RETIREMENT TRANSITIONS:
THE ROLE OF SHOCKS TO HOUSEHOLD RESOURCES

DISSERTATION

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By

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ABSTRACT

The role of shocks to household resources in affecting retirement transitions among older employees was analyzed using data from the Health and Retirement Study (HRS). Shocks, or unexpected changes, to health, family composition, income and assets were analyzed. The transitions of reverse retirement and partial retirement were of particular interest, and were contrasted with retirement from full-time employment and retirement from part-time employment.

The objectives of the study were: (1) To explore how shocks, or unexpected changes to financial and human resources, affect retirement transitions, and (2) To explore the relative importance of shocks in making retirement transitions. The study sample consisted of 2,514 HRS respondents, born between 1926 and 1938, who changed employment status between 1998 and 2000 or between 2000 and 2002. A multinomial Logit model was used in order to make comparisons among the four retirement transition groups. The empirical model included institutional variables and demographic and environmental control variables.

The results suggest that just as the paths to retirement are diverse and complex, so are their determinants. Shocks to financial resources had the largest effects on reverse retirement transitions. Shocks to human resources, including family structure and health,

affected all retirement transitions. Institutional variables had the largest marginal effects on partial retirement.

As expected, positive shocks to assets decreased the odds of reverse retirement, and negative income shocks had larger marginal effects on retirement transitions than positive income shocks. However, positive asset shocks had larger marginal effects on retirement transitions than negative asset shocks.

The partial retirement group was distinguished from the reverse retirement group in terms of financial shock impacts; for members of the partial retirement group, rather than shocks to resources, institutional supports were key determinants. Fewer significant effects on the odds of partial retirement over traditional retirement were found, and the effects were smaller than those for reverse retirement and retirement from part-time employment in terms of their magnitudes. Both negative and positive asset shocks were positively associated with the odds of partial retirement; shocking income loss was negatively associated with partial retirement but unexpected income increase was positively associated with partial retirement.

The loss of human resources was important across the transition groups, with greater impact of shock to marital status on women's labor force transitions compared to men's. To reduce shocks to household resources under uncertainty, retirement education should encompass information on asset allocation and financial risk. These topics may help workers more effectively plan for retirement.

Dedicated to Robin A. Douthitt

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FIELDS OF STUDY

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CHAPTER 1

INTRODUCTION

1.1. Motivation and Objective

Starting with the new millennium, dramatic changes in the economy and in social forces have created a wider dispersion in the employment status and living standards among different types of older workers. Financial markets are responsible for unexpected fluctuations in wealth, indicating new retirement timing. The decreasing retirement age phenomenon stabilized during the 1990s and may have edged up slightly. Such a pause in the long-term downtrend in labor force participation by older men is not unusual during an extended period of a fast-changing society.

Individuals and families in various configurations have withstood many challenges in uncertain times. Effective in January 2000, the earning test at full retirement age was eliminated (Social Security Administration, 2002a). During the nineties, the stock market index soared more than twice as much as in the previous 40 years. Starting in March of 2000, however, a steep decline in the stock market began (Dow Jones & Company, 2002; Nasdaq Stock Market, Inc., 2002). The economic environment has been characterized by increasing uncertainty and concern after the upheaval of September 11, 2001. This environment formed a social atmosphere to prevent key risks that might have had an adverse impact on the well-being of the retirees,

mitigating the impact of negative shocks when they occurred, and assisting people in coping with the aftermath of shock. One example is the change in labor market. A large number of older workers reentered the labor force after an initial exit and before terminal retirement. *The Wall Street Journal* reported on March 4, 2003 that

> The slumping stock market has destroyed the nest eggs of millions of people in the last three years -- erasing at least $678 billion in U.S. retirees' savings, according to the University of Michigan's Health and Retirement Study. Facing sudden financial straits, many retirees have gone back to work; others have postponed retirement, hoping to rebuild their savings. The portion of Americans ages 55 to 64 who are working or looking for work surged three percentage points since January 2001, to 62.6%, according to the Michigan survey. That increase is "unprecedented in post-war U.S. economic history," says Andrew Eschtruth at the Center for Retirement Research at Boston College" (p.B1).

In addition to growing instability and uncertainty linked with financial shock, all older people make expected or unexpected transitions and adjustments in the course of their lifetimes. For example, health issues due to old age can be a major obstacle to their ability in job market performance. Also, life events such as the sudden death of a spouse, will change their lives in every way. This type of shock could also involve a reduction in economic resources and changed needs for household management like decreased household work time.

After a careful review of the labor force trend among older workers, Blau (1994) suggested numerous future research topics on retirement patterns. One notable question is "What is the role of uncertainty and shocks to preferences, wages, assets, and health in these patterns?" (p.118). Inspired by Blau's question, this study will explore how shocks to household resources influence retirement transitions and whether the effects differ by transition type. How do older workers behave in the labor market when their current income is different from previous expectations? Do shocks to health and to family

structure make a difference in individuals' transitions in employment status? Moreover, this study will also consider both positive and negative shocks in terms of financial resources. Gains and losses in resources can have different impacts on employment transition. So far, earlier studies which were done during the stock market boom have mainly focused on positive wealth shocks and the effect on consumption and labor supply (Cheng & French, 2000; Sevak, 2001). Little research has been devoted to the effects of unexpected loss in financial resources.

This study will examine the impact of shocks to marital status, health and financial resources on retirement transitions. The objectives of the study were: (1) To explore how shocks, or unexpected changes to financial and human resources, affect retirement transitions, and (2) To explore the relative importance of shocks in making retirement transitions. Specifically, the study concerns reverse retirement transition and partial retirement. The outcome and influence of these shocks might suggest that people should revise their expectations of the direction of their initial lifetime plans. As economic theory proposes, changes in expected income may well make a major difference in consumption and labor supply decisions. For example, previous studies have suggested that positive wealth shocks increase consumption and reduce labor supply (Cheng & French, 2000; Sevak, 2001). The analysis of the role of shocks to household resources conceptually builds on the life-cycle hypothesis; first, consumption depends primarily on expected total resources or life-cycle income, not on transitory income fluctuations; second, constraints based on expectation can alter a household's ability to spend as much as would be appropriate given the expected resources.

Overall, this research will provide an overview of different types of retirement transitions among older workers who made a transition in employment status. The study will use recent surveys from the Health and Retirement Study and also examine how the shocks to financial resources and human resources affect retirement transitions among older workers who changed their work status. The study will consider changes in the policy environment for older workers as well as changes in the economy that took place between 1998 and 2002 and analyze the impact of these shocks on labor force transitions. Further, it is expected that depending on the institutional features of the labor market, shocks to these human and financial resources may play a different role in individual retirement transitions. Along with the fact that a large percentage of the population currently comprising the labor market is ready to retire, this study is greatly relevant in terms of policy issues surrounding a potential retirement crisis. If older workers are able to pursue more flexible employment arrangements, including partial retirement and reverse retirement, the idea of working longer could become more attractive.

Before looking at retirement decisions it is necessary to create a current picture of the older population. The following section will explore the demographic nature and general picture of older Americans' participation in the labor force that can contribute to an understanding of general retirement behavior of older workers.

1.2. Overview of Older Workers

The rise of the older population and its influence on the U.S. labor force have attracted a great deal of attention from various sectors of our society, including government, families, business, and health care providers. The goal of this study is to

examine the impact of shocks to household resources on various retirement transitions by exploring changes in work status among older workers who made transitions between 1998 and 2002. Specifically, the study focuses on flexible retirement, including reentry into the workforce (reverse retirement) and the transition from full-time employment into part-time employment (partial retirement) and a comparison to the traditional retirement pattern from full-time employment to full retirement. Older people who want to retire, but who have not accumulated enough wealth to secure their post-retirement life often consider work after their initial retirement. Even those who have reached a comfortable financial status may like easing into full retirement status in phases over time.

The number of Americans aged 65 years and over numbered 35.3 million in 2001, representing about 12.4% of the U.S. population (U.S. Census Bureau, 2003). [1] The population of older Americans is expanding faster than the population of Americans under 65. Due to declining death rates in older age, it is projected that the percentage of the older population will grow to over 20% by 2030 (U.S. Census Bureau, 2001). The American population is aging rapidly, and individuals are living longer. Along with increased life expectancy, the baby boom generation is expected to change the demographic profile in the next decade. They currently constitute the largest workforce in the U.S. Thus, it is important to determine how much the exit of older people from full-time market work will influence the national economy.

Men's labor force participation has attracted attention from various sectors. While most of the older Americans are expected to exit from market work, a significant portion of older people will remain in the labor force. Even with large increases in the length of

[1] For the last half of the 20th century, the age distribution of the population changed from 34.5% to 21.4% for children under 15, from 61.5% to 66.2% for people aged 15-64, and from 4.1% to 12.4% for people aged 65 and older (U.S. Census Bureau, 2002a).

non-working life due to substantial increases in life expectancy,[2] U.S. labor force participation rates for men have still dropped, spurring an early retirement boom. The major change in the American workforce has been a decrease in men's participation in the labor force and a rise in retirement rates. More specifically, in 1950, a 55-year-old man could expect to live to be 74, and 68.6% of men over 55 were in the labor force. In 2000, a 55-year-old man could expect to live to be 79, but only 39.8% of men over 55 were in the labor force (Bureau of Labor Statistics, 2003; National Vital Statistics System, 2002).

However, recently, the decline in male labor force participation rates started to stabilize (Wiatrowski, 2001). Even with a trend toward reduced labor force participation, there has been a noticeable recent increase in the number of those reentering the labor force, suggesting that older workers are responding to the economic recession (Eschtruth & Gemus, 2002).

Older people face a higher probability of debilitating health conditions and fewer options for generating money or retaining jobs. Starting in their late fifties, many people gradually cut back on how many hours they work, try to transfer to less hectic or stressful positions, and some partially retire at specific points in their working lives. Still others reenter the labor force after their initial retirement (Rhum, 1990). Some industries, like retailing and food service, accommodate a large number of part-time workers (U.S. Department of Labor, 1999), but historically, little is known about the part-time labor force of older workers in this country. From the point of view of business, attracting a

[2] Between 1950 and 2000, the remaining life expectancy at age 65 increased from 12.8 years to 16.3 years for males and from 15.0 years to 19.2 years for females. In 1949-51, remaining life expectancy for both men and women at age 55 was 20.57 years, but increased to 25.7 years in 2000 (National Vital Statistics System, 2002).

flexible workforce may result in a more effective match between employment hours and business needs. From the workers' perspective, a gradual retirement process could be important for individuals' adjustment to late life stages, blurring the boundary between work and retirement. One example is the trend toward a "bridge job" between primary career and permanent withdrawal from work. Also, a worker could spend time on family roles and obligations, volunteer and recreational activities while working part-time. However, the part-time labor force lacks the benefits of appropriate social policies and institutional protection. In reality, a flexible and paused retirement may help older workers who might otherwise be lost to the economy to retain their skills and may also attract older workers to join the workplace. Moreover, with such an approach to a part-time work force with social and institutional benefits to retirement, a company could employ a diverse work force that mirrors the society in which it operates.

In fact, part-time employment among older workers has increased for both men and women over the past three decades (U.S. Department of Labor, 1999; Bureau of Labor Statistics, 2004). Historically, part-time employment has been more common for female workers than for male workers. Among men aged 55 and over, however, the proportion of part-time employment increased from 21.4% to 27.5% between 1979 and 1998, while women showed an increase from 40.4% to 42.4% in part-time employment for the same period. One possible explanation may be found in workers' attitudes toward gradual retirement from their jobs. The 1999 survey by the Association of American Retired Persons (AARP) found that 73% of older workers say they want to continue some work, while only 27% want to stop working entirely. The survey also indicates that 80% of baby boomers believe they will continue to work during "retirement" – 35% for

enjoyment and 23% for the income (AARP, 2002). Some older workers, however, may not want to hold on to stress-generating job positions. Many would accept less pay in return for stepping back to less demanding roles with more flexibility.

Although economic theories focus on monetary reasons for retirement decisions, there is a key question about whether partial retirement is an option for older workers. There are some legal and institutional barriers to more flexible employment. Retirement age is tied to the Social Security system and pension programs. Health care decisions are likely to be influenced by eligibility for health benefits in retirement, and uncertainty about the future of public programs such as Medicare and Social Security. Further, some older workers face forced retirement or retirement as a result of layoffs. Many employers also hold mixed views about older workers. While some employers think of older workers as having valuable experience, excellent judgment, a strong commitment to quality, low turnover, and good attendance, others feel that older employees tend to have less work incentive and difficulty learning new skills or using technology effectively (Peterson & Coberly, 1988). Looking at the example of the European labor market, employers might reap a better payoff from training older workers than younger workers who are more likely to move to new jobs, taking their newly acquired skills with them (Pearson, 1990). In this sense, human capital, like health and education, are important in explaining labor force transitions among older people.

One consistent explanation associated with human capital has to do with the job characteristics that determine both retirement and pension accumulation in anticipation of retirement (Hayward, 1986). Flexibility in employment and full-time work conditions will make a difference when determining at what age older workers should no longer

hold full-time jobs. Also, self-employed people have different work patterns with more control over working hours compared to salary workers (Blau, Ferber, & Winkler, 2002). In sum, considering that the age at which people leave full-time work and the age at which they move into permanent retirement may not be the same for many people; retirement behavior is becoming dynamic.

Due, in part, to a lack of historical data, part-time employment has received little attention from researchers. Perhaps unexpected economic circumstance and sudden change in human capital can help explain dynamics in retirement transitions. Also, the features of Social Security and pension programs may be key determinants. Moreover, flexible retirement is expected to be different from full retirement in terms of the effects of retirement income policy. Flexible retirement patterns involve gradual changes in a person's work arrangements as they make a transition toward full retirement (Employee Benefits Research Institute, 2001). In fact, recent amendments to the Social Security Act increased the work penalties for those who retire early and decreased penalties for those who choose to continue working. Social Security is becoming more age-neutral, with reduced penalties for the worker who wants to continue working after age 65 (Association of American Retired Persons, 2003). Additionally, a highly educated generation of older workers will allow for more flexibility in the job market, relatively high labor force participation rates and later retirement. The dynamics of retirement have also been a worldwide shift (Gingburg, 1985; Latulippe & Turnder, 2000). Flexible retirement may allow the transition from full-time employment to full retirement to be less sudden (Ruhm, 1990). Latulippe and Turner (2000) addressed the importance of the Social Security system in encouraging partial retirement by offering incentives like full

social security benefits with no earnings test. A previous study found that part-time older workers are eligible for smaller retirement benefits from Social Security, and they are less likely to have pension coverage than both fully retired and non-retired workers (Honig & Hanoch, 1985). Other studies, however, reported that Social Security benefits are positively associated with partial retirement (e.g., Gustman & Steinmeier, 1984). Public and private pensions were negatively associated with partial retirement from main jobs across all age groups, while higher pensions tend to lead to partial retirement outside of the main job (Gustman & Steinmeier, 1984). Future changes in the structure of Social Security will have little impact on retirement ages if employers and employees continue to prefer earlier retirement ages (Munnell, 2003).

Chapter 2 provides a summary of how retirement has been defined and measured in previous research and presents a review of the empirical studies. Then, a brief background of the Social Security system and pensions in the U.S is provided. The research methodology is presented in Chapter 3. The empirical results are presented in Chapter 4. Chapter 5 summarizes the results and provides policy implications and suggestions for subsequent research.

CHAPTER 2

LITERATURE REVIEW

Chapter 2 is divided into three sections. The first section starts with a summery of the specific definitions of retirement and summarizes how previous research studies defined and measured retirement. Following section provides a review of the data set, variables, and methods of estimation used in previous empirical studies. In the third section, the Social Security system and pensions in the U.S and their effects on retirement behavior are explained.

2.1. Defining Retirement

Although most people use the term “retirement” to mean withdrawal from one’s occupation, business, or office, there is no general definition of retirement that seems to be agreed upon by everyone. Extensive research has employed different concepts of retirement. In fact, retirement is often studied from a subjective perspective. Rather than defining retirement as a single point in time, various aspects need to be taken into account when looking at retirement decisions. Criteria need to define retirement behavior has historically hired an economic perspective (Gustman, Mitchell, & Steinmeier, 1995). The basic elements of retirement rooted in the life cycle framework are: time allocation

between leisure and market work, wealth, and family structure. Earnings are used to capture the one's opportunity cost of retirement. Disability status can also directly influence market work participation decisions. Previous studies also focused on different patterns of retirement, including bridge jobs and reverse retirement. Flexibility has recently arisen as a new criterion when exploring retirement behavior and brings more complexity into the discrepancy between work and non-work.

