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Chapter Title: The Effect of Labor Market Rigidities on the Labor Force Rigidities on the Labor Force

Chapter Author: Michael D. Hurd

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1 The Effect of Labor Market Rigidities on the Labor Force Behavior of Older Workers

Michael D. Hurd

1.1 Introduction and Summary

Over their work life, most workers will desire to change jobs occasionally and to vary their amount of work. Impediments to these changes could reduce lifetime productivity by preventing the worker from moving to the most productive job, and they could reduce welfare by causing a worker to work too much or too little. Older workers approaching retirement, in particular, often desire job mobility because a job that was chosen for its characteristics during most of the working life may not be well suited to workers later in life. Furthermore, older workers often want to reduce hours of work to make a gradual transition into retirement. They face not only the same impediments to changes in job and hours as younger workers, but additional impediments due to the structure of pension plans, the provisions of the Social Security system, and their need for health care insurance.

Some rigidities are part of normal business practice, arising from production technologies. For example, team production requires that most workers be present in the workplace at the same time. Other rigidities may be holdovers from a time when most of the working population was young and wanted full-time, year-round jobs, when most retired late in life and life expectancy was short so that the length of retirement was short. Still other rigidities may be due to public policy, for example, the Social Security laws; while some may

Michael D. Hurd is professor of economics at State University of New York, Stony Brook, and a research associate of the National Bureau of Economic Research.

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serve legitimate social goals, others may not because the laws have not been changed to keep up with changing circumstances.

The objective of this paper is to examine some evidence about rigidities in the labor market, and particularly how rigidities affect the labor market experience of older workers by causing impediments to change. It discusses some of the causes of the rigidities, and points in the direction of how the situation for older workers might be improved. It is, however, beyond the scope of the paper to offer remedies: the labor market is exceptionally complicated, and experience has shown that uninformed interference in the labor market can be counterproductive.

1.1.1 Labor Market Rigidities

Labor market rigidities are employment practices and work-related financial arrangements that constrain or influence the volume of work with respect to hours per day, days per week, or weeks per year. Rigidities include the inability to change hours, days, or weeks on a given job, and impediments to changing to a job that offers the desired combination of hours, days, and weeks. Rigidities also include situations in which the volume of work can be varied, but the change requires a disproportionate sacrifice in compensation, job satisfaction, mental or physical requirements, or location.

Different jobs may offer different mixes of compensation (as between, say, pension accumulation and money income), but this would not necessarily be a rigidity as long as total compensation is the same. Total compensation may change with age if the change reflects changes in productivity, and, again, this would not be a rigidity.

Understanding rigidities is important from the point of view of the individual because of the costs associated with rigidities. From a theoretical point of view, people will want to stop working when they have accumulated enough resources to finance the rest of their lifetime consumption. But withdrawal from the labor force will be gradual. Both leisure and consumption are valued (produce utility), and as tastes shift with age toward leisure, the desired amount of work will slowly fall. Furthermore, an individual operates in an uncertain environment with respect to health status, life expectancy, rates of return on investments, inflation, and so forth: because the uncertainty is resolved gradually, change will be gradual.

In a simplified situation where the wage rate is fixed and there are no rigidities, a fall in the desire to work will produce a fall in the volume of work (for simplicity, hours of work). If hours cannot be varied, the optimal constrained choice will be to work more than is desired for several years, and then not to work at all. The constrained choice entails a loss of welfare, both in the years surrounding retirement and in later years because the level of economic resources is not optimal.

These welfare effects are based on the simple choice between labor and leisure, but many older workers have other important reasons for wanting part-

time work. For example, many have very old parents whose need for attention and care is not compatible with a full-time job. The constrained choices are not to work at all, which may not be economically feasible, or to work full-time and allow public support systems to care for the parents.

The aggregate effects on individuals affect society. Early retirement influences the national saving rate because on average the retired dissave whereas workers save. Ceteris paribus, early retirement is associated with lower resources during the retirement years, so that the poverty rates of the elderly will be higher, affecting needs-based programs for the elderly. To the extent that early retirement means that aggregate earnings fall, the tax base is reduced by early retirement.

1.1.2 Summary of Findings

Most workers of all ages face rigidities that arise from fixed employment costs and the requirements of team production. Fixed employment costs must be covered by a substantial number of hours of work. Therefore, part-time work will tend to have low money wages because a greater fraction of the work time will have to cover fixed employment costs. Team production tends to concentrate work hours and penalizes those who want to work irregular hours or work part-time. These rigidities imply that an older worker cannot easily reduce hours on the career job, so a job change is required.

Older workers have additional impediments to job change arising from normal business practice. If they change jobs to reduce hours, they lose their job-specific skills. Because they will be expected to stay on a new job for fewer years than a younger worker, an employer will be reluctant to invest in job training. A new job with fewer hours will have to be a job that requires few job-specific skills and that is compatible with high turnover. A better-educated, higher-skilled, older worker will be competing for a new job with a young, less-educated, lower-skilled worker. These factors make it highly likely that the new job will be low paying.

Older workers face impediments that are partly the effect of policy toward retirement. Social Security has incentives that influence work choices, but the incentives will gradually decline over the next decade because of changes in the Social Security law. The Social Security earnings test seems to affect work decisions, but it has little obvious social benefit. Defined pension plans can reduce job mobility. The requirements of an older worker for health care insurance may prevent job change, particularly if a worker has a preexisting condition. There is only scattered evidence of labor market discrimination against older workers. The effects of these impediments are difficult to quantify, but they probably are considerably less important than the effects due to fixed costs and team production.

Because the costs of job change late in the work life are so high, the main effort to reduce labor market rigidities should be toward changes in employment conditions on the career job. This would involve training and job restruc-

turing to allow hours flexibility. However, any changes must be advantageous both to employers and employees: otherwise, older workers will be viewed as a liability, and employers will be reluctant to hire them. Determining whether these kinds of changes can be accommodated within the requirements of team production and the constraints of fixed costs is far from easy.

1.2 Evidence about Labor Market Rigidities

The objective of this section is to examine the pattern of labor market activity before retirement and the hours of work of younger workers to see what evidence they give about labor market rigidities. The idea is that, given the wage rate, if hours of work can be freely chosen, we would expect to find considerable variation in hours of work of an individual as he or she ages, and considerable dispersion in hours across individuals.

1.2.1 Retirement Behavior

As workers age, tastes for work gradually change, making work less desirable. Declining tastes might be caused by gradual changes that make work more unpleasant or by changes in health status that make work increasingly burdensome. Within any time period this would change the desired ratio of work time to leisure time. An individual, anticipating this change, would plan a lifetime in which work effort in a time period would gradually decline with age, eventually falling to complete leisure, or retirement. This can be represented by a gradual shift in the labor supply function of the worker. If the wage rate facing the individual is fixed so that hours of work may be freely chosen, the change in tastes causes work hours to decline gradually. A gradual decline in productivity with age simply accelerates the rate of change: if the fall in productivity leads to a fall in the wage rate, hours of work will fall continuously as long as hours can be freely chosen.

I have made no distinction between hours per day, days per week, weeks per month, or months per year: a worker would probably want to reduce along all dimensions but probably at different rates. Because little research has been done to understand all these dimensions, I will speak of hours of work with the understanding that the changes could be along all dimensions.

Labor force participation by age in cross-section data does decline slowly in accordance with this description. Figure 1.1 shows average labor force participation rates of men and women by single years of age as measured in the Current Population Survey (CPS). The rates are the average of 1988 and 1989. Although the figure is consistent with a gradual decline in work effort of all individuals, leading to different individuals withdrawing completely at different ages, it is also consistent with each individual withdrawing suddenly at different ages without any intervening fall in hours.

Table 1.1 shows how full-time work among the employed changes with age in cross-section data. It shows falling full-time employment, which is consis-

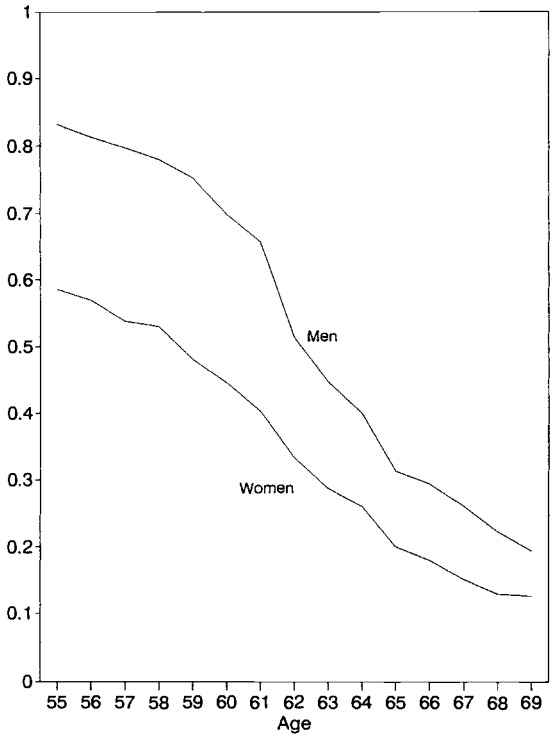

Fig. 1.1 Labor force participation rates
Source: Author's calculations from 1988 and 1989 Current Population Survey participation rates by single years of age.

Table 1.1 Percentage of the Employed Who Are Full-Time Workers

Age	1968	1974	1980	1987
55–59	82.4	82.1	81.5	80.5
60–62	80.9	79.2	76.3	74.4
63–65	74.3	71.6	68.9	66.9
66–70	57.0	51.5	40.8	44.5
71+	43.2	39.5	36.0	34.9
All	75.5	74.2	71.7	70.6

Source: Sum and Fogg (1990), based on the Current Population Survey.

tent with the idea of gradual withdrawal from the labor force: for example, in 1987, 80.5% of 55–59-year-old workers worked full-time, yet just 34.9% of workers 71 or older worked full-time. The table also shows a time trend over all ages to less full-time work. The trend is particularly strong among older workers. Yet, because the entries are percentages of workers, the trend cannot

Table 1.2 **Percentage of Persons Not Working or Working Fifty-one or Fifty-two Weeks, 1986**

Age	55–59	60–62	63–65	66–70	71+
Percentage	84.0	83.9	86.6	89.4	96.0

Source: Sum and Fogg (1990), based on Current Population Survey.

be used to verify a gradual withdrawal from the labor force: complete withdrawal of full-time workers and a more gradual withdrawal of part-time workers would produce the same age pattern of full-time work.

Table 1.2 shows that at any time the great majority of the older population works either full-time or not at all. Thus, only a fraction of the age-55-or-over population works part-time, and the fraction falls with age. The implication is that, as the labor force participation rate decreases, most workers move from full-time employment to not working at all.

Although it is not directly relevant for this argument, I note that over time the percentage of the 55-or-over population working part-time has fallen from 14.1% in 1967 to 10.8% in 1986 (Sum and Fogg 1990), probably owing to the overall decline in participation.

Any employment or participation rates that are based on cross-section data will not show the change in labor force status as an individual ages, which is what we need to understand labor market rigidities. Such change requires panel data. Using the 1969–79 Retirement History Survey (RHS), a panel data set of two-year periodicity, Rust (1990) estimated that, at a minimum, 75% of men age 58–64 in 1969 moved directly from full-time work to completely retired with no intervening part-time work. The exact percentage depends on the method of classifying work as to full-time or part-time. For example, if the classification is based on annual hours of work, just 22% of employed men changed from full-time employment to part-time employment during the ten years of the survey. By the end of the survey the youngest men were 68, and the great majority had retired, so it is unlikely that the termination of the survey caused many transitions from full-time to part-time employment not to be recorded. If the analysis is based on weekly hours, just 8% of employed men had a transition to part-time employment. Rust concludes that, although there are some transitions from full-time to part-time work, the great majority of men retire without any intervening transition.

Similar results are found by others: Based on the RHS, Quinn, Burkhauser, and Myers (1990) estimated that, among men who leave their full-time career jobs, 73% leave the labor force completely, 15% move to part-time employment, and 12% go on to further full-time employment. A rough estimate would be that about 83% eventually leave full-time employment for complete retirement.[1] Berkovec and Stern (1991) estimate that in the National Longitudinal

1. The calculation assumes that the fraction moving from any full-time job to part-time is .15, which is the fraction that move from a full-time career job to a part-time job.

Table 1.3 Distribution of Workers by Hours of Work before Retirement (%)

Hours Worked One Year prior to Retirement	Age			
	<62	62–64	65–67	68+
1–34	14.8	15.3	17.6	57.6
35–40	58.7	62.1	54.1	28.3
41+	26.5	22.6	28.3	14.1

Source: Jondrow, Brechling, and Marcus (1987), based on 1978 Panel Study of Income Dynamics.

Survey of Older Men (NLS) 67% changed directly from full-time work to completely retired. Based on quarterly labor force status in the RHS, Blau (1994) found that just 12.6% of men initially observed to be working full-time changed to part-time work at some during the ten years of the panel. Again, because the youngest was 68 by the end of the survey, it is unlikely that the termination of the survey left many transitions unrecorded.

Table 1.3 has the distribution of hours worked during the year prior to retirement in the Panel Study of Income Dynamics (PSID).[2] It shows that, at ages below 68, a large fraction of those who retired during the year were working full-time the preceding year; that is, the year before retirement was generally not a year of reduced hours.[3] It also shows that at older ages some people do retire from part-time jobs, as would be expected from table 1.1, but the total number is small because most retire completely before the age of 68.

I take these results to be good evidence that a large fraction of men leave the labor force completely with no intervening period of part-time work. However, these kinds of findings and this interpretation are not accepted by everyone. Ruhm (1989, 1990a, 1990b) used the RHS to conclude that most older workers have bridge jobs at some point before retirement, and that "fewer than two-fifths of household heads retire directly from career jobs" (Ruhm 1990a, 482). He defines a bridge job as any job held after the career job, which he defines to be the longest job ever held. In my view, however, many bridge jobs as defined by Ruhm are different from jobs taken to accomplish gradual retirement: for example, 24% of the bridge jobs in Ruhm's data were generated by workers leaving their career jobs before the age of 50. Almost all of these bridge jobs were held for more than ten years. This kind of job turnover is part of the normal job mobility of the working life, not of the movement toward retirement. A more reasonable definition of a bridge job would be a job taken at an age approaching retirement and held for a few years before retirement. For example, define a bridge job to be a new job taken at age 55 or over following a change from a career job, and held for one to four years before retirement. According to this definition just 14.4% of all workers in the RHS had bridge

2. Retirement here is self-assessed, not based on observed behavior. It includes both men and women.

3. The pattern is similar two years before retirement: the great majority were working full-time.

jobs.[4] This is similar to the fraction who partially retire in Blau (1994) and in Rust (1990).

