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THE LABOUR FORCE PARTICIPATION OF OLDER MEN IN BRITAIN, 1951-81

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ABSTRACT

The Labour Force Participation of Older Men in Britain, 1951-81*

This paper evaluates the relative impact of a range of health, economic and structural factors on the employment experience of older male workers in Britain in the 30 years since 1951. It is based on a cross-sectional analysis of data on age of workforce in 34 industrial sectors drawn from the decennial censuses from 1951 to 1981. It finds that early retirement is influenced primarily by economic factors, although health becomes important in 1981. Retirement at age 65 appears to be conditioned by structural factors, particularly the way in which exit from the labour force at age 65 is managed by employers and trade unions. By showing that retirement and early retirement behaviour are influenced by different factors, and that the importance of these factors has changed over time, this paper demonstrates why earlier research focusing on monocausal explanations has been unable to generate robust results.

JEL classification: 813, 824
Keywords: retirement, older workers, trade union density

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NON-TECHNICAL SUMMARY

There has been a substantial fall in the labour force participation of older men in Britain since 1951. In the 30 years to 1981 the participation rates for men aged 60-64 fell from 87.5% to 74.6%, and for men aged 65-69 the decline was from 47.2% to 17.0%. A number of competing explanations exist to account for this reduction, but there have been surprisingly few attempts to test empirically the competing hypotheses. This paper conducts such an empirical analysis, using cross-section data on the age of the workforce in 34 industrial sectors drawn from the decennial censuses of 1951 to 1981.

The factors that may be cited as possible explanations for changing patterns of permanent withdrawal from the labour force in later life may be roughly grouped under the headings of health, the economic status of older workers, and 'structural' conditions in the labour market. Poor health and disability have consistently been found by other researchers to be positively related to retirement, but it is not clear how improvements in life expectancy and health status relate to reduced labour force participation among older men. Studies of this relationship have been flawed by their reliance on subjective, often self-reported, data on health status, and have produced inconclusive results. High income or wealth may provide a strong incentive for people to leave the labour force before the normal retirement age, but income and wealth effects do not appear to be a sufficient explanation for the abrupt decline in male labour force participation experienced at age 65. Structural conditions in the labour market, such as retirement rules, age discrimination or unemployment, may help to explain retirement behaviour, but there are considerable problems in developing adequate measures of the strength of such forces.

This paper uses data on retirement and early retirement across 34 distinct industrial sectors to test for the impact of health, economic and structural factors. The paucity of the data, and changes in the data reported in the censuses, preclude a full explanation of retirement behaviour. In particular, the censuses contain no explicit data on retirement, so retirement and early retirement rates must be inferred from age-specific data on employment in each sector. An Inferred Retirement Rate (IRR) is constructed for each sector by comparing the size of the workforce aged 60-64 at the time of each census with that aged 65-69. The Early Retirement Rate (ERR) is constructed in a similar fashion, by comparing the size of the workforce aged 55-59 with that aged 60-64. Regression equations are then estimated to see the extent to which inter-industry variation in these retirement rates can be explained by inter-industry variation in five health, economic and structural variables. Health indicators by industry group are difficult to obtain, and the only one available for each census year is the standardized mortality rate (SMR); though not as subtle an indicator of health status as mortality or disability data, this has the advantage of objectivity and

consistency over time. Two economic indicators are used: the average weekly earnings of male adult manual workers in each sector and the proportion in each sector covered by an occupational pension scheme. The rate of unemployment in each industry is a structural indicator of general labour market conditions, while trade union density may indicate the extent to which entry to and exit from the workforce is governed by agreements between employers and unions.

The goodness of fit of the equations rises over time, with the independent variables explaining three-quarters of the inter-industry variation of retirement rates in 1981, and almost two-thirds of the variation in early retirement. This is impressive given the simplicity of the model. The equations show that health and economic factors have little influence on retirement at age 65, which is dominated by the structural factor of high trade union density and, to a lesser extent, by high unemployment. In contrast, retirement before age 65 is dominated by the economic variables of high average weekly earnings and membership of occupational pension schemes, although in 1981 there is also a strong positive relationship between high standardized mortality rates and early retirement.

These results suggest that changes in labour force participation at age 65 are the outcome of external structural influences that stem from the desire of unions and employers to manage exit from the labour force. It seems not that the supply of willing workers falls when they reach their 65th birthday, but rather that the demand for such workers is abruptly terminated. In the case of early retirement, however, the results suggest that leaving the workforce before the age of 65 was largely voluntary, being chosen by better-off workers who had pension rights and higher average weekly earnings. It appears that in the tight labour market conditions of 1961 and 1971 poor health was not a significant determinant of early retirement; the labour shake-out of the late 1970s and early 1980s may have encouraged employers increasingly to use health status as a reason for redundancy, leading to the positive and significant coefficient on mortality in the 1981 data.