2.1.1. Components of the Definition of Retirement

Traditional definitions and meanings of retirement are based on their relevance to hours of work or retirement benefits. From a theoretical perspective, retirement is a decision made by assessing outcomes from work. There are also alternative ways to examine changes in work, as well as disruptions, and discontinuities in the context of life paths. While a large body of literature has looked at "employment status" to measure retirement status, there are some differences in key characteristics. Some studies used self-reported retirement status (Gustman & Steinmer, 1986; Ruhm, 1990) while others tried to see more objective measurement of employment status (Blau, 1994; Honig & Hanoch, 1985). For example, older workers might have work transition periods due to loss of human capital or changes in personal preferences. This transition frequently involves a reduction in earnings. Beginning to receive a pension or Social Security benefits is another approach used to define retirement status (Burtless & Moffit, 1985). The basic problem with traditional definition is, however, that there is no consensus on the retirement age. For example, should we consider a 55-year-old male worker's exit from his major job as retirement behavior? For a person who frequently changes his or

her job pattern, a change in working behavior does not necessarily imply an intention to retire. Even at the aggregate level, inaccuracies in the average age of retirement have been pointed out (Johnson, 2001).[3]

Table 2.1 presents the basic indicators of retirement that have been used in previous research. Common measurement of retirement status uses working hours. Working less than a particular minimum number of hours or working zero hours can be viewed as retirement. If we look only at working hours, involuntary unemployment or temporary workforce exit might be ignored. Moreover, for a regular part-time worker in the household and for seasonal workers, traditional retirement concepts, such as stopping full-time work, cannot be easily applied as retired status. Also, working in a bridge job after leaving a primary job can be categorized as retired. Moreover, current no employment status is often regarded as retirement at the individual level. However, exit from the labor force is historically considered important when examining changes in retirement age. Even though a person is not currently working, looking for a job situation may be considered as non-retirement. At the micro-level, though, looking for employment at an older age is often coded as retirement status (Hardy, 1984).

The effort to measure retirement includes new factors of job-stopping decisions at an older age. According to Hayward (1986), retirement may be expressed as "an occupational career exit where career is defined as a sequence of occupational and labor force status changes that occur over the life course (p.1032)." If retirement is defined as

[3] Average retirement age is obtained based on labor force participation rates by each age group. According to Johnson, when the overall labor force participation rate drops, the average retirement age also falls. This sequence does not provide useful enough information on retirement age.

	Work Force Status	Earnings and Retirement Income	Occupational Change	Self-perception
Criteria	·Employed status ·Labor force participation ·Working hours	·Annual earnings ·Earnings relative to previous earnings ·Pension and Social Security benefits	·Change in main job ·Change in main industry	·Self-determined retirement status
Strength	·Objective measure ·Good for time series analysis ·Good for population comparison ·Evaluation of policy effectiveness	·Objective measure ·Predictor of retirement age	·Good for professional job holders ·Consideration of work characteristics	·Consideration of various roles in family and community · Good for female workers or secondary earners
Limitation	·Current unemployed status of older workers ·Influence of business cycle ·Measurement error: Self-reported working hours ·Self-employed persons	·Depends on previous earnings ·Varies by occupation and industry	·Not applied to regular part-time workers or contingent workers	·Subjective measure

Table 2.1: Indicators of Retirement

leaving a primary job, then part-time work and post-career employment may be misclassified as retirement.

The current retirement trend among older men can be interpreted in the context of on-the-job retirement. Historically, a decreasing population of older men in the labor force was simply viewed as an early retirement trend due to changes in retirement policies (Ippolito, 1990; Johnson, 2002). A survey by the American Association of Retired Persons (2002) reported that baby boomers were expressing a desire for a new type of retirement. Most of them believe that they will still be working during their retirement years. People don't think retirement same as zero working hours. About 80% of baby boomers said that they planned to work at least part-time during their retirement, and only 16% said they would not work at all. Also, 17% envisioned starting their own businesses, and 5% expressed the desire to work full-time at new jobs. According to Johnson, "work penalties," including Social Security and pension benefits, have been central to the retirement decision. Depending on the work transition of older men, early retirement might actually be partial retirement. Most earlier studies examining early retirement defined early retirement as retirement before age 62 (O'Rand & Henretta, 1982; Quinn, 1977). These studies, however, did not differentiate between partial retirement and full retirement.

Life cycle theory viewed retirement behavior as a result of decisions about consumption and labor supply. The basic assumption is that people find an optimal retirement age and consumption level to maximize their utility over a lifetime. Decreased hours of work among older people often proxy the demand for leisure (Hamermesh, 1984). Life cycle factors include the relationship between wealth and labor supply; life

expectancy is also considered to be important. From the perspective of the dynamics of labor supply throughout one's lifespan, either terminal retirement or full retirement can be viewed with uncertainty. Not only labor supply information, but also changes in consumption might be observed at older ages (Drifill, 1980). Although maximum wealth in a lifetime is not necessarily achieved right before retirement, life cycle theory implies that the level of wealth decreases after reaching a peak. It is also important to look at a time horizon within the context of the life cycle. Perceived longevity played a key role in deciding working life expectancy and non-working life (Wolfe, 1983). It seemed that increased life expectancy makes the terminal retirement decision more dynamic because of perceived uncertainty about the length of the remaining lifetime.

One important aspect when defining retirement is transitional retirement. Rather than a dichotomous classification of retirement status, a continuous process of retirement has been adopted throughout various studies (Blau, 1994; Ruhm, 1990). Changes in job and industry, reduction in working hours, and reverse retirement can be part of the retirement process. For these reasons, retirement age alone might not truly reflect the terminal withdrawal of older workers from the labor force. An extended concept of retirement includes partial retirement. The retirement process is characterized as involving two decision-making steps: whether or not to stop working, and how many hours to work if work is to continue. Once an older worker decides not to terminate his or her current working status fully, a decrease in working hours follows. In this sense, partial retirement can be viewed as a process of on-the-job retirement. The duration of partial retirement may provide new information on the labor supply choices of older workers. Given the contradictory signs of explanatory variables on choices about partial

retirement and its duration (Ruhm, 1990), as well as inconsistencies with regard to the effects of Social Security benefits across several studies (Gustman & Steinmeier, 1984; Honig & Hanoch, 1985), the interpretation of partial retirement behavior becomes more complicated. Although the initial age at which a change in job or industry occurs might affect the duration of bridge employment, additional information such as job characteristics and health status could be most helpful to understand partial retirement behavior.

Since retirement studies have focused on the male labor supply, the same components of retirement have been applied to both male and female retirement. After interviewing 29 female workers aged 63 to 83, Price (2002) addressed five areas of transition to retirement for women: attachment to work, loss of social status, change in social interaction, family roles and obligations, and volunteer and recreational activities. The author also mentioned that there were some differences between professionals and non-professionals. For example, unlike the non-professional group, no change in family roles and obligations was observed during the retirement period for the professional occupation group. A similar finding was reported in the study by Simmons and Betschild (2001). For women, the choice of retirement was made when encountering unexpected lifetime events, through their own decisions, or those of their partners.

2.1.2. Measurement of Retirement

Because partially retired people receive part of their retirement benefits, retirement and its monetary benefits are no longer synonymous. Among older people, retirement does not necessarily mean “no employment.” The entire concept of

"retirement" is currently being redefined. The old notion of life was divided into three exclusive periods: schooling, working years and retirement. Today, this notion applies to fewer and fewer people. Even after initial retirement, some people welcome a return to work outside the home and find that new work offers great, although different, fulfillment. The survey from the AARP (2002) provided insight into the new ways in which people expect to define their retirement years. Nearly half said that they expect to devote more time to community service or volunteer activities during retirement. Moreover, the survey found that 73% of people expect to have hobbies or special interests to which they will dedicate time when they are retired.

There are various ways to measure retirement status in any empirical analysis. After compulsory retirement was abolished, the concept of retirement became more flexible, depending on the person's lifetime plan. This concept could also involve more subjective components when making decisions about the timing of retirement. The commonly used definition to identify planned retirement for full-time workers is "stopping working full-time" (Montalto, Yuh, & Hanna, 2000). Also, Hall and Johnson (1980) used the question, "At what age do you expect to stop working at a regular job?" implying that a transition to part-time employment might be a part of the retirement decision. For some individuals, keeping their current status in the labor market might be a basic element of non-retirement status. Thus how have empirical studies measured categorical retirement status? Table 2.2 summarizes different measurements of retirement status from empirical studies on partial retirement.

The concept of partial retirement may help us to understand retirement status. Apart from self-reported status, different types of retirement patterns may provide good

explanations of individual retirement decisions. Part-time and full-time labor force, as defined by the Bureau of Labor Statistics, can be used to measure retirement status (Gustman & Steinmeier, 2001/2002; Peracchi & Welch, 1994). Honing and Hanoch (1985) defined partial retirement based on the earnings ratio through an entire working lifetime. The authors measured that ratios of current earnings to previous maximum earnings and took 0.5 of the earnings ratio as a cutoff point to classify partial retirement and non-retirement. If current earnings were below 50% of the highest earning, but not at zero, a person was classified as being partially retired.

		Full Retirement	Partial Retirement	Non-Retirement
Gustman & Steinmeier (1984)	Self-reported status	·Completely retired	·Partially retired in the main job ·Partially retired outside main job	· Not retired
Gustman & Steinmeier (2001/2002); Peracchi & Welch (1994)	Working hours per week	·0 working hours	·1 to 34 working hours	· 35 or more working hours
Honig & Hanoch (1985)	Earnings ratio based on previous maximum earnings	·0	·0.01-0.50	·0.51+

Table 2.2: Measurement of Full Retirement, Partial Retirement and Non-Retirement in Studies of Partial Retirement

Honig and Hanoch (1985) provided a comparison between self-reported retirement status and retirement status based on earnings ratios. Based on an earnings ratio, 86.4% of fully retired respondents viewed themselves as fully retired while 39% of

partially retired persons thought they were fully retired. It seems that people are more likely to consider themselves as full retirees, regardless of their actual earning status, when their earnings dropped to levels lower than 50% of their past highest earnings. Also, there might be a possibility that some older people consider partial retirement to be the same as full retirement regardless of earning ability. In addition, Gustman and Steinmeier (2001/2002) compared self-reported retirement with objective measures based on working hours. Of those who worked zero hours per week, more than 20% reported they were not retired or were partially retired. Almost half of older people who worked 1-34 hours per week considered themselves not retired, rather than partially retired. Again, a relatively small portion of partial retirement status was reported. The authors addressed the impact of previous jobs. If there was no reduction in working hours, partial retirement based on working hours also tended to be viewed as non-retirement. To identify employment status for retirement transition, the current study uses the most commonly used indicator, working hour status defined by the Bureau of Labor Statistics.

2.2. Review of Empirical Studies

So far, numerous studies on retirement have been based on life cycle theories like the permanent income hypothesis. The main building block of life-cycle models is the division of income between consumption and saving. The saving decision is driven by preferences between present and future consumption. Thus, rather than current income, expected permanent income could explain why people have high consumption even with low income and vice versa. Also, economic theory suggests consumption and leisure

increase with increased wealth. This hypothesis has justified an early retirement trend during bull market years.

To summarize, variables and data used in selected studies on retirement behavior are presented in Table 2.3. The summary table provides information on the data set used for empirical analysis as well as both dependent and independent variables, including economic and socio-demographic factors, and methods of estimation. While a majority of the studies deal with the labor supply for men, a small number of studies considered women's labor supply behavior (Honig, 1985; O'Rand & Henretta, 1982; Peracchi & Welch, 1994). Although wealth and income are expected to be influential factors in retirement decisions among older persons, a lack of consistency is found across studies.

As shown in Table 2.3, a large number of studies examined retirement decisions as categorical variables (e.g., current labor force status, early retirement or not), and some studies looked at retirement age as a continuous variable. Although this theoretical view assumes that a labor supply decision, such as working hours is flexible for workers, there is good reason to consider the limited choice of working hours. Like the history of labor law indicates, the law limits working hours to 60 hours per week (Gallaway & Vedder, 1996). Also, with fringe benefit costs like health insurance, older workers may find it advantageous to keep full-time work hours. Some older people who have flexibility in choosing how much to work gradually cut back their hours as they move into terminal retirement, but many older workers make a fairly restricted transition from working 40, 30, or 20 hours per week to essentially zero hours. This discontinuous transition implies the existence of fixed costs of going to work that make it inefficient to continue working in a few hours per week. Especially if these costs are incurred by employers, the

Author (year)	Data	Dependent Variable (Estimation Method)	Explanatory Variables
Anderson, Gustman & Steinmeier (1999)	・1969-79 Retirement History Study ・1989 Surveys of Consumer Finances	・Retirement age (Simulations with a structural retirement model)	・ Pension plan provisions, Pension coverage, Plan type, Social Security
Bartel & Sicherman (1993)	・1966-1983 National Longitudinal Surveys of Older Men	・Retire from labor force or not (Logit model)	・ Rate of technological change in the industry the individual is employed, On-the-job training, Unemployment rate in industry, Output growth, Age, Marital status, Years of schooling, Race, Firm tenure, Health, Self-employed, Government-employed
Bazzoli (1985)	・1969-1975 Longitudinal Retirement History Survey	・Early retirement: retired before 65 or not (Ordinary Least Square regression)	・Pension, Social Security benefits, Wage on the main job, Labor market experience, Spouse's labor market experience, Health condition, Asset income, Age, mandatory retirement
Blau (1994) [a]	・6 Retirement History Surveys between 1969 and 1979	・Labor force transition types (Multinomial Logit model, Discrete time hazard model)	・Budget Constraint Variables: wage rate, asset, pension eligibility, social security benefit at age 65 ・Exogenous Preference Variables: age, race, education, marital status, and health ・Lagged Endogenous Variables: years of market experience, job tenure, current duration of the spell, missing duration in progress, previous out of the labor force spell, first spell, previous part-time work spell,
Bound, Schoenbaum, & Waidmann (1995)	・1992 Health and Retirement Study	・Labor force participation (Logit model)	・Age, Race, Education, Disability status, General health status, Emotional health status

Continued

Table 2.3: Variables, Data and Estimation Methods Used in Selected Empirical Studies on Retirement Behavior

Table 2.3 continued

Chirikos & Nestel (1991)	・1966, 1983 National Longitudinal Survey of Labor Market Experience of Older Men	・Six states of market work participation: unretired and non- disabled, unretired and disabled, retired and non-disabled, retired and disabled, deceased, lost to follow-up (Time-dependent hazard rate function)	・Age, Hazardous industry (current and history), Impairment, Parents' longevity, Pension wealth, physical work (current and history), race
Fields & Mitchell (1984)	・A subset of survey conducted by the U.S. Department of Labor	・Retirement age (Ordinary Least Square regression)	・Presented discounted value variables (Presented discounted value of earnings, private pensions, and Social Security benefits net of taxes depending on each period), earning, pension, and social security depending on each age category
Filer & Petri (1988)	・March 1984 Current Population Survey ・1980 Census from the Dictionary of Occupational Titles	・Retirement age & Pension replacement rate (Two separate linear models of retirement age by 334 occupations and Pension replacement model for retired men)	・Required Aptitudes, Required Temperaments, Physical Demands, Required Interests, Employment Characteristics
Gustman, Thomas & Steinmeier (1984) [a]	・ 1969, 1971, 1973, 1975 Retirement History Study	・Partial retirement: completely retired, partially retired in the main job, partially retired outside main job, not retired (Discrete multivariate analysis)	・Eight age categories, Wage, Social Security coverage, Pension coverage, Mandatory retirement provisions, Health, Marital status, Supporting his or his spouse's parents, Presence of children under 18
Haider & Loughram (2001) [b]	・1964-1999 Current Population Survey ・1998 Health and Retirement Study and Asset and 1993, 1995, 1998 Health Dynamics Among Oldest Old surveys	・Labor force participation ・Current working status (Discrete multivariate analysis)	・Individual characteristics: gender, marital status, present discounted income, education, wealth, ・Health characteristics: subjective health status, difficulties with Activities of Daily Living (ADLs), ・Job characteristics: wage, self-employed, stressful job, occupation

Continued

Table 2.3 continued

Hall & Johnson (1980)	・1969 Longitudinal Retirement History Study (married men and single female)	・Three groups by planned retirement age: before 62, 62-64 and 65+ (Discrete multivariate analysis)	・Expected income: Social Security, private pension, government pension, expecting a pension, spouse's expected Social Security ・Current economics variables: wage rate, liquid assets, other assets, nonwage income, spouse's working status, home owner ・Current health status ・Individual characteristics: education, urbanization, self-employed, having a compulsory retirement age
Hamermesh (1984) [a]	・1960, 1972, 1977 Terman study of gifted individuals ・1973, 1975 Retirement History Survey	・Working full time, part time, or not working (Logit model)	・Social Security wealth, Pension wealth, and other wealth, Earnings, Subjective Time Horizon
Hardy (1982)	・1969-1975 National Longitudinal Surveys of Labor Market Experience	・ Hours of work per year (Tobit model)	・Heath, Retirement policies (pension, Social Security), Age, Marital Status, Dependents, Job tenure, Duncun's socio-economic status index, Education, Self-employed, Unemployment, Wage, Net assets
Hardy (1984)	・1973, 1976, 1978 National Longitudinal Survey of Older Men	・Retirement status: retired or not (Logistic regression: separate models for white and blue collar workers)	・Years of schooling, Health, Wage, Duncan's index of socio-economic status, Job tenure, Pension coverage without mandatory retirement age, Mandatory retirement with a second pension, Age (62-64, 65+)

