

The Employment and Earnings of Britain's Senior Citizens

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ABSTRACT

Britain's senior citizens, in common with the rest of Europe, are the fastest growing age group among the population and the numbers working have grown substantially. In 2007 the numbers working at or beyond the state pension age (65 and over for men, 60 and over for women) was 1.26 million, a number that has doubled over the past decade. In Europe generally these numbers will rise substantially. Using (mainly) a pooled dataset from the Labour Force Survey, the paper explores the determinants of the decision to work by household type (those with a partner and those without) as well as earnings, which are generally low. Female disadvantage appears to be a feature, just as with the working age population. Some comments about data discrimination against senior citizens are also made.

1. INTRODUCTION

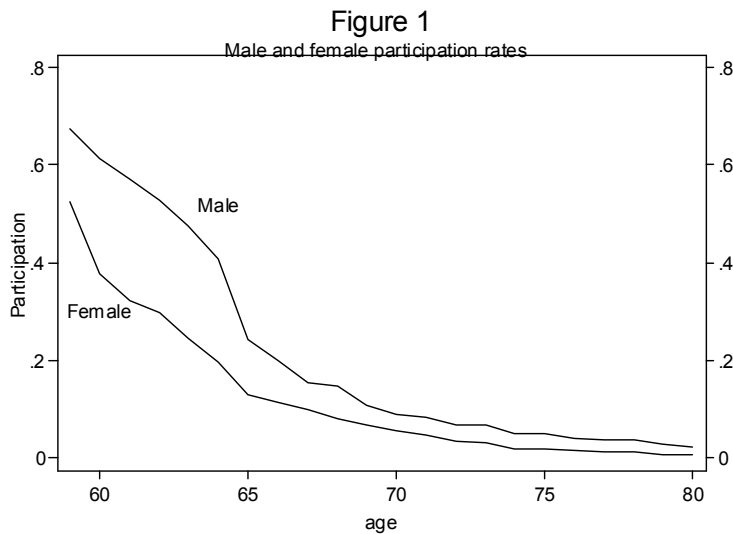
A NOTICEABLE TREND IN EUROPEAN LABOUR MARKETS is a rise in the employment of older workers. Numbers are still low internationally and workers still tend to leave the labour market at a relatively early age despite the growth. The Lisbon Accord includes strategies to remove the incentive to exit the labour market early and to promote the employment of senior citizens (European Commission, 2007). Keeping older people in work is an important objective with benefits not only to the individual but also to society.

The present paper focuses on the British labour market to help understand this process better. To this end the paper falls into three distinct parts. First, we paint a broad picture of working senior citizens (defined as 65 and over for men; 60 and over for women) and how people transition at key dates when they have the option to claim state retirement benefits. Secondly, we investigate what the key factors are that encourage working beyond retirement age. Thirdly we explore how much senior citizens earn. One question is whether senior citizen women are disadvantaged in the same way as working age women. The answer is broadly that they continue to be disadvantaged.

In common with most of the rest of Europe, Britain's senior citizens are the fastest growing age group among the population and the numbers working have grown substantially. Over the last 35 years, whereas the overall population has grown by 8 per cent, those aged 65 and over have increased by 31 per cent from 7.4 to 9.7 million by 2006.² In 2007 the numbers working at or beyond the state pension age, denoted as senior citizens, was 1.26 million, a number that has doubled over the past decade. It is predicted that these totals will climb further.³ Indeed, over the period of this study, 2002-2007, the participation rate of senior citizen men rose from 7.4 per cent to 10.0 per cent and from 8.6 per cent to 11.7 per cent for senior citizen women. These are substantial increases over a very short time.

Increasing participation can mitigate concerns about dependency, namely the view that a smaller working age population (16 and over and less than 65 for men and less than 60 for women) will have the burden of supporting an increasing number of workless elderly.⁴ The dependency ratio in the UK (the number of senior citizens relative to the working age population) is currently 30 per cent, but this will rise steadily on current trends. Europe wide, the number of those over 65 to workers is expected to rise to one half by 2030. In the absence of increased working, this will lead to severe social and economic pressures (OECD, 2000).

Although there are a number of studies focussing on older workers in the 50-69 year-old group, senior citizens are a distinctive group and deserve separate consideration.⁵ Figure 1 shows that there is a sharp drop in participation at the state retirement age, but rather less so for senior citizen women. 4.6 per cent of men over 69 still work, as do 1.9 per cent of women. These figures show that there still is a large untapped army of workers, despite recent increases in participation.



One important lesson is that current nomenclature and data sources reveal a degree of ‘data’ discrimination against Britain's senior citizens, which makes analysis more challenging. The term ‘working age population’ carries the presumption that for senior citizens to work is thought unusual. Regrettably, this presumption is carried forward into data collection. The Labour Force Survey, which is the best source for labour market information in the UK, misses out senior citizens in important respects. One example is the fact that the longitudinal datasets exclude men over 65 and women over 60. A second example is that some variables are only collected for those of working age or if in employment — most human capital variables fall into this category. A third example is an upper age limit on whether the data are collected (for example, age 69 for social security benefits). This arbitrary exclusion of senior citizens renders parts of the *LFS* unusable. Given its role as the major contemporaneous survey of working patterns and the increasing importance of working senior citizens, this is regrettable and will inevitably have to change in the face of reality about working patterns. Other data sources, such as the *Population Census*, do not record economic activity for those over 74.

2. REASONS FOR WORKING

According to Humphrey *et al* (2003), the three key reasons for late retirement are to improve financial position, enjoyment and to keep fit and active. There are, therefore, both push (such as financial need) and pull factors (such as work is enjoyable) that encourage senior citizens to work.⁶ Increased life expectancy has generated a pension crisis, whereby people realise that their pension provision is inadequate. This creates a necessity to work for those for whom the drop in income becomes unacceptably great at the state pension age if they cease work entirely.⁷ An important push factor is the diminished value that is placed on retirement leisure time. For example, Stock and Wise (1990) assume that a dollar's worth of income derived through work is worth less than a dollar of retirement income because of the positive leisure effect and this encouraged early retirement given specific pension rules. People are increasingly aware that health and happiness are inextricably linked because work provides a network of social connections that mitigates isolation.⁸ Senior citizens increasingly view work as partially a consumption good and the leisure effect is negative. A dollar's worth of income derived through work can then be worth more than one dollar's worth of pension income. People continue to work to relieve boredom, isolation and to give a sense of self-worth. The elderly are becoming healthier, which will encourage more working, which in turn maintains health.

Recent legislation also encourages work. Although the 2006 Employment (Age) regulations did not go as far as abolishing a mandatory retirement age of 65 for both men and women (unlike the USA where mandatory retirement was abolished in 1988), the rules make it easier for people to request their employer to work beyond 65. The effect of the anti-age legislation

is to generate a positive framework, whereby carrying on is seen as natural for many, whereas in previous times it would not occur to people that working on was possible or desirable. In other words, social norms are changing and 'carrying on' is no longer thought of as unusual.