Gustman and Steinmeier (1984), using the same data as Rust, find that about one-third of men partially retire at some time. The explanation of the difference seems to be in the definitions. The authors I have discussed based their conclusions on observed behavior: hours worked or weeks worked. Gustman and Steinmeier take retirement and partial retirement from a self-assessed question.[5] People who say they are retired are often, in fact, working for pay and even working full-time. In that rigidities in the labor market refer to hours worked and wages received, I believe we should base our conclusions on behavior, not self-assessed evaluations, which are subject to differing interpretations.

Although the argument at the beginning of this section suggests that the prevalence of complete retirement from full-time work is due to aspects of the labor market that discourage part-time work, not to workers' tastes, the argument will be more convincing if in jobs that have flexibility the change to retirement is more gradual. It is reasonable to suppose that the self-employed can more easily determine their hours of work, and, indeed, in the RHS hours of work by the self-employed have more dispersion: among white married males, 24% of the self-employed worked less than two thousand hours per year compared with 11% of wage and salary workers (Quinn 1980). Therefore, with increasing age the self-employed should stay in the labor force longer, and wage and salary workers should switch to self-employment so that they can stay in the labor force at reduced hours. Both effects will cause the fraction of the workforce that is self-employed to increase with age.

Table 1.4 gives the percentage self-employed at each age. The rising prevalence of self-employment is consistent with the view that workers would like to reduce hours gradually and that most of the abrupt withdrawal is due to labor market characteristics, not to workers' tastes for sudden retirement. However, cross-section data cannot show the relative importance of some workers switching from wage or salary jobs to self-employment and of the self-employed retiring later.

In panel data we find that both are important factors. In the RHS about 5% of wage and salary workers changed from wage and salary work to self-employment each year (Fuchs 1982). Most were from occupations similar to self-employed occupations: almost no blue-collar workers switched. Furthermore, the self-employed work to greater ages, further increasing the fraction of workers who were self-employed.[6]

Additional evidence that labor market characteristics are substantially responsible for the abrupt withdrawal from work of most workers is that the self-

4. My calculation based on table 2 in Ruhm 1990a.

5. "Do you consider yourself to be retired or partially retired?"

6. Quinn (1980) in the RHS and Iams (1987) in the New Beneficiary Survey found similar patterns.

Table 1.4 **Percentage of Workers Self-Employed by Age, 1990**

	55–59	60–64	65+
Men	13.7	15.8	24.0
Women	8.0	9.1	13.3
All	11.2	12.9	19.2

Source: Employment and Earnings, January 1991, based on the Current Population Survey.

Table 1.5 **Transitions from Career Jobs (%)**

	Wage and Salary Workers		
	Women	Men	Self-Employed Men
All			
Part-time on career job	10	5	25
Part-time on new job	10	10	13
Full-time on new job	7	12	13
Out of labor force	74	73	49
Total	100	100	100
Age 65 or over			
Part-time on career job	7	8	44
Part-time on new job	19	12	16
Full-time on new job	0	5	0
Out of labor force	74	74	41
Total	100	100	100

Source: Quinn, Burkhauser, and Myers (1990), based on Retirement History Survey.
Note: Distribution of self-employed women not reported.

employed change from full-time work to part-time work more often than wage and salary workers do. Table 1.5 shows transitions of full-time workers from career jobs.[7] Men and women who work for a wage or salary had quite similar patterns: they mainly left the labor force; just a small percentage moved to part-time on the same job. The transitions among the self-employed were very different: only 49% left the labor force completely; 25% reduced hours on the career job. At age 65 or over the differences are even greater: 44% of the self-employed men became part-time workers on their career job, compared with 7–8% of wage and salary workers. If workers desire hours flexibility as they age and self-employment offers hours flexibility, this is to be expected.

The conclusion is that retirement behavior provides convincing evidence of labor market rigidities: the great majority retire from full-time work with no intervening part-time work. This is not compatible with slowly changing tastes for work when hours can be freely chosen.

7. Career jobs are thirty-five hours or more per week on a job held for more than ten years. The sample is limited to those who could be followed for four or more years in the panel (Quinn, Burkhauser, and Myers 1990).

1.2.2 Work Patterns and Job Flexibility at All Ages

Almost all male workers and many female workers work full-time: 94% of men and 79% of women aged 25–44 worked full-time in 1990.[8] Full-time work tends to be full-year work: in the 1969 RHS 36% of men said they worked two thousand hours, almost all the rest worked more than two thousand hours, except for 19% who did not work at all. Economic theory and common sense say that it is not credible that almost all workers would freely choose similar hours per week and per year: variation in assets, wage rates, family circumstances, and tastes will cause variation in desired hours and, hence, in observed hours.

An indicator of rigidities in the labor market is that flextime, the ability to choose the start and stop time of the workday, is rare: in the 1985 CPS just 12.3% of workers said they were on flextime (Mellor 1986). Even this fraction is probably an overstatement of the amount of flexibility, because in the questionnaire the ability to vary hours by as little as thirty minutes was classified as flextime. Flextime varies by industry and occupation: in blue-collar jobs only 6.5% had flextime. Furthermore, the amount of flexibility was limited even among those with flextime because nearly all jobs required attendance at the place of employment during core times.

Further evidence of inflexibility comes from surveys in which workers are asked directly if they can vary hours of work. In the PSID 56% of those responding to the question said they could not reduce hours of work (Gustman and Steinmeier 1985). In an early release of the Health and Retirement Survey (HRS), only 14% of wage workers aged 55–61 said they were free both to increase and to decrease hours.

Productivity

The discussion has been about flexibility in the choice of hours of work, but wage flexibility is an important aspect of a flexible labor market. If the productivity of a worker or group of workers falls, yet employers are not free to reduce wages, employment practices will develop leading to job separation rather than income reduction. There is little direct evidence on wage flexibility at the individual level in response to individual productivity changes because there is little direct evidence on changes in productivity at the individual level: this would require panel data with measures of productivity. There is some evidence about average changes in productivity with age in cross-section.

The general finding is that on average productivity falls, but only marginally as workers age through their 50s and early 60s. The evidence is of three kinds: surveys of managers, opinions of experts, and studies of physical productivity. A typical survey result is reported in Rhine 1984: In a survey of 363 senior human resources administrators (mostly vice presidents), just 13% agreed with the statement that the performance of workers peaks at a young age. When

8. *Employment and Earnings*, January 1991, based on the CPS. Full-time is thirty-five or more hours per week.

asked about occupations where this happened, 60% of the 13% said the declines were in occupations that required physical exertion. This seems to be common: where there is a decline, it is when physical exertion is required.

Paul (1983a) reports on three studies of the physical output of workers. Each of them shows little if any fall in output with age. McNaught and Barth (1992) analyzed data on physical output of reservation operators for Days Inn of America: they found only small differences in the productivity of older and younger workers. Jablonski, Kunze, and Rosenblum (1990) report on a number of studies of physical output, conducted by the Bureau of Labor Statistics. Examples of typical findings are that the average output of 55–64-year-old males in the footwear industry was 93% of the output of 35–44-year-olds. Among mail sorters output is basically flat until age 60 or over, when it is 96% of the output of average output. Among clerical workers only those aged 25 or less have productivity that is much below average: productivity does not fall with age. Jablonski, Kunze, and Rosenblum conclude that in these studies of physical output there is evidence for a modest decline in productivity with age. However, they make the important point that, even if average productivity declines with age, the variation within age groups in productivity is much greater than the variation across age groups: that is, the productivity of many older workers will be greater than the productivity of many younger workers.

Of course, physical productivity cannot be measured in most jobs, but statements by management confirm the findings about physical productivity. Paul (1983a) reports that, when supervisors rate the performance of workers compared with the requirements of the job, older workers do as well on average as younger workers.

The general finding is well summarized as follows: "Because chronological age is not related to maintenance of performance, older employees are not more costly to firms because of declining productivity. This is not to suggest, however, that certain older (as well as younger) individuals do not experience declining performance. This can and does occur and is very costly to organizations" (U.S. Senate 1984, 63).

A final example of productivity variation by age comes from what practically amounts to a controlled experiment. In the United Kingdom a new do-it-yourself store, one of a chain of stores, was staffed entirely by workers aged 50 or over (Hogarth and Barth 1991). By a number of human resource measures such as labor turnover and absenteeism, it was the most successful store in a control group of similar stores owned by the same chain. By other measures such as sales per employee and wage costs, it was about average. The management of the chain found the experiment a success and staffed other stores only with older workers.

Interpreting this example requires some caution because the workers were undoubtedly not average in the 50-or-over population: only the healthy and active wanted to work. That is, it is likely that the experiment compared productivity of an above-average group of older workers with an average group of younger workers. This difficulty is also found in the productivity studies dis-

cussed above: in cross-section data the composition of the labor force cannot be kept constant as age increases because the least productive (least healthy) will leave the sample of workers. This is alleviated but not eliminated in panel data: we observe the same individuals as they age, so we may be able to conclude correctly that the productivity of the individuals who remain in the labor force does not fall. But, if workers whose productivity begins to fall leave the labor force, we may conclude, possibly incorrectly, that the productivity of the cohort does not fall with age.

Wage Rates

The variation of wage rates with age has been the subject of controversy because of the difficulties of measurement. In cross-section wage rates will not be a good measure of the wage path of an individual, particularly at older ages, because of changes in the composition of the workforce. For example, as unhealthy workers who have lower wage rates leave the labor force, the average wage of those remaining will tend to increase with age. Similarly, early retirement of the highly paid will tend to reduce the average wage of those remaining. But even in the absence of such changes in composition, the averages can, at best, describe wage rates that include any job changes that may happen with age. Among the elderly particularly, wages fall with a job change because the change is typically from a full-time job to a part-time, less well paid job. Thus the average wage path in cross-section cannot be matched to the productivity path of a worker who stays on the same job. These composition and job-change problems are reduced in panel data where we can follow the wage path of individuals and control for job change.

Gustman and Steinmeier (1985) in the RHS investigated the effects of composition and job-change effects. They found that conventional estimates that do not control for those effects "may overstate the decline with experience in wages for those working full time by as much as 60 per cent" (264). Jablonski, Kunze, and Rosenblum (1990) make adjustments for composition effects and find slowly declining real wage rates. The conclusion is that wage rates probably decline somewhat for those who remain on the main job, but the decline is modest. However, because the cost to the employer of fringe benefits rises with age, total compensation may well continue to increase with age.[9] Again, because we only observe those who stay on the job, we cannot say with confidence that the wages and compensation of those who left would have been roughly constant had they stayed.

This somewhat limited evidence suggests that, among workers who remain on their main job, productivity and total compensation change with age at about the same rate. Even so, the productivity of some individuals surely changes markedly with age because of changes in health status, failure to up-

9. I have seen no studies that make corrections for composition and job change in studying the relationship between age and total compensation.

grade skills, and attitudinal changes. What was a good match between the worker and the firm at a younger age becomes a worse match at older ages. This change could be accommodated if wages could be reduced at the individual level in line with the productivity change. There is, of course, a vast literature on wage rigidity, which I will not review here. It is sufficient to say that the wages of all workers are not easily reduced even during periods of falling demand: layoffs are the more usual response. It is probably even more difficult to reduce the wage of an individual worker.

If a firm is not able to reduce wages, it will adopt policies that will encourage separation, even though they are suboptimal compared to a wage reduction. A simple but effective policy will be not to allow reductions in hours worked: for example, someone whose productivity has fallen because of health changes or who finds the job particularly distasteful will have had a "taste" change toward not working. Given the all-or-nothing choice between working full-time or not working at all, such a person may choose not to work. A healthy or satisfied worker will not have had a change in "tastes" and will remain on the job. Therefore, given that individual wages cannot be reduced, hours rigidity will be an effective tool for inducing those workers to leave that the firm would like to leave.

A conclusion that is consistent with the evidence is that most jobs are full-time jobs, and although there is some variation by occupation and industry, the jobs have little flexibility. Workers choose jobs early in their careers according to what will be important to them during their work lives: the type of work, wages, benefits, promotion possibilities, and so forth. It may be that different jobs have different hours of work, but it is rare that hours may be varied once a job has been chosen. With the approach of retirement some workers will want to reduce hours because the hours that were optimal earlier in the work life are not optimal later in life. But, because of wage and hours rigidities on their own jobs, they cannot reduce hours without changing jobs or retiring completely.

This conclusion is supported by survey evidence. In a survey of 1,030 men aged 55–64 and 969 women aged 50–59, 93% of the working men and 80% of the working women worked full-time.[10] However, a substantial fraction of the full-time workers said they would like to work part-time: 18% of the men and 33% of the women. Although the workers were not asked why they could not reduce their hours, I imagine that, just as in other surveys, their employers would not allow them to.

1.3 Explanations or Causes of Job Rigidities

This section has two main goals. The first is to give evidence about the causes of the rigidities in the employment of workers of all ages and to find

10. Quinn and Burkhauser 1990, based on a survey conducted by Louis Harris and Associates.

how these affect older workers. The second is to give evidence about additional factors that primarily affect older workers.

1.3.1 Factors Affecting All Workers

Many job rigidities are normal to the workplace and affect workers of all ages. They may be caused by the economic necessity to use the capital stock fully or to be able to service customers during usual business hours. An important cause of rigidities from the point of view of this paper comes from the theory of team production.

Team Production

The theory of team production says that the productivity of a particular worker is increased (up to a point) when additional human factors of production are present. Other workers, other firms, and customers are, broadly speaking, additional factors of production. Clearly the extent and importance of team production varies across occupations and industries: all stations of an assembly line must be covered if production is to proceed; a barber shop must be open when customers want to come; yet a novelist probably requires no other human inputs most of the time. This implies that those who work in jobs requiring team production and who work during peak labor periods will, ceteris paribus, have higher wages than those who work during off-peak times (Henderson 1981). Such a relationship will vary across occupations and industries because of the varying intensities of team production. Wilson (1988) found that wages of professionals, skilled and semiskilled workers, and production workers were the most sensitive to start time. Wages of clerical or sales workers were less sensitive. This accords with expectations about the requirements for interaction among workers in these occupations.