Continued

Table 2.3 continued

Hayward (1986)	・1973-1981 National Longitudinal Survey of Older Men ・Dictionary of Occupational Titles (4th)	・Log-odds of retirement before age 62 and Log-odds of retirement age 62-64 (Logit model)	・Marital status, Health, Dependents, Double pension coverage, Employer-provided pension coverage, Education, Family assets, Tenure, Wage, Union membership, Compulsory retirement, Substantive complexity, Physical and environmental demand, Social skill, Manipulative skill
Hayward, Grady, & McLaughlin (1988)	・1971, 1973, 1980, 1981 Current Population Surveys (CPS)	・Working Life Expectancy (Increment-decrement working life tables, Hazard model)	・Occupational Characteristics: returns to experience, occupational growth, unemployed level, specific vocational preparation, physical demands, environmental conditions
Hayward & Grady (1990)	・1966-1983 National Longitudinal Survey of Mature Males	・Labor force incumbents: exposure, retirement, disability, and death (Multivariate Increment-decrement working life tables)	・Class of worker, Education, Race, Marital Status, Region and Urban-Rural Residence
Honig (1985) [a]	・1967-1973 Retirement History Survey	・Retirement status for women: full retirement, partial retirement, non-retirement (Logit model)	・Age, Health limitation, Education, Pension coverage, Social Security benefit (amount and duration), Family income, Labor force experience
Honig & Hanoch (1985) [a]	・1967-1973 Retirement History Survey	・Retirement status: full retirement, partial retirement, non-retirement (Logit model)	・Current labor market variables: wage, working hours, working experience in current job, proportion in same job ・Earning history: maximum previous earning, Social Security earning interruption, work experience ・Pension and Social Security ・Demographic and income variables: education, health, family income, assets, spouse's annual earning

Continued

Table 2.3 continued

Ippolito (1990)	・1955-1985 Statistics from the Social Security Administration, Economic Reports of the President, and Bankers Trust	・Labor force participation rate (Descriptive statistics)	・Social Security system, Tax rate, Disability program, Private pension, Inflation,
Loprest, Rupp, & Sandell (1995)[b]	・1992 Health and Retirement Study	・Labor force participation (Logit model: separate models for men and women)	・Functional limitation level determined by occupation groups, health impairment indices, mortality indices, work disability
Mitchell & Fields (1984)	・1978 Benefit Amounts Survey	・Retirement age (Ordinary Least Square, Multinominal Logit model)	・10 different pension plans reflecting Intertemporal budget set developed with earnings, Private pensions, Social Security records, Year of services, Birth year, Retirement year
Montalto, Yuh, & Hanna (2000)[b]	・1995 Survey of Consumer Finances	・Planned retirement age (2-step estimation procedure: probit model for working full time & OLS model for planned retirement age)	・Financial variables: income, assets, debt, defined contribution, defined benefit ownership, household size, retirement is a saving goal ・Employment characteristics: self-reported poor health, self-employed, occupation ・Demographic characteristics: age, education, race, life expectancy
O'Rand & Henretta (1982)[b]	・1969, 1971, 1973 Longitudinal Retirement History Survey	・Four groups by retirement age: before 62, 62-64, 65+, still working in 1973 aged 62-67 (Logit model)	・Race, Education, Children, First job after 35, Socio-Economic status Index of last job, Source of Pension, Assets, Replacement ratio, Marital status, Health impairment level
Peracchi & Welch (1994)[a,b]	・1968-1990 Current Population Survey	・ Full time participation, Part time participation, and Non-participation for individuals aged 49-68 (Multi-nominal Logit model)	・Age, Time, National Gross Product, Race, Education, Marital Status, Children, Region, Urbanization, Self-employed, Unemployed, Illness

Continued

Table 2.3 continued

Quinn (1977)	・1969 Retirement History Survey (white married men)	・Labor force participation (Logit model)	・Personal and financial characteristics: health limitation, eligible for social security, eligible for other pension, dependents, wage rate, asset income ・Local labor market conditions: unemployment rate, percent change in employment ・Job characteristics: low autonomy, strain, bad working condition
Ruhm (1990)[a,b]	・1969-1979 Retirement History Longitudinal Survey	・Retirement status: partial retirement, reverse retirement, post career employment, duration of partial retirement, age at ending career job, occupation change, industry change (Ordinary Least Square, Logit model, Cox proportional Hazard model)	・Gender, Race, Marital status, Education, Pension, Income
Sickles & Taubman (1986)	・1969-1977 Retirement History Survey	・Working full time or not (Maximum Likelihood Estimator for multivariate distribution functions)	・Age, Race, Widowed, Education, Marital status, Number of dependents, Supplementary Security Income, Longest occupation, Self-employed, Social Security benefits, Income from assets, Spouse's earnings, Pension income, Gain from postponing retirement, health
Slade (1987)	・1976, 1971 Retirement History Longitudinal Survey	・Retirement transition probability: labor force participation & labor force exit (Panel probit model)	・Earning, Education, Marital status, Race, Self-reported health, Assets, Social Security benefit, Private pension benefit
Williamson & McNamara (2001)[b]	・1998 Health and Retirement Study	・Currently working or not (Panel probit model)	・Gender, Age, Education, Race, Marital status, Health, Non-labor income, Net worth

Notes. [a] examined partial retirement or part-time work participation.
[b] included both male and female sample.

employers may want to make the workers put in a certain number of work hours or quit entirely. Thus, retirement decisions will make a discrete jump at some critical level of the given options. For these reasons, empirical studies used a discrete choice model that allows for the institutional setting that generated discontinuous transitions between zero and certain positive hours of work that determined part-time work.

What factors affect retirement decisions among older people? Most of studies examined traditional retirement that involves full retirement from full-time work, while a handful of studies focused on partial retirement behavior (Gustman & Steinmeier, 1984; Honig. & Hanoch, 1985; Ruhm, 1990). There have been also studies exploring the factors associated with expected retirement (Hall & Johnson, 1980; Montalto et al., 2000). Trend data reporting early retirement often emphasize older workers moving into bridge job patterns rather than full retirement. Another focus of retirement research is life cycle effects. Since workers make decisions to maximize their utility over their lifetimes through labor supply and consumption, previous research examined retirement consumption decisions based on the life cycle model (Hamermesh, 1984). In explaining older people's labor supply behaviors, income and wealth have been common determinants when they make decisions about the timing of retirement.

In general, four categories of explanatory factors exist, including "financial characteristics," "demographic characteristics," "health characteristics," and "occupation characteristics." Most studies assumed that education and health status are important in explaining retirement decisions. Health status reflects not only remaining life expectancy, but also one's ability to work in the labor market. Of financial characteristics, a large number of studies commonly focused on the impact of retirement income including

Social Security benefits. This issue has probably emerged from efforts to finance the Social Security system. While some studies limited their focus to the role of health (Bound, Schoenbaum, & Waidmann, 1995; Loprest, Rupp, & Sandell, 1995; Quinn, 1977), other studies concentrated on the role of education (Hardy, 1984).

2.2.1. The Effects of Earnings and Wealth

Overall, it is hard to determine the role that income and wealth play in retirement decisions. While a variety of factors are related to retirement decisions, different types of wealth may also help explain the relationship between wealth and retirement. The findings from studies exploring the effect of wealth in Table 2.3 are not consistent externally. Some studies suggest that elderly people who are wealthy are more likely to work (Hayward, 1986; Williamson & McNamara, 2001); other studies reported that high wealth levels allow workers to retire early (Quinn, 1977; Sickles & Taubman, 1986; Slade, 1987). The relationship between wealth and labor force participation was much stronger for women than men (Hanoch & Honig, 1983). Wealth levels affect the pattern of retirement. For example, Blau (1994) found that family assets are significantly associated with different approaches to retirement. Higher levels of family assets were associated with gradual retirement (from full-time work to part-time work and then to full retirement). The main question is whether or not wealth levels could serve as retirement incentives or as indicators of human resources that determine worker productivity. For example, workers from larger firms who have paused retirement programs might have more options when it comes to both retirement timing and patterns.

Higher pre-retirement earnings reduced the probability of partial retirement and increased the likelihood of working full-time (Hamermesh, 1984; Gustman & Steinmeier, 1984). Apart from wage income, wage rates reflect not only one's income level, but also give information about the opportunity cost of time. In part due to data unavailability, however, the effect of wage rates was not addressed in many previous studies. Also, the interpretation of wage effects was not clear across the studies. Hayward (1986) found that wage rates significantly increased the odds of early retirement. Haider and Loughran (2001) reported that older workers were not responsive to wage rates, and they tended to continue to work at low wages. A negative and significant effect of wage rates on early retirement has also been reported (Bazzoli, 1985). Other studies by Quinn (1977) and Hardy (1984), however, found wage rates were positively associated with older people's working. Specifically, non-retired people tend to have higher wage rates than those who are partially retired, implying a positive relationship between wage rates and working hours.

Current wage rate was much more connected with planned retirement. Hall and Johnson (1980) showed significant and positive coefficients on two planned retirement age groups (before 62, and 65 and older), indicating that higher wages induce early retirement or later retirement compared to retirement at age 62-65. The effect of wage rate was relatively clear for single females. Higher wage rates significantly increased the likelihood of planned retirement at 65 and older. It seemed that the effects of hourly wages are different from other financial factors, and, even for elderly workers, substitution effects may offset income effects, so they are encouraged to work more.

2.2.2. The Effects of Social Security and Pensions

Most studies agreed that the Social Security system has provided incentives to retire at age 62 and 65, but it is not clear whether or not Social Security actually lowers retirement age. Historically, labor supply of older people was explained by changes in retirement provisions, such as Old Age Survivor and Disability Insurance. Subsequent amendments allowed older people to work part-time without loss or with minimum loss of benefits and may have brought some people back from complete retirement. Simultaneously, labor force participation among older men has been reduced. In the long run, the financial aspect that may contribute most to trends in retirement is connected with retirement policies, such as the Social Security system. For example, Social Security provides dependent benefits that may encourage workers to exit the labor force. These benefits like retirement, disability, family benefits, survivor, and Medicare are paid through your Social Security taxes. Also, labor supply policy, such as the elimination of compulsory retirement affects one's flexibility when it comes to choices about retirement. These factors are, however, not consistent in their effects.

Focusing on retirement income, people tend to determine their retirement age based on benefits gained from working versus not working. For example, the present value of total future benefits for a person who continued working until age 68 was less than that for a worker who retired at age 60 (Social Security Administration, 2003a). This work penalty for people who work beyond 65 provides incentives to retire before the age of 65. It was also reported that older workers continue to work later, subsequently increasing their Social Security benefits. Early retirement or a delayed retirement decision has been explained by retirement policy and pensions. Although people try to

maximize their monetary benefit by choosing an appropriate retirement age, the complexity of a retirement plan, changes in Social Security provisions, various pension plans, and the tax system are making it harder for workers to determine the optimal retirement time.

Past studies have focused on the role of retirement policy (Anderson et al., 1999; Hardy, 1982; Ippolito, 1990). According to Anderson and colleagues (1999), changes in pensions and Social Security accounted for the long-term effect on early retirement and the increase in retirement among older workers. However, these changes in pensions and Social Security could not explain why there was an increase in retirement after 65 in the 1970s and 1980s. Hardy (1982) conducted time-series analysis to look at how older workers responded to changes in Social Security benefits. Compulsory retirement and pension coverage had a strong negative effect on labor force participation, and pension coverage had the largest effect on retirement among workers at age 62. The effects of Social Security benefits occurred with second pension coverage. Rather than Social Security alone, it was Social Security with second pension coverage that led to early retirement, suggesting the interaction of joint policies. Ippolito (1990) examined the influence of policy change on reduced labor force participation. Together, private pension plans and changes in the Social Security system were dominant factors in explaining early retirement among older men. The magnitude of pension effect may have also depended on eligibility for full pension benefits. Inflation rates also explain the effect of changes in the Social Security system during the period 1965-1980. Pension income also has strong effects on individual retirement decisions. Higher earnings increased retirement age, but higher pension levels reduced retirement age (Fields & Mitchell,

1984). In contrast to Fields and Mitchell, Ruhm (1990) found that both higher pension benefits and higher income increased retirement. Additionally, Mitchell and Fields (1984) reported a variance in retirement age across different pension plans. They concluded that average retirement ages might be different across firms, indicating the importance of individual preferences in retirement decisions. Non-work income and work income also have different effects on planned retirement. While pension and asset levels significantly raise the probability of early retirement, non-wage income discourages early retirement plans (Hall & Johnson, 1980). It was also found that assets and pension reduced the planned retirement age, but non-investment income increased it (Montalto et al., 2000). Bazzoli (1985) reported that pension benefits led to early retirement, but no effect of Social Security benefits was confirmed. Also, a significant effect of pension wealth was found (Chirikos & Nestel, 1991).

Honig and Hanoch (1985) found that higher pension benefits significantly decreased the likelihood of partial retirement, but cumulative Social Security benefits were positively related with partial retirement. Also, partial retirement was positively associated with higher Social Security benefits in the study by Gustman & Steinmeier (1984). Ruhm's study (1990) on retirement patterns suggested that pensions are very important predictors of different retirement patterns. Pensions had a significant and positive effect on the number of years of post-career employment and increased the likelihood of workers changing occupations or industries. Although pensions were related to long durations of partial retirement and conditional on remaining in the workforce, higher pension levels significantly reduced the likelihood of partial retirement or post-career employment. The effects of pensions on retirement behavior can be explained

more effectively with additional information on firm-specific pension plans, personal preferences, and occupational tasks.

2.2.3. The Effects of Education, Health, and Occupation

Since education provides resources to improve productivity in the labor market, one's education level was hypothesized as being a factor affecting retirement decisions. Findings about the effect of education have been fairly consistent. In general, higher education allowed older workers to stay in their jobs, and its effect varied by occupation. Hardy (1984) found that college graduates are more likely to work in professional, technical, and other career-oriented fields and are less likely to retire, while high school graduates are likely to remain in the labor market in sales and clerical positions. While technological change increased the likelihood of retirement among the elderly, education reduced it (Bartel & Sicherman, 1993). Recent research confirmed the fact that the educated older people are more likely to remain in the workforce (Bound et al., 1995; Haider & Loughran, 2001; Williamson & NcNamara, 2001). Also, some studies suggested that highly educated people are more likely to work full-time rather than part-time (Blau, 1994; Honig & Hanoch, 1985).

An interesting finding with regard to the impact of education on retirement decisions was found in Ruhm (1990). Although higher education increased the age of withdrawal from primary jobs, higher education reduced the probability of movement into post-career jobs involving changes in occupation or industry. The effect of education on partial retirement was not clear in the studies. The education estimators were not significant in Ruhm (1990); however, the study reported that high education levels

increased the probability of partial retirement, but were negatively associated with the number of years of partial retirement, given partial retirement status. Honig & Hanoch (1985) reported a significant and positive effect of education on partial retirement for male workers aged 62-67 with covered Social Security earnings. The effect of education was found to be significant in female workers' retirement decisions as well. Honig (1985) reported that higher education significantly reduced the likelihood of full retirement, and educated female workers aged 62-67 tended to choose partial retirement. Also, a negative effect of education on early retirement was found in O'Rand & Henretta (1982). In contrast to other studies, Slade (1987) reported a positive and significant effect of education on labor force exit using the two-year Longitudinal Retirement History Survey.

Significant attention was paid to health as an indicator of human capital for older individuals. Throughout past studies, health status was a good predictor of labor force participation of older workers, and health does make a difference in retirement decisions. For example, Bazzoli (1985) used a health index to analyze retirement behavior in terms of health status. The marginal probability of early retirement due to poor health was high, and it was statistically significant. Similarly, higher levels of functional limitation significantly reduced the probability of labor force participation for both men and women (Loprest et al., 1995). The impact of functional limitation was greater for men than for women.

Hardy (1985) examined the role played by health status in retirement decisions within occupational groups. Hardy found that health status had significant and similar impacts on retirement behavior among both white and blue-collar workers. Categorizing occupations often involves distinctions based on the physical demands of jobs. Filer and

Petri's (1988) classification of job characteristics based on physical demand shows that health conditions among older workers could be more important for some occupations than others. Occupations requiring heavy physical activity decreased the age of retirement. This was consistent with findings by Hayward (1986). While bad health and physical demands led to retirement before age 62, manipulative skill and substantive complexity were negatively associated with early retirement. Sickles and Tauban (1986) treated health as endogenous and looked at the relationship between work and health. They suggested that not only was health a determinant with regard to retirement, but health status was worse for workers who had unskilled jobs.