Recent changes to British pension rules will have an important short-run influence. From April 2006 everyone can place all their earned income into any number of pension funds above and beyond any occupational pension, all of which is tax deductible. The only limit is a lifetime maximum pension pot of £1.5 million that is tax sheltered (this rises to £1.8 million in 2010). The pot is calculated as 20 times the annual pension on retirement plus any pension lump sum. For the vast majority, the tax sheltered maximum will not apply and for those just below senior citizen age, this offers an unprecedented opportunity to work tax free, as long as consumption is deferred into the pension pot. Furthermore, it may be possible to enjoy all the tax sheltered deferred consumption as a tax free lump sum when the pension comes into payment because of the rule that up to 25 per cent of the pension pot can be taken as cash. Thus the new rules discourage early retirement provided that the wealth effects that might encourage leisure are not too strong.⁹ On retirement, the new rules encourage further work, because one can place any earned income into a new pension fund (100 per cent tax deductible) up to the age of 75 even if any existing pensions have come into payment. One's guess is that the largest impact will be on those who are already better off and are able to defer large amounts of consumption into private pension schemes.

One motive for early retirement is incapacity benefit (renamed Employment and Support Allowance from November 2008), which is payable to men below 65 and women below 60.¹⁰ Once in receipt of Incapacity Benefit, few transition back into work, especially older people. The 2007 Welfare Reform Act contains rules which will make it more difficult to claim. This means that larger numbers of senior citizens will be encouraged to continue working. Health, as will be seen, is a major influence on participation for senior citizens as well as the working age population.

2. A PICTURE OF SENIOR CITIZEN WORK AND EARNINGS

The data are from successive quarters of the *LFS* commencing in the Spring quarter of 2002, until the first quarter of the 2007 survey. In addition SARs microdata from the *2001 Population Census* are also explored. During these years labour demand has been relatively strong, characterised by growing participation and with little turbulence to labour demand. *The LFS* is a high quality dataset compiled by the Office of National Statistics, which gathers a large amount of labour force information on a quarterly basis and is the main source of contemporary labour market information in the UK. The structure is that a sample of around 25,000 households is interviewed over five successive quarters. To avoid double counting the same individuals, the pooled dataset consists of information from wave 1 in each of the surveys, except in the first

four surveys where data from waves 1 and 5 are taken, because this will not contain any overlapping individuals.¹¹

Table 1 summarises basic information. Households have been split into three broad types. Type 1 is where the household head has no partner present — though this does not preclude the fact that another adult may be present in the household, either a sibling or non-relative. Type 2 is a two person household where the person has a partner (either married or stating that they live together). It includes a very small number of same sex partners. Type 3 is where the person is neither of the above. For example, some senior citizens live with siblings. Type 3 is small compared with the other categories so the detailed cross-section analysis focuses on Type 1 and Type 2 households. Making this distinction is important because the work decision for Type 2 is more likely to be a household decision rather than an individual decision. Thus for Type 2 the work decision will be estimated jointly for both the Household Head and the partner to test out this idea.

Table 1: Participation rates

<i>Person type</i>	<i>Gender</i>	<i>Min. age</i>	<i>Ave. age</i>	<i>Participation rate</i>	<i>No. of observations</i>
Head of Household with no partner (Type 1)	Male	65	76.0	5.62	11949
With partner present (Type 2)	Male	65	73.0	9.72	29910
Other Household member (Type 3)	Male	65	75.2	4.94	729
Head of Household with no partner (Type 1)	Male	60	73.4	11.34	14638
With partner present (Type 2)	Male	60	69.9	22.23	41471
Other Household member (Type 3)	Male	60	71.5	14.26	1003
Head of Household with no partner (Type 1)	Female	65	77.3	2.92	28543
With partner present (Type 2)	Female	65	72.2	5.50	23104
Other Household member (Type 3)	Female	65	78.8	2.71	1732
Head of Household with no partner (Type 1)	Female	60	75.2	6.32	33041
With partner present (Type 2)	Female	60	68.9	13.34	34284
Other Household member (Type 3)	Female	60	76.2	6.00	2050

Male participation rates are higher than females and this difference is explored in greater detail in Section IV. Because many women carry on beyond 60 and many men quit work at 60 (see Figure 1), men 60 and over are also compared with their female counterparts although these men are not strictly speaking senior citizens.

Type 2 households have the highest participation rates, with Type 1 households enjoying a smaller advantage over Type 3.¹² The advantage of Type 2 appears to mirror behaviour among those of working age, where those

without a partner (especially single mothers) are known to have far lower participation rates, but note that the younger age profiles of Type 2 senior citizens also partially drive this. Many Type 1 senior citizen households may have been previously married; the majority here are widowed, separated or divorced. Only 18.7 per cent of Type 1 senior citizen males are single, as are 9.5 per cent of Type 1 senior citizen women. It is being alone that matters rather than marital status.

Table 2: Workless households

<i>Age type</i>	<i>Adults in household</i>	<i>No. of households</i>	<i>per cent of total</i>	<i>per cent workless</i>
All working age	one	50934	19.0	35.0
	two or more	127471	47.5	8.2
Exclusively senior citizens	one	40790	15.2	94.2
	two or more	29030	10.8	86.8
Senior citizens with a working age partner	two or more	19961	7.4	31.5

Note: Where there is doubt as to whether the household is workless, the household is dropped from the sample. This concerns people who decline to answer on employment status.

Table 2 casts more light on this, where the focus is whether the household is workless (meaning all adults do not work) and where the table includes some working age households for comparative purposes. The participation rate of senior citizen males living alone is 5.4 per cent, and 5.8 per cent for senior citizen females. This derives the overall workless rate of 94.2 per cent. If these numbers applied to two person households, we would expect to see a workless rate of 89.1 per cent. In fact the figure is 86.9 per cent for two person exclusively senior citizen households.¹³ So being in a partnership seems to help senior citizen participation. This finding is similar to that found for working age workless households. The participation rates for working age males and females living alone are 68.8 per cent and 61.9 per cent. In the absence of other forces we would expect to see a workless rate of 11.9 per cent for two person households. The actual figure is 8.9 per cent. So polarisation of worklessness is also a feature for senior citizens.

Working senior citizens are also disproportionately found in the private sector, so working opportunities appear to be better there - this might be termed the 'B&Q effect'.¹⁴ 8.9 per cent of senior citizen men are employed in the public sector compared with 15.6 per cent of working age. For women 60

and over, 29.2 per cent are employed in the public sector compared with 33.4 per cent of working age, but this falls to 17.8 per cent for the over 65s — another sharp fall. Senior citizens are also concentrated in smaller working establishments. 55.1 per cent of senior citizen men work in establishments with less than 20 employees, compared with 27.4 per cent of working age. For women the comparative numbers are 44.0 per cent and 30.3 per cent. Surprisingly, senior citizens are no more likely to be on flexible working arrangements; indeed for women this is less likely. 11.8 per cent of working age women are on flexitime compared with 7.3 per cent of senior citizen women. Responsibility for children among working age women most likely explains this.