If wages are higher for workers who follow similar schedules, we would expect considerable bunching of work hours. Indeed, full-time workers have similar schedules: in the 1985 CPS, 50.9% of full-time workers worked one of the four schedules: 8–5, 8–4, 7–4, or 9–5 (Mellor 1986). There is even more bunching in start and stop times: 78.8% of full-time workers began work at either 7 A.M., 8 A.M., or 9 A.M.; 69.5% stopped at either 4 P.M., 5 P.M., or 6 P.M. The amount of bunching was by necessity much less for part-time workers.

When a job requires team production, flexibility in work hours becomes difficult, and this applies whether a worker permanently works different hours from the other workers, or when a worker is on flextime. By case study, Swart (1978) investigated the drawbacks of flextime and found that many are associated with the requirements of team production. For example, a common management complaint about flextime was that communication between departments was weakened. Nollen and Martin (1978) found that complaints about and problems of flextime were associated with communication and scheduling, aspects of team production.

Despite the obvious advantages of reduced congestion and travel time and the accommodation of taste variation and preferences, only a small fraction of workers are on flextime, 12.8% in 1977 (Ronen 1984) and 12.3% in 1985 (Mellor 1986). The percentage by occupation of those working flextime varies from 19.9% in sales occupations, where many employees can work alone, to 4.0% among machine operators, assemblers, and inspectors, where the job requires the presence of others. This variation supports the view that team production is an important aspect of the workplace in many occupations and industries.

If team production affects the availability of flextime, it will also affect the availability and pay of part-time work. Suppose that a substantial fraction of workers (not even necessarily a majority) want to work full-time during "normal hours." If in most occupations and industries individual production is higher when other workers are present, jobs during normal working hours will have higher productivity and tend to pay more than off-hour jobs, drawing additional workers to those hours. Eventually a good deal of employment will be concentrated in normal hours. Anyone wanting to work outside of those hours, whether part-time or full-time, will have lower productivity and lower pay. The firm will discourage anyone from working part-time during normal working hours because that worker's absence during part of the normal working day will affect the productivity of the full-time workers.

We do not, of course, observe everyone working the same hours. Several factors prevent the concentration of hours from being complete. Some workers have such strong tastes for unconventional hours that they are willing to work off hours even if their wages are less. Some services such as bus service and entertainment must be produced during off hours. The firm will desire to use its capital stock during off hours: when the capital-labor ratio is high and team production is important, a firm will want to have several complete teams of workers to use the capital stock continuously. Apparently not enough workers want to work off hours that a complete team can be assembled at the normal wage: overtime pay has to be paid. The fact that the overtime bonus is typically 50% shows the strength of team production: the productivity of the marginal worker must be high indeed to justify such a large bonus.

Fixed Costs of Employment

The costs to a firm of employing a worker can, in principle, be divided into fixed costs and variable costs. Table 1.6 has estimates of such a division.[11] They are, of course, an average because the allocation will vary from firm to firm. In particular, some firms have few training costs and offer no health benefits; then, fixed costs would be negligible. Probably the most controversial entry is

11. The table does not include the costs of any capital the firm furnishes to the worker.

Table 1.6 Distribution of Employment Costs

Cost Item	Percentage of Cost
Fixed costs	
Training	13.5
Hiring	1.0
Health insurance	5.1
Total	19.6
Variable costs	
Wages and salary	53.6
Pension	4.5
Time off with pay	11.5
FICA tax	5.4
Unemployment insurance contributions	1.0
Workman's compensation	1.2
Total	77.2
Other, not classified	3.2
Total costs	100.0

Source: Jondrow, Brechling, and Marcus, 1987.

the attribution of health insurance to fixed costs. Apparently, however, companies that offer health insurance to part-time workers typically pay the same amount for the insurance as they do for a full-time worker (Paul 1983b); that is, health insurance is not prorated by work effort as are pension benefits, paid time off, and so forth.[12] In this case it is a fixed cost.

The figures are calculated for 1981. Since then, according to Health Care Financing Administration estimates, the real cost per person of health care has grown by about 38%.[13] This would put health insurance costs at about 7% of total employment costs and total fixed costs at about 21.5% of employment costs.

Fixed costs vary with age. In particular, recruitment, hiring, and training costs must be amortized over expected years of employment: because newly hired older workers probably have a shorter work life with the new employer than newly hired younger workers, the implicit cost per year of employment will be larger.[14] Health insurance costs increase with age. Paul (1984) reports from a survey of employers that employees aged 55–59 have the highest health

12. If work hours fall below one thousand per year, under the Employee Retirement Income and Security Act the firm is not obligated to offer the benefit at all. In some cases, therefore, health insurance is not truly a fixed cost.

13. My calculations based on the scenario of moderate growth of health care costs (Advisory Council 1991).

14. Firms may react to the shorter work life by giving less training to older workers. Although I have seen no studies confirming this, the net result may be that training costs are roughly invariant with age. However, the fixed costs of recruitment and hiring would still be greater per year of employment among older newly hired workers.

Table 1.7 **Percentage of Workers Participating in Health Care Plans**

Age	20–49	50–59	60–64	65–69
Participation	61	68	79	78

Source: Repko (1987), based on data from J. C. Penney.

Table 1.8 **Relative Cost of Medical Insurance**

Age	All Employees	Single Male
≤45	1.00	1.00
45–49	1.25	1.87
50–54	1.41	2.79
55–59	1.56	2.84
60–64	2.00	4.51
65–69	2.81	—

Source: U.S. Senate (1984).

care costs, followed by those 65 or over, then those 60–64, followed by younger groups.[15]

This is partly caused by increasing participation in health care plans with age, as shown in Table 1.7. Furthermore, given participation in a plan, older workers file claims more frequently than younger workers; therefore, health care costs increase with age. Whether this is seen as an age-related employment cost by the employer depends on the method of financing health care insurance. Firms that self-insure would bear fully the cost difference by age. If a firm buys insurance for its employees, its premium will depend on whether it is experience rated or community rated. If experience rated, the cost of premiums depend on the historical health care costs incurred by the firm's employees. Therefore, a firm that employs a disproportionate number of older workers should expect higher health care insurance premiums. If community rated, the firm's premiums depend on the average health care costs of covered employees in some large local pool of employees. Then firms would have no differential cost for medical insurance premiums as the result of employing older workers.

Table 1.8 has estimated relative costs of providing medical insurance to employees by age to all employees and to single males. The costs are calculated from health maintenance organization (HMO) claims data on families covered by group contracts, so there is surely a question about the generality of the results. Nonetheless, there certainly is general agreement that health benefit costs increase with the age of the employee.

The Special Committee on Aging (U.S. Senate 1984) estimated that average costs of health care were about 5% of pay. The report of the committee noted that, "[w]hile medical benefits may be worth about 5 percent of pay overall,

15. Costs increase with age for both single employees and employees with dependents.

for lower paid older workers this percentage could be 20 to 30 percent of pay. This is particularly true if the employer offers medical benefits to employees who work on reduced schedules. Some employers offer medical coverage to employees who work 20, 25, or 30 hours per week. Older persons are one of the groups who prefer such schedules" (46). If a firm truly does spend 4.51 times as much in health care costs for a 60–64-year-old single male as a younger single male (table 1.8), the large percentages of pay for health care costs in the quotation are comprehensible. In this case the fixed costs associated with hiring an older male would be a large fraction of total costs.

Individuals also have fixed costs of working. The only estimate of an individual's fixed cost of which I am aware is an econometric estimate based on observed hours of work of women. The basic idea is that fixed costs to the individual could explain why almost no women work just a few hours per year. Because many women either work a substantial number of hours or not at all, the estimate of fixed costs is large: 28% of average yearly earnings (Cogan 1981). These costs would come from the requirement for extra private transportation, work-related clothing, meals at work, and day care.[16] Casual observation suggests that, because of day care, 28% may not be unreasonable. It seems high for men: in the 1986 Consumer Expenditure Survey average expenditures on items that could be counted as fixed employment costs of men are food away from home, 6.1%; private transportation, 19.3%; and apparel and services, 5.6%. These items total 31%, but, of course, not all of these expenditures are work-related and fixed. In the example that follows I will use an estimate of 10%.

The effect of fixed costs on the ability of an employer to pay a generous wage to a part-time employee is rather sharp. Consider as an example someone who works two thousand hours per year at $10 per hour. In line with table 1.6, suppose that the nonwage costs of employment equal the wage costs and that the firm breaks even on the worker. Then the earnings of the worker would be $20,000 and the product would be $40,000. Of this, I assume that fixed costs are 25% (adding in 3.5% for fixed capital costs to the 21.5% derived from table 1.6), variable nonwage costs are 25% of which 18% are compensation in the form of pension benefits and paid time off and 7% are in the form of Federal Insurance Contributions Act (FICA) taxes, unemployment insurance, and other, which are not compensation to the worker. If hours are reduced to one thousand, total product would be worth $20,000. Table 1.9 shows how that product would be allocated.

Fixed costs remain at $10,000, the variable costs are now $5,000, leaving wages of $5,000. Thus, hours fell by 50%, but earnings fell by 75% and the wage fell by 50%. The fall in total compensation, including variable nonmonetary compensation, would not be quite as great, but it would also be substantial.

The percentage change in earnings divided by the percentage change in

16. Of course, some of these costs could have both fixed and variable components.

Table 1.9 Example of Allocation of Employment Costs

Type of Cost	Percentage at Full-Time	Full-Time ($)	Half-Time ($)
Wages	50	20,000	5,000
Fixed costs	25	10,000	10,000
Variable (compensation)	18	7,200	3,600
Variable (not compensation)	7	2,800	1,400
Total	100	40,000	20,000

Source: Author's calculations, based on table 1.6.

hours is an elasticity, and with no fixed costs it would be 1.0. Here the estimate is 1.5. Although this may seem like a large elasticity, it is similar to estimates based on the observed relationship between hours and earnings. For example, Jondrow, Brechling, and Marcus (1987) estimated the elasticity to be 1.53; Owen (1976) and Rosen (1976) both estimated an elasticity of 1.4; and Clark, Gohmann, and Sumner (1982) estimated it to be 1.6.

The interpretation of my example is that a reduction in hours would require the wage rate of an individual to fall in order for the firm to break even. It is difficult to estimate this relationship from observations of individuals because individuals rarely reduce hours at the same firm. Gustman and Steinmeier (1985) reported that, in the RHS when individuals changed from full-time to partially retired at the same firm, their wage rate fell by 10% on average; but "partially retired" is self-assessed and Gustman and Steinmeier do not report the change in hours worked, so this result cannot be compared with the others I have cited. Regardless of the exact comparison, however, it seems clear that, in many occupations and industries, fixed costs are an important component of total employment costs, and, in order that a firm can cover fixed costs, money wage rates must be lower for part-time work than for full-time work. Therefore, earnings will decline at a faster rate than hours, and at some point it will not be worthwhile to work.

If the worker also has fixed costs associated with working, that point will probably be reached at a fairly high number of hours. Suppose in my example that the worker has fixed costs of working of 10% of full-time income, or $2,000. Then, pretax discretionary income (after subtracting the fixed costs of working) would be $18,000 at full-time hours. Pretax discretionary income at half-time hours would be just $3,000, so the worker would be earning $3.00 per hour in discretionary income. This is a low wage, indeed, to compensate for the disutility of working.

This example and the estimates from the literature of the importance of fixed costs imply that most workers will work enough hours to cover both the fixed costs of the firm and of the worker, yet still leave adequate money earnings for the worker. Part-time work will be associated with low pay, and there will be a minimum number of hours of work. The relationship between hours and the wage rate will vary across occupations and industries because of the variation

in fixed costs; similarly the minimum number of hours will vary across occupations and industries. This is what we observe both across occupations and industries and across individuals: occupations and industries in which there is considerable part-time work have lower average wage rates, and individuals who work part-time have lower average wage rates.[17]

1.3.2 Factors Particularly Affecting Older Workers

This section discusses other factors that particularly affect older workers, and how normal work practices affect the labor market activity of older workers. The discussion considers the effects on reducing hours on the main job, the effects on changing jobs to reduce hours, and the effects on complete retirement.

Social Security

The earnings test under Social Security reduces the Social Security benefits of a retired worker between the ages of 62 and 65 by $1 for every $2 earned, beginning at the exempt amount of $7,680 in 1993.[18] Thus, a worker with a wage of $10 per hour could work no more than 768 hours per year without facing a Social Security benefit reduction. From the discussion of fixed costs and team production of the last section, this level of work effort would not sustain a wage rate of $10 unless the worker had a job with little fixed costs, including fixed-cost fringe benefits.

The earnings test interacts with the Social Security provision of reduced benefits for early retirement: an eligible worker may draw Social Security benefits beginning at age 62, but the benefit is permanently reduced by 5/9% for each month in which benefits are drawn before the age of 65. The reduction factor, about 7% per year, was meant to be actuarially fair, and at a real interest rate of 3% it is approximately fair. Therefore, a worker contemplating drawing benefits at age 62 should realize that the total value of the expected stream of benefits is approximately independent of retiring at 62 or working an additional month because the eventual increase in the stream of benefits will compensate for the lost benefits from delaying retirement for a month. What the worker may not realize, however, is that any monthly benefits lost under the earnings test are treated in the same way, except benefits are not increased until age 65, when they are recalculated to take into account lost benefits due to the earnings test. For example, a worker who retired at 62 and then at age 63 took a part-time job resulting in the loss of three months' benefits would have monthly benefits increased permanently by $3\times(5\div 9)\%$ beginning at age 65. Therefore, before age 65 the earnings test is not really a tax: it is forced saving. According to lifetime utility-maximizing models in which individuals can

17. I realize that the empirical observations may not hold constant individual characteristics that affect productivity and, therefore, do not correspond to the theory as completely as I would like.