When making decisions about retirement, older workers are influenced by job requirements and work environments because of health limitations. Job characteristics may involve not only monetary rewards, such as wages and pensions, but also task requirements, such as high physical demands or social skills. There are noticeable occupational differences in retirement patterns. A large number of studies considered occupational variables. While the classification of occupations varied by study, analyses yielded somewhat inconsistent findings. While some research did not show a significant difference between occupations (e.g., Sickles & Taubman, 1986), other studies suggested that labor force participation among older workers varied by occupation (e.g., Hayward & Grady, 1990). Besides occupation, the class of workers and job tenure were often hypothesized as affecting retirement decisions. Hardy (1982) found a significant and positive effect of job tenure on labor force participation among older men. The results from Hayward (1986), however, suggested that job tenure was positively associated with early retirement even though the coefficients were not significant. Hardy (1984) showed

similar findings, indicating that job tenure was positively related to retirement. Although the three studies used the National Longitudinal Survey for older men, the year analyzed by Hardy (1982) was prior to that of two later studies. Additionally, it was found that self-employed workers are more likely to remain in the work force (Haider & Loughran, 2001; Sickless & Taubman, 1986) and more frequently apt for partial retirement. Generally, occupational effects may occur in conjunction with education levels, health status and pension plans.

2.2.4. Rationale for Shocks to Household Resources in Retirement Behavior

Most of the studies discussed above looked at financial status or expected financial status to explain retirement behavior. When focusing on very short-term periods over a business cycle, however, these factors might not predict well how people respond to economic change. Rather than financial status, workers could be sensitive to how their actual status is different from their prior expectations. As suggested by Prospect theory (Kahneman & Tversky, 1979), value is associated not with actual levels of consumption, but with anticipated changes in well-being. Also, according to the conservation of resources theory (Hobfoll, 1989), acute resource loss could matter more than chronic lack of resources. For example, people may be more affected by unexpected loss of resources than consistently poor financial status. Likewise, a healthy worker who was recently diagnosed with cancer will go through a greater change in life than a worker who has chronically poor health.

The life-cycle hypothesis and permanent-income hypothesis predict that current income is not the key predictor of current consumption because the marginal propensity

to consume out of permanent income is large, while the marginal propensity to consume out of transitory income is small. The central idea of the permanent-income hypothesis, proposed by Milton Friedman in 1957, is clear: people base consumption on what they consider their permanent income. Further, permanent income was defined as the sum of non-human wealth and human wealth, which is the present value for current and future income (Flavin, 1981). By viewing future income, people attempt to maintain a fairly constant standard of living even though their incomes may vary considerably from month to month or from year to year. As a result, increases and decreases in income that people see as temporary have little effect on their consumption spending (Bryant, 1990).

The idea behind the permanent-income hypothesis is that consumption depends on what people expect to earn over a considerable period of time. Friedman assumed that people would base their idea of normal or permanent income on what had happened over the past several years (Dornbusch & Fischer, 1980). While one's expectation of permanent income does not depend solely on what has happened in the past, additional factors like business cycles and mortality risk are almost as crucial as previous income information.

Both the permanent-income hypothesis and life-cycle hypothesis relax the relationship between consumption and income. This is more clearly seen in the permanent-income hypothesis, which suggests that people will try to decide whether or not a change of income is temporary. If they decide that it is temporary, this has a small effect on their spending. Only when they become convinced that it is permanent, then, will consumption change. As is the case with all economic theory, this theory does not describe any particular household, but only what is expected on the average. Theories of

consumption assume that individuals want to maintain relatively smooth consumption profiles over their lifetimes. Their consumption behavior is geared to their long-term consumption opportunities from lifetime wealth. While the process of expectation formation varies across individuals, expected future budget constraints will affect current behavior. Thus, a person who has a higher future expected income could have a higher level of consumption than those who have not, if both have the same current income.

The permanent income hypothesis and the life-cycle hypothesis introduced assets into the consumption function, and gave a role to the stock market. Friedman (1980) focused on financial markets to evaluate the effects of expectations. The study concluded that investor's demand depends on the risk-return characteristics of other financial assets. A rise in stock prices increases wealth, and thus should increase consumption, while a fall should reduce consumption. Hence, the state of the financial markets will impact consumption as well as investment behavior. Moreover, the growth of defined contribution pension plans compared to defined benefit pension plans suggested the importance of the stock market. Because the stock of assets at retirement depends on workers and employers' contributions, and the returns on the assets, more financial risks exist for workers in defined contribution plans.

Consideration of income variability is a key point of expected income. The permanent-income hypothesis introduces lags into the consumption function. An increase in current income should not immediately increase consumption spending by very much, but with time it should have a greater effect. The existence of lags may make it more difficult for the government to control the economy. Policies do not have their full effect immediately, but only gradually. By the time they have their full effect, the problems that

they were designed to cure may have changed to new problems (Dornbusch & Fischer, 1980).

Behavior that introduces a lag into the relationship between income and consumption will generate the sort of momentum that the business cycle indicates. A change in income changes spending, but people only slowly adjust to it. As they do, their additional income might change spending later. An initial increase in income tends to have effects that take a long time to completely unfold (Dornbusch & Fischer, 1980). Suppose income or assets move out of line with previous expectations at any time, then, plans can be revised. When real income rises, income expectations are not immediately revised, because one sees this change as a temporary event. The individual's marginal propensity to save at that date would stay high enough to finance subsequent consumption at a higher level until death. If income expectations were revised upwards permanently, then higher consumption could more easily be provided by future-period incomes. In this context, it seems that even if income has deviated from prior expectations, people may still act as if their unfulfilled expectation was met, because of the time lag between income changes and labor force behavior. Besides, there are numerous institutional restrictions on the ability to change labor force status. For example, the social security system generates strong financial incentives to retire around age 65. For many workers, labor force decisions are tied to health insurance benefits and a pension at retirement.

The life-cycle hypothesis suggests that saving is high (low) when income is high (low) relative to lifetime average income. The typical shape of the age-income profile over the life cycle starts with low income during the early working life, then labor income

increases until reaching a peak before retirement, while pension income during retirement is substantially stable. It also suggests that aggregate saving depends on the growth rate of the economy. The rate of consumption, and thus of saving, could in principle be affected by the interest rate. For this reason, retired people could accumulate wealth as they age. Also, some older people are still employed beyond the normal retirement age, and their wealth will increase with age even after retirement age. With such a view, current income is not the only determinant of consumption. Wealth and expected income play a role, too. Actual consumption is much smoother than the simple Keynesian consumption function predicts.

Although both the life-cycle hypothesis and the permanent income hypothesis have played a central role in empirical studies of consumption and saving (e.g., Banks, Blundell & Tanner, 1998), a relatively small number of studies have focused on labor force behavior (e.g., Cheng & French, 2000). The life-cycle and permanent-income hypotheses have greatly increased understanding of consumption behavior, but the data does not always fit these theories as well as it should, which means they do not provide a complete explanation of consumption behavior (Deaton, 1986). These theories do not explain why many people retire with low savings, nor why household consumption drops during the post-retirement period. Even when the unemployed are distinguished from the retired, consumption reductions were larger for the retired than for older unemployed people (Banks, Blundell & Tanner, 1998).

As Hatcher pointed out (1998), per-period shocks would change desirable wealth levels, resulting in revision of retirement timing. Unexpected macroeconomic shocks like recessions cause difficulties for people planning their retirement. There are also

unexpected shocks to life-time needs. Sudden health loss will change both consumption patterns and market productivity. Questions have already been raised as to the adequacy of the life-cycle hypothesis without attention to uncertainty as to date of death or health care costs. Blank and colleagues (1998) found that the best explanation of a sharp drop in consumption after retirement is the arrival of unexpected and unfavorable information. Further, the authors stated that this is the only explanation that can be reconciled with the life-cycle hypothesis in terms of consumption changes over the lifetime. Taking these theories together, individuals' labor force transitions appear to be motivated by consumption smoothing plans.

While the current study borrows the expected income concept from the life-cycle hypothesis, the key point is deviations from expectations. Although economic theories treat gains and losses of equal size the same, there are alternative viewpoints. Prospect theory suggests that people respond differently to equivalent situations depending on whether they are presented in the context of a loss or a gain (Kahneman & Tversky, 1979). Gains and losses are evaluated from a subjective reference point. People value a certain gain more than a probable gain with an equal or greater expected value; the opposite is true for losses. The function relating the subjective value corresponding to losses is steeper than that for gains. Therefore, the displeasure associated with the loss is greater than the pleasure associated with the same amount of gain. Typically, people become considerably more distressed at the prospect of losses than they are made happy by an equivalent prospect of gains. Based on this corollary, the shocks from resource loss are expected to have a great impact on the behavior of the older worker.

2.3. Social Security, Pensions, and Retirement Decisions

In the post-World War II era, the trend toward early retirement has been strongly supported by incentives contained in compensation systems. To examine incentives for retirement, this section looks at those elements of pay that are based on age rather than worker productivity. While Social Security regulations have been modified in recent years to eliminate some of the built-in disincentives to employment, private pensions have moved in the other direction, making early retirement increasingly attractive. Since retirement policies differ in their rules-- some disallowing people to retire early and others penalizing those who work beyond certain ages--choosing an optimal retirement age is not easy. How do such rules and regulations influence workers' decisions about whether or not and how much to work when they are older?

2.3.1. Social Security

The goal of Social Security is to provide insurance to every worker and family against loss of income due to disability, old age, or death. There are five major categories of benefits paid through your Social Security taxes: retirement, disability, family benefits, survivor, and Medicare. Retirement benefits are payable at full retirement age with reduced benefits available as early as age 62 for anyone with enough Social Security credits. People who delay retirement beyond full retirement age receive a credit for each month they do not receive a benefit until they reach age 70. Disability benefits can be paid to people at any age who have enough Social Security credits and who undergo severe physical or mental impairment that is expected to prevent them from doing substantial work for a year or more, or who have conditions expected to result in death.

The disability program includes incentives to smooth the transition back into the workforce, including continuation of benefits and health care coverage while a person attempts to work. If workers are eligible for retirement or disability benefits, other family members might receive benefits as well. Also, when a person dies, his or her family may be eligible for benefits. There are two parts to Medicare-- hospital insurance (Part A) and medical insurance (Part B). Generally, people who are over age 65 and getting Social Security automatically qualify for Medicare.[4] Beginning in October of 2000, Medicare coverage was extended to beneficiaries who return to work (Social Security Administration, 2002b).

Social Security and Medicare eligibility provide strong messages about when to retire, regardless of physical ability, and workers respond accordingly. In a pay-as-you-go system, money raised by a payroll tax on wages is paid out to beneficiaries. This trust fund plays the role of a checking account, being only large enough to ensure a smooth cash flow and to even out fluctuations of the economy. The key factor with respect to pay-as-you-go system becomes the ratio of workers to retirees. Social Security has been the primary source of income for most older people.[5] Under this pay-as-you-go plan, the worker still has the option to invest additional money privately to provide for earlier retirement (AARP, 2003).

With the aging of the population and the population surge of the post-World War II baby boomer generation, it has become apparent that the Social Security system will be

[4] Part A is paid for by a portion of the Social Security tax of people still working. It helps pay for inpatient hospital care, skilled nursing care and other services. Part B is paid for by monthly premiums from those who are enrolled and from general revenues. It helps pay for such items as examination fees, outpatient hospital visits and other medical services and supplies.

[5] Among persons aged 65 and older, 90% received Social Security in 2000, while 29% and 14% had income from private and public pensions, respectively. Social Security income provided more than half of the total income for 64% of older persons (AARP, 2003).

facing serious financial difficulties in the near future. In 1982, the National Committee on Social Security Reform provided recommendations for sweeping changes. The resulting legislation--the Social Security Amendments of 1983--included several reforms designed to reduce disincentives to work and to encourage older persons to remain in the labor force. The retirement age at which beneficiaries are eligible to receive full benefits will increase by 2 months per year for persons reaching the age of 62 in the years between 2000 and 2005, will remain at 66 for those reaching 62 between 2005 and 2016, and will increase by 2 months per year for persons reaching age 62 in 2017 to 2022. The normal retirement age will remain at 67 for those reaching age 62 after 2022 (Social Security Administration, 2003a).[6] Social Security benefits are a function of lifetime earnings. In determining benefits, average annual earnings between 1951 and the year of retirement are adjusted for inflation to derive an Average Index of Monthly Earnings (AIME). A benefit formula is then applied to this AIME to determine an individual's full benefit amount (AARP, 2003).

Individuals are eligible to receive full benefits at normal retirement age as defined in the Social Security program. For every month after age 62 that receipt is deferred, the 20% early retirement penalty is reduced by 0.56% (or 6.67% per year) so that the full level is earned at age 65. If an individual chooses to continue working beyond age 65, he or she receives a delayed retirement credit of 3% per year. For example, a person working (and deferring Social Security receipt) to age 68 could expect to receive benefits equal to 109 percent of full benefits. Not only have penalties for early retirement increased, but also the delayed retirement credit has become more generous increasing by

[6] The full retirement age is 65 for persons born before 1938. The age gradually rises until it reaches 67 for persons born in 1960 or later.

half a percentage point every other year from 3% for workers age 62 prior to 1987 to 8 % per year for workers age 62 after 2004 (Social Security Administration, 2002a).

2.3.2. Pensions

Retirement decisions are rarely made based on Social Security benefit levels alone. Though most workers can no longer be forced to retire because of their age, many other provisions in pension plans encourage workers to retire at specified ages, often before the Social Security program's normal retirement age of 65. Private pensions are becoming important determinants of retirement decisions. The two major types of pension plans are defined benefit plans and defined contribution benefit plans. A defined benefit plan provides life annuity at retirement. The annual annuity payment is generally tied to years of service and final salary. The present value of a defined benefit plan may eventually fall with retirement age. A defined contribution plan provides a savings account that the worker may receive as a lump sum at retirement. The present value of the defined contribution plan grows with retirement age because contributions are added over time.

Over time, there has been a switch from defined benefit to defined contribution plans (AARP, 2003). While employers bear the risk of funding program in a defined benefit pension, defined contribution pension plans tend to place risk and responsibility of investment performance on employees. Part-time workers, seasonal workers, or small firm workers do not usually have pension benefits; and those who do usually have only limited coverage. Pensions programs are governed by three major pieces of legislation: the Internal Revenue Code, the Employee Retirement Income Security Act (ERISA), and

the Age Discrimination in Employment Act (ADEA). Each has features that conflict with each other regarding the development of phased retirement programs. Both ERISA and the Internal Revenue Code are complex and inflexible statutes. They set rules as to who can and who must participate in a pension plan, the amount and types of benefits that can be paid, when benefits can be paid, and how those benefits will be taxed. Hiring retirees then is risky because the penalty for not complying with the IRS rules on independent contractors is high and more exacting than in the past (Gale & Orszag, 2003). Additionally, many private pensions do not regularly adjust for cost of living. Unlike Social Security benefits, full cost-of-living adjustments are almost non-existent in pension plans. Thus, the net present value of pension benefits reaches their maximum level before normal retirement age. This may reduce compensation for persons who continue working after reaching either the maximum levels of credited service or maximum level of pension benefits. Individuals who opt for early retirement usually receive reduced pension benefits. However, reduction percentages are not always actuarially neutral; the greater the number of years of pension receipt due to early retirement often more than offsets any decline in benefits. Similarly, accrual beyond normal retirement age for those who delay retirement is often less than actuarially neutral and gives a substantial disincentive to continue work.

In summary, the incentives in Social Security and private pension policies do not always operate in the same direction. Changes in Social Security rules passed in 1983 were designed to increase work incentives for older persons, although some people expect them to have only a minor impact on retirement ages (AARP, 2003), as the changes themselves do not dramatically alter the basic incentive structure of Social

Security. In any case, any changes in Social Security regulation may be offset by pension plan provisions that encourage retirement and penalize continued work activity. It is unclear exactly what long-term impact Social Security reforms will have on the work activity of older persons because private pensions have not followed Social Security's lead in encouraging later retirement. While pension policies that often allow retirement before age 65 are undoubtedly attractive to many older workers, those who might prefer to continue to work part-time often do not or cannot. Some reasons for this situation are discussed in the following section.