By showing that retirement and early retirement behaviour are influenced by different factors, and that the importance of these factors has changed over time, this paper demonstrates why earlier research that has focused on either health or economic or structural factors has been unable to generate robust results. The paper also has a clear policy implication. An increase in the normal age of retirement may become an economic and demographic necessity as pensioner dependency ratios rise in the first three decades of the next century. The importance of trade union density in the results suggests that this would require the agreement of both workers' and employers' groups. Yet there is little incentive for employers to raise retirement ages when, in order to manage their internal labour markets, they tend to have earnings gradients which pay older workers a remuneration greater than their marginal product. And there is little incentive for

unions to bargain for an extended working life for members who are increasingly opting for retirement before age 65. The increasing extent to which structural factors appear to influence the cross-industry pattern of retirement suggests that it will be difficult to increase the normal age of retirement through marginal economic changes to pension entitlements of the sort hinted at in the 1985 Green Paper on the Reform of Social Security.

THE LABOUR FORCE PARTICIPATION OF OLDER MEN IN BRITAIN, 1951-1981

This paper attempts to evaluate the relative impact of a range of health, economic and structural factors on the employment experience of older male workers in Britain in the thirty years since 1951. It is based on a cross-sectional analysis of data on age of workforce in thirty-four industrial sectors drawn from the decennial censuses from 1951-1981.

Although there has been a substantial fall in the economic activity of older men in Britain since 1951, and a number of competing explanations exist in the literature to explain this reduction, there have been surprisingly few attempts to test empirically the competing hypotheses. This is in sharp contrast to the US, where the existence of detailed longitudinal panel data drawn from the Retirement History Survey has allowed researchers to test the applicability of complex explanatory models. The absence of such data for Britain precludes any similar analysis but does not diminish in importance the issue of why the economic activity of older men has declined so steeply. The first section of this paper reviews the attempts of other investigators to address this issue, and outlines the range of explanations that have been advanced. The next section discusses the cross-sectional approach adopted in this paper and describes the data used. The third section presents some regression estimates of the relative influence on the labour force participation of older men of a range of health, economic and structural factors, and the conclusion relates these results to other findings about retirement behaviour in modern Britain.

I

The change in the economic activity rate of older men in Britain since 1951 is shown in table 1. This decline is part of a longer-run trend which can be traced back to the late nineteenth century, but the pace of decline since the second world war makes this modern period distinct from the earlier years. The trend for older women is rather different, with overall labour-force participation for women aged 60-64 actually rising from 14.4 to 28.0 per cent between 1951 and 1970 before falling back to 19 per cent by 1985. This, however, is a reflection of the substantial post-war rise in overall female (especially married female) participation rates rather than a specific change in the behaviour of older female workers. The rise in overall female participation rates obscures other changes that may be taking place among the participation of older women, and therefore the analysis in this paper has been confined to male workers.

Permanent withdrawal from the labour force in later life may be induced by a variety of reasons which may roughly be grouped under the headings of health, economic and structural factors. Poor health and disability is consistently found to be positively related to retirement, but it is not clear whether or how this relationship has changed since 1951. The survey of retired men carried out by Parker (1980), and Walker's study of early retirement in Sheffield (p.218,1985) both found that ill health was an important factor in the retirement decision. These findings confirm the conclusion of a number of American interview and questionnaire surveys that ill health is the most important self-reported reason for retirement. However, doubt has been cast

on the validity of these results, because interview and questionnaire surveys of retired people may encourage them to give socially acceptable reasons for retirement such as ill health rather than self-interested ones such as leisure preference, and because the individual focus of the interview technique encourages respondents to advance personal rather than structural explanations for their behaviour (Campbell and Campbell, 1976, p.373).

A model of the labour supply decisions of the elderly in Britain derived by Zabalza, Pissarides and Barton (1980) from individual data relating to a sample of 1417 British men aged 55-73 and 1178 women aged 50-73 indicated that poor health was a significant positive influence on the retirement decision, though not the dominant influence suggested by some interview surveys. The reliance in this study on subjective personal assessments of health status may introduce the same bias for which the interview surveys have been criticised. One US study by Hurd and Boskin (1984) using Retirement History Survey data attempts to minimize this bias by using self-definitions of health status in 1969 for a panel of workers aged 58 to 63 whose labour force participation was then followed over the next five years. Again health was found to be important, with labour force participation rates at age 65 for those who were in the labour force at age 59 over thirty percentage points lower for those in self-declared poor health in 1969 relative to those not in poor health.

Health status, therefore, appears to be an important influence on retirement, and in particular on early retirement, decisions, even when post hoc justification of retirement behaviour is avoided by using measures of pre-retirement health status. It is not clear, however, how the influence of health status on individual retirement decisions relates to changes in the overall participation rate of older men in Britain since 1951. Although the incidence of heart disease and cancer among late-middle aged men has increased since the second world war, there has nevertheless been an unequivocal

reduction in mortality for men over this period, with average life expectancy for men aged 55 rising from 18.6 to 20.5 years between 1953-5 and 1983-5, and life expectancy for men aged 65 rising by 1.4 years to 13.3 over the same period (Health and Personal Social Services Statistics for England, 1987). Mortality may not be the most appropriate indicator of health status, but it does have the positive attribute of being objectively defined, whereas measures of disability may vary according to the subjective definitions of doctors, social security administrators and workers themselves. Piachaud has shown that the considerable rise in recorded disability among men aged 55 and over in Britain between 1971 and 1981 does not appear to have been caused by any rise in objectively defined disability. Instead he found that 'about half the increase in economic inactivity ascribed to disability is attributable to the worsening labour market: the other half may be due to the general increase in the relative value of social security benefits, changing individual, medical or administrative standards of disability, or quite other factors' (Piachaud, 1986, p159).

