was used to calculate the male after-tax wage rate, namely that of *single* male employees. For women, two cases were considered. For women aged 15-24 net earnings were measured as those of a single woman on the average female industrial earnings. For older women the net contribution to household income of a married woman on the average female industrial earnings, assuming her husband was employed at average male earnings, was used.

Unemployment benefits for men and women aged 15-24 were measured as the basic adult rate of Unemployment Benefit (UB). For women aged 25 and over the benefit payable to an unemployed married woman with no eligible dependants was used. (This rate was equalised with the basic male rate in 1986.) The annual figures used are a weighted average of the rates in force in the course of the year. Data for earlier years is contained in Hughes (1985). All earnings and benefits variables were deflated by the consumer price index to base 1990 = 100.

Further refinement of the social security variables is possible but not warranted in view of the aggregate nature of the dependent variable. For example, the unemployed in all demographic categories are a mixture of recipients of unemployment assistance (UA) and unemployment benefit (UB). The former is important among the younger age groups and for the long-term unemployed, whose importance has increased over the years. Although UA has risen more rapidly than UB, both variables move closely together and

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13. The series are contained in the CSO EOLAS data base, file LFAA.

little difference would be expected from using a weighted average of the two. Similarly, weighted averages of married and single after-tax earnings are very highly correlated with the components of the average.

Econometric Issues

The LFPRs in most of the population groups studied are strongly trended and most of the equations initially estimated showed evidence of (positive) serial correlation. A partial adjustment model was deemed inappropriate because it generally yielded estimates of the adjustment coefficient not significantly different from unity. Instead, the effect of the trend in the LFPRs was removed and/or additional exogenous variables were included to account for it. Among young adults, for example, the long-run decline in labour force participation is the obverse of the long-run rise in educational participation, and no attempt was made to model this, but in the case of women aged 25-44 the key factor shifting the supply schedule outward was believed to be the decline in the birth rate, and this was included as an explanatory variable. Where evidence of serial correlation persisted, the Cochrane-Orcutt iterative estimation procedure was used.

A single-equation approach such as ordinary least squares (OLS) ignores feedback from explanatory variables such as the rate of unemployment and the wage rate to the LFPR. However, the problem of simultaneity may be somewhat reduced by the fact that Irish wages are strongly influenced by exogenous forces such as wages in Britain, while the use of the same measures of unemployment and earnings for several age groups reduces the problem of feedback. But a related econometric issue arises, namely, that of correlation between the disturbance terms across equations. This could be dealt with using a technique such as seemingly unrelated regression (SUR), but SUR and OLS yield the same estimates when identical regressors are used in all the equations in a system (Pindyck and Rubinfeld, 1991, p. 310). Thus while acknowledging the desirability of expanding the model to allow for the joint determination of labour force participation and some of the variables treated as exogenous in the present study, at this stage of the research single-equation procedures were used exclusively.

Population Aged 15-24

More than 98 percent of the male population aged 15-24 was classified as in either the labour force or the educational system in both 1971 and 1991, so the decline in the LFPR in this group mirrors the rise of the educational participation rate, from 27.7 per cent in 1971 to 46.1 in 1991. This in turn would be expected mainly to reflect long-run socio-economic developments, including the introduction of "free" post-primary education at the end of the

1960s, which are modelled by a non-linear trend, but cyclical economic factors and social welfare variables would also be expected to have played a rôle.

The regression results reported in Table 9 show that labour market variables were a significant influence on LFPRs among young adults. With the exception of the wage variable for females aged 20-24, all the coefficients have the expected signs, and the unemployment benefit variable is highly significant in three out of four cases. The rate of unemployment is significant for males aged 15-19. On the basis of the second equation in Table 9, which omits wages, the effect of the increase in the rate of unemployment from 6.0 per cent in 1971 to 17.3 per cent in 1991 was to lower the LFPR by 5.6 percentage points, while the effect of the rise in the real value of unemployment benefits from £33.60 to £47.32 (in 1990 prices) was to raise it by 10.9 points. Thus the combined effect of these two variables was positive, raising LFPRs by over five points.