2.3.3. Effects on Flexible Retirement

Older workers are often faced with choices about continuing full-time work in long-held jobs or completely withdrawing from the labor force; the majority reject part-time employment, which usually pays low wages and provides very few benefits due to both low productivity and fixed costs. Whether or not the part-time market for older persons will become more common in the future depends on many diverse factors, including (1) pension and Social Security regulations that determine levels of non-wage income and place restrictions on employment; (2) the characteristics of part-time jobs; and (3) the preference for non-market activity over market work at older ages. While the preference for leisure over work is very strong for many older persons, it is also possible that many people say they do not want to work because they see only very limited opportunities open to them. As discussed previously, substantial institutional barriers--especially the Social Security earnings test--have provided strong disincentives to continue full-time work at later ages. Pension provisions often make continued work for

one's employer disadvantageous. Older workers, then, are often funneled into the part-time job market, where options are frequently limited to low-paid employment. The solution, many argue, is to expand opportunities for part-time work to include jobs with higher wages and non-wage benefits.

The age at which workers become eligible for full Social Security benefits has gradually risen from 65 to 67. Before January 2000, benefits were not reduced for earnings after age 70, but currently, the earning limit for full retirement age has been eliminated. This change can affect those between 62 and 64 years of age because they might want to claim Social Security benefits before reaching full retirement age (AARP, 2003). Also, the withholding for earnings above the exempt amount--$25,000 in 2001 and $30,000 in 2002 --decreased from $1 of every $2 for persons before full retirement age to $1 of every $3 (Social Security Administration, 2002a). Latulippe and Turner (2000) suggested providing full Social Security benefits with no earnings test to encourage partial retirement. Under such a system, workers would be able to retire partially and receive full Social Security benefits. In a defined benefits Social Security scheme including the earnings test, workers earning above a certain level become ineligible for benefits. Workers who have earnings below a certain level receive full Social Security benefits. The amount of exemption provided by the earnings test allows eligible workers to retire partially on full Social Security benefits.

This feature provides greater flexibility to low-wage workers than high-wage workers, because the fixed ceiling on earnings allows the low-wage workers to work more hours. The earnings test often provides greater incentives for partial retirement at older ages than it does at younger ages: the level of disregarded earnings is higher, and

the percentage reduction factor is lower at older ages. In certain cases, the earnings test does not apply at all for workers beyond a certain age. In other words, workers are given the opportunity to take partial retirement at an early age, but they may be better off taking it later. Moreover, this system could encourage workers who opted for partial retirement at an early age to continue working part-time at later ages (Latulippe & Turner, 2000). To help in making their retirement decisions, workers compare what their situations would be if they were to take full retirement with what those situations would be if they took partial retirement or continued to work full-time. To encourage partial retirement, it is important to establish the incentives or disincentives created by earnings limits during partial retirement after workers exit from full-time employment. If the earnings test is structured so that workers receive the same income whether they choose to retire fully or partially, most would be more like to fully retire because their work efforts would produce no financial advantages (Sum & Fogg, 1990).

Overall, major changes in Social Security policy are expected to encourage older people to continue to work, such as increases in the average retirement age, penalties for early retirement, and credits for delayed retirement, as well as decreases in withholding rates for those earning less than the exempt amount. Before the 1983 Social Security Amendments, Social Security and Medicare benefits played a big role in encouraging earlier retirement. However, the new full retirement age established under Social Security sets a new norm for society, and many have suggested that an increase in that age serves as one mechanism for strengthening the sustainability of the system. It is still not clear, however, to what extent Social Security encourages retirement or discourages continued work.

One of the most important barriers to working longer comes from privately negotiated defined benefit pension plans. The typical plan may state that the normal retirement age is 65, but a worker starting at age 25 is likely to find that the expected value of the pension accrues most rapidly between ages 51 and 55 under reasonable economic assumptions. Soon after 55, the accrual might actually turn negative. That is to say, the increased pension earned by working an extra year does not compensate for the fact that the person will get one less year of benefits (AARP, 2003). This is an important characteristic of many private plans as well as public plans for school teachers and government workers. Moreover, those age-neutral pension plans like the cash balance (CB) plan and 401(k) plan do help many workers to ease themselves into partial retirement (Kalnberg & Fitzpatrick, 2001).

Two decades ago, there was a positive desire to move people out of the labor force early in order to make room for baby boomers to work. Now, imminent changes in our demographic conditions created a much more urgent need for reform. The fact that people strongly have followed recent social trends toward retiring early limits the extent to which reform can counter the decline in labor force growth; but reform can help, and it can greatly improve the welfare of those individual workers who would welcome more flexible arrangements. In fact, there are a large number of legal and institutional barriers to more flexible employment arrangements for older workers. Although partial retirement is becoming an option for older workers, this option is limited by low-paying, part-time jobs due to the high cost to employers. Employee training and many administrative costs, for example, are essentially identical for full and part-time workers. A short-term work week raises the hourly costs to employers for these expenses. In contrast, offering part-

time schedules to workers holding jobs that generally require little training does not significantly raise the costs to employers, especially if benefit packages are more limited than those given to full-time workers. These jobs, by their nature, usually have low skill requirements and provide low pay (Sum & Fogg, 1990). As the younger population has declined and the growth rate in the female labor force has slowed, some service-sector employers have begun to target few cost jobs for older workers. Such employment will be attractive to a narrow range of older persons, however, as they usually entail part-time work with few fringe benefits. While widespread worker shortages may occur (U.S. Department of Labor, 1999), their effect on employment opportunities for older workers is difficult to predict. Particularly, workers are now encouraged to retire at specific ages, often well before the normal retirement age of 65. Private pensions are becoming important for retirement decisions. Yet, many who receive private pensions do go on to work in new fields or their same fields, but in a different capacity.

In principle, flexible retirement should be an opportunity for older workers who want to pursue work-leisure balance. Not all workers want to retire at age 65. In the era of post-mandatory retirement age, this choice extends both potential economic security and retirement enjoyment. Whether they are looking at part year or part-time work schedules, older workers should be able to make their retirement decisions voluntarily and as a result of weighing positive choices.

This chapter presented a review of definitions and measurement of retirement and summarized empirical studies on retirement behavior. A brief background of the Social Security system and pensions was also introduced. In the next chapter, a description of

the data and the sample used for analysis is presented. This explanation is followed by the empirical specification of a set of equations to be estimated, and an explanation of the interpretation of the estimated parameters.

CHAPTER 3

METHOD

The purpose of this study was to explore the effects of shocks, or unexpected changes to financial and human resources on retirement transitions in employment status and their relative importance among older respondents across two periods, the period between 1998 and 2000, and the period between 2000 and 2002. Specifically, this analysis focused on transitions to partial retirement (from full-time employment to part-time employment) and reverse retirement transitions (from no employment to part-time employment, or from no employment to full-time employment, or from part-time employment to full-time employment), and included comparisons between the different transition groups. For the empirical analysis, three recent waves from the Health and Retirement Study were used to construct the data set.

This chapter first provides a brief explanation of the data and sample, and then turns to an empirical specification of a set of equations to be estimated. After a variable explanation, the last section describes the statistical analysis.

3. 1. Data and Sample

3.1.1. Data Description

The data used in this study are from the 1998, 2000 and 2002 waves of the Health and Retirement Study (HRS), a nationally representative longitudinal survey. This survey was sponsored by the National Institute on Aging and conducted by the Institute for Social Research at the University of Michigan. The HRS sample was selected under a stratified multi-stage area probability sample design which involves differential selection probabilities: (1) “probability proportionate to size selection of U.S. Metropolitan Statistical Areas (MSAs) and Non-MSAs” (2) “area segments within sampled primary stage units” (3) “complete listing of all housing unit” (4) “systematic selection of housing units from housing unit listings for the sample area segments” (5) “selection of the household financial unit within a sample housing units” (http://hrsonline.isr.umich.edu/docs/sample.html).

The survey covers a broad range of features related to the well-being of older Americans, such as “work behavior, attitudes toward retirement and jobs, expectations and subjective probabilities, income and assets from various sources, family structure, health insurance and health status and event history” (http://hrsonline.isr.umich.edu/intro/sho_uinfo.php?hfyle=overview&xtyp=2). Thus, the survey is appropriate for providing information for policy-makers, program planners, and researchers who are concerned with retirement decisions, health insurance, and economic and psychological well-being among older people.

Starting in 1992, the HRS collected data on over 12,650 individuals aged 51-61 from 7,600 households. For married couples near retirement, separate interviews were

conducted with each spouse. For the initial interview, in-person interviews were conducted in the respondents' homes. The survey was continued using follow-up telephone interviews every second year, allowing proxy interviews after death. In 1998, the fourth wave, the data were collected from the previous sample and a new group of people aged 51-56. The response rate for the 1998 survey was 84.4%. For the fifth wave survey in 2000, the average response rate was 81.8%. The data collection for the 2002 wave (sixth wave) was conducted from January of 2002 to March of 2003, and the sample included a sub-sample of previous HRS participants. The HRS data collection process includes over-sampling of Hispanics, African Americans, and Florida residents.[7] The date file includes weight variables that can be used to generate estimates that are representative of the population (Institute for Social Research, 2002).

Questionnaires were designed so that individual retirement behavior could be connected with various other aspects of the respondent's life including health status, psychological factors, and financial variables. Among the existing data sets regarding retirement decisions, the HRS probably provides the most extensive source of individual and household information that is highly focused on biannual labor force behavior at the end of the life cycle (National Academy Press, 1997). Data are presented about household members aged 51 and older and provide a full record of personal information including work, income, and health status.

In particular, respondents were asked for detailed information related to labor force behavior: health, cognitive conditions and status, retirement plans and perspectives, attitudes, preferences, expectations, and subjective probabilities, family structures and

[7] The over-sampling only applies for respondents in the 1992 survey. This weight does not apply to the additional sample for the following waves.

transfers, employment status and job histories, job demands and requirements, disability, demographic backgrounds, housing, incomes and net worth, health insurance and pension plans (Institute for Social Research, 2004). Hence, the advantages of the HRS are that it allows for adequate statistical power, questions and hypotheses about retirement pathways that tie a wide variety of outcome with life experiences. Moreover, the data collected in these biannual longitudinal surveys have enabled researchers to conduct analyses with the goal of identifying and understanding the reciprocal links between labor supply and the macro environment.

The use of self-reported health-related events and family events from biannual surveys has the advantage of tracking personal history. Also, the survey included questions about expectations. These questions were asked in an effort to determine the probability of future events. For example, the respondents were asked the probability of their income keeping up with inflation. Thus, the survey may allow analyses of the relationship between prior expectations and retirement decisions. It is thought these lifetime shock effects (unmet expectations or unexpected events) explain short-term transition behavior in a life-cycle context. Additionally, questions on individual expectations about the economy may help explain people's behavior with respect to their financial status.

Needless to say, the advantage of the HRS comes from its scale and sampling (Juster & Suzman, 1995). A large, well-drawn sample allows researchers to draw inferences about population parameters; it allows comparisons within part-time older worker population subgroups and across time. The 1998, 2000, and 2002 data are the most recently available longitudinal panel with sufficient sample size to perform the

required analyses for this study. While data from the HRS can be examined cross-sectionally, the advantages of longitudinal design are especially compelling. In particular, a longitudinal design can provide information on transitions and changes during later-life. A longitudinal design allows one to track the emergence of disease, to identify the important correlates of differences in lifetime events and shocks to household resources, and to explore how differences in outcomes are related to differences in new experiences. That is, longitudinal data allows one to focus on people who make a transition between waves. Longitudinal data also make it possible to follow transition outcomes relative to behavioral differences.

In addition, the HRS obtained its data through both survey instruments and administrative records. For accurate and objective information, the Employer Pension Study, the National Death Index, earnings and projected benefits data from the Social Security Administration, W-2 and self-employment data, and Medicare files were all used. For example, employers provided information about health insurance benefits and pension coverage. Social Security records provided information on covered earnings and total taxable compensation.[8]

Several innovative techniques were used in the HRS (National Academy Press, 1997). Most of the surveys on labor supply and income collected information on types of assets, but no value of each asset was provided. The HRS, however, asked the holders about the values of their assets, using a "bracketing technique." Giving the categories of asset values may have been a key to the low rate of non-response. Missing value

8 The problem with Social Security earnings is the changes in the covered population overtime. During the 1970 and 1990 periods, federal government employees hired before 1984 were not covered and some state employees had changes in coverage. However, the restricted HRS Social Security data did not provide state of residence (Hu, 1999). Additionally, the supplementary data on covered earning are not available for the current three waves, 1998, 2000 and 2002.

imputation procedures were developed to deal with various problems arising from use of this bracketed information.

The current study uses the 1998, 2000 and 2002 surveys of respondents when they were at similar points in time; updated longitudinal data are also provided in the following survey. Since this study examines older people's transitions in employment status during this short period, the HRS surveys are appropriate for estimating the effects of shocks to household economic resources, health and marital status on retirement transition behavior.

3.1.2. Sample

Respondents who participated in at least two consecutive waves (1998 and 2000 or 2000 and 2002) of the HRS were initially selected. The sample for these analyses was constructed by pooling Panel 1(1998-2000), and Panel 2 (2000-2002), for males and females born between 1926 and 1938 who provided information on employment and financial status. This procedure reduced the sample to 12,580 observations. The youngest respondents were 60 years old in the first year of a panel and would be 62, the age for eligibility for Social Security benefits, in the following wave. Before narrowing the sample further, missing data were imputed. Income and assets information from the imputation data in HRS were used to reduce missing cases. For variables on education, however, 17 missing cases were replaced with median values (12 years for white, black and others, and 8 years for Hispanic people) of their race group. In the final step of sample selection, only respondents who changed employment status between the years of a panel were included, resulting in a total of 2,514 respondents consisting of 1,326 people

from Panel 1 and 1,188 people from Panel 2. There are four transition groups in the sample: 1) 739 individuals who made a reverse retirement transition from no employment to part-time employment or from no employment to full-time employment, or from part-time employment to full-time employment; 2) 711 individuals who made a transition from part-time employment to no employment; 3) 671 individuals in the traditional retirement group who made a transition from full-time employment to no employment; and 4) 393 individuals in the partial retirement group who made a transition from full-time employment to part-time employment. About 55% of the respondents ("full-time employment to no employment" and "part-time employment to no employment") made transitions toward full retirement over the two-year period.

Though exact age varies when considering birth month and interview time, the ages of those in the sample ranged approximately from 60 to 72 in 1998, from 62 to 74 in 2000; and from 64 to 76 in 2002. Because age 62 is the earliest age at which one can start to receive Social Security benefits and age 65 is the full retirement age for people who were born in 1937 and before, previous studies of retirement behavior closely tracked employment changes by respondents between the ages of 62 and 65. This age status has served as a common benchmark for evaluating retirement policy effects. Since this study focuses on nontraditional retirement, the current sample included an older age group beyond retirement age.

3.2. Empirical Specification

3.2.1. Variables

Table 3.1 defines the independent and dependent variables that will be used for the analysis and provides their descriptive statistics. Explanatory variables that affect transition behavior included shocks to marital status, health, and financial resources, institutional variables, and demographic characteristics. Additionally, the model controls for two important micro and macro attributes: adequacy of respondents' asset levels and the community unemployment rate. Shock variables include loss of spouse due to death, divorce or separation, health loss, and shocks to financial resources. Each shock occurred between time 1 (1998 for Panel 1 and 2000 for Panel 2) and time 2 (2000 for Panel 1 and 2002 for Panel 2). The effects of shocks are estimated controlling for institutional constraints such as pension plan type, health insurance coverage, and employment flexibility. Demographic characteristics are included to proxy one's preferences. Controlling for the adequacy of household assets is important in order to examine effects of shocks to financial resources. Monthly unemployment rate for the interview month at time 2 is included to control for business cycles.