It may be argued, of course, that fixed measures of health status are inappropriate to any investigation of the link between health and retirement, because over time the mental and physical demands of work may alter in such a way as to render those formerly capable of work now unemployable, or vice versa. What is really required is some measure which relates the current objective health status of the worker to the health status requirements of current employment, and as far as this author is aware, no such convenient measure exists. All that can be said is that changes in the health status requirements of employment in Britain since 1951 have not necessarily moved against the interests of older workers. Extensive studies by industrial sociologists and psychologists in the 1950s and early 1960s of the work capacity of older people found that they were quite able to compete with younger workers in jobs where they were able to exercise some control over the

pace of their work (such as skilled manufacturing and, perhaps surprisingly, navvying), but that they found it increasingly difficult to sustain work such as on a production line which was conducted at an externally imposed pace (Thane, 1987,pp 14-15). The increased mechanisation of manufacturing employment since 1951 may therefore have increased work stress for older men and forced some of them out of the labour force, but the great expansion of service sector employment over the same period, in which the pace of work often cannot be strictly controlled, may well have increased the number and range of employment opportunities most suited to older workers.

Given the difficulty of determining how to measure the impact of changing health status on changing participation rates over time, it is not surprising that an attempt at time series estimation of labour force participation for the over 45s in Britain for the period 1966 to 1983 produced very weak and largely insignificant results. Warburton (1987) used aggregate annual data to estimate the impact of income, national insurance benefits, unemployment, mortality and certified incapacity on the participation rate of four different age groups of workers. He found that his two health variables, mortality and incapacity, generally had the wrong sign in his male participation equations, and only in the case of incapacity for men aged 60-64 was the coefficient negative and significant. His conclusion that 'this suggests that health limitations only bite after the age of 60 for men' does not correspond with the findings of Parker and of Walker that health status is a particularly important determinant of early retirement among men in their 50s. Whether changes in older men's health status over time, or in the health requirements of employment, have affected the overall participation rate of older male workers in Britain since 1951, remains, therefore, an open question, despite a consensus that health status is an important influence on individual retirement decisions.

The economic factors that have an influence on the retirement decisions are a combination of income and wealth effects. Since retirement necessarily implies a cessation of employment income, it is sustainable in the long run only if other income is available from accumulated assets, pensions, welfare benefits or transfers from other family members. As the transfer of income to the retired elderly from other family members appears to be negligible in modern Britain (Falkingham and Gordon, 1988, pp 20-21) attention can be focussed on the way in which the availability and the scale of income from the national insurance and welfare system, from private pension schemes and from personal assets influences the retirement behaviour of older British men. Interview studies find that higher financial resources have had an important positive bearing on the decision of British men to retire early (ie. before 65, the age of eligibility for the national insurance retirement pension) (Walker, 1980, 218-9; Parker, 1980; McGoldrick and Cooper, 1980). Membership of an occupational pension scheme, and higher occupational position (skilled manual and white collar status) and its associated higher income appear to offer a strong stimulus to early retirement. However, as the model of the labour supply decisions of the elderly developed by Zabala, Pissarides and Barton (1980) makes clear, the link between wages and retirement in Britain is complex because of the retirement rule and the deferred pension premium which can apply to 65-70 year olds. As their budget line analysis shows, whereas higher pay for older men under state retirement pension age reduces labour supply, higher pay for men over 65 increases labour supply, though in both cases the elasticities are low. They also found a negative (but low) influence of unearned income on the participation rate of men, and overall their model provided significant explanations of which men under pensionable age retired early and which over pensionable age continued to be economically active, but could not explain the abrupt shift in participation at age 65 solely in terms of changes in the budget constraint (the dummy for the attainment of statutory pension age was large and significant). Although

income effects are clearly an important determinant of the retirement decision, there also appears to be a shift at age 65 in the income leisure preference of many men and/or a sudden fall in the demand for workers at that age.

The time-series analysis carried out by Warburton (1987) found that real average net weekly earnings from work were positively linked with participation for the 45-54, 55-59 and over 65 age groups, and had a negative coefficient for the 60-64 age group, but in no case were the coefficients statistically significant. The real amount of weekly income support provided by the state had, as expected, a negative sign, though again was not generally significant. This study, however, does not capture the change in eligibility for state income support that occurs for most men at age 65, and so ignores the age threshold effect that Zabalza et al found to be so important. Given the inconclusive nature of this time-series analysis for Britain, it is worth mentioning that some evidence from the US Retirement History Survey shows that the large (and unanticipated) increases in social security benefits for the retired population that took place in the early 1970s were positively and significantly associated with declining labour force participation among the elderly (Hurd and Boskin, 1984). Pooled cross-section estimates using data from the same source find social security income entitlement, non-wage income, and membership of a private pension scheme all negatively assocated with labour force participation for men aged 58-69 but also finds large age effects at 62 (minimum age for qualification for a reduced OASI pension) and 65 (full pension age) (Hanoch and Honig, 1983). There seems, therefore, to be a fairly consistent indication in both the UK and the US research that social security income entitlements, private pension wealth and other non-earned income are all negatively associated with labour force participation, but that large threshold effects at statutory pension age cannot be explained by reference to the budget constraints experienced by individual workers. It is therefore not