18. Over age 65 the reduction is $1 to $3, beginning at the exempt amount of $10,560.

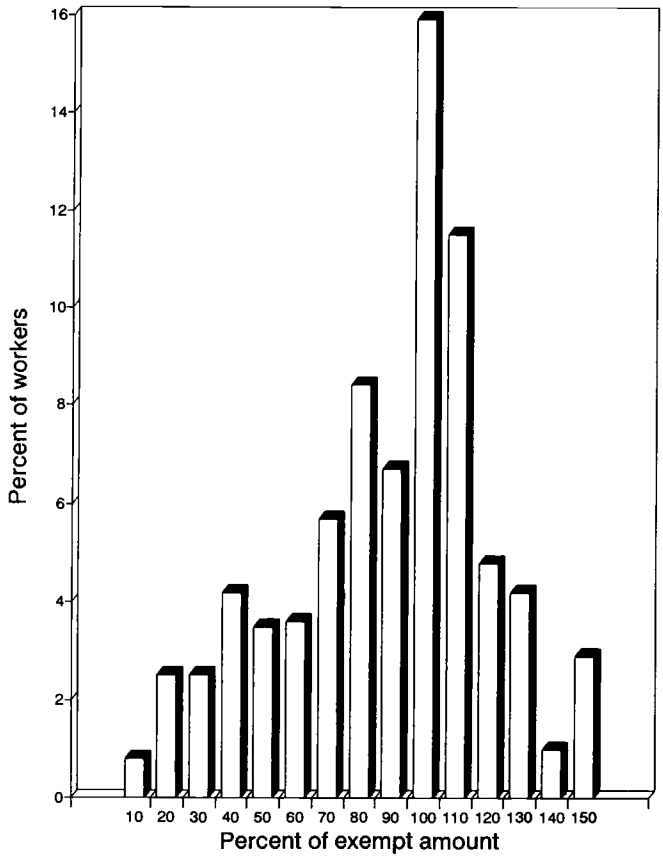

Fig. 1.2 Distribution of "retired" workers
Source: Burtless and Moffitt (1985), based on the Retirement History Survey.

freely borrow and lend, the earnings test should have no effect on the choice of how much to work.

The empirical fact, however, is that the earnings test seems to have important effects. Burtless and Moffitt (1985) calculated from the RHS the distribution of annual hours of work where the points in the distribution are percentages of the exempt amount. This calculation can show the importance of the earnings test because, if it is an important determinant in the choice of hours, we would expect to see many workers choosing hours at or just beneath the exempt amount. Figure 1.2 shows the distribution of hours in the RHS of "retired" workers aged 62 or over who are still working.[19] The figure shows a remarkable

19. Someone is defined to be retired if he or she has a sudden and discontinuous drop in hours of work (Burtless and Moffitt 1985).

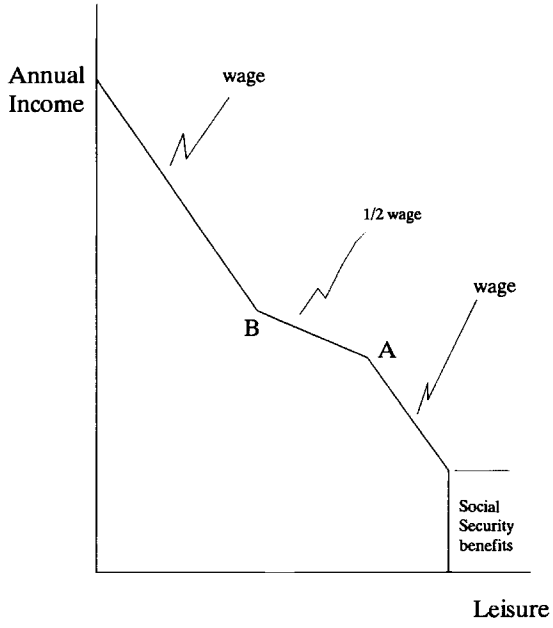

Fig. 1.3 Effect of earnings test on annual income

bunching of workers near the exempt amount: 16% have hours in the range of 91% to 100% of the exempt amount; 12% have hours in the range of 101% to 110%. Given that the data have observation error and that it is probably difficult for a worker to reach exactly the exempt amount, the figure shows that workers respond to the earnings test in a way not predicted by the utility-maximizing models. The models hold that lifetime wealth is the important determinant of behavior, whereas the figure suggests that annual (or monthly) income is also important.

The difference is illustrated in Figure 1.3, which shows the relationship between annual work and annual income. If a worker could not borrow or lend, this would be the annual budget constraint. Point A is the exempt amount of annual hours, which corresponds to the 100% point in figure 1.2. Between points A and B benefits are reduced by $1 for each $2 of earnings, effectively reducing income from working by 50%. At B (the breakeven point) benefits have been reduced to zero, so earnings increase at the wage rate. With this budget constraint, utility maximization will lead to bunching of hours at zero and at A. We should also observe hours spread from zero to A, and far above B. This is almost exactly what we find: we already know that most have zero hours; Burtless and Moffitt found that 22% of the working retired had hours more than 150% of the exempt amount and 65% had hours between zero and

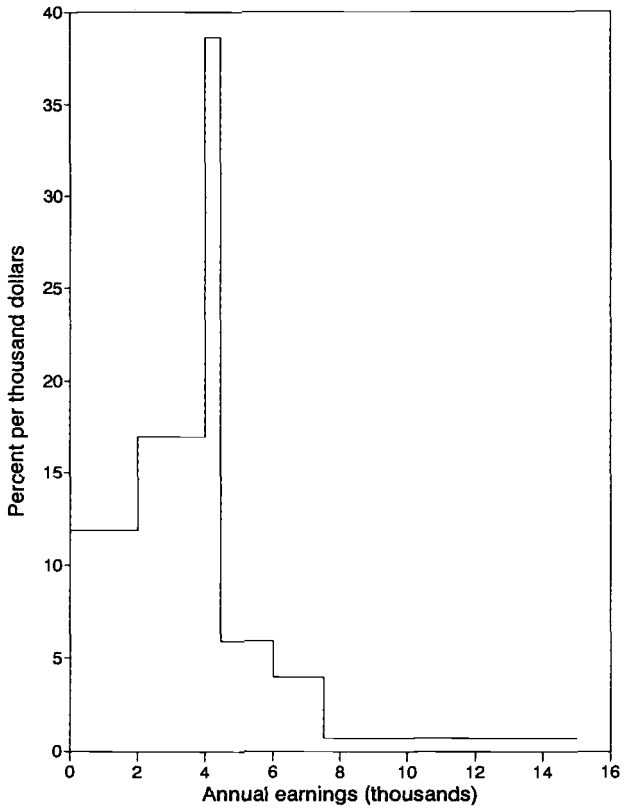

Fig. 1.4 Distribution of retired workers
Source: Author's calculations from Iams (1987), based on the New Beneficiary Survey.

110% of the exempt amount. Just 13% had hours between 110% and 150% of the exempt amount.

I know of no other study that gives such detailed distributions of hours. Iams (1987) gives the distribution of workers aged 64 or less by earnings level in the New Beneficiary Survey (NBS).[20] In this sample, the workers have already drawn some Social Security benefits, so they are aware of the test. Figure 1.4 shows the density of workers who have already left their longest employer, so they are in transition jobs. The figure shows a very sharp peak near the exempt amount ($4,440). This is a somewhat more convincing case than in Burtless and Moffitt: some of the Burtless and Moffitt sample is 65 or over, and at those ages the earnings test is really a tax, whereas in Iams all are younger than 65.

I conclude that in both the RHS and the NBS, many working recipients of

20. These would be men who had "retired" in the sense that they had begun to receive Social Security benefits, but they either were still working or had gone back to work.

Social Security retirement benefits have hours of work that place them near the exempt amount. This is good evidence that workers believe that the earnings test has at least some characteristics of a tax.

One explanation for the tax nature of the earnings test is that most workers do not know that benefits forgone through the earnings test will be regained at age 65. Some mild support for this point of view comes from Quinn, Burkhauser, and Myers (1990). They study the bunching of hours near the exempt amount as the age of the worker varies. The relative amount of bunching of those 65 or over is about the same as of those 62–64, even though the earnings test is a true tax at 65 or over but not below 65. Furthermore, I believe this explanation is likely because I have spoken to economists who do research in the economics of aging, and many of them were unaware of the automatic benefit recalculation. Another explanation is that we have an inadequate understanding of how workers react to a complicated program that has a feature that acts partly like a tax and partly like a savings mechanism. My conclusion is that we really do not know what causes the clustering around the exempt amount.

The earnings test seems to discourage work. Besides its obvious effects on the lifetime income of the worker, it seems to affect the employment opportunities of older workers. Paul (1987, 172) reports on a survey of twenty-five managers who administered work programs in their organizations.

> The Social Security retirement earnings test was identified by eight of the managers as the greatest disincentive to work for Social Security beneficiaries. The managers administering retiree labor pools expressed frustration in the fact that once retirees who are receiving Social Security earn $6,000 (the 1982 maximum earnings limitation[21]) they usually cease working, or they will limit their work hours, upon re-employment, so as not to exceed the $6,000 limit. This common work pattern of many retirees not only *restricts management's use of this type of employee,* but is also symptomatic of the financial disincentive associated with prolonged employment during retirement.

I put the emphasis in this quotation to point out that the earnings test may well discourage the development of programs for part-time work: management will often need to ask workers with particular skills to work more than the exempt amount, and if workers consistently refuse, it may not be worth the cost of maintaining such programs.

Pension Plans

Apparently defined-benefit pension plans have substantial effects on the work choices of employees. Most of the research has been directed to their

21. The discussion is about workers aged 65 or over. For them the exempt amount is higher than for workers aged 62–64.

most obvious effect, the effect on retirement, which I will discuss later in this paper, but they also have an influence on hours of work before retirement.

Although there are thousands of defined-benefit pension plans, many have formulas for rates of accrual of pension benefits of the form $b = k \times e \times y$, in which b is the benefit, k is a constant factor, e is some measure of earnings near the end of work life such as the final year's earnings or an average of the final two years' earnings, and y is years of service. In that b is the annual benefit for the retired lifetime, a reduction in earnings near retirement will have a large effect on lifetime wealth. For example, if e is just the final year's earnings, a decrease in earnings of 10% will reduce pension benefits by 10%, which translates into a lifetime wealth loss of about 150% of annual earnings.[22] That is, the financial loss of reducing hours in the year before retirement can easily be greater than an entire year's earnings. Therefore, a worker will not want to reduce hours if pension benefits depend on current earnings.

A common way to avoid this problem is to have the worker "retire," fixing the benefit, and then be rehired as a consultant or outside employee who has no benefits, and particularly no accrual of pension. In some cases, however, the consultant can work only a limited number of hours without losing pension benefits: under the Employee Retirement Income and Security Act (ERISA) retirees who are reemployed for more than forty hours per month can have their pension benefits suspended. Although some managers mentioned this as a barrier to hiring retirees on a part-time basis, it was viewed to be a minor factor compared with the Social Security earnings test (Paul 1987).

An aspect that could be quite important under some circumstances has to do with inflation risk. While a worker is employed under a defined-benefit plan, pension benefits are on average protected against inflation risk because prices and money wages change at about the same rates. Thus, if there is general inflation during the last five years of work life, money wages should increase by the same amount, keeping the real value of the pension at the point of retirement about the same. Typically, however, pensions once taken are not protected against inflation, so that a worker who retires early and is then rehired at fewer hours will not have inflation protection for the pension.[23] This method of reducing hours on the main job exposes a worker to considerable inflation risk compared with staying on the main job longer and then retiring completely.

ERISA and Health Insurance

I have already discussed how firms that are experience rated or that self-insure will have to spend more on the health insurance of older workers, mak-

22. Discounting will convert a real lifetime income flow of $1 at age 65 into a wealth equivalent of about $15.

23. During the high-inflation decade of the 1970s, firms often made ad hoc adjustments in pensions for inflation (Allen, Clark, and Sumner 1986).

ing the fixed costs of older workers greater. This will, of course, restrict the lower bound on hours that will be financially acceptable both to the firm and the employee. The fixed cost of health insurance can be eliminated, however, if annual hours are not allowed to reach one thousand; then, under ERISA, the firm need not pay health insurance or other benefits available to all workers. Apparently this is often a management strategy: in a survey of six programs that form pools of labor from retirees, Paul (1987) found that they all restricted the number of hours to less than one thousand. The general attitude of the managers who were surveyed was that "if the 1000-hour rule were eliminated, their organizations would permit part-time personnel, particularly retirees, to work more hours" (172). It is difficult to know how much of this is simply self-serving, but because of the costs involved, I believe it should be taken seriously. A further reason is that these surveys were made during the early 1980s, when health care costs were substantially lower than today, and when the projections of health care costs were not nearly so pessimistic as they are today.

Under the thousand-hour rule the firm would like to keep hours below one thousand hours so that medical insurance could be eliminated. The worker might want to work more than one thousand hours, both because the drop from two thousand to one thousand hours is too abrupt and because he or she requires medical insurance. The outcome of these incompatible desires will depend on the alternatives of each side. The main option of the older worker is to retire. The firm can hire young workers who may not care about health insurance and who want to work less than one thousand hours. Then the firm can retain the health insurance benefit for its full-time workers while eliminating it for its part-time workers.

1.3.3 Impediments to a Job Change at Older Ages

This section discusses the factors that may impede a job change to reduce hours.

Special Job Skills

Over time an employee acquires skills and knowledge about the firm that increase productivity at that firm. Such skills and knowledge are called specific human capital because they are specific to the firm. Skills and knowledge that would increase productivity should the worker change to another firm are called general human capital. When a firm hires a worker who is expected to remain for many years, it will be in the firm's interest to invest in the specific human capital of the worker; this kind of investment is thought to be an important cause of rising productivity paths early in a worker's career. Obviously some skills cannot be defined as either specific or general: the definition will depend on the alternative employment. For example, most of the skills of a General Motors employee will transfer to Ford, but few of them will transfer

to a Wall Street law firm. The general point is nonetheless valid: over time workers become more valuable to a particular firm than to any other firm, so that, at least potentially, the firm can pay the worker more than any other firm could.

Some productivity-increasing activities are not specific human capital in an obvious way, but they still have the characteristics of specific human capital. For example, the search for a good match between a firm and a worker may involve several rounds of hiring and quitting or firing. This is a costly activity, but both the worker and the firm are willing to bear the cost if the payback period is sufficiently long. Once a good match has been found, the costs of the search that led to the match should be considered part of specific human capital. This particular example is germane to understanding why the turnover rates of young and older workers cannot easily be compared. Young workers have higher turnover rates because of the search for a good match: if a good match is found, however, the payback period is much longer. Therefore, both the firm and the worker are willing to bear the greater turnover costs of younger workers.

Often unions negotiate job pay or title by seniority rather than by productivity. From the point of view of the worker this looks like specific human capital because the seniority has no value at another firm. From the point of view of the firm it is the way of determining the shape of the lifetime wage trajectory, but to the extent that pay late in the career is not connected to productivity, the firm will have an incentive to get rid of highly paid older workers. It is surely no accident that, as will be discussed later, defined-benefit pensions are most often found in unionized firms, and that the pensions have provisions that encourage retirement.