While it is widely believed that the labour market conditions facing young people deteriorated in the 1980s, none the less the net effect of the labour market variables included in the regression was to raise labour force participation. This result is plausible when it is recalled that the value of w*, the expected returns to labour force participation, rose from £136 a week in 1971 to £161 in 1979 (in 1990 prices) and although it fell sharply in the early 1980s, by 1991 it had risen back to £149.[14]

It is to be expected that labour force participation among girls aged 15-19 would be influenced by similar considerations to those that are relevant to boys of this age, with the caveat that more girls than boys of this age are classified as "in home duties" and "other" and the numbers in these categories declined markedly after 1971. In fact the results in Table 9 show that although the coefficients of the labour market variables have the expected signs, they are much less significant statistically in the equations for girls than for boys. The influence of a non-linear negative trend, reflecting the rise in educational participation and the decline in the residual categories, is even more dominant for girls than boys.

The forces operating on the LFPR for females aged 20-24 are complex. Between 1971 and 1991 the increase in the LFPR among married women aged 20-24 added 5,100 to the labour force, but the fall in the LFPR among single women reduced the labour force by 11,300. The latter was probably due mainly to rising participation in education. A further complication in this age group was the fall in the proportion of women married, from 31 per cent in 1971 to only 12.5 per cent in 1991. This demographic change would have

14.   When w* is used as the sole explanatory variable, its coefficient is positive for both age groups, although not significant. The results reported in Table 9 indicate that the restrictions on the coefficients of w, u, and b implied in the use of w* should not be imposed.

Table 9: *Regression Results for LFPRs among Young Males and Females*

Population Group	Males 15-19			Males 20-24		
Intercept	19.7 (1.16)	30.18 (3.64)	45.02 (9.60)	68.6 (7.32)	75.92 (16.34)	87.77 (10.90)
b	0.942 (2.76)	0.80 (2.96)		0.486 (2.56)	0.380 (2.54)	
w	0.035 (0.71)			0.025 (0.90)		
u	−0.414 (2.31)	−0.51 (4.37)		−0.017 (0.17)	−0.0084 (1.29)	
w*			0.05 (1.78)			−0.001 (0.07)
Trend	−0.71 (1.43)	−0.44 (1.34)	0.10 (0.47)	−0.21 (0.73)	0.38 (2.05)	0.77 (7.78)
Trend^2	−0.05 (4.66)	−0.05 (5.77)	−0.06 (6.90)	−0.04 (7.72)	−0.04 (9.31)	−0.05 (12.0)
$\bar{R}^2$	0.989	0.989	0.97	0.913	0.963	0.952
Probe(F)	0.57	0.59	0.00	0.45	0.57	0.74

Population Group	Females 15-19			Females 20-24		
Intercept	32.12 (3.39)	31.50 (3.46)	44.34 (18.89)	43.63 (4.87)	25.08 (3.345)	74.44 (25.91)
b	0.357 (1.46)	0.348 (1.46)		0.828 (3.58)	1.191 (5.00)	
w	0.061 (1.27)	0.072 (1.90)		−0.103 (2.28)		
u	−0.060 (0.39)			0.051 (0.35)		
w*			0.044 (1.37)			−0.172 (4.36)
Trend	−1.011 (3.22)	−1.083 (2.77)	−0.552 (6.26)	0.37 (0.89)	−0.39 (1.21)	1.572 (7.83)
Trend^2	−0.031 (3.23)	−0.029 (3.38)	−0.039 (6.26)	−0.012 (1.34)	0.002 (0.30)	−0.034 (4.54)
$\bar{R}^2$	0.990	0.990	0.990	0.965	0.943	0.922
Prob(F)	0.28	0.35	0.12	0.60	0.44	0.036

Notes: t-ratios are given beneath coefficients. Prob(F) is the probability of the F-value obtained from the Lagrange multiplier test for serial correlation.

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raised the numbers in the labour force by about 20,000 on unchanged LFPRs. Because of these conflicting influences on labour supply it would be highly desirable to study the time series for married and single women separately in this population group, but this is not possible with available data.