Table 3: Real hourly earnings

<i>Person type</i>	<i>Gender</i>	<i>Min. age</i>	<i>Avg. age</i>	<i>Avg. wage</i>	<i>Median wage</i>	<i>No. of obs.</i>
Head of Household with no partner (Type 1)	Male	65	69.5	9.65	6.31	265
With partner present (Type 2)	Male	65	68.6	10.78	6.25	1023
Head of Household with no partner (Type 1)	Male	60	64.3	9.74	7.39	811
With partner present (Type 2)	Male	60	63.4	10.87	7.90	4179
Head of Household with no partner (Type 1)	Female	65	69.2	6.97	5.25	442
With partner present (Type 2)	Female	65	68.1	8.03	5.58	635
Head of Household with no partner (Type 1)	Female	60	64.3	8.18	6.48	1329
With partner present (Type 2)	Female	60	63.1	8.24	6.07	2651

Note: Too few observations for Type 3 Households

Table 3 shows some information on real hourly earnings (based on 2005 prices). Note that low participation means that sample sizes are small and furthermore hourly pay is only recorded for around 60 per cent of those senior citizens that work.¹⁵ Average and median earnings are shown, where the median is probably a better measure of typical earnings as the presence of a few outliers can have an undue influence on the average. Once again these figures mirror what happens among the working age population. Men earn more than women. Type 1 individuals do marginally better than Type 2.

Another feature is that average earnings are far below those of working age for all senior citizens. As examples, Type 2 working age males' median earnings are 72.5 per cent ahead of senior citizen Type 2 males and for women the figure is 88.2 per cent. These are large differences and Britain's working senior citizens are among the lowest paid of any group.¹⁶

As a consequence many report hourly earnings below the National Minimum Wage (NMW), and the NMW applies to all working adults not just those of working age. For senior citizen men 18.4 per cent report hourly earnings below the NMW, compared with 3.9 per cent of working age men 22 and over.¹⁷ For senior citizen women the comparable figures are 19.5 per cent and 9.5 per cent. One possible explanation is that senior citizens are more likely to work from home (10.1 per cent compared with 2.4 per cent). However, there is no evidence that the low paid are concentrated in this group. A more plausible reason is the dominance of part-time working among senior citizens, where errors concerning actual hours worked are more likely. Despite the criticisms that can be made about *LFS* hourly wage data (Dickens and Manning, 2003) and its ability to track non-compliance, these differences are concerning.¹⁸

Table 4: Pay and employment transitions

<i>Age and gender</i>	<i>Sample size</i>	<i>% reporting a cut in nominal hourly pay</i>	<i>Employment rate</i>	<i>Current state</i>	<i>Transition to employment</i>
65 male	1779	48.9	23.5	Employed	55.5
				Workless	2.7
64 male	1815	33.9	40.0	Employed	87.5
				Workless	3.0
60 male	2040	39.5	61.8	Employed	90.0
				Workless	6.1
59 male	2175	38.4	70.7	Employed	94.0
				Workless	6.7
60 female	2304	35.8	41.5	Employed	75.2
				Workless	4.3
59 female	2451	37.0	52.5	Employed	91.0
				Workless	4.4

We can explore the dynamics of the retirement process using the longitudinal datasets from the *LFS*. In the *LFS* the same households are tracked over five successive quarters and income questions are asked in the first and fifth quarter. Tables 4, 5 and 6 show information about labour market transi-

tions for men reaching 65 and women reaching 60 in comparison to earlier dates. This enables us to track the labour market transitions and hourly pay changes of the same individuals over one year. Of chief interest is the transition at the age of state retirement.¹⁹ The evidence shows, that despite the rising trends in senior citizen participation, these are two watershed dates where behaviour changes dramatically.

As mentioned in the introduction, one unfortunate feature of the *LFS* longitudinal datasets is that men over 65 and women over 60 are excluded. Thus it is not possible to explore transitions beyond these key watershed dates. In order to generate sufficient data for males and females at 65 and 60, 20 longitudinal datasets are pooled from May 2002 to March 2007; even so the number of observations is small in some categories, especially hourly pay transition data. Hence unconditional transitions are explored to develop a sense of how people's activity changes at the state retirement age compared with before. The key point is that not only is there a movement into worklessness, but also the nature of work changes. Furthermore, women and men behave differently at their respective state retirement dates.

Table 4 looks at broad transitions for males and females between the wave 5 interview and the previous year wave 1. The age shown is that obtained in wave 5 and gives the transition from the state observed in wave 1. Thus a man aged 65 in wave 5 and a woman aged 60 will be below the state retirement age in wave 1. This is compared with the transitions for ages below the state retirement.

Looking at males it is clear there is a large jump into worklessness (this means either being ILO unemployed or inactive) at 65 compared with transitions at 64 and below. Many people quit work at the state retirement age, but there is still a great deal of diversity. Very few workless males (just 2.7 per cent) transition back into employment and many have already left the world of paid labour before 65. Transitions at earlier ages (not shown) make clear that these movements into worklessness start at around 50 but show a large jump at 65. There is also a jump at the aged 60 year point for men, though this is not as severe as the 65 year point. This reflects the fact that for many men 60 is a retirement option date, especially in the public sector where 60 is the age at which occupational pension benefits can be drawn without any actuarial reduction in benefits. For women, there is a similar jump into worklessness at the state retirement age of 60. This is not as severe as men aged 65, but is more severe than men age 60. Thus many women consider 60 as being too young to quit, even though that is the state retirement age.²⁰ Many quit because of previous institutional conditioning that at 60 women are expected to withdraw. The new view of work with non-rigid retirement dates suggests that traditional role patterns are breaking down. For example at 60, 41.5 per cent of women work compared with 23.5 per cent of men aged 65. Nevertheless, there is a significant jump in the numbers of employed who transition into worklessness at 60. As with men, few transition back from worklessness.

Table 5: Full-time work to part-time work transitions

<i>Age and gender</i>	<i>% full-time of those in work</i>	<i>Current state</i>	<i>Transition to full-time</i>	<i>Transition to part-time</i>
65 male	43.0	Full-time	34.4	18.4
		Part-time	0.5	61.7
		Workless	0.4	2.3
64 male	71.5	Full-time	83.4	5.3
		Part-time	5.3	78.3
		Workless	0.5	2.6
60 male	80.8	Full-time	85.9	5.0
		Part-time	5.4	79.8
		Workless	2.8	3.4
59 male	85.2	Full-time	91.0	4.3
		Part-time	13.0	72.5
		Workless	3.4	3.3
60 female	36.0	Full-time	60.3	18.6
		Part-time	3.0	69.2
		Workless	0.3	4.0
59 female	42.8	Full-time	81.4	11.2
		Part-time	2.9	86.8
		Workless	0.6	3.9

The other feature to note is hourly pay transitions. Older workers are in general more likely to take a pay cut, but this feature increases dramatically at 65 for males with 48.9 per cent taking a nominal wage cut and helps explain the low pay issue for senior citizens. Of those taking a pay cut, 17.7 per cent changed job over the past year, compared with 7.8 per cent not changing jobs. Nevertheless a considerable number of long-term employees also take a pay cut. Of those taking a pay-cut, 25.8 per cent had been with their current employer 20 years or more. This points to the fact that the nature of work changes at retirement date. People who carry on working are not necessarily motivated by money as strongly as younger workers.

