Job Characteristics and Early Retirement

#190

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1. INTRODUCTION

There has been a noticeable increase recently in the research effort devoted to retirement issues. Two basic methodological approaches have been used to analyze the determinants of the retirement decision. In the first, retired individuals are simply asked why they retired or left their last job. The most frequent response is always that health was the primary motivating factor.[1] Depending on the questionnaire format used, other frequent responses include "wanted to retire," "job," and "pressure to leave work." Very few individuals mention the availability of retirement income sources. Though informative, these subjective responses may be motivated by a number of conscious and subconscious factors, in addition to the real reasons for retirement.[2] The respondent, for example, may be interested in providing a socially acceptable retirement motive, and so may color health or environmental factors in the workplace to this end. The second methodological approach avoids these subjective responses, and relies instead on econometric analyses of retirement status. In these studies, although health is usually still important, the availability of retirement income sources (Social Security and pensions) emerges as a key factor.[3] Although this approach does have the advantage of increased objectivity, it tends to ignore some of the dimensions alluded to in the subjective answers mentioned above. In particular, the influence of the work environment is not adequately treated. These environmental factors--the focus of this study--include the nature of the job and the actual working conditions under which the tasks are performed. These would appear to be important dimensions to the casual empiricist, and may be behind some of the job related answers mentioned above.

The literature in this area is extremely limited because researchers have rarely had a description of the job environment other than that provided

by the respondent. An exception to this is the work of Jacobson, who related the retirement intentions and attitudes of a small sample of older workers to the amount of strain on the job.[4] Workers were divided into three categories, by job strain, and Jacobson found that those in the "heavy strain" category were more than twice as likely as others to be willing to retire at a pensionable age, to prefer to retire before age 65, and to view retirement before age 65 as ideal. He also found that the percentage of workers with a retirement orientation increased with the degree of rigidity fixed in the work pattern. Conversely, those with some autonomy on the job were much more likely to prefer working beyond the retirement age.

This study expands on Jacobson's research in a number of ways. Most importantly, it investigates actual retirement patterns rather than retirement intentions.[5] Secondly, we utilize a much larger and more representative sample than did Jacobson, and one which includes both retired and working respondents. Finally, we investigate a wider range of objectively defined working conditions, and control for the individuals' health, and Social Security and pension eligibility status.

We hypothesize that older individuals will be less likely to be retired the more favorable the environment in which they work. By environment, we mean both the nature of the job and the physical working conditions. We suspect that, ceteris paribus, individuals will be more likely to remain at jobs that are interesting and varied than those that are monotonous and repetitive, and more likely to withdraw from jobs that are physically demanding or involve unpleasant working conditions.

We do not suggest that job characteristics are the only, or even the most important, retirement determinants. Previous research indicates that

these factors should be analyzed within a medical and economic framework. Certain health limitations make continued work either impossible or extremely difficult. Lack of adequate retirement income also considerably limits retirement options. We hypothesize, however, that job characteristics are important within this medical and economic framework. Operationally, we must control for health differences, and for the availability of retirement income. This is done by stratifying by health condition and eligibility status for Social Security and other pension income, thereby allowing complete interaction between these dimensions and the job characteristics under study.

2. DATA AND SAMPLE

This research combines two data sources. The first is the 1969 wave of the Retirement History Study (RHS)--a 10-year longitudinal study of the retirement process currently being conducted by the Social Security Administration.[6] From this survey, we have drawn a sample of nearly 5000 white married men of early retirement age (58-63).[7] For each of these men, we know the Census 3-digit occupational and industrial categories of their current job, or, if not currently employed, of their last job. These Census codes provide the link to the specific job characteristics--the focus of this research.

The Department of Labor has developed extensive job descriptions for each of the nearly 14,000 jobs listed in the Dictionary of Occupational Titles (DOT). These descriptions, which appear as a series of dummy variables, are not widely used in social science research because so few other data sources utilize the detailed DOT categorization scheme. Fortunately, a cross-classification matrix has been developed which lists, for each of

the Census occupational categories, the probability of holding each of the 14,000 DOT occupations. With this, and the DOT descriptions, we can calculate expected job characteristics, or the probability that a worker in a given Census occupation will have a particular characteristic.[8] These probabilities are then divided into "high" and "low" categories with 0.50 as the dividing line.