In the results reported in Table 9 a significant negative coefficient was obtained for the wage variable and a non-significant, positive coefficient for the unemployment variable. A significant *negative* coefficient was estimated for the w* variable. Only the positive coefficient on the benefits variable, when it is entered separately, is consistent with a priori expectations. Taken at face value, this attributes an increase of about 14 percentage points in the LFPR to the rise in the real value of social welfare benefits. The apparently large impact of benefits on the LFPR could be rationalised by reference to the fact that in this age group many women marry and have their first child. Whether or not they remain in the labour force at this stage in their lifecycle may be sensitive to the real value of unemployment benefits to which they may be entitled. Finally, the net migration rate was added to these equations for LFPRs among young adults on the grounds that the migrant stream contains a higher proportion of economically active people than the non-migrant population. A high net emigration rate would therefore be expected to reduce the LFPR. This effect would be more likely to be important in the case of women because of the selectivity of migration of unmarried women, whose LFPR is high. However, in no case was the addition of this found to improve the statistical fit of the equations.

"Prime Age" Women

The increase in the LFPR among women aged 25-34 was the most important single influence on the changes in the composition of the labour force between 1971 and 1991 as may be seen from Figure 1. The number of economically active women in this age group increased by 68,500 over the period. This was due primarily to the marked increase in the LFPR among married women, but the rise in participation among single women and the fall in the proportion of population married also contributed. In contrast to the 20-24 year age group, all three factors worked in the same direction in this age group. There were also significant increases in the LFPR among women aged 35-44 and 45-54.

Table 10 displays regression results for women's LFPRs in the age groups 25-34, 35-44 and 45-54. Two models have been estimated for each group, one including w, u and b separately, the other using w*. As was the case for women aged 20-24, there is a general tendency for b to be significant whereas the level of real wages, w, or the unemployment rate, u, or the weighted average of b and w, w*, are not. Moreover, the coefficient on the benefits

variable is consistently much higher than that on the wages variable. The implied elasticity of labour force participation with respect to benefits is very high. For example, the results imply that the increase in the real value of the unemployment benefits for which married women are eligible accounted for almost half (14 out of 29 percentage points) of the total increase in the LFPR of women aged 25-34 over the period 1971-1991 and a similar proportion in the next older age group.

Table 10: *Regression Results for LFPRs among Females aged 25-54*

| Age Group	25-34		35-44		45-54	
Intercept	32.23	78.37	17.85	39.38	15.97	31.16
	(2.02)	(14.07)	(1.67)	(9.64)	(7.08)	(5.79)
b	0.746		0.337		0.352	
	(3.31)		(2.15)		(2.82)	
w	0.117		−0.003		−0.042	
	(1.77)		(0.07)		(1.09)	
u	−0.003		0.20		−0.087	
	(0.01)		(0.69)		(0.47)	
w*		0.193		0.084		−0.038
		(4.52)		(3.03)		(0.82)
BR	−1.59	−2.78	−0.37	−1.09		
	(3.55)	(18.08)	(0.89)	(8.73)		
$\bar{R}^2$	0.989	0.979	0.964	0.946	0.801	0.713
D.W.	1.48	1.58	2.20	1.52	1.65	1.91
Estimation	C-O	C-O	C-O	C-O	C-O	C-0
Procedure	AR(1)	AR(1)	AR(2)	AR(2)	AR(1)	AR(1)

Notes: t-ratios are given beneath coefficients.
Prob(F) is the probability of the F-value obtained from the Lagrange multiplier test for serial correlation. C-O refers to the Cochrane-Orcutt estimation method and AR(n) to the autoregressive model used.

As only a minority of those in the labour force is unemployed, it would be expected that wages rather than benefits would exert the stronger influence on LFPRs. It is therefore somewhat puzzling that benefits should be a more significant influence on female LFPR than the expected return to participation, w*, of which benefits are a part, or w, net earnings on their own. A graph of b, w and w* (Figure 2) shows that w was the main determinant of the variation in w*. This reflects that fact that the weight of w in w*, averaged over the sample period, is about ten times that of b. It is therefore not surprising that if w is not closely related to the LFPR neither is w*. It