As this discussion suggests, older workers who change employers, whether the change is to full-time or part-time employment, can expect a fall in productivity because of the loss of specific human capital. Furthermore, because of a short payback period on the new job, extensive job search to find the best match is not warranted, so the starting wage will be lower than the highest that could be found in the market. The new employee cannot expect rapid wage growth because, again, the short payback period will cause the new employer not to want to invest in specific human capital.

If an older worker had maintained or increased his or her general human capital, a job change would not occasion a large fall in productivity. However, most older workers probably have little general human capital: during the many years since schooling the initial stock of general human capital would have depreciated; there is little financial incentive for investment in general human capital on the part of the firm because the employee can simply leave, taking the investment to another firm.

If an older worker wants to reduce hours but cannot on the main job because of fixed costs or team production, it is unlikely that other firms in the same

industry will offer a similar job, but at reduced hours, because of its own fixed costs and requirements of team production. Therefore, the older worker will have to change occupations or industries. This seems to be common. In the NLS 59% of the job changes following retirement from the main job were to a different occupation and 52% were to a different industry (Parnes and Nestel 1981). In the RHS just 12% of the changes from career jobs by men aged 60 or over were to the same occupation and industry (Ruhm 1990a). In the CPS job changes at older ages tend to concentrate workers in just a few industries (Hutchens 1988).

These figures show a remarkable amount of mobility across occupations and industries. Practically by definition these will be easy entry jobs that require few specific skills, a rather low level of general skills, and minimal search costs because of the short payback period. They cannot have large fixed costs or the wage rate would be unacceptably low, given the reduced hours. Furthermore, because the older worker loses the specific human capital acquired during the work life with a particular firm, he or she must compete in a labor market with a pool of rather unskilled labor, which may have low opportunity costs of its time. For example, students need jobs with approximately the same characteristics as a job the older worker would switch to; and students are willing to work for rather low wages. Therefore, forces of supply and demand will tend to keep the wage rate low. We would expect, then, that jobs taken after retirement from the main job for the purpose of reducing hours, will have low wage rates.

This is a universal finding: In the RHS wage rates of men fell 30% on average at job change (Gustman and Steinmeier 1985). In the NLS the median wage change was −39%, and 71% of those changing jobs had a wage loss (Parnes and Nestel 1981). Average wage rates fell by 18%, according to a survey of eighteen hundred retirees from three large corporations (Morse, Dutka, and Gray 1983). In the NBS the wage rates of men who continued to work after initial receipt of Social Security benefits fell by about 50% (Iams 1987).

Table 1.10 has some details of the change in wage rates at a job change. Of those who reduced hours on their career job, 36% had a wage gain of more than $2.50 (1984 dollars), and just 24% had a wage loss of more than $2.50. It appears, therefore, that if someone can reduce hours on the career job, the wage rate can be expected to remain about the same. Almost half of those who changed to a new full-time job had roughly constant wage rates, but the percentage having a wage loss (42%) is much greater than the percentage having a wage gain. The table makes clear that changing to part-time on a new job causes the largest decline in wages. This is, of course, consistent with an explanation based on the loss of specific job skills and fixed costs.

Fringe Benefits

Fringe benefits are a barrier to job change at older ages. Partly this is because the new jobs often do not offer fringe benefits, so the fall in total com-

Table 1.10 **Wage Change of Men on Leaving Full-Time Lifetime Jobs (% distribution)**

Wage Change	Type of Transition		
	To Part-Time on Same Job	To Full-Time on New Job	To Part-Time on New Job
>$2.50	36	12	11
−$2.50 to $2.50	42	46	21
<−$2.50	24	42	68
Total	100	100	100
Number of observations	57	151	134

Source: Quinn, Burkhauser, and Myers (1990), based on Retirement History Survey.

pensation is greater than what is indicated from the wage rate changes. This would be true for someone of any age changing into those jobs.

Changes in fringe benefits at a change in job have not been studied nearly as much as changes in wages; in particular, I have not seen any data from the PSID, the RHS, or the NLS on how benefits changed. However, at older ages the incidence of fringe benefits surely falls at job change because many job changes are into the service sector, which has a much lower incidence of fringe benefits than the manufacturing sector. Some evidence comes from Morse, Dutka, and Gray (1983), who report that just 29% of the retirees who continued to work in their survey had fringe benefits on their new jobs.

Fringe benefits are a barrier to job change at older ages, however, partly because of the particular requirements of older workers for some kinds of fringe benefits. Health insurance is especially important for older workers, so its loss entails a large loss in compensation on average. But preexisting conditions may well mean that, even if the new job offers medical insurance, the new worker may not be allowed the benefit. This means that the equivalent monetary loss of moving to a new job and losing medical insurance is much greater than the average cost of medical insurance: were someone with a preexisting condition to purchase medical insurance privately, the cost would depend on the condition, increasing the fair market price.

It is difficult to know the extent and importance of the reduction in job mobility due to preexisting conditions. Surveys of the population show a large incidence: 30% of the respondents to a CBS–*New York Times* poll answered yes to the question "Have you or anyone else in your household ever decided to stay in a job you wanted to leave mainly because you didn't want to lose health coverage?" (*New York Times,* 6 September 1991). Madrian (1994) used the 1987 National Medical Expenditure Survey to study job mobility of married men. She estimated that the "job-lock" aspects of not having medical insurance reduced job mobility from 16% per year to 12%. Based on the 1973 Quality of Employment Survey, Mitchell (1983) estimated that men would have to be compensated $1,800 (out of mean earnings of $9,000) to move from

a firm with health insurance to one without health insurance. This is much more than the cost of simply purchasing health insurance, which indicates that preexisting conditions are important.

Defined-benefit plans have many provisions that can affect job mobility, but some have only minor effects. In particular, vesting in a new plan is not particularly important to younger workers because of the long period before retirement benefits are paid: private defined-benefit plans are not indexed between the time of separation from the firm and the receipt of benefits, so that inflation as well as discounting makes the present value from vesting small. Among workers nearing retirement, vesting is more important. For example, five years of service could give a pension of 5–10% of salary, which has a wealth equivalent of about a year's earnings.

The effect on the mobility of worker with many years of service will depend on the nature of the pension plan and on the wage path of the worker. Consider again the simplified plan $b = k \times e \times y$, in which b is the benefit, k is a constant factor taken in this example to be 0.02, e is the final year's earnings, and y is years of service. If e increases linearly with years of service, as would be the case when the same raise is given each year, then b increases in the square of y. Then, the gain in benefits from an additional year of service is linear in y, and the value of an additional year of service is very much greater at the end of a long work life than at the beginning. This should, of course, reduce mobility toward the end of work life.[24]

Even if someone has reached the maximum number of years' service for pension accrual so that no additional pension is earned with additional service, early retirement from the firm to change jobs will cause a loss of real pension wealth: defined-benefit plans are not formally inflation-protected following separation from the firm, so the pension will lose value at the rate of inflation. Furthermore, because the rate of inflation can change unexpectedly, the pension is exposed to inflation risk: a rate of pension loss that is judged acceptable at retirement could increase in an unexpected way.

Defined-benefit pensions can change in an important way the financial incentives to remain with an employer. We would expect that, depending on the nature of the plan and the characteristics of the employee, they would have strong effects of mobility. Apparently, as I will discuss in the next section, they do.

1.3.4 Factors Influencing Complete Retirement

Pension Plans

Defined-benefit plans have widely differing patterns of accrual and of benefit adjustments for the age of retirement. I will speak of typical plans, but it should be kept in mind that the plans are very heterogeneous.

24. I will discuss below the research findings on how accrual rates affect job mobility.

At some combinations of years of service and age, defined-benefit plans strongly discourage mobility. For example, a plan may effectively offer Social Security benefits at age 60 to someone who stays with the firm until 60 and then retires. This would be done by augmenting until age 62 the worker's pension benefits by the amount of Social Security the worker will get at 62. Thus, a 59-year-old worker could earn two years of Social Security benefits by working one year, in addition to salary and any increment in pension. Such a worker would be discouraged from complete retirement or from reducing hours by changing employers. This example is one of many aspects of defined-benefit plans that change the compensation of working another year on the main job.

The adjustment for delaying retirement past the normal retirement age is often not actuarially fair in a defined-benefit plan. Although eliminating accrual on the basis of age is not longer allowed under the Age Discrimination in Employment Act (1986), it can be capped for reaching maximum years of service. In combination with the actuarial adjustment, the financial reward for another year of work can be substantially below money earnings. Kotlikoff and Wise (1987) give an example based on a firm's actual defined-benefit plan in which the wage of a 61-year-old worker is effectively reduced by 14%. In other examples, the reduction can be considerably greater.

The influence of the particular features of the plans on worker mobility rates is well documented (Burkhauser 1979; Stock and Wise 1990a, 1990b; Kotlikoff and Wise 1989; Lumsdaine, Stock, and Wise 1994). In these studies and others, workers respond strongly to the incentives built into the plans: at some ages, the incentive to remain at the firm is strong and we observe little mobility; at other ages the incentives to leave are strong, and we observe considerable separation. For example, in a firm studied by Kotlikoff and Wise, someone leaving the firm at age 55 could get substantially higher pensions benefits than someone leaving at age 54. The difference depends on the circumstances of the worker: Kotlikoff and Wise give a case of someone with earnings of $42,000 whose pension wealth is increased by $30,000 by staying from age 54 to 55. Accordingly the rate of separation of those with twenty-one or more years of service is 2% at age 54 and 11% at age 55.

Defined-contribution plans do not have such strong incentives as defined-benefit plans. They do, of course, have a wealth effect because they represent forced saving that the worker might not have done otherwise; if this happens, the worker will arrive at retirement age with more economic resources than otherwise. By itself, this is not an impediment to the choice of work effort: provided a worker can finance consumption from other assets, the level of consumption can be chosen independently from income in a particular year. However, even defined-contribution pensions may influence the age of retirement through a so-called liquidity effect. Imagine a defined-contribution plan that puts a large fraction of a worker's compensation in the plan, so much that the worker does not want to save anything in addition for retirement. As the worker approaches retirement, he or she may have accumulated so much in the plan

that consumption will be higher in retirement than before retirement, which would cause the worker to want to borrow against the future retirement benefits to finance greater consumption before retirement. If there are capital market imperfections or if the benefits cannot be used as collateral, the borrowing will not happen and consumption before retirement is liquidity constrained: the worker has the assets (future benefit payments) but cannot use them to achieve the desired consumption path. Then, the level of the benefit payment will influence the choice of retirement age: the worker will tend to retire earlier than if consumption could be chosen independently from retirement. That is, the person's income stream is conditioned by work status, and capital market imperfections cannot be used to allow consumption to be chosen independently from the income stream. Thus, consumption and work status must be chosen jointly, causing the choice of retirement age to depend on the defined-contribution plan.[25]

As far as I know, the effects of defined-contribution plans on retirement age through the liquidity constraint have not been empirically studied. However, Social Security can, in principle, have a similar effect, and there is some empirical evidence that it does have. I will look at this evidence in connection with my discussion of Social Security.

Defined-contribution plans can affect retirement in at least two other ways. The continuing accrual of benefits under a defined-contribution plan may be capped for years of service, which changes the reward from working. Inflation affects the assets in a defined-contribution plan differently from the assets in a defined-benefit plan. Before retirement a defined-benefit plan subjects a worker to little inflation risk; the effect of inflation on a defined-contribution plan will depend on how the worker's assets are invested, so no generalization can be made. After retirement the effects will be the same if both types of pension plans lead to a nominal annuity.

Overall we observe that workers covered by pensions have fewer job changes at younger ages and higher retirement rates at greater ages. At younger ages mobility is reduced primarily because of the incentives from the plans and because the jobs associated with pension plans seem to be better jobs. For example, in the 1984 Survey of Income and Program Participation, the rate of job change by 30–50-year-old males was 20% among those without pensions and 6% among those with pensions (Gustman and Steinmeier 1993). Yet there was little difference in mobility according to whether the plan was a defined-benefit plan or a defined-contribution plan. Because defined-contribution plans are completely portable, offering no impediments to job change, this result suggests that the reduced mobility is caused by other factors associated with jobs that have pensions. In particular, jobs with pensions seem to be better

25. The same reasoning applies if the defined-contribution plan can be cashed out rather than taken as an annuity.

jobs: they pay more even after accounting for observable worker characteristics. Furthermore, workers who leave jobs that have pensions have lower earnings on their new jobs, whereas workers who leave jobs that do not have pensions have higher earnings (Gustman and Steinmeier 1993).

Early retirement has long been associated with pensions because of the historical dominance of defined-benefit plans with their incentives for retirement. However, defined-contribution plans have grown at a much greater rate, so that by 1987 only about 68% of active participants in a pension plan had a defined-benefit plan (Turner and Beller 1992). The pension coverage rate was 42% of the workforce in 1988, so that only about one-third of workers were covered under a defined-benefit plan. Of course, benefit levels in many of these plans are not great enough to influence behavior in a substantial way.[26] Therefore, defined-benefit plans may explain the retirement behavior of some, but only of a minority. And their influence is diminishing.

Social Security

Social Security affects retirement in a number of ways. Historically, incremental Social Security taxes caused benefits to increase at such a high rate that, taken by itself, the accrual of benefits encouraged later retirement (Blinder, Gordon, and Wise 1983). In effect the reward from an additional year of work was substantially greater than the wage rate. Because of the indexing of wages and maturing of the system, that is no longer the case for most workers: in fact, Social Security contributions will be a true tax for a worker with many years of contributions and steady earnings because any additional contributions will not increase the benefit. However, a worker with a small number of years of contributions could accrue higher benefits from additional Social Security contributions, but I imagine the overall effect of the accrual of benefits is rather small.

As I discussed earlier, the reduction in benefits for early retirement is approximately actuarially fair. The system should not affect retirement before the age of 65 through any "price" effects,[27] although it has a wealth effect through forced saving in the manner I discussed in connection with defined contribution plans. After age 65 the delayed retirement credit increases benefits for each month by which retirement is delayed or for each month in which benefits are lost due to the earnings test. Until 1986 the delayed retirement credit was 3% per year, far lower than what is actuarially fair. This undoubtedly encour-

26. In 1988 just 17% of households aged 65–74 received more than 20% of their income from private pensions (Grad 1990). Thus, even among the recently retired, pension income is a rather minor source for most households.