Table 5 shows the full-time work to part-time work transition. Once again the 65 year watershed shows a large jump into part-time work with just 43.0 per cent of males working full-time at 65, compared with 71.5 per cent one year before. Once again these trends start in a more muted way from around the age of 50. Full-time workers transition into part-time employment as well as worklessness. Part-time workers are more likely to carry on part-time or transition into worklessness. Very few move into full-time work. This move towards part-time work helps explain why so many take a pay cut at 65. More people take a pay cut moving from full to part-time work. As before these

patterns are observed, but less strongly, for women at 60. Far more women work part-time anyway.

Table 6: Self-employment transitions

<i>Age and gender</i>	<i>% self-employed of those in work</i>	<i>Current state</i>	<i>Transition to employment</i>	<i>Transition to self-employment</i>
65 male	38.4	Employed	47.7	1.8
		Self-employed	3.5	67.0
		Workless	1.1	1.6
64 male	27.8	Employed	84.8	1.0
		Self-employed	4.4	87.9
		Workless	1.7	1.4
60 male	24.9	Employed	87.2	1.6
		Self-employed	5.8	88.0
		Workless	4.5	1.6
59 male	22.9	Employed	91.5	2.2
		Self-employed	6.7	88.2
		Workless	5.0	1.7
60 female	13.8	Employed	73.3	0.8
		Self-employed	5.1	79.0
		Workless	2.9	1.3
59 female	9.4	Employed	91.0	0.9
		Self-employed	9.0	74.4
		Workless	3.2	1.0

It might be thought that one option for those reaching the state retirement age is to become self-employed. It is also easier for the existing self-employed to carry on working. Table 6 provides some information. For males aged 65, the employed do not generally transition into self-employment. However, the self-employed (67.0 per cent) tend to carry on with self-employment and are less likely to transition into worklessness. This causes a rise in the self-employment share of total employment from 27.8 per cent to 38.4 per cent at 65. This actually reflects behaviour at earlier ages. Only a small number of employees transition into self-employment at earlier ages, but once self-employed they are unlikely to transition back. The number of self-employed women is around half that of men and rather more will typically transition back to being an employee at any age, but it is still a small proportion. It can be seen that self-employed women are more likely to carry on as self-employed at 60 in the same way as men. This leads to a small rise in the share of self-employment in total employment from 9.4 per cent at 59 to 13.8 per cent at 60.²¹

**Table 7: Logit for Type 1 households. Males 65 and over.
Females 60 and over. (Dependent variable =1 if in employment)**

	Margin- al effect (men) %	Sample mean (men)	Sample mean (working age men)	Marginal effect (women) %	Sample mean (women)	Sample mean (working age women)
Age	-0.37*	76.02	42.67	-0.29*	75.22	40.09
Single	-1.28*	18.72	58.18	-0.12	9.52	45.98
Sep/widowed/div	-1.61	80.17	40.87	0.39	89.99	53.15
Mortgage	2.35*	3.88	31.46	1.69*	4.59	28.97
Social housing	-1.25*	35.35	24.19	-0.91*	32.42	37.01
Private rent	2.48*	16.12	31.38	0.08	16.04	24.14
Immigrant	-0.16	8.30	11.61	0.19	7.30	10.97
East Midlands	0.84	7.39	7.15	0.40*	7.15	6.60
East Anglia	1.23	3.94	3.55	0.55**	3.73	3.05
London	2.12*	10.34	13.77	1.04*	9.49	14.17
South East	1.83*	17.47	18.11	1.09*	18.68	16.90
South West&Wales	1.91*	15.01	12.78	0.45*	14.28	12.64
West Midlands	1.61*	9.18	8.05	0.19	8.84	8.37
North West	-0.15	12.65	11.80	0.22	11.89	12.79
Scotland	-0.76	8.75	10.22	0.28	10.49	10.67
Children under 16	0.08	0.67	5.22	-0.26	0.84	44.13
More than one adult	-0.2	8.74	17.80	-0.34*	10.92	25.89
No religion	0.29	9.21	24.07	0.06	4.29	19.51
Non-christian	2.36*	2.75	5.73	0.27	2.30	5.41
Non-white	-1.40*	3.45	8.74	-0.42*	2.31	10.05
Poor health	-3.35*	48.29	23.52	-1.67*	49.37	22.30
Other person works in household	2.64*	3.87	9.31	1.03*	5.29	13.08
British identity	0.61*	31.44	35.69	0.19*	33.80	40.66
Other person in poor health in household	-1.50*	2.71	2.55	-0.34**	3.25	3.48
Has a qualification (from Census)	4.33*	35.12	75.22	4.26*	34.21	75.89
Pseudo R ²	0.188			0.316		

Notes: * indicates significant at 5 per cent level ** at 10 per cent level. Time dummies are included, but not reported. Default category is married; house owned outright, living in North/Yorks Humberside, christian religion, white in good health, non-immigrant.

3. LABOUR FORCE PARTICIPATION

Table 7 shows logit estimates to explain the participation decision of Britain's senior citizens for Type 1 households, using pooled cross-section data. The dependent variable takes the value one if in work, zero if ILO unemployed or inactive. Compared with those of working age, few senior citizens describe themselves as ILO unemployed, just 0.2 per cent for males over 65 (as a ratio of the

population) compared with 4.1 per cent for those of working age. For females 60 and over the figures are 0.17 per cent and 2.9 per cent respectively. Table (8) estimates a bivariate probit model for exclusively senior citizen (male at least 65 and female at least 60) Type 2 households. The justification for the bivariate approach is that the decision to work is more likely to be a household decision, rather than an individual decision. Thus, after controlling for characteristics if one person works, that person's partner is more likely to work. The household effect is picked up by the correlation in errors across the two equations, which is shown as the rho term in the last row. The two tables show the per cent marginal effects on the probability of working at mean values. For the dummy variables the marginal effect is calculated as the change in probability that occurs when switching the dummy on at the mean value of the other variables.

The specification is typical for this type of work with the notable exception of the absence of a human capital variable.²² As mentioned in the introduction, the *LFS* excludes non-working senior citizens when collecting this information.²³ As a check, a set of equations equivalent to Table 7 were run using the *Census* data, but with the inclusion of a qualification variable which is always significant. The overall pattern of results is similar and the marginal effect of qualifications from the *Census* is shown at the bottom of Tables 7 and 8.

As well as showing the marginal effects of each variable, the sample means are also shown. For comparative purposes, sample means for the working population for equivalent household types are also shown. This helps build a picture of the characteristics of Britain's senior citizens as well as how they contribute to labour force participation. So, focusing on differences from those of working age, Table 7 for Type 1, far fewer are single (meaning never married), only a few have an outstanding mortgage and far more live in social housing (either local authority housing or a housing association). Fewer are immigrants, but nevertheless the difference is not as large as might be expected. This is because the immigrant variable includes the Irish Republic from which there are substantial numbers for senior citizens as well as from other parts of Continental Europe. Looking further down the table it can be seen that proportionately fewer senior citizens are non-white and 97.2 per cent (male and female) of these are immigrants compared with 48.4 per cent of those of working age. However, one inevitable trend of New Commonwealth immigration and a tendency for larger family sizes is that the population of non-white senior citizens will grow considerably. There are no significant regional differences at this level of disaggregation.