is evident that the cyclical pattern of wages is not closely related to the behaviour of female LFPR. Benefits and the LFPR for several demographic groups, on the other hand, share a common trend. The consistently significant positive coefficients obtained for b in the presence of additional variables, including trend, is compelling evidence of the importance of the real value of social welfare benefits as a factor in the timing of participation decisions among women. However, further research is needed to establish the exact mechanisms by which this effect operates.[15]
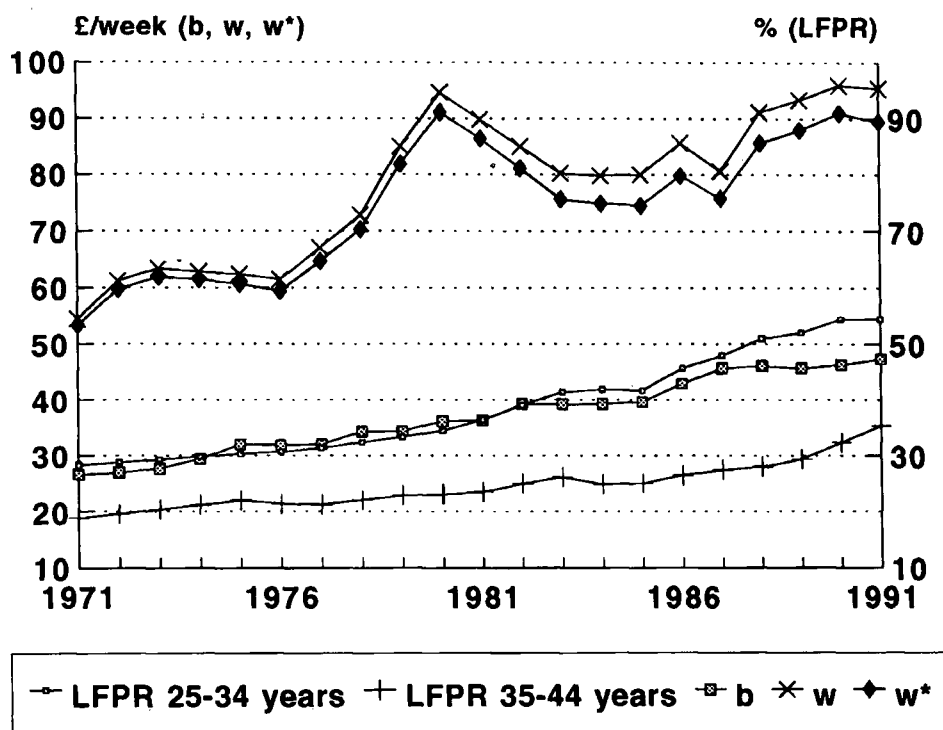
Figure 2: *Wages, Benefits and Female Labour Force Participation*

15. It should be noted that the LFS data used in this analysis are less sensitive to social welfare conventions than the Live Register (LR) series. This is shown by the fact that following the improvement in women's entitlement to unemployment benefits in 1986 there was a marked jump in the LR measure of female unemployment relative to the LFS measure. The number of women recorded as unemployed on the LR jumped from 110 per cent of those returned as unemployed in the LFS in 1985 to 176 per cent in 1990.

The influence on labour force participation of the proportion of women with dependent children to care for has been modelled in the regression results through the inclusion of the birth rate. Changes in the birth rate are a proxy for changes in the proportion of women with young dependent children and may also capture additional attitudinal variables of relevance to labour force participation. Figure 3 shows the female LFPRs in the 25-34 and 35-44 age groups and the birth rate for the period 1971-1991. It is clear that there was a close association between the timing of the increases in LFPRs and the decline in the birth rate. There may well be feedback from the LFPR to the birth rate. The fall in the birth rate may have been due in part to the rising opportunity cost of child-rearing as the returns to female employment increased. The timing of the fall in the birth rate calls this interpretation into question, however. The birth rate declined more slowly during the 1970s, when employment opportunities for men and women were expanding rapidly, than during the 1980s, as the labour market situation deteriorated. The significance of unemployment-induced adjustments in the birth rate around a declining trend is shown by the following regression result for the period 1971-1991:

$$BR_t = 5.50 + 0.79\ BR_{t-1} - 0.14\ U_m$$
$$(3.49)\quad (12.86)\qquad (4.28)$$

$$\bar{R}^2 = 0.98 \qquad \text{Durbin's h-statistic} = 1.07$$

where BR = the birth rate. (Annual average number of live births per 1,000 total population.)

and

U_m = the male unemployment rate.