27. By price effects I mean the change in the present value of benefits when the age of retirement changes. Between the ages of 62 and 65, this change is roughly zero. The system could still affect the retirement of someone with a number of years of zero or low Social Security contributions because additional work would increase average monthly earnings.

aged the very high rates of retirement at age 65: for example, in the RHS 24% of men working on their sixty-fifth birthday had retired within three months of their birthdays (Blau 1994).

Beginning in 1990 the delayed retirement credit began to rise; in 1993 it was 4% per year, and by the year 2009 it will be 8% per year, which will be approximately actuarially fair. Therefore, by 2009 the system should, in principle, have no price effects either through the reduction for early retirement or through the delayed retirement credit once a worker has reached 62.

Despite the apparent fairness of the reduction for early retirement, we observe high rates of retirement at age 62. What is the explanation? A liquidity constraint is one possible explanation. As discussed in connection with defined-contribution pensions, an income stream such as Social Security benefits that is contingent on work status can affect retirement when a worker cannot borrow against the future income stream (Crawford and Lilien 1981). The effect will be to reduce retirement in the ages just before eligibility for benefits and increase retirement at the age of first benefit. Hurd and Boskin (1984) found in the RHS that workers with a high ratio of Social Security benefits to private assets had less retirement at age 61 and more retirement at age 62 than workers with a lower ratio. This is mild evidence for a liquidity constraint. Burtless and Moffitt (1986) and Kahn (1988) also find evidence for a liquidity constraint. As far as the Social Security tax is concerned, the system has effects similar to the income tax because earnings are taxed, whereas the Social Security benefits of most beneficiaries are not taxed. I know of no empirically based estimates of these effects.

Over the past fifty years, the Social Security system has provided enough retirement income so that people could retire earlier and earlier. Today the labor force participation rate of men is about 45% at age 63. The structure of the program causes retirement to be concentrated at certain ages. Figure 1.5 has the retirement hazard rates of men and women. The retirement hazard rate is the probability of retirement at each age, given participation at the preceding age.[28] For example, the hazard rate of men at age 62 is about 0.22, indicating that, of those men who reach 62 and are still working, 22% leave the labor force while 62. Particularly for men, the graph has spikes at 62 and 65, which are, of course, important ages in the Social Security system. Retirement rates appear to be slightly depressed at 64, probably because people are waiting until 65 to retire, and at 66, probably because of the large number that retired at 65. Retirement of women is less highly concentrated at 62 and 65 because husbands and wives tend to coordinate their retirement dates: because of the age difference between husbands and wives (about three years on average),

28. The hazards in the figure were calculated from the assumption that participation is steady over time: the retention rate at age t is just the labor force participation rate at age t divided by the participation rate at age $t - 1$, and the hazard rate is just one minus the retention rate. Although the hazard rate in the figure is calculated from cross-section CPS data, its shape is similar to what would be found in panel data (Hurd 1990b).

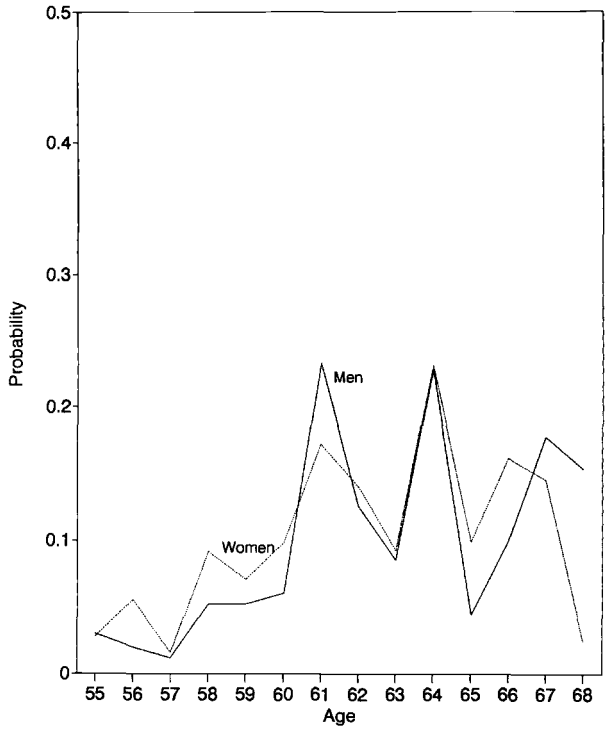

Fig. 1.5 Retirement hazard rates
Source: Author's calculations from 1988 and 1989 Current Population Survey participation rates by single years of age.

more women retire before the age of 62 (Hurd 1990a). If the spikes were smoothed out, the retirement hazards would have an upward trend, which is consistent with the view that gradually changing tastes as the population ages increase the probability of retirement gradually.

In my view the spikes in the retirement hazards are good evidence of the effects of Social Security system on retirement. First, in microdata where we can control for details of any pension plan, retirement spikes at age 62 and 65 are still found (Burkhauser 1979; Stock and Wise 1990a, 1990b). Second, in data from other countries where the important ages for retirement under the public pension system are different from the ages in the United States, we find spikes at those ages. For example, in Germany public pension income is about 95% of total retirement income. Special ages for retirement under the pension system are 60, 63, and 65, and the retirement hazard rate peaks at those ages. The third reason for thinking that Social Security has an important effect on retirement is that there is no other alternative explanation for the fall in participation over time of older workers: most retirees depend on Social Security for

most of their income, so it is hard to imagine that they would have retired as early had their Social Security benefits been considerably smaller.

Despite the obvious links between retirement and Social Security, econometric models of retirement based on lifetime utility maximization typically find that variations in Social Security have only small effects on retirement (Burtless and Moffitt 1984, 1985; Fields and Mitchell 1984; Gustman and Steinmeier 1986). Although it is hard to show because of how complicated the models are, I believe the difference primarily comes from observation errors: we do not observe accurately in the data the variables that influence decisions.[29] Due to observation error we see apparent change in explanatory variables, but with no change in behavior, and so we conclude that workers are not responsive to financial incentives, whether they are incentives in the Social Security system or simply the wealth effect of the Social Security program. However, in situations where we have good data on the incentives facing workers, we find that they respond strongly to incentives: for example, in the research on defined-benefit pensions where we have detailed information of the firm's plan, we find strong responses.

Health Care Insurance

Although employer-provided medical insurance may not have been an important determinant of retirement fifteen or twenty years ago, I believe that, because of the rapid growth in the per capita cost of medical care, it must be today. It affects retirement in two broad ways. First, medical insurance provided by an employer is a valuable benefit simply because it is expensive; that is, it is an important component of total compensation. Second, it provides employees access to the firm's risk pool.

A firm's risk pool (its employees) is selected for reasons other than health status, so that the pool should have average health characteristics. This would not be the case if the employees as individuals had to purchase medical insurance privately because fellow purchasers (the risk pool) are self-selected and tend to be at higher than average risk for medical expenses. Therefore, privately purchased health insurance is more expensive than group insurance obtained through an employer. At older ages many workers have medical conditions (preexisting conditions), and should they want to purchase medical insurance they will join the risk pool of everyone with preexisting conditions. Because the risk of high expenses is great for that pool, medical insurance will be more expensive than if the risk pool contains everyone.[30]

This illustrates the difference between ex ante and ex post risk. A group can agree to share future medical expenditures, knowing ex ante that some

29. We probably do not observe the structure of the Social Security with much error; I have in mind other aspects of the budget set.

30. Of course, some individuals with preexisting conditions are almost uninsurable.

individuals in the group (but not which ones) will eventually require high medical expenditures. Ex post, after some information is available about which individuals are more likely to require high medical expenditures, the group divides into subgroups along the new risk lines. The individuals in the high-risk group can expect to share higher medical costs than they anticipated ex ante. Under the usual assumption that individuals are risk averse, it is in the interest of everyone ex ante not to allow the formation of ex post risk groups. This, however, is exactly what happens when someone leaves a firm's risk pool with a preexisting condition: he or she moves from an ex ante risk pool to an ex post risk pool and will face higher medical insurance costs in the new pool.

It can be worth a considerable amount to an individual to remain in the ex ante risk pool. This is particularly true if the writers of privately purchased medical insurance have the right to cancel a policy when new health information is revealed. Then, the privately purchased insurance no longer has the aspects of true insurance.

It has been difficult to study quantitatively the effects of medical insurance on retirement because it is hard to control for other influences on retirement. It is even more difficult to control for unobserved heterogeneity arising from variation in risk aversion across individuals and from prior conditions, both of which make the response to the availability of medical insurance differ across individuals.[31] We do see considerable retirement at age 65, which may be partially due to the availability of Medicare at 65: someone with medical insurance on the job but without employer-provided medical insurance to its retirees would probably delay retirement from age 64 to 65 when Medicare is available. Lumsdaine, Stock, and Wise (1994) speculate on such an effect: their model accounts for the financial incentives in pension plans and Social Security, yet it cannot explain the excessive retirement at age 65. The only remaining explanation seems to be the availability of Medicare at age 65. This is an important topic for future research.

Age Discrimination

I have been discussing rigidities caused by legitimate employment practices and financial incentives. A very different kind of rigidity comes from age discrimination. Several examples of past employment practices suggest that age discrimination was widespread at one time, and although age discrimination is now illegal, employers may still desire to discriminate on the basis of age. In the 1970s mandatory retirement was quite common. For example, in the RHS 44% of white males in wage and salary jobs aged 58–61 faced mandatory retirement (Gustman and Steinmeier 1984). Defined-benefit pension plans

31. Gustman and Steinmeier (1993) find small effects of health insurance on retirement. In their simulations health insurance is simply a component of compensation, but this does not get at the issues of risk pooling, risk aversion, and prior conditions discussed earlier.

were often structured to encourage retirement at specific ages. In an example from Kotlikoff and Wise (1989) pension accrual after age 65 was negative $18,000, amounting to a reduction in the wage of 21%.

As these examples show, at one time many employers did not want to retain older workers whether full-time or part-time. The extent to which employers today have those views is not known, partly because age discrimination is illegal, so employers are reluctant to admit to age discrimination. It is difficult to believe, however, that the conditions that led some employers to want to discriminate in the past have changed sufficiently so that today no employers want to discriminate.

Generally the cause of an employer's wanting to terminate an employee is that as fully measured the product of the worker is less than the compensation paid to the worker. The widespread use of mandatory retirement and defined-benefit plans to regulate the separation of older workers has led to the conclusion that older workers as a group are overpaid, and has produced a vast literature on why a worker's product can differ from compensation.[32] The literature is mostly theoretical and centers on implicit contracts, the notion that the firm and its workers agree (implicitly) on an employment contract that covers a long period of employment. In this framework it can be in the best interest of both the firm and the worker for the firm to pay less than a worker's product in the early years of employment and more in the late years. But at the age when the worker has been fully paid back (total product during the work life equals total compensation), either employment must be terminated or the contract renegotiated. If termination is chosen, the outcome can look like age discrimination.

The empirical support for implicit contracts as an explanation for apparent age discrimination is rather marginal (Straka 1992). As I discussed above, empirical studies show slowly falling real wage rates on the lifetime job at older ages, but possibly slowly rising total compensation. The productivity studies show approximately constant productivity. However, their generality should be questioned: they are limited to just a few occupations, they do not control for sample selection, and there is general agreement that at least in some jobs (physically demanding jobs) productivity falls with age. We do know that wages fall substantially with job change at older ages, which is consistent with the implicit contract theory, but as I have already discussed there are other more straightforward explanations.

An alternative explanation for apparent age discrimination is based on changes in productivity at the individual level. Older workers tend to have supervisory positions where it is both difficult to monitor their productivity and where a fall in productivity can be very costly to a firm. If a few supervisors have large declines in productivity but they cannot be identified, it may be cost effective for a firm to ask all workers over a certain age to retire even though

32. See Straka (1992) for a review of the arguments and empirical findings.

the productivity of most has not fallen. Regardless of the theoretical explanation, in the past many firms apparently desired to terminate the employment of older workers at some fixed age and used employment practices such as mandatory retirement before they were made illegal. Today when employment practices cannot be based on age alone, a firm could respond to an overpaid older workforce by reducing wages. However, for reasons centered on worker morale, this seems to be difficult and apparently does not happen sufficiently to eliminate overpayment. The firm could continually train its workforce to maintain or increase productivity, but because of a shortened payback period, this becomes infeasible at older ages.

A firm may engage in (illegal) employment practices that are not related to pay and are difficult to observe, such as unfair treatment of older workers in promotions or job assignment. The objective of the firm would be to induce workers to retire at ages similar to the former mandatory retirement age. Needless to say, evidence about the use of such practices is sketchy at best.

According to surveys, the opinion of managers about older workers is generally positive. In a 1982 survey of executives of 363 companies, older workers were seen to be better than younger workers along a number of dimensions (Rhine 1984). They have lower turnover rates, they are more conscientious, and they have better judgment. They were judged, however, to be less flexible than younger workers by a majority of the executives, which suggests they may be at a disadvantage in a rapidly changing work environment. In a 1991 survey of 406 senior human resource managers, older workers were rated better than younger workers in six categories and worse in three (Johnson and Linden 1992). Older workers were generally viewed favorably, and certainly at a minimum as no worse than younger workers.[33] These survey responses give no reason to think that managers would use employment practices to discriminate systematically against older workers.

In a widely cited study by Rosen and Jerdee (1977), however, managers said that they viewed older workers favorably, yet when given specific situations the managers made hypothetical decisions that were unfavorable to older workers. The survey was made at a time when many kinds of age discrimination were not illegal, so it is certainly possible that the managers felt more free to reveal age discrimination than in later surveys. Of course, we have no knowledge of whether these kinds of survey answers carry over into actual business decisions.

Rather small fractions of older workers say they have been subject to age discrimination: only 6% of workers aged 40 or over in a 1985 survey (Secretary of Labor 1989). In the new HRS, 83% of wage and salary workers aged 51–65 disagreed with the statement "In decisions about promotion, my employer gives younger people preference over older people." Eighty-one percent dis-

33. See McNaught and Henderson (1990) and Barth, McNaught, and Rizzi (1993) for additional survey findings of a similar nature and a discussion of the literature.

agreed with "My co-workers make older workers feel that they ought to retire before age 65."[34] There was little evidence of a differential response by the age of the worker.