Seven job dimensions are included in this analysis and are described below. The first three refer to the general nature of the job; in particular, whether it involves the performance of an entire activity or the performance of a number of repetitious, short cycle operations. The last four describe the physical demands of the job, and the working conditions under which the tasks are performed.

1. Whole Activity: involving the direction, planning and control of an entire activity or the activities of others.
2. Repetitive: involving repetitive or short cycle operations carried out according to set procedures and sequences.
3. Specific Instructions: involving doing things under specific instructions, with little or no room for independent action or judgment in working out problems.
4. Stress: involving taking risks or performing adequately under stree when confronted with the critical or unexpected.
5. Strength: involving heavy or very heavy work.
6. Physical: involving other physical activities, such as climbing, balancing, stooping, kneeling, crouching, crawling, handling or reaching.
7. Bad Working Conditions: involving extreme heat or cold, wet or humid conditions, noise or vibrations, hazards, fumes, odors, tox conditions, dust or poor ventilation.[9]

We hypothesize that the first of these is a favorable job attribute, and that individuals with such jobs are more likely to have interesting work, and therefore less likely, ceteris paribus, to have retired. The other attributes are judged to be unfavorable, and should be associated with increased labor force withdrawal.[10]

3. EMPIRICAL RESULTS

Of the 4,845 white married men in this sample, 636 (13.1%) have retired from the labor force,and 4,209 (86.9%) have not. Using Chi-squared techniques, we test whether there are significantly different proportions of those who are retired when we disaggregate along each of the job attribute dimensions.

Table 1 presents the percentage retired for high and low levels of each job attribute, without the use of any control variables. At this aggregate level, there is considerable support for our hypotheses. Workers involved in a whole activity are less likely to have retired than those not so involved, and individuals whose jobs involve repetitive work, work under specific instructions, stress, strength, other physical demands or bad working conditions are more likely to have retired. All of the differences are highly significant, and five of them exceed the .001 level.

Table 1 may overstate the influence of job attributes on the retirement decision, since job characteristics are correlated with other important factors, such as health status. People whose jobs involve the direction, planning or control of an entire activity are less likely to suffer a health limitation than those who jobs do not, and individuals whose jobs involve repetitive tasks, work under specific instructions, stress, strength, other physical demands or undesirable working conditions are more likely

Table 1

Retirement Status
(percentage out of the labor force)
by Job Characteristics

Job Characteristic	Probability of Having Characteristic		Chi Squared Probability Level[a]
	Low (0-50%)	High (51-100%)	
Whole activity	14.2%	10.0%	.000
Repetitive	11.2	18.4	.000
Specific instructions	12.2	17.8	.000
Stress	12.9	21.0	.015
Strength	12.9	16.8	.053
Physical	11.9	15.5	.000
Bad working conditions	11.4	15.0	.000

[a]The probability that there is no relationship between job characteristics and labor force status.

to have a health limitation.[11] It may be the effects of the health dimension rather than the direct influence of job characteristics that are important. If so, the differences will disappear when we disaggregate by health status. Job attributes are also correlated with pension eligibility status, since both vary by industry and occupation. With one exception (stress), individuals in the less favorable half of the probability distribution for each characteristic are significantly less likely to be currently eligible for a pension. Again, the relationships in Table 1 may be picking up this pension effect. Finally, there is a much weaker relationship between these job characteristics and current Social Security eligibility.

In Table 2, we disaggregate by health status and some interesting patterns emerge.[12] Among those with some health limitation, the influence of job characteristics is exactly as expected--people with unfavorable job attributes are more likely to have retired. In general, the differences are very significant.[13] Among individuals with no health limitation, however, the results are quite different. For four of the attributes, the retirement differences are insignificant. For the other three (whole activity, physical demands, and bad working conditions), there are significant differences, but in an unexpected direction. Among the healthy, people are more likely to be retired from jobs involving a whole activity, and less likely from jobs requiring physical exertion or bad working conditions. There are several conceivable explanations for these results. First, it is a subjective judgment on our part that these attributes are favorable or unfavorable. It may be, for example, that some individuals, even in this age cohort, enjoy a physically demanding job, or extremes of heat or cold. And it is certainly more likely that someone who is in good health would feel this way

Table 2

Retirement Status
(percentage out of the labor force)
by Job Characteristics,
Controlling for Health Status