Adding measures of *female* labour market conditions, such as the unemployment rate and wages, does not result in a statistically significant increase in explained variance,[16] which justifies the inclusion of the birth rate as an exogenous variable in the LFPR equations. The depressing effect of male unemployment on the birth rate could reflect the fact that, in addition to its effect on households where the husband loses his job, high male unemployment leads to greater income uncertainty for the employed.

The birth rate was included for the age groups 25-34 and 35-44. For the 25-34 year-olds the birth rate has a highly significant, negative coefficient,

16.   The lagged marriage rate had a significant negative coefficient, but its addition also did not significantly improve the fit of the equation. The negative coefficient could reflect the effect of male unemployment on the marriage rate.
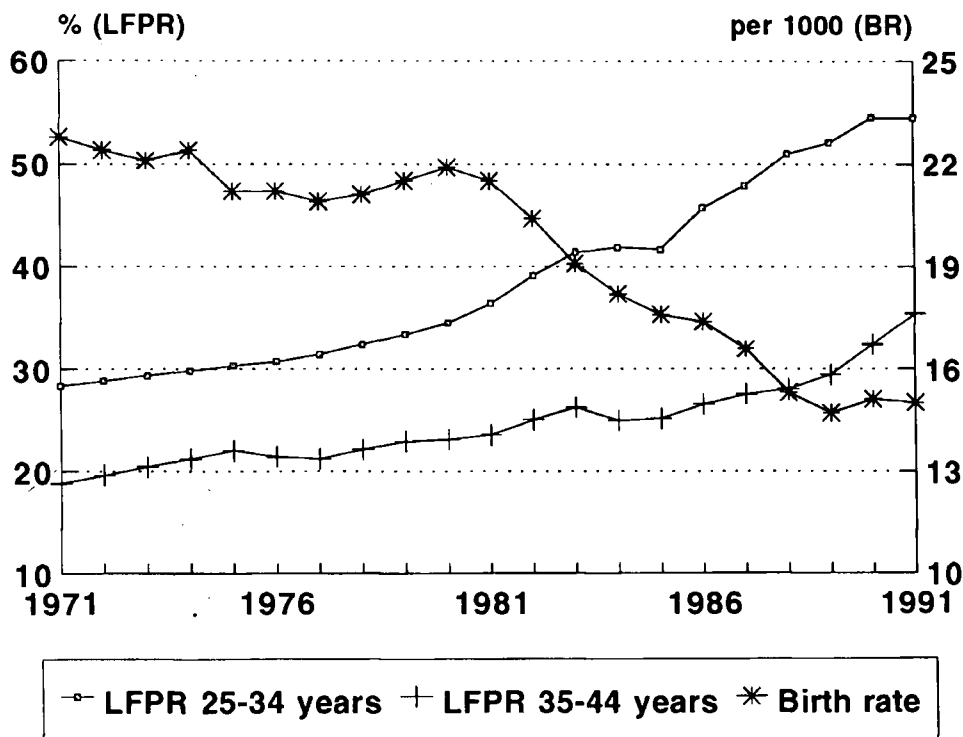
For definition of variables see text

Figure 3: *The Birth Rate and Female Labour Force Participation*

suggesting that the decline in fertility increased labour supply in this age group. The other labour market variables all have the expected signs, but only the coefficient of the benefits variable is significant. In the alternative specification, w* has a highly significant positive coefficient. For the age group 35-44, the birth rate and w* are both highly significant with the expected signs. For the 45-54 age group, the benefits variable appears with a highly significant positive coefficient, but w* is not significant.

These results suggest that the decline in the birth rate was associated with a large increase in labour supply among women aged 25-44. Supply also increased due to the rise in the expected wage, reflecting higher real wages and the increased value of unemployment benefits. Using the second of the pair of equations shown in Table 8, the rise of 29 percentage points in LFPR among women aged 25-34 can be allocated between these two causes as follows: the fall in the birth rate from 22.8 per thousand to 15.0 accounts for an increase of 22 percentage points, whilst the rise in w* accounts for a further increase of 7 percentage points. Among women aged 35-45 the attri-

bution of the rise in LFPR is different: 9 percentage points can be attributed to the fall in the birth rate, and 3 percentage points to the rise in w*. The full effect of the decline in the birth rate during the 1980s on the LFPR of older women may not be apparent until the cohort with fewer children ages.