surprising to find that in a simulation exercise carried out by Zabalza and Piachaud (1981) raising the state retirement pension by 20% and abolishing the earnings rule for men aged 65-69 would have a negligible effect on labour supply in Britain, whereas changing the statutory pension age or introducing flexible retirement, both of which would directly alter the age threshold, would have a major impact on both full-time and part-time work among men over 60.

The third set of factors that affect the labour force participation of the elderly are structural conditions of the labour market. Walker found that redundancy or the threat of redundancy, high local levels of unemployment, employer discrimination against older workers and official attitudes and policies which discourage job search among older men were all important in encouraging early retirement among older male workers in his Sheffield sample. Warburton found that the national unemployment rate exercised a strong negative pressure on the labour force participation of men aged 60-64, though not surprisingly this effect was weak and insignificant for men over 65. The study by Leslie Hannah (1986) of the evolution of occupational pensions in Britain stresses the role of mandatory retirement ages within occupational pension schemes as an instrument by which increasingly large and bureaucratic employers have controlled their internal labour markets. Some econometric estimates of data (again from the US) relating to over 8000 workers covered by ten different pension plans confirms that pension plan rules have a powerful influence on retirement patterns (Mitchell and Fields, 1984). Although there seems to be agreement that structural factors are both potentially and actually important influences on the retirement decision of older workers, there are considerable problems in developing adequate measures of the strength (or even the existence) of such forces as employer discrimination against older workers. In consequence, for Britain at least, there have been few attempts to measure the impact of structural factors on the labour force

participation of older men, despite a consensus in much of the literature that ageism, mandatory retirement and rising unemployment between 1951 and 1981 have together worked to force more older men out of the labour force.

To summarize, previous research into the retirement behaviour of older men in modern Britain has determined that the retirement decision is affected by a complex mixture of health, economic and structural factors. The relative importance attributed to these different factors by different investigators appears to a large extent to be a function of the research methodology adopted - interview surveys have stressed the role of health and structural factors, the labour supply model of Zabalza et al focussed on economic criteria, the time-series analysis of Warburton found it difficult to obtain significant results using aggregate annual data, but did identify unemployment among 60-64 year old men as an important structural influence on retirement. The different findings of these inquiries are not necessarily contradictory, but they do not add up to a coherent and full explanation of the labour force participation of older men in Britain either in cross-section or over time.

II

It would be idle to suggest that this paper can provide a full explanation of retirement behaviour - the paucity of British data precludes this. What it will do is examine the stability of estimates of labour force participation among older men across four census years derived from a model that incorporates measures of health, economic and structural factors. The issue the analysis will focus on is the variation in retirement and early retirement rates across industrial sectors, as defined by minimum list headings given in the industry tables of the census 10% sample. Because these industry tables report employment rather than retirement, and because definitions and data

availability vary between census years, it is necessary to discuss in some detail how this census data has been used to construct proxy measures of retirement.

The industry tables of the censuses report the number of workers employed in each industry by five-year age groups. This information can be used to construct proxy measures of retirement by industry in two ways. A net retirement rate (NRR) is found by comparing, for any industry group i, the size of the male workforce aged 55-59 in census year t-10 with the size of the male workforce aged 65-69 in census year t. The difference between the two figures gives a proxy net retirement rate. An alternative inferred retirement rate (IRR) can be found by comparing the size of the workforce aged 60-65 in census year t with that aged 65-69 in the same year. Formally the two retirement rates are defined as:

$$NRR_{i,t} = \frac{W_{i,t-10}^{55-59} - W_{i,t}^{65-69}}{W_{i,t-10}^{55-59}} \times 100$$

$$IRR_{i,t} = \frac{W_{i,t}^{60-65} - W_{i,t}^{65-69}}{W_{i,t}^{60-65}} \times 100$$

where t is the census year, i is the industry group, and W_i is the male workforce in industry i, defined by the superscript according to age group. The net retirement rate compares the labour force participation of the same cohort of workers at different dates, and is a true measure of the retirement

of workers in industry i between the two census dates only if there is no net movement by members of this cohort between industry groups in the ten years between the censuses. In other words, the industry-specific employment pattern of a five-year birth cohort of men between five and ten years prior to the statutory pensionable age is being taken as a proxy of their industry specific employment pattern immediately prior to pensionable age. By contrast the inferred retirement rate takes the industry-specific employment pattern of a five-year birth cohort between 0 and 5 years prior to the statutory pensionable age as a proxy of the actual employment pattern prior to pensionable age of the next-oldest five-year birth cohort. Because this retirement rate is calculated from the observed industry-specific employment pattern of adjacent cohorts in the same year, rather than from the actual employment pattern of the same cohort over time, it is best described as an inferred retirement rate.