There is some evidence that the inability of older workers to reduce hours is not really the problem: the main problem is that many employers do not want to retain older workers either full-time or part-time. This causes the transition from full-time work to complete retirement that we observe so often. The extent of age discrimination is not known because we have no direct observations. However, management and worker surveys give the impression of only a modest amount. I conclude that for most older workers it is, indeed, the inability to reduce hours without substantial pay loss that causes the transition to complete retirement from full-time work.

1.4 Conclusions

Many rigidities facing the elderly are normal to the workplace and are faced by workers of all ages. Rigidities in the choice of hours seem to be caused in part by fixed costs and the requirements of team production. These lead to regular and long hours for the great majority of workers. Anyone who wants to work shorter hours or odd hours typically will have a lower wage rate because productivity is lower. Therefore, we should expect that if older workers want to retire gradually by decreasing hours of work as they age, their wage rates will fall.

Some occupations and industries, however, seem to have much higher fixed costs and less flexibility than others, and therefore they have little part-time employment. Lifetime workers in those occupations and industries who want to reduce hours will have to change jobs. The loss of specific human capital and the costs of job change will reduce further the financial payoff from work, so many find a change is not financially acceptable and choose to retire instead.

The implications of this analysis are observed in data, which I have interpreted as support for the theory. However, the empirical findings all incorporate sample selection: we observe wages and hours only of those who remain employed. In particular, we do not observe what the wage rates would have been of those who retired. For example, suppose some workers retired because their job opportunities were even worse than those who changed jobs and remained in the labor force; then we would substantially underestimate the difficulties of reducing hours by changing jobs. That this is plausible can be inferred from the difficulties that involuntarily unemployed older workers have in finding a new job: many leave the labor force following a spell of unemployment. This example illustrates a general and serious problem in understanding the labor market behavior of older workers: we have no individual-level data from which we can construct the range of options each worker faces.

34. Author's calculations from the HRS.

Older workers face some rigidities that are the result of policy. The delayed retirement credit under Social Security is not actuarially fair; however, it is gradually being increased so that in a few years it should not provide any incentives to retire. The reduction for early retirement is approximately actuarially fair, so, to the extent that workers maximize utility over an extended time horizon, the reduction should not have any incentive effects.

The earnings test seems to have an effect on behavior, but we do not really know why it does. Because of the automatic benefit recalculation, it does not affect the present value of the Social Security benefits of someone aged 62–64, so our models say it should have no effect; naturally, then, the models cannot explain the observed behavior. For this reason we do not know the magnitude of the effect: that is, how many workers would change their labor market behavior were the earnings test to be eliminated. From the point of view of public policy the earnings test is an anachronism: because the earnings test is approximately actuarially fair, the financial impact on government of a suspension of benefits for earnings is approximately zero.[35] I can see no public policy reason for the earnings test.

The obvious effect of the earnings test on behavior points out an area of professional ignorance: many people seem to trade present consumption for future consumption in a way that is different from how they trade present income for future income. That is, people will save at some rate of interest through financial institutions (trade present for future consumption), yet they will not make the same trade in income streams. The Social Security earnings test is a good example. Workers can forgo income at age 62 (the income lost due to the earnings test) for higher income at age 65, and the rate of exchange is about the same as the rate of interest adjusted for mortality. Consumption need not be affected if the person has assets, because spending assets can make the consumption paths from the two income streams the same. Therefore, if people would work without the earnings test, they should work with the earnings test, yet apparently a considerable number do not. This is an area for research that would be of interest to advance our knowledge of human behavior both in the abstract and for policy purposes. It is particularly relevant because of the growth in defined-contribution pension plans: they may affect retirement in a way similar to the earnings test.

Defined-benefit pension plans have important incentives for some, but we do not know the importance in the population because of data limitations. That is, we cannot find the quantitative effects in the population of pensions on retirement by extending our solid empirical results, which are based on individual firm pension plans. Furthermore, because our panel data sets have not

35. Because the delayed retirement credit is less than actuarially fair after age 65, eliminating the earnings test would cost the Social Security system money. The amount is probably small, however: my rough estimate based on the work patterns of 65–69-year-olds reported in Leonesio (1990) is that the loss is about 5% of the benefits of the group when the delayed retirement credit is 4%. The revenue loss will gradually disappear as the credit becomes fair by the year 2009.

had detailed information on both pensions and Social Security earnings, we know little about how defined-benefit pensions interact with Social Security to affect retirement decisions. I expect that with the availability of the HRS over the next decade we will learn a great deal more about the effects in the population.

The rigidities induced by employer-provided health insurance are, I believe, large, but I have seen no research to support this view. Older research typically finds effects on costs of employment that, while large in percentage terms, are small in absolute terms (Zedlewski 1991). Consequently, the employment effects of changes such as making employer-provided health insurance the primary payer for workers aged 65–69 (Tax Equity and Fiscal Responsibility Act) are small (Anderson, Kennell, and Sheils 1987). This kind of research is probably outdated because of the sharply rising costs and the accompanying increased awareness of health care costs. Similarly, eligibility for Medicare surely has much greater effects on retirement decisions than a decade ago: at one time someone would retire before age 65 and self-insure or purchase health care insurance until age 65. Because of the costs and risk this is becoming infeasible.

Defined-benefit pension plans are not portable, but I believe it is unreasonable to make them portable as they are now structured. Consider the risk faced by the first employer. A former employee who has a sharply rising wage path with another firm will end up with a large pension. Because of the heavy backloading of many plans this will not be expected by the first firm, yet the first firm will have to pay a fraction of the pension.[36] Furthermore, the first employer has no control over the earnings path of the former employee, which introduces an element of unfairness.

Indexing defined-benefit plans until the age of retirement would certainly reduce rigidities by removing inflation risk. This could be accomplished rather easily if the government issued indexed bonds. Then the employer could diversify the inflation risk by purchasing indexed bonds whose return matched the firm's flow of future real pension benefits.

I have discussed many factors that prevent labor market flexibility, but little evidence on their quantitative importance. This is because the complexity of the labor market and data limitations have restricted solid quantitative research that can be confidently used to infer quantitative effects. Nonetheless, I believe that many of the factors probably have substantial effects on a minority of workers and, therefore, could be changed to increase flexibility, yet in the aggregate they have rather small overall effects on hours reduction, which has been the main focus of this paper. I would put in this category the Social Secu-

36. Furthermore, if the first employer has to pay only what was accrued until the time of separation, the plan no longer has real portability: the employee with a long earnings history becomes a costly new hire, which will interfere with the normal process of job mobility.

rity earnings test and pension plans. I would also include health care insurance, but with much less confidence because our knowledge of its effects on job mobility is scanty.

I believe that the important factors restricting the ability of most workers to reduce hours are, first, fixed employment costs and production requirements that encourage or require full-time work and, second, the costs of changing jobs late in the work life. While the costs and productivity losses associated with job change might be reduced, they are probably unavoidable. This leads to the conclusion that the best opportunity for hours reduction by older workers is with the career employer, not with a job change. There is an extensive literature on how the workplace could be made more hospitable for older workers. It mentions factors such as continuous training, job redefinition, and so forth. I have no knowledge of the practicality of implementing these proposals.

It should be apparent, however, that regardless of any workplace changes there are some genuine difficulties associated with hours reduction on the main job. A prominent difficulty is the provision for medical insurance. Older workers need medical insurance, yet it is a large fixed cost for employers. A possible solution is to make the benefit a variable cost to the employer: that is, the employer would pay a fraction of the cost, which would depend on hours of work. The great advantage of this arrangement is that the worker could stay with the firm, remaining part of the risk pool; people would not be penalized for preexisting conditions, so risk sharing would be ex ante. The disadvantage comes from the fact that total costs of medical coverage remain the same, just the division changes. Medical insurance costs would become variable costs (varying with hours of work) for both employer and employee, whereas in the main they have been fixed costs to both. Fixed costs give an incentive to the firm to increase hours and an incentive to the worker to reduce hours. These incentives would be eliminated, but unless the wage rate rose to compensate, the worker would face increased costs. There are, of course, tax advantages to having employer-provided medical insurance, but this could be handled with legislation about the tax treatment of the part paid by the employee. Similar considerations apply to converting other fixed costs to variable costs.

As evidenced by the lack of flextime in the United States, team production and the attendant requirement for full-time work appear to be major impediments to a gradual reduction in hours on the career job. But the U.S. experience is not universal: in Germany and Switzerland from 30 to 40% of the workforce is on flextime (Swart 1978; Ronen 1981). As many as 30% of production workers in Germany may be on flextime (Young 1982). Could these practices be transferred to the United States? There are differences in supervisors' and workers' attitudes toward work that seem to make flextime more successful in Germany (Young 1982). At the same time, there are many similarities between German and American firms, so there seem to be no absolute barriers to increased flextime in the United States. If flextime can be accommodated in the

Table 1.11 **Weekly Hours and Probabilities of Working Past 62 or 65 among Those Who Cannot Reduce Hours**

	Percentage	Weekly Hours	Probability of Working Full-Time after Age 62	Probability of Working Full-Time after Age 65
Yes (would like to)	15	42.9	0.36	0.15
		(0.5)	(.02)	(.02)
No (would not like to)	85	41.2	0.48	0.23
		(0.1)	(.01)	(.01)

Source: Author's calculations, based on Health and Retirement Survey.
Note: Sample is 1,292 full-time wage workers. Standard errors are in parentheses.

United States, part-time work can be accommodated, provided fixed costs can be controlled.

There are few solid empirical findings that directly link rigidities to retirement beyond the suggestive data I discussed at the beginning of this paper. However, some new findings based on the HRS indicate that rigidities may have an important effect in inducing retirement. Wage workers aged 51–61 were asked if they could reduce hours on their present job. Those who said they could not reduce were asked further if they would like to reduce hours even if their earnings were reduced in the same proportion. All wage workers were also asked the probability they would be working full-time after age 62 and after age 65. Table 1.11 gives the distribution of responses, weekly hours, and the probabilities of working after 62 or 65 among those who cannot reduce hours.

Those who would like to reduce hours, but are not allowed to on their present job, expect a labor force participation rate at age 62 that is about 75% of the participation rate of those who do not want to reduce hours, and at age 65 a rate that is about two-thirds. The differences are statistically significant.

The difference can be put in perspective as follows: In 1989 the participation rate at age 65 was 25%. Under the assumption that this rate will not change over time, the results in the table imply that those who desire to reduce hours will have a participation rate of about 16%, or a difference in participation rates of 9%. This is a larger difference than the estimated effects on retirement of rather large changes in the Social Security system. For example, according to the econometric model of Gustman and Steinmeier (1985), increasing the delayed retirement credit from 3% to 8% (the 1983 law change) would increase participation at age 65 by about 4%.

In this sample the fraction that wants to reduce hours is small (15%), but I would expect it to increase with age. If these results hold up when we observe actual retirement in the panel of HRS, they will provide convincing evidence on the effects of rigidities on retirement behavior.

References

Advisory Council on Social Security. 1991. *Income Security and Health Care: Economic Implications, 1991–2020.* Washington, DC: Government Printing Office.

Allen, Steven, Robert H. Clark, and Daniel Sumner. 1986. Postretirement Adjustments of Pension Benefits. *Journal of Human Resources* 21 (1): 118–37.

Anderson, Joseph, David Kennell, and John Sheils. 1987. Health Plan Costs, Medicare, and Employment of Older Workers. In *The Problem Isn't Age*, ed. Steven H. Sandell, 206–17. New York: Praeger.

Barth, Michael C., William McNaught, and Philip Rizzi. 1993. Corporations and the Aging Workforce. In *Building a Competitive Workforce: Investing in Human Capital for Corporate Success*, ed. Philip Mirvis. New York: John Wiley and Sons.

Berkovec, James, and Steven Stern. 1991. Job Exit Behavior of Older Men. *Econometrica* 59 (1): 189–210.

Blau, David. 1994. Labor Force Dynamics of Older Men. *Econometrica* 62 (1): 117–56.

Blinder, Alan S., Roger H. Gordon, and Donald E. Wise. 1983. Social Security, Bequests, and the Life Cycle Theory of Saving: Cross-Sectional Tests. In *The Determinants of National Saving and Wealth*, ed. Franco Modigliani and Richard Heming, 89–122. New York: St. Martin's Press.

Burkhauser, Richard V. 1979. The Pension Acceptance Decision of Older Workers. *Journal of Human Resources* 14 (1): 63–75.

Burtless, Gary, and Robert A. Moffitt. 1984. The Effect of Social Security Benefits on the Labor Supply of the Aged. In *Retirement and Economic Behavior*, ed. Henry J. Aaron and Gary Burtless, 135–71. Washington, DC: Brookings Institution.

———. 1985. The Joint Choice of Retirement Age and Postretirement Hours of Work. *Journal of Labor Economics* 3 (2): 209–36.

———. 1986. Social Security, Earnings Tests, and Age at Retirement. *Public Finance* 14 (1): 3–27.

Clark, Robert L., Stephan F. Gohmann, and Daniel A. Sumner. 1982. Wages and Hours of Work of Elderly Men. Department of Economics and Business, University of North Carolina State. Typescript.

Cogan, John. 1981. Fixed Costs and Labor Supply. *Econometrica* 49 (4): 945–63.

Crawford, Vincent, and David Lilien. 1981. Social Security and the Retirement Decision. *Quarterly Journal of Economics* 96 (August): 509–29.

Fields, Gary S., and Olivia S. Mitchell. 1984. *Retirement, Pensions, and Social Security.* Cambridge: MIT Press.

Fuchs, Victor R. 1982. Self-Employment and Labor Force Participation of Older Males. *Journal of Human Resources* 17 (3): 339–57.

Grad, Susan. 1990. *Income of the Population 55 or Older, 1988.* Washington, DC: U.S. Department of Health and Human Services, Social Security Administration.

Gustman, Alan L., and Thomas L. Steinmeier. 1984. Partial Retirement and the Analysis of Retirement Behavior. *Industrial and Labor Relations Review* 37 (3): 403–15.

———. 1985. The Effect of Partial Retirement on the Wage Profiles of Older Workers. *Industrial Relations* 24 (2): 257–65.

———. 1986. A Structural Retirement Model. *Econometrica* 54 (3): 555–84.

———. 1993. Pension Portability and Labor Mobility: Evidence from the Survey of Income and Program Participation. *Journal of Public Economics* 50: 299–325.

Henderson, J. Vernon. 1981. The Economics of Staggered Hours. *Journal of Urban Economics* 9: 349–64.