Job Characteristic	Health Limitation	Probability of Having Characteristic: Low (0-50%)	Probability of Having Characteristic: High (51-100%)	Probability Level[a]
Whole activity	no	4.5%	6.1%	.061
	yes	35.1	25.3	.003
Repetitive	no	5.1	4.6	——
	yes	28.8	42.2	.000
Specific instructions	no	5.0	4.8	——
	yes	31.1	41.6	.000
Stress	no	4.9	5.6	——
	yes	32.9	44.7	.128
Strength	no	5.0	5.0	——
	yes	32.7	41.5	.080
Physical	no	5.4	4.0	.079
	yes	29.7	38.7	.001
Bad working conditions	no	5.7	4.0	.022
	yes	28.4	37.6	.000

Note: (——) denotes probability level above .15.

[a]See Table 1.

than someone who is not. Secondly, both the "physical" and "bad working conditions" categories encompass a number of dimensions. For example, "physical" includes climbing, crouching and crawling as well as reaching or handling. "Bad working conditions" include both heat and cold, and fumes, toxic conditions, dust and poor ventilation. The data do not reveal which of these component dimensions apply. Since the job environment undoubtedly affects an individual's health, it may be that those with poor health are more likely to have jobs with the more severe components.[14] If this is true, then it is reasonable to expect that physical demands and bad working conditions would have a larger effect, in the expected direction, on those in relatively poor health, which is exactly what is found. Finally, the unexpected results may be reflecting the effects of excluded variables, in particular, retirement income eligibility status. Since individuals in jobs with unfavorable characteristics are less likely to have current pension eligibility, they will be less able to retire. We control for these retirement income differences below.

In Table 3, the sample is disaggregted into eight groups on the basis of health status, current Social Security eligiblity and current pension eligibility.[15] Despite more severe problems with sample size, the same patterns observed in Table 2 emerge.[16] The effect of job characteristics on retirement status falls primarily on those with health limitations. In the four subgroups with health limitations, and the six job attributes shown in Table 3, 23 of the 24 percentage comparisons show differences in the expected direction.[17] Of these, twelve of the differences are significant at the 0.15 level, and eight at the .10 level. Despite the insignificance of half of the differences, the fact that all but one are in the expected direction, and the significance of the others, provides strong

Table 3

Retirement Status
(percentage out of the labor force)
by Job Characteristics,
Controlling for Health Status,
Current Social Security Eligibility,
and Current Pension Eligibility

Job Characteristic	Health Limitation	Elig. for SS	Elig. for Pension	Probability of Having Characteristic Low (0-50%)	High (51-100%)	Probability Level[a]
Whole activity	no	no	no	0.9%	2.0%	.111
	no	no	yes	5.6	7.1	—
	no	yes	no	5.7	3.3	—
	no	yes	yes	20.8	22.5	—
	yes	no	no	12.6	7.4	—
	yes	no	yes	27.8	23.2	—
	yes	yes	no	55.7	47.1	—
	yes	yes	yes	65.9	50.0	.098
Repetitive	no	no	no	1.2	1.3	—
	no	no	yes	6.1	6.3	—
	no	yes	no	5.7	3.3	—
	no	yes	yes	21.1	22.6	—
	yes	no	no	10.1	15.0	.106
	yes	no	yes	23.7	33.3	—
	yes	yes	no	49.8	61.8	.026
	yes	yes	yes	45.6	78.7	.001
Specific instructions	no	no	no	1.2	1.2	—
	no	no	yes	5.4	10.3	.125
	no	yes	no	5.4	3.8	—
	no	yes	yes	21.2	22.7	—
	yes	no	no	9.3	21.0	.001
	yes	no	yes	24.4	36.4	—
	yes	yes	no	53.5	57.3	—
	yes	yes	yes	60.7	75.8	.146
Strength	no	no	no	1.3	0.0	—
	no	no	yes	5.8	11.8	—
	no	yes	no	4.5	14.3	.034
	no	yes	yes	21.8	11.8	—
	yes	no	no	11.2	17.8	—
	yes	no	yes	25.1	38.9	—
	yes	yes	no	53.1	72.4	.069
	yes	yes	yes	63.5	57.1	—

Table 3--Continued.