Although the NRR and IRR figures in any census year will be different because the denominators are different, they should produce a similar ranking of industrial sectors by retirement rate. The IRR can be provided for all census years, but calculation of the NRR is problematic. To calculate the NRR it is necessary to have the employment data classified in the same way in two adjacent census years, but a number of changes in the system of industrial classification by minimum list heading (MLH) makes this difficult to achieve. The MLH classification was changed substantially in 1958, marginally in 1968 and substantially again in 1980. For the analysis undertaken here all the occupational information has been re-classified according to the 1968 MLH, but this introduces two possible biases into the data. First, some men may be misallocated to an industrial sector, though the fullness of the MLH descriptions means that this is probably a minor problem. Secondly, some men have to be omitted because their original MLH classification does not correspond to any of the 34 industrial categories for which information has

been gathered, and which are listed in table 2. Not all industries are covered by these 34 categories - certain professional employments and the domestic, hotel, catering and leisure services are the major omissions. If we consider the 1971 census, for which no re-classification is necessary, the 34 industrial sectors include 90 per cent of all men aged 60-64 who were economically active. When the occupational information for the other census years is reclassified, the coverage is 74, 84 and 91 per cent for 1951, 1961 and 1981 respectively. The particularly low figure for 1951 results from the large number of men who were listed as general labourers, foremen or clerks, and who therefore cannot be allocated to any particular industrial sector.

The most accurate estimation of the NRR will come from the two adjacent census years that permit the widest coverage of the industrial population - in this case 1971 and 1981. Unfortunately, however, data for 1981 are available for only 27 separate industrial sectors (see the note to table 2), so no direct comparison with 1971 is possible. The best comparison that can be made, therefore, is between 1961 and 1971 data, which allows the calculation of NRR figures for 1971. These can be compared with IRR figures for 1971 and, not surprisingly, they show a high degree of similarity. Spearman's rank order correlation for NRR and IRR figures for the thirty-four industry sectors for 1971 is 0.94, and the correlation between the absolute values of the two measures is 0.91. Because these two measures are so similar, and because calculation of the NRR is so problematic, it will not be used for the estimations reported in the next section. The inferred retirement rate - IRR - will be used as the measure of retirement after 65, and a similarly-constructed early retirement rate (ERR), which compares for industry sector i the size of the workforce aged 55-59 in year t with that aged 60-64 in year t, will also be used as a proxy measure of early retirement by industrial sector.

Table 3 reports the means and standard deviations for IRR and ERR for each of the four census years. The fact that there is a large amount of variation around the means, and that the means alter considerably over time, is a clear indication that there is some explaining to be done. To check the overall consistency of the IRR and ERR figures, we should compare the means with the aggregate census data presented in table 1, but in order to do so a simple weighting of IRR and ERR figures is necessary to compensate for differences in the size of the 60-64 and 65-69 cohorts in each census year, which is itself a product of different initial cohort size, differential mortality up to age 60, and mortality between the age groups 60-64 and 65-69. For each census year, the figures for the workforce aged 65-69 need to be multiplied by a constant defined as:

$$\frac{N_t^{60-64}}{N_t^{65-69}}$$

where N is the total surviving male population in these age groups. The corresponding constant for the 60-64 age group is:

$$\frac{N_t^{55-59}}{N_t^{60-64}}$$

The means of the adjusted IRR and ERR figures should correspond to the aggregate economic activity rates reported in table 1, with some small margin of error resulting from the exclusion of those workers not accounted for in the 34 industrial sectors used in the analysis. The economic activity rates of table 1 can be converted into implicit retirement rates by age group, and compared with adjusted IRR and ERR figures. Table 4 shows the identical trends and close correspondence of the two sets of figures, and indicates that the IRR and ERR estimates provide a sound basis for the further analysis of

differential retirement and early retirement by industrial sector.

The previous studies discussed above suggest that health, economic and structural factors may all help to explain the pattern of retirement and early retirement, so a range of industry-specific measures for these factors has been assembled for each census year from 1951 to 1981. Health indicators by industry group are difficult to obtain, and the only one that is available for each census year is the standardized mortality rate (SMR) derived from the Registrar General's occupational mortality tables. The SMR has the advantage, noted above, of consistent objectivity over time, but it is a less subtle indicator of health status than morbidity or disability data.

Two economic indicators have been assembled. The first, which is available for each census year, is the average weekly earnings (AWE) of male adult manual workers by industrial category. The second indicator is the proportion of the male workforce in each industry covered by an occupational pension scheme (PEN). This is an implicit wealth measure, but it is not available for 1951 or 1961. Finally, two structural indicators have been used - the male unemployment rate (U) by industry, and the male trade union density (TUD) by industry. The unemployment rate is an indicator of general labour market conditions, whereas trade union density mesures the level of union membership in each industry, and may indicate the extent to which entry and exit from the workforce is likely to be controlled by bipartite agreements between employers and unions. This is one way of formally measuring some of the structural factors affecting retirement discussed by Walker (1985). Details of all these data sources are given in the appendix.