Male unemployment affects female LFPRs, working through its effect on the birth rate. Higher male unemployment lowers the birth rate which in turn raises female LFPR. A rise of about three percentage points in the LFPR for females aged 25-34 in the short run and 15 points in the long run is attributable to the doubling of male unemployment between 1971 and 1991. For those aged 35-44 the corresponding figures are one and five percentage points, respectively.

The Older Population

The growing tendency of males to retire early has been widely noted internationally. It is evident from Figure 1 that the decline in LFPRs among males aged 55-59 and 60-64 accounted for a significant reduction in the numbers in the Irish labour force between 1971 and 1991. Surprisingly, the rate of decline in older men's LFPRs slowed during the first half of the 1980s when labour market conditions were deteriorating rapidly. These rates proved difficult to model with the available data. After the influence of trend is allowed for, the labour market variables are either non-significant or have unexpected signs (Table 11). Trials with additional variables such as the rate of notified redundancies and the share of agriculture in total employment yielded no satisfactory results. A possible interpretation of the significant positive coefficients on the unemployment variable is that they reflect the influence of other household income on labour force participation in these age groups: men aged 55-64 are likely to be heads of households in which there are young adult dependants. If the latter are experiencing high unemployment this could lead to postponement of the decision to retire by their fathers. Alternatively, and perhaps more plausibly, unemployed older men may be only loosely attached to the labour force and in effect retired. In his study of male *employment* participation rates in the US Juhn concluded that the "decline in real wages can account for the vast majority of the decline in employment from the early 1970s to the late 1980s" (p. 115).[17] This conclusion was based on a time series of employment participation rates classified by wage level. The aggregate male earnings and unemployment rate which are the only data available for Ireland may not adequately capture shifts in the distribution of wage offers for older males over time and

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17.   Juhn chose to use employment rather than labour force participation rates because (i) the former showed more cyclical variability and (ii) many unemployed elderly men have been out of work for a long time and "appear to be only loosely attached to the labor force" (p. 82).

seriously limit our ability to understand the decline in labour force partici-
pation among older males.

Table 11: *Regression Results for LFPRs among Older Males and Females*

Population Group:	Males 55-59	Males 60-64	Males 65 & over	Females 65 & over
Intercept	90.02 (130.5)	83.92 (72.3)	52.36 (34.8)	13.39 (30.87)
u	0.370 (4.14)	0.532 (3.54)	−0.065 (4.84)	−0.089 (1.73)
Trend	−1.03 (6.96)	−1.81 (7.23)	−5.24 (12.32)	−1.63 (12.12)
Trend^2	0.011 (1.89)	0.007 (0.78)	0.405 (7.78)	0.106 (6.71)
Trend^3			−0.010 (6.51)	−0.002 (4.97)
$\bar{R}^2$	0.941	0.969	0.987	0.985
Prob(F)	0.075	0.088	0.56	0.36

Notes: t-ratios are given beneath coefficients.

Prob(F) is the probability of the F-value obtained from the Lagrange multiplier test for serial correlation.

Men engaged in agricultural occupations accounted for two-thirds of the male labour force aged 65 and over in 1971 and a slightly higher proportion in 1991. The decline in the LFPR among this population group has been modelled by a cubic trend which captures the effects of the decline in the elderly farm labour force and changes in entitlement to pensions. The highly significant and negative coefficient on the unemployment rate suggests that at this age the timing of retirement is associated with the incidence of redundancies and the availability of alternative employment opportunities. The real value of the old age pension was included as an additional variable, but was not significant.

The decline in the LFPR among women aged 65 and over reduced the labour force by almost 20,000 over the period 1971-1991. Economically active women of this age were concentrated in agricultural occupations and personal service at the start of the period. The results obtained for women aged 65 and over were very similar to those obtained for men in the same age group. As with the males, a cubic trend was included. The negative coefficient of the unemployment variable was similar to that obtained for men, but was significant only at the 10 per cent confidence level. Finally, the redundancy rate was tried in these equations, on the grounds that it might provide a

better measure of the type of unemployment likely to precipitate withdrawal from the labour force, especially in view of the growth of entitlement to redundancy payments with length of service. However, in no case was it found to add significantly to the explained variance.