Job Characteristic	Health Limitation	Elig. for SS	Elig. for Pension	Probability of Having Characteristic Low (0-50%)	Probability of Having Characteristic High (51-100%)	Probability Level[a]
Physical	no	no	no	1.5	0.6	.118
	no	no	yes	6.4	5.5	—
	no	yes	no	3.5	8.2	.027
	no	yes	yes	23.3	16.0	—
	yes	no	no	9.9	14.4	.114
	yes	no	yes	25.2	29.6	—
	yes	yes	no	50.7	58.9	.132
	yes	yes	yes	57.5	71.4	.056
Bad working conditions	no	no	no	1.7	0.7	.055
	no	no	yes	6.0	6.3	—
	no	yes	no	4.2	6.3	—
	no	yes	yes	23.1	18.2	—
	yes	no	no	10.2	13.0	—
	yes	no	yes	25.9	27.3	—
	yes	yes	no	48.3	58.5	.065
	yes	yes	yes	53.1	71.7	.008

[a]See Table 1.

support for the hypothesis tha job attributes do influence the retirement decisions of those in relatively poor health.

There is also some evidence that the influence of the job environment may depend on Social Security eligibility. In the last two subgroups (those with a health limitation and eligible for Social Security), nine of the twelve differences are significant at the 0.15 level, and seven at the 0.10 level. In the two previous groups (those with health limitations but ineligible for Social Security), only three of twelve differences are significant at the 0.15 level, and only one at 0.10. In the last group (with a health limitation, and eligible for both Social Security and a pension), five of six differences are significant at the 0.15 level, despite a sample size of only 211. This supports our premise that the effects of job characteristics should be studied within an economic framework. It appears that the effects are strongest among those with the most economic discretion, that is, among those eligible for retirement income sources.

As before, the evidence is not strong among those without a health limitation. Only 11 of the 24 comparisons yield differences in the expected direction, and only 2 of these are significant at the .10 level. There is only one cell with a significant difference (and at only the .10 level) in the wrong direction, indicating that some of the unexpected results in Table 2 may have been due to correlations between job characteristics and retirement income eligibility.

4. CONCLUSIONS

Using a large sample of white married men around early retirement age, and an objective set of job characteristics, we present statistical support for the hypothesis that individuals are more likely to retire from jobs with

undesirable job attributes. The relationship, however, is more complicated than has been acknowledged before. In particular, there is an important interaction with health status. Those respondents who have a health condition limiting the kind or amount of work they can do are much more sensitive to the job environment than those in good health. This may be because the health limitation increases the importance (the disutility) of any given undesirable job attribute, or because, on average, the bad job characteristics of those in poor health are more severe than the bad job characteristics of those with no health limitation. There is also evidence that the effect of job attributes depends on the individual's retirement income status. Because those currently eligible for Social Security or pension benefits have more options available than those who are not eligible they are therefore more able to respond to and withdraw from an undesirable workplace.

We do not propose that the environmental dimensions we have studied are the primary determinants of retirement status. In fact, we hypothesize just the opposite: that health and retirement income eligibility are more important, and that the effects of job characteristics must be analyzed within this medical and economic framework. When we control for these other factors, however, we do find that the nature of the job and the conditions under which the work is performed do influence the early retirement decision, especially among those with health limitations.

NOTES

[1]In a national survey in the 1960s, Barfield and Morgan report that 42% of the retirees sampled named health as the primary reason for retirement. In a survey of new social security beneficiaries under 65, Reno reports that 45% labelled health the most important reason for leaving their last job. Finally, in the data source used for this study, 66% of the retired men claimed health as their primary retirement motive. See Richard E. Barfield and James N. Morgan, Early Retirement: The Decision and the Experience and a Second Look (Ann Arbor: University of Michigan Press, 1974), p. 218 and Virginia Reno, Why Men Stop Working At or Before Age 65, Survey of New Beneficiaries Report 3 (Washington, 1971), p. 32.

[2]For some empirical evidence on this issue, see Joseph F. Quinn, "Microeconomic Determinants of Early Retirement," Journal of Human Resources 12 (Summer, 1977), p. 331.

[3]See Quinn, op. cit. and Michael J. Boskin, "Social Security and Retirement Decisions," Economic Inquiry 15 (January, 1977), pp. 1-25.