One large difference is children under 16. Not surprisingly, more Type 1 men of working age are bringing up children, but this is dwarfed by the 44.1 per cent for working age Type 1 women. Furthermore, working age Type 1 households are far more likely to have another adult present — once again Type 1 women show the highest proportion.

Senior citizens are more likely to claim to have a religion (the religion question does not specify whether one actually practices the religion) and note

that more working age men than women state that they have no religion. Once again the fewer numbers of non-whites is reflected in the smaller numbers of non-Christians.²⁵ Not surprisingly, far more senior citizens describe themselves as being in poor health. Perhaps more surprising is that fewer claim to have a British identity. Finally, note that the *Census* data show that senior citizens are far more poorly qualified.

Considering the sample means of Type 2 households in Table 8, the

Table 8: Bivariate probit for Type 2 households. Males 65 & females 60 and over. (Dependent variable =1 if in employment)

	Margin- al effect (men) %	Sample mean (men)	Sample mean (working age men)	Marginal effect (women) %	Sample mean (women)	Sample mean (working age women)
Age	-0.13*	73.46	45.08	-0.18*	70.67	41.73
Mortgage	0.77*	4.92	50.31	0.72*	-	52.88
Social housing	-0.28*	13.23	9.92	-0.30*	-	10.37
Private rent	0.61*	20.86	23.69	0.28**	-	22.62
Immigrant	-0.10	6.19	10.39	-0.03	-	10.72
East Midlands	0.34*	8.04	7.93	0.17	-	8.00
East Anglia	0.53*	4.59	4.02	0.16	-	4.04
London	0.67*	6.92	9.33	0.64*	-	9.07
South East	0.52*	20.52	20.59	0.52*	-	20.83
South West&Wales	0.39*	16.10	14.04	0.30*	-	14.09
West Midlands	0.24*	9.54	9.15	0.19	-	9.10
North West	0.05	10.67	10.79	0.09	-	10.68
Scotland	0.23	8.70	9.01	0.08	-	9.08
Children under 16	-0.01	0.64	44.19	-0.24	-	48.35
More than two adults	0.31*	8.78	25.91	0.25*	-	26.88
No religion	-0.13	6.33	17.34	0.22	3.69	13.54
Non-christian	0.54*	2.42	6.04	-0.28	2.31	5.80
Non-white	-0.44*	2.23	7.23	-0.02	2.10	7.24
Poor health	-0.86*	43.01	15.52	-0.99*	41.08	14.75
British identity	0.05	31.46	38.15	0.02	31.28	39.61
Partner in poor health	-0.25*	41.08	17.03	-0.12*	43.01	16.21
Partner of different religion	0.28*	5.15	11.10	0.19**	-	10.57
Partner of different ethnicity	0.35*	3.27	6.69	0.27**	-	6.63
Has qualification (from <i>Census</i>)	3.42*	43.02	76.80	3.12*	37.29	77.79
rho	0.53*					

Notes: * Indicates significant at 5 per cent level ** at 10 per cent level. Time dummies are included, but not reported. Default category is house owned outright, living in North/Yorks Humberside christian religion, white in good health, non-immigrant. Marginal effects are calculated assuming that common variable values are held constant in the other equation. - indicates same mean value for female data (common variable).

focus will be differences with Table 7 across senior citizens. As the majority here are married, the marital status variables are dropped from the bivariate probit estimates. Fewer are found in social housing and more are mortgage payers. Type 2 are less likely to state that they have no religion and fewer state that they have a health problem. This reflects the fact that couples are mutually self-supporting and have a more settled lifestyle.

Turning now to the estimates of the marginal effects, both tables show that age has a strong negative effect on participation (the numbers show the change in the per centage probability of participation). The strong age effect makes clear that, despite the rising upward trend in senior citizen participation, they are unlikely ever to come close to matching working age participation rates. Furthermore, poor health has a strong additional negative influence, which is clearly an age-related factor.²⁶ Those with a mortgage are more likely to work as are those in the private rented sector. This probably reflects the fact that such senior citizens are more likely to have a financial necessity to work. Those in social housing are less likely to work, where this reflects lower than average human capital and is also picking up other factors that have a negative influence. This variable is also found to have highly significant negative influence for working age households in other studies.²⁷

In fact, one feature of the results is that the influences on participation are similar to those of working age. Although the numbers are far smaller, being non-white has a significantly negative influence except for Type 2 women. Regional demand variables have an influence, with a strong Midlands and South England effect.

It can be seen that in Type 1 households, if there is another adult present, around half of these adults are working. This is far higher than the mean participation rates of these households. Note, however, that the number of these Type 1 households, two or more persons but without a partner, is extremely small. The presence of a working adult has a small positive influence. For Type 2 households this effect is tracked by the *rho* term in the bivariate probit, which is large and highly significant. The positive sign means that a person who works is more likely to have a working partner, after controlling for characteristic differences. This confirms the findings of Schirle (2008) in a study of older male workers in the USA, Canada and the UK. She explains much of the increase by arguing that leisure is strongly complementary for older households. Increasing female participation therefore encourages more participation among older males.

Immigrant status is an exception in comparison to working age households and appears not to influence participation. Senior citizen immigrants are predominately white and are probably integrated by the time they reach senior citizen age. Having a British identity appears to have a weak positive influence for Type 1 households. For Type 2 households two mixed identity variables are included. These are generally significant for males. It possibly picks up the fact that mixed households consist of people who are more open-

minded and are therefore more likely to engage with the labour market. Finally, the *Census* data show that being qualified leads to about a 3 per cent to 4 per cent increase in participation. As an example, if senior citizens were as well qualified as the general population, then participation would rise by around 1.7 per centage points overall.

Table 9 seeks to explain gender differences in participation using decomposition analysis. The decompositions are a variant of the Gomulka and Stern (1990) method, developed by Oaxaca and Ransom (1994). Let the difference in the predicted means from the logits be $\hat{I}^m - \hat{I}^f$, where the superscripts m and f refer to males and females. The coefficient effect is:

$$\bar{P}(x^m \hat{\alpha}^m) - \bar{P}(x^m \hat{\alpha}^*) - [\bar{P}(x^f \hat{\alpha}^f) - \bar{P}(x^f \hat{\alpha}^*)] \quad (1)$$

and the characteristic effect is:

$$\bar{P}(x^m \hat{\alpha}^*) - \bar{P}(x^f \hat{\alpha}^*) \quad (2)$$

where the $\hat{\alpha}^*$ coefficients are estimated from a pooled logit combining the male and female observations. $\bar{P}(x^m \hat{\alpha}^m)$, for example, is the average predicted employment probabilities when using the male group's characteristics on male coefficients. Together (1) and (2) sum to the predicted mean difference $\hat{I}^m - \hat{I}^f$.