III

Linear equations can be estimated to establish the extent to which these health, economic and structural factors have a consistent impact on retirement and early retirement rates by industry. Weighted ordinary least squares regressions of the form

IRR = f (SMR, AWE, PEN, U, TUD,e)

where the variables are defined as in section II, and e is an error term, were estimated for each census year; similar equations were estimated with ERR as the dependent variable. The weights used were the size of the total male workforce in each industrial sector in each census year; because of large variations in the size of the 34 sectors, unweighted regressions would give biased results. Before discussing the regression results, it is worth considering what a priori expectations about the sign of the coefficients can be derived from the literature surveyed in section I.

In general it would be expected that any indicator of poor health (in this case SMR) would be positively related to retirement, and particularly early retirement. The work of Walker and Parker suggests that membership of an occupational pension scheme will have a positive influence on the decision to take early retirement, and the simulations of Zabalza et al. suggest that average weekly earnings will also be positively associated with early retirement, though high earnings may be negatively associated with retirement after the age of 65. In looking at structural factors, both Walker and Warburton found unemployment positively related to early retirement, which suggests a strong positive association between U and ERR. Trade union density would be expected to be positively related to retirement at age 65 since according to Hannah, it is in the interests of both employers and unions to establish and implement formal retirement ages, though unions may be expected to oppose early retirement, suggesting a negative link between TUD and ERR.

The results of the regressions of retirement and early retirement by industry

on this range of health, economic and structural influences are reported in tables 5 and 6. Two points are immediately obvious: first, the retirement equations in table 5 have greater explanatory power than the early retirement equations in table 6, and secondly, the goodness of fit of the equations in both tables generally increases over time, with the best results being obtained for 1981. This suggests that the health, economic and structural factors captured in the five independent variables have become more important determinants of retirement behaviour over time, and that together they have a stronger influence on retirement decisions of men aged 65-69 than of men aged 60-64.

Looking first at the retirement equations in table 5, it can be seen that the dominant influence on retirement rates by industry comes from structural factors, particularly TUD which has a significant positive co-efficient for each census year. The unemployment rate is also positively associated with retirement in 1971, and to a lesser degree in 1981. By contrast, the economic variables are rather weak - PEN is never significant, and AWE is insignificant except in 1971. Likewise the crude health variable, SMR, is insignificant for all years except 1981. These results go some way towards explaining why the labour supply model of Zabalza et al cannot explain the abrupt shift in participation at age 65 by reference to the individual's budget line, because the major influence is an external structural one that stems from union and employer desire to manage exit from the labour force. This lends support to writers such as Walker (1980) and Townsend (1981) who argue that the high degree of economic and social dependency of many older people in modern Britain is a direct consequence of the way in which the labour market is deliberately structured to remove older workers. It is not that the supply of willing workers falls when they reach their sixty-fifth birthday, but rather that the demand for such workers is abruptly terminated. The power of the TUD variable, however, suggests that this structuring of the labour market is the

result of complicity between employers and trade unions, and not simply a one-sided imposition.

The results in table 6 suggest that early retirement has rather different determinants. Unemployment is never significant, not even in 1981 when the labour market was generally depressed and older workers may have been under increased pressure to make way for younger men. TUD is also insignificant except for 1961, when it has a negative coefficient, which suggests that at this time of full employment unions may have exercised their power to prevent employers shedding older marginal workers. Far from early retirement being structured it would appear that, from 1961 onwards, it was primarlily optional, chosen by better-off workers who had pension rights and higher average weekly earnings. It also seems that in the tight labour market conditions of 1961 and 1971 poor health was not a significant determinant of early retirement, though the labour shake-out from the late 1970s may have encouraged employers to use health status as a reason for redundancy, hence leading to a positive and significant coefficient on SMR for 1981. The peculiar results for SMR and AWE in 1951 may be ascribed to transitional factors associated with post-war economic conditions and the introduction in 1948 of the national insurance scheme. Labour shortages at the time should have reduced the influence of health on labour force participation, as employers competed to employ even marginal workers, but the introduction of relatively generous national insurance disability pensions will have worked in the opposite direction to encourage early withdrawal from the workforce by those whose health status was poor. The strong negative association between AWE and ERR in 1951 may indicate that better paid workers were more interested in enjoying a rising employment income after many years of war-time and post-war wage control rather than an immediate increase in their leisure.

IV

The regression results reported in tables 5 and 6 demonstrate that a considerable part of the extensive variation between industrial sectors in rates of retirement and early retirement can be accounted for by variation between sectors in a range of health, economic and structural factors. For 1981, three quarters of the variation in retirement and almost two-thirds of the variation in early retirement is explained by the model, which is an impressive result given the simplicity of the model and the inevitable crudeness of some of the independent variables. The implications of these results now needs to be considered.