Summary

Among the population aged 15-24 and 65 and over LFPRs declined primarily in response to long-run socio-economic developments which can be regarded as exogenous. For the population aged 15-24 the important factor was the increase in participation in education. For the older population, the key factors were the decline in the number of elderly workers in farming and private domestic service and the move towards earlier retirement. However, even in these population groups there is some evidence of responsiveness to current labour market conditions. Among young males, especially those aged 15-19, both the rate of unemployment and the value of unemployment benefits exerted a significant influence. LFPRs among young women appear less responsive to labour market conditions, but the level of unemployment benefits was significant among 20-24 year-olds. Among men aged 65 and over, participation was depressed by the rate of unemployment. This could reflect the timing of retirement or, perhaps more importantly, the availability of part-time, occasional work for elderly men.

Among women aged 25-44 a major increase in labour supply was associated with the decline in the birth rate. The supply of labour also responded to the rise in the real value of the expected wage. The marked increase in the real value of unemployment benefits appears to have been a surprisingly important component of the increase in the expected returns to labour force participation by females. This factor was also important among women aged 45-54.

The responsiveness of LFPRs in several population groups to the social welfare component of the returns to labour force participation is a striking feature of the results and one which merits further study.

VI CONCLUDING REMARKS

This paper reports the results of an investigation of Irish labour force participation rates in the main demographic groups over the period 1971-1991 based on time series data. Despite the limited range of data available, some insights have been gained into the working of the labour market, which complement the findings of earlier studies based on cross sectional and panel data. Earlier attempts to account for variations over time in the aggregate LFPR require further study in the light of the evidence from disaggregated time series results.

A striking feature of the development of labour markets over the recent past both in Ireland and in other OECD countries has been the growth of female employment as male employment stagnated or declined. It appears that changes in the structure of the labour force and shifts in labour supply both contributed to this trend. On the demand side, economic activity shifted towards female-intensive sectors due to the decline of employment in agriculture and increases in services (other than private domestic service). However, despite the rapid growth of female employment opportunities, the rate of female unemployment rose proportionately as fast as the male rate. This reflects the highly elastic supply of female labour. The main factors leading to the increased supply of women to the labour force were the fall in the birth rate and the rise in the expected returns to labour force participation, which in turn reflected the growth of real wages and the marked increase in the real value of the unemployment benefits to which married women are entitled. The trend in the Live Register after 1986 suggests that the effect of changes in the social welfare code on registered unemployment was even more pronounced than that on the Labour Force Survey measure of unemployment used in this study.

Some of the trends noted here are likely to be less important in the future than they were over the last two decades. Among those aged 15-24 high participation in education has already reduced Irish LFPRs below the EC average. Although the average age at retirement remains relatively high in Ireland, the gap with other EC countries has narrowed and the rate of decline is likely to be slower in the future than it was over the past two decades. However, married women's LFPRs remain low in Ireland by international standards. Some of the factors identified in this study as contributing to the rise in female labour force participation will continue to operate in that direction in the future. In particular, the Irish birth rate is still one of the highest in Europe and is likely to fall further.[18] However, the improvement in the social welfare system that provided a significant incentive to higher labour force participation by women during the 1980s reflected an adjustment to equality legislation that is now complete, and the growth in the real value of benefits is likely to be much slower in the future than it was over the past two decades. We are unlikely therefore to see a repetition of the dramatic increase in female labour supply that occurred in the 1970s and 1980s. It is also likely that further increases will involve more part-time working and that greater availability of child-care facilities will be an increasingly important prerequisite of higher female participation. None the less, if the structure of the economy continues to generate relatively abundant employment

18. However, fertility rates rise as well as fall in developed countries, as was shown by the recovery in fertility in the Scandinavian countries during the late 1980s.

opportunities at attractive wage rates for women, an increased supply of female labour is likely to be forthcoming and the trend towards a labour force more equally balanced between men and women will continue.

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