Table 9: Employment decompositions

<i>Person type</i>	<i>Minimum age comparisons</i>	<i>Total difference in per cent employment rates</i>	<i>Coefficient component</i>	<i>Characteristics component</i>
Head of Household with no partner (Type 1)	65 male	-0.69	1.87	-2.57
	60 female		(7.72)	(35.25)
	65 male	2.71	2.06	0.65
	65 female		(9.07)	(12.08)
	60 male	5.02	3.58	1.44
	60 female		(13.71)	(22.29)
With partner present (Type 2)	65 male	0.24	1.87	-1.62
	60 female		(6.42)	(10.07)
	65 male	1.54	1.92	-0.38
	65 female		(7.41)	(3.15)
	60 male	3.50	5.14	-1.63
	60 female		(17.70)	(11.90)

The results of the decomposition are shown in Table 9 and it can be seen that both the aggregate characteristic effect and coefficient effect are highly significant.²⁸ In addition to comparing senior citizen men with senior citizen women (which come from Tables 7 and 8), decompositions at two other age points are shown for both household types. The decomposition for Type 2 households is based on a reduced form, which includes the partner's characteristics in each equation, given the strong household effect identified from the bivariate probit. In addition (not shown) decompositions using the *Census* data have also been undertaken both including and excluding a qualifications variable. The decompositions are virtually identical whether or not qualifications are excluded. Furthermore, the *Census* data decompositions tell virtually the same story as the *LFS* decompositions. The only difference is that for Type 2 households in the last two rows, characteristics account for 43.8 per cent and 39.7 per cent of the total difference. Coefficient differences always have the major influence.

Looking at the results where men and women of a similar age are compared, the results show a clear pattern. The vast majority of the difference in participation rates is explained by coefficient differences; indeed, in two out of four cases men have characteristics that imply lower participation. Repeating the decompositions using the same co-variates, splitting ages into working age categories 16-24, 25-39, 40-49 and 50-59, there is a strong contrast in results. Type 2 households mirror senior citizens with the coefficient effect strongly dominating. By strong contrast, for Type 1 households it is characteristics that dominate up to 40-49, but there is no significant difference in the 50-59 category. What drives this is the presence of young children, which has a strong negative impact on participation. Over 55.5 per cent of Type 1 female households aged less than 50 have dependent children, compared with 6.4 per cent of Type 2 males. This falls to just 7 per cent for women in the 50-59 year-old group.

It is possible to decompose the aggregate characteristics effect into its constituent components.²⁹ It is the age difference that is the key contributor to the characteristics component. For Type 1, for the 65-60 comparison, male average age is older, in contrast to the 65-65 and 60-60 comparisons. Age accounts for 74 per cent, 77 per cent and 92 per cent of the characteristic component. For Type 2 age differences dominate in two countervailing ways. Men are always older, so own age differences mean a negative characteristics contribution as in the Type 1 65-60 comparison. However, the partner's age also enters the reduced form and this also has a significant negative coefficient in the reduced form. Given that women are on average younger, the age difference here has a positive characteristics contribution for men. However, the own age negative effect strongly dominates the partner effect and together they account for most of the characteristics contribution (97 per cent, 111 per cent and 100 per cent respectively).

So what can be made of these findings? Does the coefficient effect imply discrimination against female senior citizens, as is suggested by other

Table 10: Earnings functions for Type 1 households. Males 65 and over. Females 60 and over. (Dependent variable Ln real earnings)

	<i>Male</i>	<i>Sample mean</i>	<i>Female</i>	<i>Sample mean</i>
Age	0.002	69.49	-0.013*	64.29
Single	-0.811*	22.26	-0.214	7.46
Separated/widowed/divorced	-0.606*	75.09	-0.209	92.16
Immigrant	-0.236	9.43	0.010	9.95
East Midlands	0.055	9.06	-0.037	7.84
East Anglia	-0.618*	3.77	-0.009	3.32
London	0.111	14.34	0.221*	10.78
South East	0.204	22.26	0.034	27.13
South West&Wales	0.073	18.11	0.020	13.26
West Midlands	0.234	9.81	0.044	7.54
North West	0.045	9.43	-0.001	9.95
Scotland	-0.058	4.15	0.001	8.59
Children under 16	0.727	1.13	-0.158	1.21
More than one adult	0.021	12.08	-0.030	15.07
No religion	0.137	8.68	0.043	5.65
Non-christian	0.569*	3.40	0.133**	3.17
Non-white	0.138	5.28	-0.004	3.54
Poor health	0.091	17.36	-0.036	18.69
Other person works in household	-0.214	7.55	0.025	10.78
British identity	0.094	36.98	0.029	39.19
Professional	0.125	7.92	0.338*	8.14
Associate professional and technical	0.139	6.04	0.009	12.36
Admin and secretarial	-0.498*	6.42	-0.246*	22.38
Skilled	-0.468*	10.94	-0.405*	2.41
Personal services	-0.535*	3.77	-0.454*	13.34
Sales and customer services	-0.549*	6.79	-0.513*	10.55
Machine operatives	-0.444*	13.21	-0.336*	2.56
Elementary	-0.642*	33.21	-0.540*	22.16
Other person in poor health in household	-0.118	1.51	-0.114	2.71
Work away from home	0.006	91.70	0.154*	94.35
Part-time	-0.148	66.79	-0.033	66.84
Public sector	0.192	13.96	0.127*	35.80
More than 50 employees	0.121	30.57	0.068*	38.73
2 - 5 years tenure	0.224	26.79	-0.039	23.59
More than 5 years	0.274**	63.40	-0.024	66.16
constant	2.499*	0.00	2.928*	0.00
R ²	0.403		0.401	
n	265		1327	

Notes: * Indicates significant at 5 per cent level ** at 10 per cent level. Time dummies are included, but are not reported. Default category is single, house owned outright, living in North/Yorks Humberside Christian religion, white in good health, non-immigrant, manager (senior official).

Table 11: Earnings functions for Type 2 households. Males 65 and over. Females 60 and over.(Dependent variable ln real earnings)

	<i>Male</i>	<i>Sample mean</i>	<i>Female</i>	<i>Sample mean</i>
Age	-0.021*	68.56	-0.006*	63.12
Immigrant	0.026	7.56	0.031	6.91
East Midlands	-0.088	9.33	-0.016	8.15
East Anglia	-0.036	4.42	-0.006	3.40
London	0.131	7.17	0.145*	7.06
South East	0.081	27.50	0.079	24.76
South West&Wales	-0.051	15.03	-0.030	14.57
West Midlands	0.066	9.63	-0.015	10.12
North West	-0.019	8.55	0.002	9.63
Scotland	0.064	8.35	0.021	8.72
Children under 16	-0.042	2.36	0.039	0.94
More than two adults	-0.035	16.80	-0.041	15.55
No religion	0.024	6.78	0.044	4.45
Non-christian	-0.200	3.24	-0.078	2.23
Non-white	0.087	3.54	0.011	2.42
Poor health	-0.032	20.63	-0.020	17.06
British identity	-0.010	35.07	-0.003	34.92
Other person works in household	-0.018	41.16	0.047	55.38
Other person in poor health in household	-0.034	30.35	0.002	32.96
Partner possibly of different religion	-0.017	14.34	0.007	12.91
Partner of different religion	0.009	5.99	0.018	6.19
Partner possibly of different ethnicity	-0.204	2.46	-0.053	1.36
Partner of different ethnicity	-0.058	5.30	-0.034	4.57
Professional	0.190*	10.71	0.270*	7.51
Associate professional and technical	-0.244*	5.50	-0.041	8.42
Admin and secretarial	-0.344*	7.56	-0.306*	24.12
Skilled	-0.543*	10.81	-0.563*	2.27
Personal services	-0.762*	5.50	-0.541*	13.02
Sales and customer services	-0.900*	5.80	-0.625*	12.42
Machine operatives	-0.807*	16.01	-0.637*	2.42
Elementary	-0.860*	24.36	-0.648*	24.12
Work away from home	0.076	87.82	-0.035	91.62
Part-time	0.041	70.33	-0.019	77.05
Public sector	-0.038	18.17	0.081*	37.26
More than 50 employees	0.131*	32.81	0.053*	35.82
2 - 5 years tenure	-0.082	27.21	-0.028	20.16
More than 5 years	0.019*	57.86	0.018	71.39
constant	3.751*		2.597*	
R ²	0.357		0.332	
n	1018		2649	