The first point to emphasis is that the factors influencing retirement and early retirement behaviour appear to have changed over time. As table 3 shows, the inter-industry variation in retirement and early retirement rates has not narrowed over time, yet the goodness of fit of the equations rises across the census years. This suggests that the importance either of one or more missing variables or of a truly random inter-industry variation in retirement behaviour has decreased over time. In either event this must bring into question the attempt of Warburton to develop a simple single equation time-series model of retirement behaviour, and may account for the poor and somewhat erratic results he obtains. Furthermore, it underscores the point that conclusions about retirement behaviour drawn from any particular cross-section may not be valid for a study made at a different time if labour market conditions, wages, pension schemes or levels of unionization have changed in the intervening period. It also suggests that small-scale sample surveys may lead to unrepresentative conclusions if, for instance, they look at a particularly low wage or highly-unionised sector.

The second point to emphasize is that the patterns of inter-industry

variations of early retirement for men before the age of 65 are quite different from the patterns of retirement at or shortly after the age of 65, and this points to a difference in the underlying nature of causality. For 1981, for instance, the correlation coefficient between IRR and ERR is .57, so it is perhaps not surprising that the size and significance of the coefficients of the IRR and ERR equations are very different. The results reported in tables 5 and 6 suggest that income and wealth variables (AWE and PEN) have a persistent influence over time on early retirement, structural variables (U and TUD) have a persistent influence on retirement, with the importance of health (SMR) varying over time, possibly as labour market conditions change. It would be unreasonable, therefore, to expect explanations of retirement behaviour that focus on either economic or structural factors to perform equally well for the 64-and-under and 65-and-over populations; the array of competing explanations for retirement and early retirement surveyed in section I may result from an inability or unwillingness to develop multi-factoral models.

A further implication about possible future trends in retirement behaviour may be drawn from table 5. The dominant explanatory variable in this table is TUD, and the size of the coefficients tends to rise across the census years. If it is accepted that TUD reflects to some degree the extent to which exit from the labour force is positively managed by unions and employers, then it implies that an increase in the normal age of retirement (which may become an economic and demographic necessity as pensioner dependency ratios rise in the first three decades of the next century) will require the agreement of worker and employers groups. Yet there is little incentive for employers to raise retirement ages when, in order to manage their internal labour markets, they tend to have earnings gradients which pay older workers a remuneration greater than their marginal product. And there is little incentive for unions to bargain for an extended working life for their members. Indeed, the clear

tendency of recent years is for both employers and unions to negotiate for the reduction of the normal retirement age, rather than its increase. The increasing extent to which structural factors appear to influence the cross-industry pattern of retirement suggests that it will be difficult to increase normal age of retirement through marginal economic changes to pension entitlements of the sort hinted at the Green Paper on the Reform of Social Security (1985).

TABLE 1

Economic activity rates of older men in Britain, 1951-1981

	Age Range		
	55-59	60-64	65-69
1951	95.0	87.5	47.2
1961	97.1	90.9	39.7
1971	95.3	86.6	30.6
1981	91.5	74.6	17.0

Sources: Decennial censuses of Great Britain, 1951-81.

TABLE 2

Industrial Sectors, classified by the 1968 Minimum List Heading

MLH Classification	MLH Description
001-2	Agriculture, Horticulture and Forestry
003	Fishing
101	Coal Mining
102-9	Other Mining and Quarrying
211-39	Food and Drink
240	Tobacco
261-79	Chemicals and Allied Trades
311-99	Metals and Engineering
411-29	Textiles
431-33	Leather
441-49	Clothing
450 + 895	Footwear
461,4,9	Bricks and Building Materials
462	Pottery
463	Glass
471-79	Timber and Furniture
481-84	Paper and Board
485-89	Printing and Publishing
491-99	Other Manufacturing
500	Construction
601	Gas
602	Electricity
603	Water
701	Railways
702-4	Road Transport
705	Sea Transport
706	Port and Inland Waterway
707	Air Transport
708	Post and Telecommunications
81032	Distribution (Wholesale and Retail)
860-63	Insurance, Banking and Finance
872 + 906	Local Government and Education
874	Health Services
901	National Government

Note
For 1981 it was not possible to collect data on all 34 sectors.
The following sectors had to be pooled:
211-39 and 240: Food, drink and tobacco
441-49 and 450 + 895: Clothing and footwear
461,4,9 and 462 and 463: Bricks, pottery and glass
481-84 and 485-89: Paper, printing and publishing
601 and 602: Gas and electricity
705 and 706: Sea, inland waterway and port
This gives 27 distinct sectors for 1981.

TABLE 3

Mean and Standard Deviation of Inferred Retirement Rate and Early Retirement Rate, 1951-1981

Year	Mean	Standard Deviation	Number of Observations
Inferred Retirement Rate (IRR)			
1951	58.9	12.7	34
1961	69.1	13.9	34
1971	75.1	13.6	34
1981	79.8	14.5	27
Early Retirement Rate (ERR)			
1951	24.7	16.9	34
1961	31.7	12.3	34
1971	21.7	14.3	34
1981	36.1	13.5	27

Source: Decennial census 1951-81, Industry tables.