[4]Jacobson's sample consisted of 145 semi-skilled British operatives aged 55-64. Job strain was objectively measured by a "Rest Allownace" index, defined as "The percentage of the work cycle allocated to compensate for fatigue incurred during the cycle." See Dan Jacobson, "Willingness to Retire in Relation to Job Strain and Type of Work," Industrial Gerontology 13 (Spring, 1972), pp. 65-74.

[5]Although intentions are interesting, they may change in systematic ways as people appraoch retirement age. If so, then the actual retirement

behavior is the more important dimension from a policy perspective, although the nature of and reasons for the systematic change are also of interest.

[6]For a detailed description of this data source, see Lola Irelan, "Retirement History Study: Introduction," Social Security Bulletin 35 (November 1973), pp. 3-8.

[7]From the entire RHS sample of white married men we eliminated farmers and the self-employed, those seriously ill (operationally, those bedridden or housebound), and a few other small miscellaneous groups, leaving a sample of 4,845.

[8]The probability that Census occupation K has job characteristic J is calculated as follows.

$$\text{Prob}(J\ K) = \sum_i \left[\text{Prob}(J \mid \text{DOT}_i) \cdot \text{Prob}(\text{DOT}_i \mid K)\right]$$

where i ranges over all DOT jobs. The terms "$\text{Prob}(J \mid \text{DOT}_i)$" will be either 0 or 1, since each DOT job either has the characteristic or does not. The "$\text{Prob}(\text{DOT}_i \mid K)$" terms are derived from the cross-classification matrix, and will sum to 1, with the vast majority being 0. The result of these calculations, for each Census occupation, is a series of probabilities between 0 and 1, one for each job characteristic. These probabilities are then assigned to the individuals in the sample on the basis of their occupational codes. For those currently employed, the job characteristics refer to their current jobs; for those retired, they refer to the last job.

For example, if 75% of the jobs in Census occupation 1 were in DOT category 10 and the remainder were in DOT 11, and DOT job 10 had

characteristic J while DOT 11 did not, the probability of finding attribute J in Census occupation 1 would be

$$\text{Prob}\,(J \mid \text{Census job 1}) = 0 + 0 + \ldots + (.75)1 + (.25)0 + 0 + 0 + \ldots 0$$
$$= .75.$$

[9]Worker Trait Requirements for 4000 Jobs, U.S. Department of Labor, Bureau of Employment Security (Washington, 1965), pp. 131, 145-151.

[10]In this work, we have defined retirement as complete labor force withdrawal. Since the respondents in this sample are aged 58-63, we are discussing early retirement--retirement prior to the traditional age of 65.

[11]Six of these seven health differences were highly significant, and the seventh (strength) was significant at the .20 level.

[12]The importance of health status is apparent in this simple disaggregation. Of the 3450 men without a health limitation, only 5% were out of the labor force. Of the 1395 men with a health condition limiting the type or amount of work they can do, over 33% had withdrawn. Note that the seriously ill (bedridden or housebound) have already been removed from the sample.

[13]The one exception to the high significance level (stress) is probably explained by the fact that less than 3% of the sample had jobs with stress probabilities over 50%. When we disaggregate by health, there are very few respondents in each health category with stressful jobs, making a statistically significant pattern unlikely. Distributions of the job characteristics are available from the author.

[14]To exaggerate this hypothesis, it may be true that for those with a health limitation, "physical" usually means crouching and crawling,

and "bad working conditions" denote hazards, fumes and toxic conditions, while for those in good health, "physical" represents only handling and reaching, and "bad working conditions" merely imply working in the heat.

[15]These dimensions denote current eligibility status, not merely coverage by a program. In other words, an individual "currently eligible" could receive benefits immediately if he were to retire. The sample sizes for these eight groups are 1917, 604, 541, 388, 608, 189, 387 and 211, respectively.

[16]For example, the group with a health limitation, eligible for a pension, but ineligible for Social Security contains only 189 individuals. Although every one of the percentage comparisons is in the expected direction--those with unfavorable characteristics are more likely to have retired--none of the differences is statistically significant.

[17]Because of the extremely small numbers of individuals with stressful jobs in the subsamples, none of these differences was significant, and that job characteristic has been removed from Table 3. It is worth noting that the concept of stress used here (taking risks, or confronting the unexpected) is very different from the stress concept used by Jacobson, who defined it in terms of the percentage of the work cycle allocated to rest.

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