Notes: * indicates significant at 5 per cent level ** at 10 per cent level. Time dummies are included, but are not reported. Default category is house owned outright, living in North/Yorks Humberside, Christian religion, white in good health, non-immigrant, manager (senior official). Partner of male and partner of female not restricted to be a senior citizen.

studies of working age adults? Studies of racial differences reveal similarly significant coefficient effects, which is interpreted as discrimination. It is simplistic to argue the same in this case; rather it might be thought of as a complex hysteresis effect. Although participation rates have increased considerably for prime age women, rates are still smaller than men. Women still have the traditional 'caring and nurturing' role at the expense of career and it should be recalled that for senior citizen women, when they were of working age, this stereotype was far more dominant. It seems that for many, despite losing family responsibilities, the tradition of non-working carries on into later age. The transition data of Table 4 reinforce this idea. Those who are already not working rarely transition back into work at older ages. It is those that are already employed that are more likely to carry on. If this interpretation is correct, a narrowing of participation rates across male and female senior citizens is to be expected.

4. EARNINGS

Tables 10 and 11 show earnings functions for Type 1 and Type 2 households.³⁰ Age is entered linearly; more complex specifications add nothing to the explanatory power. The specification includes occupational dummies, which in the absence of a human capital measure, are a useful proxy. These variables are highly significant. In general, the explanatory power of the equations is similar to earnings functions for those of working age.

The age variable suggests that earnings decline as senior citizens become older - hardly a surprising result. The exception is Type 1 males, but note that this equation has only 265 observations. Other than that there is no clear pattern. There is evidence of a limited regional pattern. However, it is occupation that dominates along with age.

Table 3 indicates that senior citizen women earn less, which carries over from differences observed at working age. Once again decomposition analysis can cast light on the factors involved. Table 12 does this, where the same Oaxaca and Ransom approach has been applied by decomposing around a set of coefficients obtained from a pooled regression. The results are clear-cut. As with participation, there is a strong and significant coefficient component. Thus the earnings advantage enjoyed by working age men with similar characteristics to women carries over to Britain's male senior citizens. Note also that the decomposition may underestimate the discrimination effect. The 'glass ceiling' for women is a well-observed phenomenon with occupational crowding into the lower occupations.³¹ Here only 3.4 per cent of Type 1 senior citizen women are in the highest paying (default) category of manager or senior official, compared with 11.7 per cent of men. The same is true for Type 2, with 5.7 per cent as opposed to 13.7 per cent. This compositional difference is picked up as a characteristic effect, but arguably occupational crowding is indicative of discrimination during working age. Indeed, when characteristics are disaggregated into their component parts, occupation differences are a

major contributor to the positive male characteristics component.

One criticism of the approach is that possible selection effects have been ignored in the earnings equation. We have experimented with fitting a Heckman two step estimator for sample selection where housing tenure is used to identify the wage equation.³² These are not particularly revealing because for older workers the samples are dominated by censored observations. Those in work for whom hourly pay is not available are dropped from the sample, which further increases the number of censored observations, which range from 97.7 per cent for Type 1 senior citizen males to 91.8 per cent for Type 2 senior citizen females.

As an alternative to the binary logit specification, an hours of work equation was fitted. Once again, this was done using simple OLS and with a Heckman procedure to correct for selectivity bias. The results are not shown, but reinforce those factors that lower participation, age, health and working in the public sector are the key variables that have a negative impact on hours. As senior citizens become older, fewer work and additionally hours decline for those in work by about 45 minutes for each additional year.

5. CONCLUDING COMMENTS

An ageing population and the resultant rise in the dependency ratio confronts Europe with a number of challenges to maintain economic growth whilst funding state pension and additional welfare costs (European Commission, 2007). Increases in labour market participation among the elderly will help mitigate these problems. We find that in Britain those factors that influence participation of those beyond retirement age are similar to those below retirement age.

The unconditional trend growth in participation of Britain's senior citizens is an increase of around 0.45 per centage points per annum. The conditional logit estimates indicate a smaller underlying trend growth of around 0.16 percentage points. Other factors that point to a secular increase are health improvements and new cohorts of senior citizens who will be better qualified. There is, therefore, every reason to believe that substantial increases in participation will continue and the gradual rise in the retirement age and the positive attitude to work will re-enforce this. Nevertheless, the pattern is for fairly rapid declines in both participation and hours worked as senior citizens become older. Low pay is also a feature.

The policy implications are clear. Evidence on transitions shows that once people move out of work, few transition back. Keeping people in work at the state retirement age is important. Age legislation helps in this regard, but this needs to be carefully modified and strengthened in the light of its effectiveness. Health is also a decisive factor and whilst the inevitability of time cannot be assuaged, the fact that work helps maintain health can generate a virtuous spiral of more work and better health. Keeping people qualified with relevant skills also promotes lifelong working. The promotion of lifetime learn-

ing in the workplace and access to training to avoid the deskilling of older workers needs to be promoted and monitored. Finally, to investigate these questions requires data on senior citizens to feature in regular national datasets. We advocate the elimination of data discrimination against the elderly in national datasets such as the Labour Force Survey.

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ENDNOTES

1. Department of Economics, Richard Price Building, Swansea University, Swansea SA2 8PP. * Corresponding author: d.g.leslie@swansea.ac.uk. Thanks to the referees and editors of this journal for helpful comments. Remaining errors are our own.

2. Office of National Statistics, <http://www.statistics.gov.uk/cci/nugget.asp?ID=949>

3. Centre for Research into the Older Workforce, <http://www.niace.org.uk>. This is in stark contrast to the behaviour of older male workers (50-64) in the last quarter of the last century (Campbell, 1999; Disney, 1999). Disney and Hawkes (2003) note a recent reversal in this trend.

4. The 2007 Pension Act means that by 2020 the state pension age will be 65 for both men and women, rising in stages to 68 in 2048.