Table 4

Comparison of adjusted IRR and ERR data with aggregate census data

	Adjusted Mean IRR	Implicit Aggregate Retirement Rate for age group 65-69
1951	50.6	52.8
1961	58.4	60.3
1971	68.9	69.4
1981	77.8	83.0

	Adjusted Mean ERR	Implicit Aggregate Retirement Rate for age group 60-64
1951	12.7	12.5
1961	12.0	9.1
1971	15.7	13.4
1981	25.1	25.4

Source: see text.

TABLE 5

Estimates of Retirement Rates by Industry

Dependent Variable: IRR

Year	Nob.	SMR	AWE	PEN	U	TUD	C	R^2	F
1981	27	.236 (2.32)	-.127 (0.72)	.102 (0.60)	.484 (1.80)	.419 (4.88)	31.6 (2.10)	.73	15.3
1981	27	.235 (2.35)	-.070 (0.48)	-	.393 (1.80)	.445 (6.11)	29.6 (2.05)	.74	19.6
1971	34	.015 (0.17)	1.09 (2.68)	.136 (1.64)	2.49 (3.14)	.262 (3.73)	13.5 (1.18)	.70	16.2
1971	34	.023 (0.26)	1.14 (2.71)	-	2.12 (2.71)	.324 (5.32)	18.0 (1.58)	.68	18.5
1961	34	.098 (0.77)	.248 (0.24)	-	-7.67 (0.44)	.338 (4.99)	38.1 (3.01)	.48	8.7
1951	34	.270 (1.88)	-1.16 (0.73)	-	-.227 (0.29)	.277 (3.17)	25.4 (1.68)	.46	8.0

TABLE 6

Estimates of Early Retirement Rates by Industry

Dependent Variable: ERR

Year	Nob.	SMR	AWE	PEN	U	TUD	C	R^2	F
1981	27	.186	.172	.308	.110	-.033	-20.1	.62	9.4
		(2.36)	(1.27)	(2.33)	(0.52)	(0.50)	(1.73)		
1981	27	.183	.347	-	-.168	.045	-26.3	.54	8.6
		(2.12)	(2.78)		(0.89)	(0.72)	(12.4)		
1971	34	.012	.942	.213	-.084	.024	-19.8	.33	4.3
		(0.11)	(1.88)	(2.11)	(0.08)	(0.28)	(1.42)		
1971	34	-.007	1.01	-	-.662	.112	-.127	.25	3.7
		(0.06)	(1.91)		(0.67)	(1.59)	(0.88)		
1961	34	.060	2.38	-	2.66	-.18	8.88	.22	3.3
		(0.47)	(2.40)		(1.60)	(2.81)	(0.73)		
1951	34	.75	-5.18	-	-1.67	.08	-14.1	.43	7.3
		(4.15)	(2.56)		(1.70)	(0.76)	(0.73)		

Notes to tables 5 and 6

Nob is the number of industrial sectors included in each equation.
Figures in brackets are t-statistics.
All equations were estimated by ordinary least squares, weighted by the size of the male workforce in each industrial category,

APPENDIX

Data for the independent variables used in the equations reported in tables 5 and 6 have been drawn from the following sources and, where necessary, regrouped according to the industrial sectors listed in table 2.

SMR: Standardized Mortality Rates for Men aged 20-64

SMR 1951: Registrar General's Decennial Supplement for England and Wales for 1951. Occupational Mortality Tables (HMSO, 19??)

SMR 1961: Ibid. for 1961 (HMSO 1971)

SMR 1971: Ibid. for 1970-71 (HMSO 1978)

SMR 1981: Ibid. for 1979-80, 1982-3 (HMSO, 1986)

AWE: Average Weekly Gross Earnings for males aged 21 and above in full-time employment, excluding those whose pay was affected by absence.

AWE 1951: British Labour Statistics Historical Abstract, table 41. Ministry of Labour Gazette, Sept 1951, pp 343-50

AWE 1961: British Labour Statistics Historical Abstract, table 50 Ministry of Labour Gazette, Feb 1961, pp.50-51; June 1961, pp.244-49.

AWE 1971: British Labour Statistics Yearbook, 1971, table 33.

AWE 1981: New Earnings Survey 1981, part C, table 54.

PEN: Proportion of Male Employees covered by occupational pension schemes

PEN 1971: Department of Employment Gazette, Aug 1971. pp.691-5. Figures relate to April 1970.

PEN 1981: Figures derived from SIR datafiles of the 1979 General Household Survey.

U: Proportion of male workers wholly or temporarily unemployed

U 1951: Ministry of Labour Gazette, April 1951, pp 196-199

U 1961: Ibid, April 1961, pp.165-6

U 1971: British Labour Statistics Yearbook, 1971, table 109

U 1981: Employment Gazette, June 1981, table 2.10

TUD: Male trade union density

TUD 1951, 1961, 1971:
G S Bain and R Price, Profiles of Union Growth (Oxford, 1980) pp.13-78

TUD 1981: Robert Price and George Sayers Bain 'Union Growth in Britain:

Retrospect and Prospect' British Journal of Industrial Relations, xxi, 1983, pp.46-68. Figures relate to 1979.

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