Shocks to Human Resources

Change in marital status, including widowhood and divorce, reflects changes in expected income and consumption levels as well as household productivity. Marital status has been frequently included in retirement studies. The existence of a spouse not only reflects costs of retirement, but also implies additional financial sources. For older

Variable	Description	Mean (S.D.)	Min	Max
Shocks to Human Resources				
WIDDIVSP	=1, if widowed, divorced, or separated since time 1	.038(.19)	0	1
FEWIDDIV	Interaction term of FEMALE and WIDDIVSP	.021(.15)	0	1
HEALTHLS	=1, if had cancer, heart attack, stroke, or became disabled since time 1	.083(.28)	0	1
Shocks to Financial Resources				
REDUINCP	% change in reduced income	22.394(27.08)	0	100
NEGINSHC	=1, if expect income to keep up with inflation with 75%-100% confidence but real income declined at time 2	.142 (.35)	0	1
CHINCNEG	Interaction term between NEGINSHC and REDUINCP	5.647(16.79)	0	100
REDUASTP	% change in reduced assets	30.645(54.32)	0	364
NEGATSHC	=1, if expect double-digit inflation with 75%-100% probability but assets declined at time 2	.073(.26)	0	1
CHASTNEG	Interaction term between NEGATSHC and REDUASTP	5.341(28.19)	0	364
INCRINCP	% change in increased income	19.225(32.98)	0	100
POSINSHC	=1, if expect income to keep up with inflation with 0%-25% confidence but real income increased at time 2	.114(.32)	0	1
CHINCPOS	Interaction term between POSINSHC and INCRINCP	5.361(19.63)	0	100
INCRASTP	% change in increased assets	71.316(117.31)	0	364
POSATSHC	=1, if expect double-digit inflation with 0%-25% probability but assets increased at time 2	.124(.33)	0	1
CHASTPOS	Interaction term between POSATSHC and INCRASTP	15.823(61.01)	0	364
Institutional Variables				
SELFEMP	=1, if self-employed	.291(.45)	0	1
FLEXIBLE	=1, for being able to reduce and increase employment hours	.386(.49)	0	1
DB	=1, if defined benefit pension plan	.082(.27)	0	1

Continued

Table 3.1: Variable Description and Descriptive Statistics (N=2,514)

Table 3.1 continued

DC	=1, if defined contribution pension plan	.095(.29)	0	1
GOVHI	=1, if covered by Medicare or Medicaid	.687(.46)	0	1
PRIVHI	=1, if covered by private health insurance	.618(.49)	0	1
Demographic Control Variables				
AGE	Exact age at time 1 interview	65.26(3.55)	59.17	74.33
FEMALE	=1, if female	.47(.50)	0	1
EDU	Formal schooling years	12.47(3.12)	0	17
BLACK	=1, if African American	.143(.35)	0	1
HISPANIC	=1, if Hispanic	.066(.25)	0	1
Environmental Control Variables				
ADEQAST	Assets at time 2 divided by poverty threshold level	15.23(19.17)	–8.87	58
UNEMRATE	Unemployment rate at time 2	4.84(.91)	3.80	6.00
Dependent variable				
RT	Four transition types (0) Full time employment to no employment; (1) Reverse retirement; (2) Part time to no employment; (3) Full time employment to part-time employment			

Notes.1.Income and asset values were used by adjusting the 1998-dollar with the CPI-U.
2. Percentage change values were truncated at the 90th percentile value (100 for income and 364 for assets) to mitigate outlier effects.
3. The 1998 weighted poverty threshold level (U.S. Census Bureau, 2002) was used. ADEQAST was truncated at 90th percentile value, 58.

people, a spouse may provide economic resources and also serve as a caregiver. For example, an individual's basic needs and health status heavily depend on the spouse's economic, social, and psychological well-being. This makes marital status an important predictor of retirement decisions. This analysis considered change to marital status due to an adverse event. According to conservation of resources theory of stress by Hobfall

(1989), an acute lifetime event can be more influential than chronic status in an undesirable situation.

Change into widowhood might affect Social Security income and pension income as well as health insurance benefits. The loss of a spouse is often associated with financial difficulties, specifically for women. The current analysis looks at the experience of the death of spouse or divorce/separation between time 1 and time 2. A total of 3.8% of respondents became widowed or divorced or separated after time 1. The variable "FEMALE" was interacted with the variable for whether a respondent experienced a shock to martial status because different effects between men and women are expected for this shock. About 2.1% of the sample were females who experienced a shock to marital status over the two-year period.

Sudden health loss constrains employability as well as expenditure patterns. Increased health care and medical costs as well as disability limitations are expected to change an employee's/retiree's expected income and saving. Also, they can become eligible for government or private assistance programs such as disability insurance, based on their health status. If respondents were diagnosed with cancer, or had a stroke or a heart attack, or became disabled since time 1, the value "1" was assigned. About 8.3% of respondents experienced a health shock during the reference waves.

Shocks to Financial Resources

The role of shocks to financial resources at the individual level has been underplayed in past literature. Although the Keynesian consumption function gives no consideration to expectations of future economic conditions, the life-cycle hypothesis and

permanent income hypothesis present a linkage between individuals' consumption and their total resources as they pass from youth, through their employment years into their retirement years (Bryant, 1990). A decline in real income because of illness, unemployment, or recession must be met by a temporary decline in consumption. The life-cycle hypothesis emphasizes expected future income. If the income decline is temporary and expected, people need not drastically change their standard of living. They can withdraw savings to be replenished later when income recovers. They can also borrow against future expected income. Bottom line, the life-cycle hypothesis implicitly includes expectations because this theory considers expected future income. While people may not be able to say what their future income will be, they nevertheless act as if they could, although how that expectation is formed varies. What the life-cycle hypothesis suggests is that people make decisions today based on some expectation of future income. Changes in expected income may be permanent or transitory, depending on the history of that income. An individual may expect that what happened last year will happen this year. What if the prediction is wrong?

People plan their consumption and savings based on subjective estimates of expected income. When people have optimistic expectations and are confident their expectations are correct, unfulfilled outcomes tend to be more surprising to them. This might change their behavior, unlike the people for whom outcomes were previously expected. To measure financial shock, the variable indicating whether income is different from expectations, referred to as "SURPRISE", was used by Elder and Rudolph (2003) and provided a basis for the current analysis. In the HRS, respondents were asked, "What do you think are the chances that your income will keep up with inflation for the next five

years? The possible responses given were from “0” for “absolutely no chance” to “100” for “absolutely certain”. Household income included earnings and retirement income from both the respondent and spouse, and other non-employment income from all sources.

Real Income at Time 2 / Probability at Time 1	Decreased	Increased	Total
0-25%	472(18.8%)	286(11.4%)	758(30.2%)
26%-74%	638(25.4%)	465(18.5%)	1,103(43.9%)
75% to 100%	358(14.2%)	295(11.7%)	653(26.0%)
Total	1,468(58.4%)	1,046(41.6%)	2,514(100%)

Note. 1. The HRS provided household income of the last calendar year, 1997 for the 1998 survey, 1999 for the 2000 survey and 2001 for the 2002 survey. Every value was adjusted to 1998 dollars.
2. Shaded areas indicate the group that experienced income shock.

Table 3.2: Subjective Probability of Expected Income and Actual Income Reduction

Table 3.2 summarizes six groups defined by combinations of the subjective probability of income keeping up with inflation and, actual income changes between time 1 and time 2 (whether household real income at time 2 was less/more than household real income at time 1). More than 58% of people experienced a reduction in real income between the two waves. Respondents who were less confident about future income (probability of 0-25%) who experienced an actual income decrease at time 2 represented 18.8% of the sample. Respondents who were less confident but who experienced actual income increases represented 11.4% of the sample. Confident respondents (75%-100% probability) who experienced an income decrease represented 14.2% of the sample.

Confident respondents who experienced an income increase represented 11.7% of the sample.

The following table shows six groups by subjective probability about high future inflation. The HRS asked, “How about the chances that the U.S. economy will experience double-digit inflation sometime during the next 10 years or so”? The possible responses ranged from 0 to 100. More than 49% of the people experienced an actual reduction in household assets between time 1 and time 2. Those who expected future high inflation with a probability of 75%-100% and their actual assets then decreased at time 2 represented 7.3% of the sample. A total of 7.2% of respondents were confident people whose actual assets increased. Less confident respondents who did not expect high inflation represented 25.5%, while 12.4% of the total sample was less confident respondents who experienced a decrease in assets.

Actual Assets at Time 2	Decreased	Increased	Total
Probability at Time 2			
0-25%	329(13.1%)	312(12.4%)	641(25.5%)
26%-74%	721(28.7%)	786(31.3%)	1,507(59.9%)
75% to 100%	184(7.3%)	182(7.2%)	366(14.6%)
Total	1,234(49.1%)	1,280(50.9%)	2,514(100%)

Note. Shaded areas indicate the groups that experienced asset shock.

Table 3.3: Subjective Probability of High Inflation and Actual Assets Reduction

As shown in Table 3.1, the analysis considered unexpected changes to financial resources. Two continuous variables measuring income declines and income increases were constructed. One was percentage change in income for those who experienced an income reduction (REDUINCP). The second was percentage change in income for those who experienced an increase in income (INCRINCP). A total of 1,468 respondents experienced a reduction in real income. The average percentage change was 22.40%. The average percentage increase in income was 19.23%. Respondents who were confident that their real income would keep up with inflation but who experienced a reduction in actual income at time 2 were assigned "1" for the variable, NEGINSHC. Respondents who were less confident, but who experienced an increase in income were coded as experiencing a positive shock (POSINSHC = 1). About 14% and 11% experienced these income shocks, respectively. Two interaction terms were included in the analysis to ascertain whether and to what extent positive and negative shocks were affected by the size of the unexpected change in income. The interaction terms also made it possible to ascertain whether respondents reacted differently to shocking and non-shocking changes in income, and, if so, by how much.

Household assets may provide resources in sufficient quantities to survive inevitable cycles of abundance and scarcity. These assets for a rainy day provide a basis for financial stability and retirement planning. People buy goods and services with money from financial assets like savings. This aspect of assets allows a household to maintain its standard of living regardless of market work participation. Thus, rather than money income, accumulated assets could provide financial security that would allow one to retire. Sudden loss of assets may change decisions about consumption and retirement. Net

assets is defined as total assets minus debts. Assets consist of liquid assets, such as savings, and non-liquid assets, such as real estate.

Two continuous variables were constructed to measure decreases and increases in net asset value. One was percentage decrease in assets for those who experienced a decline in net asset value. The second was percentage increase in assets for those who experienced an increase in net asset value. If a respondent expected high inflation with a 75%-100% probability, but their assets declined in value after two years, they were considered to have experienced an adverse asset shock. The value "1" was assigned to NEGATSHC for these respondents. If a person expected double-digit inflation with a 0%-25% probability, but their assets retained at least the same value, they were considered to have experienced a favorable asset shock. The value "1" was given to POSATSHC for these people. A total of 7.3% experienced an adverse shock, and about 12.4% experienced a favorable shock.

Two interaction terms were created and included in the analysis to ascertain whether and to what extent positive and negative shocks were affected by the size of the unexpected change in net asset value. The interaction terms also made it possible to ascertain whether respondents reacted differently to shocking and non-shocking changes in net asset value, and, if so, to what extent. A total of 1,234 respondents experienced a reduction in assets and the average percentage change was 30.64%.

Institutional Variables

This analysis included job characteristics related to labor force flexibility. Two dummy variables were included: self-employment (SELFEMP) and opportunities for

reducing or increasing employment hours (FLEXIBLE). The value "1" was given if a respondent was self-employed. These respondents are expected to have different patterns from other respondents because of their control over retirement decisions and retirement timing. They have more opportunities to choose flexible approaches to the retirement process compared to those who are employed by others. About 29% of the respondents were self-employed. The proportion of self-employed in this sample was higher than in the HRS, suggesting that self-employed persons may be more likely to change their work status. More than 38% of respondents reported that they were able to reduce or increase their employment hours.

Two measures of pension type are included, dummy variables for defined benefit pension and defined contribution pension. In a defined benefit plan (DB), the amount of pension income is based on a formula involving age, years of service, and salary, and professionals manage accumulated funds to pay these benefits within legally mandated actuarial guidelines, so income from these pensions is more secure than that from defined contribution pensions. In a defined contribution plan (DC) money is accumulated in an account and pension income is dependent on the amount of money accumulated rather than a formula. Also, there is no actuarial standard or review for the invested funds so the employee's pension income is less assured and more variable. Thus, pension type affects the lifetime budget constraint. About 8% of respondents held a defined benefit pension plan, and about 9.5% of respondents held a defined contribution pension plan (Table 3.1). Under defined contribution plans, people may see retirement as especially advantageous during strong stock market periods and vice versa.

Medicare or Medicaid coverage (GOVHI) and private health insurance (PRIVHI) are important because, not only do these reflect differences in the quality of life and expenditure patterns, the benefits are closely associated with retirement decisions. For example, reducing employment hours might affect the availability and/or cost of health benefits. A total of 68.7% of respondents were covered by Medicare or Medicaid. Private insurance included both self-employed health insurance and employer-provided insurance, and about 62% of respondents were covered by private health insurance.

Demographic Control Variables

Age is a major indicator that reflects one's productivity in the labor market and is also associated with eligibility for retirement benefits. Life-cycle theories present consumption and expected income relationships with respect to age. Even among older people between birth cohorts 1926-1938, their consumption and saving decisions vary, depending on their market productivity and physical ability. Also, age serves as an institutional constraint via employer age stereotyping and retirement benefit eligibility. For a person preparing for retirement, different types of benefits are provided based on age. Age 65 is the normal retirement age for birth cohorts before 1938 and age 65. 167 (65 and 2 months) is normal retirement age with eligibility for full Social Security benefits for the 1938 birth cohort. The exact ages at time 1 ranged from 59.17 to 74.33 with an average age of 65.3 years (Table 3.1).

In addition to age, there are observable socio-demographic conditions beyond an individual's control. These may affect one's access to the labor market and one's employment pattern as well as one's preferences. Gender and anthropomorphic

characteristics are commonly employed in retirement decision models (e.g., Ruhm, 1990; Williamson & McNamara, 2001). These characteristics often provide information on stratification of resources, benefits, and opportunities in the market. Previous reports indicated that older African Americans and Hispanics had a different financial status from Whites (Social Security Administration, 2003b). These groups also have shown different employment patterns at the end of the life cycle (e.g., O'Rand & Henretta, 1982; Ruhm, 1990). About 14% and 6.6% of the sample were of African American and Hispanic origin, respectively (Table 3.1).

Education is an important attribute explaining labor market productivity and time preferences. Higher investment in schooling at younger ages may reflect time preference for the future over present time. In general, one's education provides resources for understanding and processing broad types of knowledge and skills. Thus, education represents competitiveness in the labor market and may encourage older people to remain in the labor market for both monetary and non-monetary returns. Formal schooling years ranged from 0 to 17 with an average of 12.5 years (Table 3.1).

Although these socio-demographic characteristics are expected to influence retirement decisions, their direction and significance may vary across samples and empirical specifications. Without uncertainty or institutional constraints, life-cycle theory indicates that labor supply might be decided primarily by age and preferences.

Environmental Control Variables

Household asset adequacy level is controlled in order to better examine the effects of financial shocks. If household assets are adequate for the remaining lifetime, the shock

to financial resources may not be important. The asset adequacy level was measured as net assets at time 2 divided by the poverty threshold level. Asset adequacy was measured in poverty threshold units, so a unit increase in asset adequacy is a change in assets equal to the family poverty threshold. The original maximum value of ADEQAST was 2,684; the value at the 90th percentile was 58. All values in excess of 58 were recoded to 58. The average score of the truncated adequacy level was 15.23 and ranged from –8.87 to 58.

One continuous variable is included to control for business cycles. For each interview date at time 2, that month's unemployment rate was used. A total of eight values were assigned for the model (Bureau of Labor Statistics, 2004). The unemployment rate ranged from a minimum of 3.80% to a maximum of 6.00% with an average of 4.84% (Table 3.1). The average unemployment rate was 3.98 for Panel 1 and 5.79 for Panel 2.

Dependent Variable

The dependent variable in the study measures retirement transitions for respondents involved in changing their employment status between time 1 and time 2. Based on regular weekly employment hours, three types of employment status were determined: Not employed for 0 hours, part-time employment for 1-34 hours, and full-time employment for 35 hours and over. Based on employment status, four transition groups were defined as: (0) "full-time employment to no employment" group (N=671, 26.7%); (1) reverse retirement group (N=739, 29.4%) consisting of "no employment to part-time employment" and "no employment to full-time employment" and "part-time to

full-time employment "; (2) "part-time to no employment " group (N=711, 28.3%); and (4) partial retirement group (N=393, 15.6%), "full-time employment to part-time employment".

Table 3.4 presents sample descriptive statistics for characteristics of the transition groups. Pearson Chi squared was used to test differences in frequency distributions for categorical variables. The Dunnett's T3 and Tukey HSD tests of difference in multiple means also was used. SPSS (12.0) software was used to generate the descriptive statistics and run the tests of difference.

As indicated by the Chi squared in Table 3.4, the frequency of a marital shock did not differ across the transition groups. The frequency of health loss was significantly different across the transition groups. Both the traditional retirement group and the retirement from part-time employment group showed higher proportions of respondents who experienced health loss.

The traditional retirement group had the highest average amount of income reduction, while the reverse retirement group showed the lowest average amount of income reduction. The Dunnett's T3 test for reduced income indicated that traditional retirement and reverse retirement groups were significantly different from the other transition groups. The Chi squared statistic for a negative income shock was not significant. The mean difference for asset reduction was not significant by the F-statistic from one-way ANOVA. The frequency distribution for a negative asset shock was not different across transitions.