5. Sloane (2007) has a comprehensive review. The Department of Work and Pensions is a good example. In a major study of older workers involving a specially commissioned sample, the age range was 50-69, mainly because the over 50s are a key target group to return to work for the government. See Humphrey *et al* (2003).

6. Disney and Hawkes (2003) present a concise review.

7. See Watson Wyatt Consultants (2005) on the changing patterns of pension provision.

8. See Irving *et al* (2005), which is a qualitative but informative study based on focus groups.

9. Disney and Smith (2002) showed that an earlier change abolishing the upper earnings rule for retirees in 1989 had a positive impact on labour supply of senior citizens.

10. Blundell *et al* (2002), in a study of pension take-up, make the point that the availability of incapacity benefit encourages transition into worklessness, especially as this can often be supplemented by an ill-health provision in an occupational pension scheme.

11. The *LFS* switched from seasonal to quarterly in 2006. Again we made sure respondents are included only once.

12. The participation rate is those who are classified as in work, expressed as a percentage of the inactive, working and ILO unemployed. The reported results focus on the household as the basic unit, mainly because most studies use the household cri-

terion. Households can, however, comprise more than one family unit and it is possible to use the family as an alternative basic unit. The results are not greatly different using the family as the basic unit. The sample used here excludes Northern Ireland.

13. This idea is developed by Gregg and Wadsworth (2003).

14. B&Q is a large hardware chain that actively recruits senior citizens.

15. One reason is that the hourly pay responses exclude the self-employed.

16. The paper does not focus in detail on the occupational and industrial mix. In fact, the occupational and industrial composition of senior citizen males is broadly similar to those of working age. The major difference arises with senior citizen females. Whereas only 11.4 per cent of working age women work, the lowest elementary occupational category, this rises to 20.0 per cent for senior citizens, with corresponding smaller numbers in professional occupations.

REFERENCES

Arulampalam W, Booth A L and Bryan L (2005) 'Is there a Glass Ceiling over Europe? Exploring The Gender Pay Gap Across The Wages Distribution', Working Paper 25, Institute for Economic and Social Research, Essex University.

Blackaby D, Leslie D, Murphy P and O'Leary N (2008) 'Exploring the Religious Dimension in Employment and Earnings', mimeo, Swansea University.

Blackaby D, Leslie D, Murphy P and O'Leary N (2002) 'White/Ethnic Minority Earnings and Employment Differentials in Britain: Evidence from the LFS', *Oxford Economic Papers*, 54, 270-297.

Blundell R, Meghir C and Smith S (2002) 'Pension Incentives and the Pattern Of Early Retirement', *Economic Journal*, 112, c153-c170.

Campbell N (1999) 'The Decline of Employment among Older People in Britain', STICERD (London School of Economics) Centre for Analysis of Social Exclusion, Discussion Paper 19.

Daniel K and Heywood J S (2007) 'The Determinants of Hiring Older Workers', *Labour Economics*, 14, 35-51.

Dickens R and Manning A (2003) 'Minimum Wage, Minimum Impact' in Dickens R, Gregg P and Wadsworth J (eds) *The Labour Market under New Labour*, Basingstoke: Palgrave MacMillan.

Disney R (1999) 'Why have Older Men Stopped Working?' in Gregg P and Wadsworth J (eds) *The State of Working Britain*, Manchester: Manchester U P.

Disney R and Hawkes D (2003) 'Why has Employment Recently Risen among Older Workers in Britain', in Dickens R, Gregg P and Wadsworth J (eds) *The Labour Market under New Labour*, Basingstoke: Palgrave MacMillan.

Disney R and Smith S (2002) 'The Labour Supply Effect on the Abolition of The Earnings Rule for Older Workers in the United Kingdom', *Economic Journal*, 112, c136-c152.

Egerton M and Mullan K (2006) 'An analysis and monetary valuation of formal and informal voluntary work by gender and educational attainment', Institute of Economic and Social Research Paper 22, University of Essex.

European Commission (2007) *Employment in Europe 2005*, Brussels: OOEPEC.

Even E W and Macpherson D A (1993) 'The Decline of Private-sector Unionism and the Gender Wage Gap', *The Journal of Human Resources*, 28, 279-296.

Gomulka J and Stern N (1990) 'The Employment of Married Women in the United Kingdom', *Economica*, 57, 171-199.

Greenhalgh C (1980) 'Male-female Wage Differentials in Great Britain: is Marriage an Equal Opportunity', *Economic Journal*, 90, 751-775.

Gregg P and Wadsworth J (2003) 'Workless Households and the Recovery', in Dickens R, Gregg P and Wadsworth J (eds) *The Labour Market under New Labour*, Basingstoke: Palgrave MacMillan.

Humphrey A, Costigan P, Pickering K, Stratford N and Barnes M (2003) Factors Affecting the Labour Market Participation of Older Workers, Research Report No 200, Dept of Work and Pensions.

Irving P, Steels J and Hall N (2005) Factors Affecting the Labour Market Participation of Older Workers: Qualitative Research, Research Report No 281, Dept of Work and Pensions.

Jones F L (1983) 'On Decomposing the Wage Gap: A Critical Comment on Blinder's Method', *Journal of Human Resources*, 18, 126-130.

Lazear E (1979) 'Why is there Mandatory Retirement?', *Journal of Political Economy*, 87, 1261-1284.

Lazear E (1981) 'Agency, Earnings Profiles, Productivity, and Hours Restrictions', *American Economic Review*, 71, 6-20.

Leslie D (1998) *An Investigation of Racial Disadvantage*, Manchester: Manchester U P.

Nickell S (1980) 'A picture of Male Unemployment in Britain', *Economic Journal*, 90, 776-794.

Oaxaca R and Ransom M (1994) 'On Discrimination and the Decomposition of Wage Differentials', *Journal of Econometrics*, 61, 5-21.

Oaxaca R and Ransom M (1998) 'Calculation of Approximate Variances for Wage Decomposition Differentials', *Journal of Economic and Social Measurement*, 24, 55-61.

OECD (2000) *Reforms for an Ageing Population*, Paris: OECD.

Omerod C and Ritchie F (2006) 'Issues in the Measurement of Low pay', mimeo, Earnings Analysis Branch, London: Office of National Statistics.

Schirle T (2008) 'Why Have the Labor Force Participation Rates of Older Men Increased since the Mid-1990s?', *Journal of Labor Economics*, 26, 549-594.

Sloane P J (2007) 'Economic Issues Surrounding the Employment of Older Workers', WELMERC Report, University of Swansea.

Stock J H and Wise D A (1990) 'Pensions, the Option Value of Work, and Retirement', *Econometrica*, 58, 1151-1180.

Watson Wyatt Consultants (2005) Report on the Initial Scoping Research on the Occupational Pensions Environment to inform the Full Comparative Valuation, Office of Manpower Economics, available at: [www.ome.uk.com/downloads/WW per cent20Occupational per cent20Pensions per cent20Research.PDF](http://www.ome.uk.com/downloads/WW_per_cent20Occupational_per_cent20Pensions_per_cent20Research.PDF)

Yun M S (2004) 'Decomposing Differences in the First Moment', *Economic Letters*, 82, 275-280.