Hogarth, Terence, and Michael C. Barth. 1991. Costs and Benefits of Hiring Older Workers: A Case Study of B&Q. *International Journal of Manpower* 12 (8): 5–17.

Hurd, Michael D. 1990a. The Joint Retirement Decision of Husbands and Wives. In

Issues in the Economics of Aging, ed. David A. Wise, 231–54. Chicago: University of Chicago Press.

———. 1990b. Research on the Elderly: Economic Status, Retirement, and Consumption and Saving. *Journal of Economic Literature* 28 (June): 565–637.

Hurd, Michael D., and Michael J. Boskin. 1984. The Effect of Social Security on Retirement in the Early 1970s. *Quarterly Journal of Economics* 99 (November): 767–90.

Hutchens, Robert M. 1988. Do Job Opportunities Decline with Age? *Industrial and Labor Relations Review* 42 (1): 89–99.

Iams, Howard. 1987. Jobs of Persons Working after Receiving Retired-Worker Benefits. *Social Security Bulletin* 50 (11): 4–18.

Jablonski, Mary, Kent Kunze, and Larry Rosenblum. 1990. Productivity, Age, and Labor Composition Changes in the U.S. Work Force. In *The Aging of the American Work Force*, ed. Irving Bluestone, Rhonda Montgomery, and John D. Owen. Detroit: Wayne State University Press.

Johnson, Arlene, and Fabian Linden. 1992. Availability of a Quality Work Force. Conference Board, New York. Pamphlet.

Jondrow, Jim, Frank Brechling, and Alan Marcus. 1987. Older Workers in the Market for Part-Time Employment. In *The Problem Isn't Age*, ed. Steven H. Sandell, 84–99. New York: Praeger.

Kahn, James. 1988. Social Security, Liquidity, and Early Retirement. *Journal of Public Economics* 35: 97–117.

Kotlikoff, Laurence J., and David A. Wise. 1987. The Incentive Effects of Private Pension Plans. In *Issues in Pension Economics*, ed. Zvi Bodie, John B. Shoven, and David A. Wise, 283–336. Chicago: University of Chicago Press.

———. 1989. Employee Retirement and a Firm's Pension Plan. In *The Economics of Aging*, ed. David A. Wise, 279–330. Chicago: University of Chicago Press.

Leonesio, Michael. 1990. Effects of the Social Security Earnings Test on the Labor-Market Activity of Older Americans: A Review of the Evidence. *Social Security Bulletin* 53 (5): 2–21.

Lumsdaine, Robin L., James H. Stock, and David A. Wise. 1994. Pension Plan Provisions and Retirement: Men and Women, Medicare, and Models. In *Studies in the Economics of Aging*, ed. David A. Wise, 183–212. Chicago: University of Chicago Press.

McNaught, William, and Michael C. Barth. 1992. Are Older Workers "Good Buys"? A Case Study of Days Inns of America. *Sloan Management Review* 33 (3): 53–63.

McNaught, William, and Peter Henderson. 1990. Working with Business to Improve Employment Opportunities for Older Americans: A Literature Review. Commonwealth Fund Americans over 55 at Work Program, Background Paper no. 2. New York.

Madrian, Brigitte. 1994. Employment-Based Health Insurance and Job Mobility: Is There Evidence of Job-Lock? *Quarterly Journal of Economics* 109(1): 27–54.

Mellor, Earl F. 1986. Shift Work and Flexitime: How Prevalent Are They? *Monthly Labor Review* 109 (November): 14–21.

Mitchell, Olivia S. 1983. Fringe Benefits and the Cost of Changing Jobs. *Industrial and Labor Relations Review* 37 (1): 70–78.

Morse, Dean, Anna B. Dutka, and Susan Gray. 1983. *Life after Early Retirement: The Experience of Lower-Level Workers*. Totowa, NJ: Rowman and Allanheld.

Nollen, Stanley, and Virginia H. Martin. 1978. *Alternative Work Schedules: Part 1: Flexitime*. New York: AMACOM.

Owen, John D. 1976. Workweeks and Leisure: Analysis of Trends, 1948–1975. *Monthly Labor Review* 99 (8): 3–8.

Parnes, Herbert S., and Gilbert Nestel. 1981. The Retirement Experience. In *Work and Retirement,* ed. Herbert S. Parnes, 155–97. Cambridge: MIT Press.

Paul, Carolyn. 1983a. Company Productivity and Worker Age. Andrus Gerontology Center, University of Southern California. Typescript.

———. 1983b. Employee Benefit Costs for Workers at Older Ages: Implications for Management. Andrus Gerontology Center, University of Southern California. Typescript.

———. 1984. *Age and Health Care Costs: A Technical Report.* Washington, DC: U.S. Department of Health and Human Services.

———. 1987. Work Alternatives for Older Americans: A Management Perspective. In *The Problem Isn't Age,* ed. Steven H. Sandell, 165–76. New York: Praeger.

Quinn, Joseph. 1980. Labor Force Participation Patterns of Older Self-Employed Workers. *Social Security Bulletin* 43 (4): 17–28.

Quinn, Joseph, and Richard Burkhauser. 1990. Retirement Preferences and Plans of Older American Workers. Commonwealth Fund Americans over 55 at Work Program, Background Paper no. 4. New York.

Quinn, Joseph, Richard Burkhauser, and Daniel Myers. 1990. *Passing the Torch: The Influence of Economic Incentives on Work and Retirement.* Kalamazoo, MI: Upjohn Institute.

Repko, David V. 1987. *Government Mandating of Employee Benefits.* Washington, DC: Employee Benefit Research Institution.

Rhine, Shirley. 1984. *Managing Older Workers: Company Policies and Attitudes.* New York: Conference Board.

Ronen, Simcha. 1981. *Flexible Working Hours: An Innovation in the Quality of Work Life.* New York: McGraw-Hill.

———. 1984. *Alternative Work Schedules.* Homewood, IL: Dow Jones–Irwin.

Rosen, Benson, and Thomas Jerdee. 1977. Too Old or Not Too Old. *Harvard Business Review* 55: 97–106.

Rosen, Harvey S. 1976. Taxes in a Labor-Supply Model with Joint Wage-Hours Determination. *Econometrica* 44 (3): 485–507.

Ruhm, Christopher. 1989. Why Older Americans Stop Working. *Gerontologist* 29 (3): 294–99.

———. 1990a. Bridge Jobs and Partial Retirement. *Journal of Labor Economics* 8 (4): 482–501.

———. 1990b. Career Jobs, Bridge Employment, and Retirement. In *Bridges to Retirement,* ed. Peter B. Doeringer, 92–107. Ithaca: ILR Press.

Rust, John P. 1990. Behavior of Male Workers at the End of the Life Cycle: An Empirical Analysis of States and Controls. In *Issues in the Economics of Aging,* ed. David A. Wise, 317–78. Chicago: University of Chicago Press.

Secretary of Labor. 1989. Labor Market Problems of Older Workers. Washington, DC: U.S. Department of Labor.

Stock, James H., and David A. Wise. 1990a. The Pension Inducement to Retire: An Option Value Analysis. In *Issues in the Economics of Aging,* ed. David A. Wise, 205–24. Chicago: University of Chicago Press.

———. 1990b. Pensions, the Option Value of Work, and Retirement. *Econometrica* 58 (5): 1151–80.

Straka, John W. 1992. *The Demand for Older Workers: The Neglected Side of a Labor Market.* Washington, DC: Office of Research and Statistics, Social Security Administration.

Sum, Andrew, and W. Neal Fogg. 1990. Profile of the Labor Market for Older Workers. In *Bridges to Retirement,* ed. Peter B. Doeringer, 33–63. Ithaca: ILR Press.

Swart, J. Carroll. 1978. *A Flexible Approach to Working Hours.* New York: AMACOM.

Turner, John A., and Daniel J. Beller. 1992. *Trends in Pensions, 1992.* Washington, DC: Government Printing Office.
U.S. Senate. Special Committee on Aging. 1984. *The Costs of Employing Older Workers.* Washington, DC: Government Printing Office.
Wilson, Paul. 1988. Wage Variation Resulting from Staggered Work Hours. *Journal of Urban Economics* 24: 9–26.
Young, William McEwan. 1982. Flexitime for Production Workers in Britain and Germany. In *New Work Schedules in Practice: Managing Time in a Changing Society,* ed. Stanley D. Nollen, 33–53. New York: Van Nostrand Reinhold.
Zedlewski, Sheila. 1991. *Expanding the Employer-Provided Health Insurance System: Effects on Workers and Their Employers.* Washington, DC: Urban Institute.

Comment

Angus S. Deaton

It is a pleasure to read this paper; it is a thoughtful and interesting essay that addresses a range of issues about older workers in the labor market. As Hurd emphasizes, it does not attempt to make policy recommendations. The aim is rather to survey the literature and to identify a research agenda for the future, something that is especially appropriate as we look forward to the data from the new Health and Retirement Survey.

Like all good papers in economics, this one is about supply and demand. It looks at various aspects of labor market behavior of older workers, trying to identify features that are due to supply, features that are due to demand, and features that come from workers being forced off their supply curves, or at least that interfere with the smooth equation of supply and demand. As is often the case, identification can be controversial, and while it is sometimes easy to agree with Hurd's identification of what is going on, his discussion is a good deal more convincing on some points than on others. This is nowhere more so than when we are discussing rationing, or quantity restrictions. Literature from a decade or so ago, associated particularly with papers by Orley Ashenfelter and John Ham, tried to detect cases where workers were forced off their labor supply curves, and forced to accept wage and hours combinations where, given a free choice, they would have either increased or decreased hours at their current wage. While that literature is technically quite sophisticated, working out all the consequences of quantity rationing, it was perhaps not ultimately persuasive. Partly, the economics profession likes to believe in markets, and is resistant to interpretations in which markets do not work properly, but it was also the case that models of rationing, while offering good explanations of the spillover effects from one market to another, did not by themselves offer a

Angus S. Deaton is the William Church Osborn Professor of Public Affairs and professor of economics and international affairs at Princeton University and a research associate of the National Bureau of Economic Research.

better explanation of hours than that offered by the standard model of labor supply. While it is true that many—perhaps even most—workers report that they work fifty forty-hour weeks each year, there is still a great deal of variation in weeks and hours, variation that is difficult to explain unless a large fraction of workers are free to choose how much they work. There are presumably also a lot of workers who want to work fifty forty-hour weeks, so that it was (and is) far from clear that the labor supply story is beaten out by one in which employers determine hours, and workers take what they can get. As always, it is remarkably difficult to identify a demand-side phenomenon that could not be a supply-side phenomenon, and vice versa. This paper suffers from at least some of these problems of the earlier literature.

Before I turn to specific areas of agreement and disagreement, I should like to make two general points about the interpretation of the evidence. First, when we look at how wage patterns, participation rates, and hours vary with age, especially among older workers, it is important to make sure that cohort effects are properly controlled for. At several points in the paper, evidence is cited—for example, on the mild decline in wages among older workers—that is clearly cross-section evidence, where we have no way of knowing whether the decline comes from a real decline in wages with age, or whether what we are seeing is that older workers have lower lifetime wage profiles. The second point is that wage profiles should not be too readily associated with life-cycle variations in productivity. We know from the various theories of wage contracts that firms may tailor income profiles so as to match workers' desired consumption profiles, or there may be incentive reasons to have systematic differences between wages and productivity. Even in academia, where, contrary to what happens in most industries, there is a genuine negative return to years of service, common experience suggests that older workers—senior tenured professors—are paid a great deal more than their marginal product, while junior workers—junior assistant professors—are paid a great deal less. One can think of many reasons for this, and it might not even be true, but it is certainly hard to rule out the possibility that wages and productivity follow different lifetime profiles.

Suppose, however, that we accept the evidence. To what extent can we accept Hurd's interpretation of it, that older workers face a number of rigidities that importantly constrain their choice of jobs? Let me start with some parts of the story that I find less than convincing. The first is the assumption that what workers would like as they grow older is to reduce their hours gradually, so that when we see people switching from full-time to no-time, we are seeing something that comes from the demand side. While this story is certainly possible, I can also think of lots of reasons, particularly health-related, why a major change in hours could come from the supply side. Many people like to work as long as they can, continuing the work and living habits of a lifetime until some event, usually a health-related event, leaves them either unable or

unwilling to continue as before. In this situation, we would observe immediate withdrawals from the labor force that have nothing to do with the demand for workers.

The second story that I am less than convinced by is the teamwork explanation. While it is true that it is hard to run an assembly line without all the workers in place, the workers don't have to be the same workers all the time, and substitution of one person for another can allow as much flextime as people want. One example is supermarket checkouts, which have to be manned when the store is open, but where workers are close to perfect substitutes and where part-time and flextime is common. In cases where there is more human capital, and job-specific human capital, people are likely to be less easily substitutable for one another, and it would be interesting to inquire as to whether retirement patterns can be linked to relevant observable characteristics of the job. Even in those cases where teamwork is important, it is hard to be sure that the phenomenon is only on the demand side. Many people like to spend their leisure time with their spouse, or to play team sports, or to go to the theater, and all these activities are timed to make it easy for people who work standard hours.

It is much easier to agree with Hurd's analysis of the role played by fixed costs, and with the difficulties that they present for those who do not wish to work full-time. Indeed, I have come to think that work-related costs are important for a number of issues in the economics of aging. In recent work on the Family Expenditure Survey in Britain, Richard Blundell and his coworkers have shown that much of the sharp drop in consumption at the time of retirement is associated with the elimination of work-related costs. In the United States, the Consumer Expenditure Survey data on the consumption patterns of one- and two-earner families also suggest that a large share of consumption is associated with these costs, in clothing, in transportation, and in meals away from home.

My final point is in the nature of a quibble, but it ties in with an issue that arises in a number of the papers in this volume. In examining the effects of the Social Security benefits test, Hurd finds that people do not behave as they ought to, given that the benefits test is essentially forced saving. He points out that, since the test does not change the net present value of lifetime earnings, life-cycle theory predicts there should be no change in behavior. But of course, this is only life-cycle theory for agents with quadratic, certainty-equivalence preferences. When there is uncertainty, and when there are precautionary motives in saving, money today is worth more than an actuarially fair amount tomorrow, which is in the direction of the results that are reported. Of course, one may also suspect that there is something else going on, perhaps behavioral considerations, or more simply, as Hurd himself suggests, that people do not understand how the test works.