Variables	(g) Full-time to no employment (N=671)	(h) Reverse retirement (N=739)	(i) Part-time to no employment (N=711)	(j) Partial retirement (N=393)	Chi-Square Statistic[a]
Shocks to Human Resources					
WIDDIVSP	19 (2.8%)	27 (3.7%)	34 (4.8%)	16 (4.1%)	3.700
HEALTHLS	76 (11.3%)	35 (4.7%)	78 (11.0%)	20 (5.1%)	32.344*
Shocks to Financial Resources					
REDUINCP	30.114[h,i,j]	15.332[g,i,j]	23.606[g,h]	20.300[g,h]	37.646*
NEGINSHC	111 (16.5%)	92 (12.4%)	107 (15.0%)	48 (12.2%)	6.556
REDUASTP	28.475	34.736	30.491	26.934	2.372[b]
NEGATSHC	42 (6.3%)	44 (6.0%)	62 (8.7%)	36 (9.2%)	7.163
INCRINCP	13.413[h,j]	27.194[g,i]	14.975[h,j]	21.856[g,i]	26.522*
POSINSHC	53 (7.9%)	122 (16.5%)	67 (9.4%)	44 (11.2%)	30.060*
INCRASTP	78.176[i]	72.217	61.540[g]	75.598	2.592*
POSATSHC	91(13.6%)	68(9.2%)	93(13.1%)	60(15.3%)	11.062*
Institutional Variables					
SELFEMP	107 (15.9%)	257 (34.8%)	199 (28.0%)	168 (42.7%)	103.766*
FLEXIBLE	170(25.3%)	309 (41.8%)	299 (42.1%)	192 (48.9%)	74.062*
DB	82 (12.2%)	51 (6.9%)	35 (4.9%)	39 (9.9%)	27.654*
DC	84 (12.5%)	56 (7.6%)	34 (4.8%)	65 (16.5%)	51.314*
GOVHI	364 (54.2%)	573 (77.5%)	561 (78.9%)	229 (58.3%)	146.311*
PRIVHI	454 (67.7%)	422 (57.1%)	405 (57.0%)	272 (69.2%)	32.847*
Demographic Control Variables					
AGE	64.02[h,i,j]	65.71[g,i,j]	66.27[g,h,j]	64.70[g,h,i]	56.718*
FEMALE	280(41.7%)	351(47.5%)	378(53.2%)	169(43.0%)	20.913*
EDU	12.33[j]	12.30[j]	12.43[j]	13.12[g,h,i]	7.148*
BLACK	97(14.5%)	117(15.8%)	95(13.4%)	51(13.0%)	2.498
HISPANIC	69(10.3%)	48(6.5%)	37(5.2%)	13(3.3%)	23.786*
Environmental Control Variables					
ADEQAST	14.798	13.563[i]	16.566[h]	16.672	3.811*
UNEMRATE	4.725[h,i]	4.904[g]	4.767[g]	4.769	6.885*
Total	671(100 %)	739(100%)	711(100%)	393 (100%)	

[a] For dichotomous variables, the chi-squared statistic is a test of independence. For continuous variables, the chi-squared statistic is from a Brown-Forsythe test when the Lavene statistic from the test of homogeneity of variance is significant.

[b] The Lavene statistic was not significant. As a result, the F-statistic from a one-way ANOVA is reported.

[g, h,i, j] Indicate the mean is significantly different from the mean of that superscript group by the Dunnett's T3 test when the Lavene statistic from the test of homogeneity of variance is significant. For REDUASTP, the Tukey HSD test is used.

Table 3.4: Univariate Analysis Results for Non-Interaction Term Variables

The Brown-Forsythe test indicated that both increases in income and assets were different across groups. With respect to income, both the reverse retirement and the partial retirement groups were different from the traditional retirement group and the retirement from part-time employment group. The average amount of increased income for the reverse retirement group was not different from the average amount of increased income for the partial retirement group. The average amount of increased assets for the traditional retirement group was different from the average amount of increased assets for the retirement from no employment group. The partial retirement group had the highest proportion of those who experienced a positive asset shock. The Chi-squared statistic indicated that the frequency of a positive income shock differed across transition groups.

All the Chi-squared statistics for institutional variables were statistically significant. Self-employed people and those who have flexible employment hours were under-represented among the traditional retirement group but over-represented among the partial retirement group. The partial retirement group also had the highest proportion with a defined contribution pension plan and private insurance coverage. People who had pension plans were under-represented among the retirement from part-time employment group. The proportion with federal insurance coverage was highest for the retirement from part-time employment group and lowest for the traditional retirement group.

Average age at time 1 was highest for the retirement from part-time employment group and lowest for the traditional retirement group. According to the results of the Dunnett's T3 test, the average age of each transition group was significantly different from the average of the other groups.

The whole sample consisted of 1,336 males (53.1%) and 1,178 females (46.9%). Because people who never were in the labor force between the reference waves were excluded, the proportion of men was higher than that of women. More women (53.2%) than men (46.8%) were retired from part time employment. They were over-represented in the reverse retirement group. The Chi-squared statistic was significant at the 0.05 level.

The average education of respondents in the partial retirement group was significantly higher than the education of respondents in the other three transition groups. The other three transition groups were not significantly different from each other.

The distribution of Hispanic respondents differed among the transition groups according to the Chi squared statistic. Hispanics were under-represented among the partial retirement group. The distribution of Black respondents was not significantly different among transition groups.

The Brown-Forsythe test statistic was statistically significant for adequate asset level. Respondents who retired from part-time employment had greater asset adequacy than respondents in the reverse retirement group as indicated by the Dunnett's T3 test.

The average unemployment rate varied significantly across the transition groups. According to the Dunnett's T3 test, the unemployment rate for the traditional retirement group was lower than unemployment rate for the reverse retirement group and the retirement from part-time employment group. Respondents in the partial retirement group faced a very similar unemployment rate to that of the retirees from part-time employment. The implication of the lack of significance for the partial retirement group's unemployment rate is that there was greater variance within the partial retirement group than within the retirees from part-time employment.

3.2.2. Statistical Procedure

Multinomial Logit Model

To analyze the categorical dependent variable for respondents' employment transitions, a multinomial Logit procedure was employed.[9] Estimation of the multinomial Logit was done by maximum likelihood.[10] The likelihood ratio is formed as the product of the probabilities of each observation (Greene, 2002). The multinomial Logit model that originated in the work of Nerlove and Press in 1973 is appropriate because the four categories of the dependent variable exceed two and are not independent. Multinomial Logit handles non-independence by estimating the models for all outcomes simultaneously (Long, 1997). The dependent variables are assumed to have unordered categories. Using the multinomial Logit procedure for this analysis has the advantage of a degree of ease (Agresti, 1990) of execution and interpretation. Using multinomial Logit also may help minimize outlier effects (Pampel, 2000). The Logit model is recommended over other procedures for analyzing limited dependent variables when there are many cases in one tail or the other of a distribution, as is the case in the current data.

The application of the multinomial Logit model implies a model of employment transition decisions in which a person makes a single decision, the outcome of which is a single transition. The four possible alternative transitions in this analysis each have an

[9] There are a number of retirement studies that employed a multinomial Logit model, particularly to look at more than binomial choice. For example, see Blau (1994), Dwyer & Hu (2000), Mitchell & Fields (1984), and Peracchi & Welch (1994). A large literature with a dependent variable of multinomial labor supply choices, however, used the binomial Logit model instead of multinomial Logit model (e.g., Hall & Johnson, 1980; Hamermesh, 1984; Hong, 1985; O'Rand & Henretta, 1982, Ruhm, 1990).

[10] Because the HRS sampling design feature involves selection probabilities, software program that assumes simple random sampling can underestimate variances of estimated parameters (Institute for Social Research, 2002). Current analysis presents corrected standard errors based on asymptotic covariance matrix by placing weights. If under or oversampling is severe, this method will yield much larger corrected standard errors (Greene, 2002).

associated probability. The sum of the probabilities for the four transitions equals one. Following Maddala (1983), let *RT* be the discrete choice of each transition type and $P_{RT=m}$ (m = 0,1,2,3) be the probability of falling into the mth group where there are 4 groups.

With a vector of explanatory variables, X and parameters β, the mth logit has the following form:

$$\log \frac{P_{RT=i}}{P_{RT=j}} = \beta_m^{'} X \qquad (3.1)$$

Where m = every ratio of i and j, i, j = 1,..,4 $i<>j$

The logit function was empirically specified as:

$$Log \frac{P_{RT=i}}{P_{RT=j}} = \beta_{m0} + \beta_{m1} WIDDIVSP + \beta_{m2} FEWIDDIV + \beta_{m3} HEALTHLS + \beta_{m4} REDUINCP$$
$$+ \beta_{m5} NEGINSHC + \beta_{m6} CHINCNEG + \beta_{m7} REDUASTP + \beta_{m8} NEGATSHC + \beta_{m9} CHASTNEG$$
$$+ \beta_{1m10} INCRINCP + \beta_{m11} POSINSHC + \beta_{m12} CHINCPOS + \beta_{m13} INCRASTP + \beta_{m14} POSATSHC$$
$$+ \beta_{m15} CHASTPOS + \beta_{m16} SELFEMP + \beta_{m17} FLEXIBlE + \beta_{m18} DB + \beta_{m19} DC + \beta_{m20} GOVHI$$
$$+ \beta_{m21} PRIVHI + \beta_{m22} AGE + \beta_{m23} FEMALE + \beta_{m24} EDU + \beta_{m25} BLACK + \beta_{m26} HISPANIC$$
$$+ \beta_{m27} ADEQAST + \beta_{m28} UNEMRATE + \varepsilon$$

Where $m = 1,\ldots,7$ (3.2)

$$FEWIDDIV = WIDDIVSP * FEMALE$$

$$CHINCNEG = REDUINCP * NEGINSHC$$

$$CHASTNEG = REDUASTP * NEGATSHC$$

$$CHINCPOS = INCRINCP * POSINSHC$$

$$CHASTPOS = INCRASTP * POSATSHC$$

The left term indicates the log of the ratio of the probability of ending up in one of the groups relative to another transition group, and ε refers to a random error term. The explanatory set of variables is assumed to be the same for each transition.

Interpretation of Estimated Parameters

The parameters of the standard logit model are marginal effects on the log odds ratio and may be interpreted as the percentage change in the odds of two categories per unit change in the explanatory variable. However, interaction effects were specified in equation 3.2, so the standard interpretation is not correct for all the parameters. The first derivatives of equation 3.2 are marginal effects and may be interpreted as the percentage change in the odds per unit change in the explanatory variable. To evaluate the effect of each variable, the marginal effects from equation (3.2) are derived and marginal effects are interpreted rather than parameters. The effect of a shock to marital status is the first derivative of the log-odds with respect to widowhood:

$$\beta_{m1}+\beta_{m2}FEMALE \qquad (3.3)$$

The first term in the marginal effect is the effect of a marital shock for men. For women, the effect of a marital shock becomes $\beta_{m1}+\beta_{m2}$. The marginal effect of a health shock is straightforward. Since β_{m3} directly indicates the marginal effects on the log-odds. Thus, the parameter is interpreted as the percentage increase or decrease in the odds of the observed transition over the base group when a respondent experienced a health loss.

As shown in Table 3.1, to estimate the effect of each financial shock, two main effect variables and an interaction term were included in the equations. Two marginal effects will be discussed to interpret the effect of financial shocks. The marginal effect of a change in resources will be referred to as a response effect in the results and discussion. The response effect can be decomposed into a main effect of a resource change and a

sensitivity effect. From equation (3.2), the first derivatives with respect to the percentage change in financial resources give the marginal effects of a change in resources. The four marginal effects for changes in resources (negative income change, negative asset change, positive income change, positive asset change) are specified as:

$$\begin{aligned} &\beta_{m4}+\beta_{m6}NEGINSHC \\ &\beta_{m7}+\beta_{m9}NEGATSHC \\ &\beta_{m10}+\beta_{m12}POSINSHC \\ &\beta_{m13}+\beta_{m15}POSATSHC \end{aligned} \qquad (3.4)$$

The first term in the marginal effect is the main effect of a resource change. The main effect of a resource change can be interpreted as the percentage change in the odds of the transition due to a one percent change in resources in the absence of a shock. The second term in the marginal effect is the sensitivity effect. The sensitivity effect is the adjustment in the main effect due to the shock. For people who do not experience a shock the sensitivity effect is zero. For people who do experience a shock both components are nonzero.

The marginal effect of a resource shock will be referred to as the direction effect in the results and discussion. The direction effect can be decomposed into a shock effect and a size effect. From equation 3.2, the first derivative with respect to the four financial shock dummy variables (negative income shock, negative asset shock, positive income shock, positive asset shock) are:

$$\begin{aligned} &\beta_{m5}+\beta_{m6}REDUINCP \\ &\beta_{m8}+\beta_{m9}REDUASTP \\ &\beta_{m11}+\beta_{m12}INCRINCP \\ &\beta_{m14}+\beta_{m15}INCRASTP \end{aligned} \qquad (3.5)$$

The first term in the direction effect is the main effect of the shock. The main effect of the shock can be interpreted as the change in the intercept due to the surprise itself. The second term in the direction effect is the size effect. The size effect is the adjustment in the intercept due to the amount of the unexpected resource change. To estimate each size effect, the respective average percentage change in financial resources for the sample is used. From Table 3.1, the average percent decline in income for the sample is 22.394; the average percent decline in assets for the sample is 30.645; the average percent increase in income for the sample is 19.225; and the average percent increase in assets for the sample is 71.316.

When the response effect and the direction effect have the same sign, the effect of a shock is straightforward. When the response effect and the direction effect differ in sign, the effects offset each other. In this case, a point can be identified where the actual direction of the net effect can reverse. This point will be referred to in the results and discussion as the breakeven point. When the response effect and the direction effect differ in sign, the breakeven points are derived by dividing the direction effect by the response effect. The breakeven points (negative income shock, negative asset shock, positive income shock, positive asset shock) are specified as:

$$\begin{aligned}
&\beta_{m5} + \beta_{m6} REDUINCP \Big/ -(\beta_{m4} + \beta_{m6}) \\
&\beta_{m8} + \beta_{m9} REDUASTP \Big/ -(\beta_{m7} + \beta_{m9}) \\
&\beta_{m11} + \beta_{m12} INCRINCP \Big/ -(\beta_{m10} + \beta_{m12}) \\
&\beta_{m14} + \beta_{m15} INCRASTP \Big/ -(\beta_{m13} + \beta_{m15})
\end{aligned} \qquad (3.6)$$

The breakeven point is interpreted as the amount of resource change necessary to negate the direction effect, given the response effect.

There is no expectation about the relative size of the two components within each marginal effect. Based on the theory of labor supply, increases in wealth would be expected to reduce labor supply and increase consumption. Also, life-cycle theory implies that unexpected income changes may change future expected income. Thus, people may revise their consumption and labor supply plans. To maintain a standard of living, an unexpected income decline might lead to increased labor force participation. An unexpected increase in wealth may induce retirement among older people.

In this context, negative financial shocks are expected to increase the odds of reverse retirement and positive financial shocks are expected to decrease the odds of reverse retirement. Likewise, positive financial shocks are expected to increase the odds of retirement from part-time employment and negative financial shocks are expected to decrease the odds of retirement from part-time employment when compared to reverse retirement or partial retirement. There are no a priori expectations with respect to partial retirement.

Also, Prospect theory suggests that people respond to losses more than to gains (Kahneman and Tversky, 1979; Thaler, 1985). For this reason, negative financial shocks are expected to be more significant and to have larger effects than positive shocks on the odds of reverse retirement over traditional retirement.

The estimated logit coefficients (β_m) for the institutional variables, the demographic control variables with the exception of FEMALE, and the environmental control variables are the marginal effects on the log-odds. Thus, the coefficient is interpreted as the percentage increase or decrease in the odds of the relevant transition group relative to the base group per unit change in the explanatory variable.

Numerous studies have used separate models for men and women although a small number of studies used combined samples (Haider & Loughran, 2001; Williamson & McNamara, 2001). The pooled sample of men and women in this study allows an examination of gender effects, controlling for given predictors. To evaluate the effect of gender, the first derivative of the log-odds with respect to FEMALE is:

$$\beta_{m23}+\beta_{m2}WIDDIVSP \qquad (3.7)$$

The first term is the gender effect for women who did not experience a marital shock. For women who experienced a shock to marital status, the gender effect is $\beta_{m23}+\beta_{m2}$. Thus, the gender effect is different for women who experience a marital shock and women who do not.

To determine the impact of each independent variable on the log odds of labor market transitions, the magnitude of each marginal effect will be considered in addition to the statistical significance of the estimated coefficients. The rationale for focusing on all marginal effects, and not relying solely on statistical significance, is that the full model provides the "best estimate" of the effect of each independent variable on the dependent variable. While an estimated coefficient that is not statistically significant is typically interpreted as meaning we do not have strong evidence that the true parameter is statistically different from zero it doesn't mean that true parameter is exactly equal to zero. Thus, we will interpret each estimated coefficient as the "best estimate" of the true parameter, regardless of statistical significance.

To answer the implicit question in objective one, "What is the effect of shocks on retirement transitions?," the marginal effects of the shock variables on the odds of pairs of transitions will be interpreted. All of the respondents in this sample made a retirement

transition, so framing the discussion of the results in terms of odds of one transition versus another makes sense. Both the sign and the size of the marginal effects of the shocks on the odds are relevant aspects of the answer. Another aspect of the answer to this question is whether some shocks have a more reliable effect than others. There is also the question of whether all shocks have the same type of effect. Do all losses (gains) have the same sign within an equation, and is the sign different from that for shocking gains (losses)?

To answer the implicit questions in objective two, "What is the relative impact of shocks?," a qualitative assessment will be made. The size and significance of the shock variables will be compared with other groups of variables for each transition and across transitions. The comparison will focus on whether: 1) shocks to human and financial resources have larger effects than institution constraints, 2) shocks have larger effects on the odds of some transitions than on others, and 3) shocks have significant effects on some odds and not on others.

CHAPTER 4

EMPIRICAL RESULTS

The objectives of this study were to explore how shocks, or unexpected changes to financial and human resources, affect retirement transitions, and to explore the relative importance of shocks in making retirement transitions. To deal with the discrete nature of employment transitions, the multinomial Logit model was estimated by Newton's Method, using the LIMDEP (8.0) software system (Greene, 2002).

The estimated parameters of the multinomial Logit model examining employment transitions are reported in Table 4.1. The four transitions examined are: (1) traditional retirement, capturing the transition from full-time employment to no employment; (2) reverse retirement, consisting of no employment to part-time employment and no employment to full-time employment and part-time employment to full-time employment; (3) retirement from part-time employment, capturing the transition from part-time employment to no employment; and (4) partial retirement, capturing the transition from full-time employment to part-time employment. The sample used in the analysis pooled data from two panels (1998-2000 and 2000-2002) and resulted in a total sample of 2,514 older employees. The null hypothesis of the multinomial Logit model

	Reverse Retirement		Part-time to No Employment		Partial Retirement	
Variable	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Constant	-6.695***	1.501	-10.754***	1.485	-6.608***	1.824
Shocks to Human Resources						
WIDDIVSP	-0.429	0.579	0.798*	0.424	0.193	0.521
FEWIDDIV	1.480**	0.736	-0.496	0.633	0.644	0.728
HEALTHLS	-0.840***	0.231	0.196	0.198	-0.765***	0.296
Shocks to Financial Resources						
REDUINCP	-0.018***	0.0030	-0.009***	0.003	-0.010***	0.003
NEGINSHC	0.294	0.319	0.321	0.316	-0.180	0.376
CHINCNEG	-0.002	0.007	-0.008	0.007	-0.001	0.008
REDUASTP	0.001	0.001	-0.0003	0.001	-0.002	0.002
NEGATSHC	-0.560	0.356	0.227	0.332	0.207	0.340
CHASTNEG	0.006*	0.0033	0.003	0.004	0.005	0.004
INCRINCP	0.005**	0.002	-0.002	0.003	0.003	0.003
POSINSHC	-0.134	0.321	-0.185	0.334	0.074	0.384
CHINCPOS	0.009	0.006	0.007	0.006	-0.001	0.007
INCRASTP	-0.001	0.001	-0.001**	0.001	-0.0003	0.001
POSATSHC	-0.910***	0.270	0.032	0.245	-0.018	0.282
CHASTPOS	0.003**	0.001	-0.001	0.002	0.001	0.001
Institutional Variables						
SELFEMP	1.564***	0.161	0.938***	0.162	2.527***	0.195
FLEXIBLE	1.218***	0.135	1.022***	0.131	1.976***	0.176
DB	-0.242	0.211	-0.722***	0.217	0.121	0.233
DC	-0.259	0.203	-0.873***	0.223	0.558***	0.208
GOVHI	0.502***	0.169	0.271	0.165	-0.302	0.195
PRIVIHI	-0.248*	0.136	-0.314**	0.138	0.142	0.166
Demographic Control Variables						
AGE	0.083***	0.024	0.151***	0.023	0.062**	0.028
FEMALE	0.407***	0.124	0.802***	0.124	0.246*	0.145
EDU	0.006	0.021	-0.007	0.020	0.067**	0.027
BLACK	0.033	0.174	0.049	0.183	-0.045	0.217
HISPANIC	-0.242	0.246	-0.294	0.244	-0.799**	0.358

Continued

Table 4.1: Multinomial Logit Results of Retirement Transition: Effects on Log-Odds

Table 4.1 continued

Environmental Control Variables						
ADEQAST	-0.006	0.004	0.009**	0.004	-0.010**	0.004
UNEMRATE	0.142*	0.073	0.090	0.072	0.020	0.084
Actual N	739		711		393	
Predicted N	854		728		228	
Corrected predicted	375		309		100	
Log-likelihood with d.f. 84			–3418.380			
Chi-squared			883.3617***			
R^2			0.12921			

Notes. Corrected Standard Errors (S.E.) were based on the asymptotic covariance matrix.
Base group (N=671) is "full-time employment to no employment" group. Predicted N=704, correctly predicted N=386
*Significant at the 0.1 level **Significant at the 0.05 level ***Significant at the 0.01 level

was rejected at the 0.001 significance level. The Pseudo R^2 value[11] for the model was 0.1292, indicating that 12.92% of the variation in the dependent variable was explained by the independent variables.

The constant terms were negative and significant for the odds of reverse retirement, retirement from part-time employment, and partial retirement compared to traditional retirement. This implies that the probability of belonging to the traditional retirement group was the highest of all four groups controlling for all of the predictors in the model.

[11] The R-square was calculated using McFadden's Pseudo $R^2 = 1 - \left(L_M / L_0 \right)$, where L_M denotes the log-likelihood value of the Logit model and L_0 is the log-likelihood value when the non-constant parameters are restricted to zero. McFadden's R-square is known to be the most appropriate for a multinomial Logit model (Borooah, 2001).

The results from the multinomial Logit model that compared traditional retirement to each of the other three employment transitions are interpreted in the next three sections. The estimated multinomial Logit coefficients are presented in Table 4.1. The marginal effects of each independent variable on the log odds for each pair of transitions are presented in Appendix Table A1.

4.1. Odds of Reverse Retirement vs. Traditional Retirement

4.1.1. Shocks to Human Resources

The multinomial Logit results (Table 4.1) confirm the importance of shocks to human resources on older employees' decisions to increase their hours of paid employment. The loss of a spouse for females and health shocks had significant effects in the expected direction. Experiencing the loss of a spouse reduced the odds of reverse retirement over traditional retirement for men by 42.9%. For women, the loss of a spouse increased the odds of reverse retirement over traditional retirement by 105.1% (Table A1). Experiencing a serious illness such as a heart attack or cancer decreased the odds of reverse retirement over traditional retirement, as expected. The odds of reverse retirement were 84% lower for people who experienced a health shock.

4.1.2. Shocks to Financial Resources

Income reductions were significantly associated with decreased odds of reverse retirement. Unexpected, or shocking, declines in income augmented the effect of income reductions. A one percent decline in income was associated with a 1.8% decline in the

odds of reverse retirement. When that decline in income was unexpected, the shock augmented the response to the income decrease by 11% (=0.2/1.8). The effect of the decline in income increased by 0.002 (the sensitivity effect) to 2%. Thus, a one percent shocking decline in income was associated with a 2% decline in the odds of reverse retirement.

The direction effect of a negative income shock increased the odds of reverse retirement over traditional retirement by 24.9%. The total direction effect consisted of a 29.4% shock effect and a negative 4.5% size effect. Because the response effect (-0.02) and direction effect (0.249) had opposite signs, small declines in income had a different effect from large declines in income. Shocking declines in income up to 12.46% increased the odds of reverse retirement. Larger declines in income reduced the odds of reverse retirement.

Asset reductions had an insignificant effect on the odds of reverse retirement. However, when asset reductions were a shock, the effect of a one percent asset reduction on the odds of reverse retirement was significantly larger. A one percent asset reduction increased the odds of reverse retirement by 0.1%. When the asset reduction was a shock, a one percent asset reduction increased the odds of reverse retirement for a response effect of 0.7%. There was a 600% increase in the response effect to an asset decline when that decline was unexpected.

The direction effect of a negative asset shock was -37.6%. The direction effect consisted of a negative 56% shock effect and an 18.4 % size effect. Because the response effect (0.007) and the direction effect (-0.376) had opposite signs, shocking asset declines

of less than 53.7% decreased and unexpected asset declines greater than 53.7% increased the odds of reverse retirement.

Increases in income had a significant effect on the odds of reverse retirement over traditional retirement. As income increased by 1%, the odds of reverse retirement increased by 0.5%. Unexpected income increases augmented the response to the income increase; however neither the sensitivity effect nor the direction effect had significant effects on the odds of reverse retirement. When the increase in income was unexpected, a one percent increase in income increased the odds of reverse retirement by 0.009 for a response effect of 1.4%.

The direction effect of a positive income shock was 3.9%. The direction effect of a positive income shock consisted of a negative 13.4% shock effect that was moderated by a positive 17.3% size effect. For shocking income increases, both the response effect and the direction effect were positive. Thus positive income changes increased the odds of reverse retirement.

Expected increases in assets had an insignificant effect on the odds of reverse retirement. However, unexpected asset increases had significant sensitivity and direction effects on the odds of reverse retirement. An expected one percent increase in assets decreased the odds of reverse retirement 0.1%. When the increase in assets was unexpected, a one percent increase in assets increased the odds of reverse retirement by 0.003 (the sensitivity effect) increasing the response effect to 0.2%. Not only did the response effect of a change in assets double the odds of reverse retirement, the response effect also changed from negative to positive when the asset increase was unexpected.

The direction effect of a positive asset shock was negative 69.6% and consisted of a negative 91% shock effect and a 21% size effect. The direction effect (-0.696) was much larger than the response effect (0.002) and opposite in sign. Positive asset shocks up to 348% decreased the odds of reverse retirement. Only when a positive asset shock exceeded 348% did the odds of reverse retirement over traditional retirement increase.

4.1.3. Institutional Variables

Several institutional variables had statistically significant effects on the odds of reverse retirement over traditional retirement. Being self-employed increased the odds of reverse retirement by 156.4%. Flexible employment hours increased the odds of reverse retirement by 121.8%. The effects of having either a defined benefit pension plan or a defined contribution pension plan were not statistically significant; however both were negatively associated with the odds of reverse retirement over traditional retirement. Having a defined benefit pension plan decreased the odds of reverse retirement by 24.2%; having a defined contribution pension plan decreased the odds of reverse retirement by 25.9%. The health insurance variables were significant, but government insurance and private insurance had opposite effects on the log odds of reverse retirement. Medicare/Medicaid coverage increased the odds of reverse retirement by 50.2%. Private insurance reduced the odds of reverse retirement by 24.8%.

4.1.4 Demographic Control Variables

Two of the five demographic control variables had statistically significant effects on the log odds of reverse retirement over traditional retirement. Age and being female

were significant and positively related to reverse retirement. As age increased by one year, the odds of reverse retirement increased by 8.3%. The effect of being female is different for women who experience a marital status shock and women who do not. The odds of reverse retirement were 188.7% higher for women who experienced a marital status shock, and 40.7% higher for women who did not experience a shock to marital status.

Education was positively associated with reverse retirement. Each additional year of education increased the odds of reverse retirement by 0.6%. The coefficients for the race and ethnicity control variables were not statistically significant. Based on the multinomial Logit results, the odds of reverse retirement were 3.3% higher for Blacks and 24.2% lower for Hispanics compared to Whites.

4.1.5. Environmental Control Variables

The household asset adequacy level was negatively associated with the odds of reverse retirement as expected, however the effect was not statistically significant. A one unit increase in asset adequacy reduced the odds of reverse retirement over traditional retirement by 0.6%. The effect of the unemployment rate was significant and positive. A 1% increase in the unemployment rate raised the odds of reverse retirement over traditional retirement by 14.2%.

The multinomial Logit predicted reverse retirement for 754 (34.0%) of the 2,514 respondents (Table 4.1). The actual number of reverse retirement transitions in the sample was 739 (29.40%). Of the 739 actual reverse retirement transitions, 375 were correctly predicted (50.74%).

4.2. Odds of Retirement from Part-Time Employment vs. Traditional Retirement

4.2.1. Shocks to Human Resources

The multinomial Logit results partially confirm the importance of shocks to human resources on older employees' decisions to retire from part-time employment relative to traditional retirement. The loss of a spouse had a significant effect but health shocks had no significant effect on the odds of retirement from part-time employment. Experiencing the loss of a spouse increased the odds of retirement from part-time employment for men by 79.8%. The impact was smaller, but still positive for women. Experiencing the loss of a spouse increased the odds of retirement from part-time employment for women by only 30.2%. The odds of retirement from part-time employment were 19.6% higher for employees who experienced a health shock but the effect was not statistically significant.

4.2.2. Shocks to Financial Resources

The effects of financial shocks on retirement from part-time employment were not as strong as the effects for reverse retirement. Income reductions and asset increases had statistically significant main effects on the log odds of retirement from part-time employment. Income reductions were significantly associated with decreased odds of retirement from part-time employment. Unexpected declines in income augmented the effect of income reductions. A one percent decline in income was associated with a 0.9% decline in the odds of retirement from part-time employment. When the decline in income was unexpected, the shock augmented the response to the income decrease by

89%. The response effect of the decline in income increased by 0.008 (the sensitivity effect of the negative income shock) to 1.7%.

The direction effect of a negative income shock increased the odds of retirement from part-time employment over traditional retirement by 14.2%. The total direction effect consisted of a 32.1% shock effect and a negative 17.9% size effect. Because the response effect (-0.017) and direction effect (0.142) had opposite signs, small declines in income had a different effect from large declines in income. Unexpected declines in income up to 8.3% increased the odds of retirement from part-time employment. Larger unexpected declines in income reduced the odds of retirement from part-time employment.

Asset reductions, expected or not, had no significant effect on the odds of retirement from part-time employment. However, when asset reductions were a shock, the effect of a one percent asset reduction on the odds of retirement from part-time employment was much larger. A one percent asset reduction reduced the odds of retirement from part-time employment by 0.03%. When the asset reduction was a shock, a one percent asset reduction increased the odds of retirement from part-time employment by 0.3%. Not only did the response effect increase three-fold, the response effect also changed from negative to positive when the asset reduction was unexpected.

The direction effect of a negative asset shock was 31.9%, and consisted of a positive 22.7% shock effect and a 9.2 % size effect. For unexpected asset reductions, both the response effect (0.003) and the direction effect (0.319) were positive. Thus unexpected asset reductions increased the odds of retirement from part-time employment.

Increases in income, expected or not, had no significant effect on the odds of retirement from part-time employment. However, when income increases were unexpected the effect of a one percent increase in income on the odds of retirement from part-time employment was much larger. A one percent increase in income reduced the odds of retirement from part-time employment by 0.2%. When the increase in income was unexpected, a one percent increase in income increased the odds of retirement from part-time employment by 0.007 (the sensitivity effect) to a positive 0.5%. The response effect increased in size and changed sign when the income increase was unexpected.

The direction effect of a positive income shock was a negative 5%, and consisted of a negative 18.5% shock effect and a positive 13.5% size effect Because the response effect (0.005) and the direction effect (-0.050) of a positive income shock had opposite signs, small increases in income had different effects than large increases in income. Positive income shocks up to 10.1% reduced the odds of retirement from part-time employment. When income increased unexpectedly by more than 10.1%, the odds of retirement from part-time employment increased.

Asset increases were significantly associated with decreased odds of retirement from part-time employment. Unexpected increases in assets augmented the main effect. An expected one percent increase in assets decreased the odds of retirement from part-time employment by 0.1%. When the increase in assets was unexpected, a one percent increase in assets reduced the odds of retirement from part-time employment by 0.2%. The sensitivity (-0.001) of the odds of retirement from part-time employment to an unexpected increase in assets doubled the response effect.

The direction effect of a positive asset change was -3.9%. The direction effect of a positive asset shock consisted of a 3.2% shock effect and a negative 7.1% size effect. For positive asset shocks, both the response effect (-0.002) and the direction effect (-0.039) were negative. Thus positive asset shocks decreased the odds of retirement from part-time employment.

4.2.3. Institutional Variables

All of the institutional variables, except the variable for federal health insurance coverage, had statistically significant effects on the odds of retirement from part-time employment. Being self-employed increased the odds of retirement from part-time employment by 93.8%. Flexible employment hours increased the odds of retirement from part-time employment by 102.2%. Having either a defined benefit pension plan or a defined contribution pension plan was negatively associated with the odds of reverse retirement compared to traditional retirement. Having a defined benefit pension plan decreased the odds of retirement from part-time employment by 72.2%; having a defined contribution pension plan decreased the odds of retirement from part-time employment by 87.3%. Private health insurance coverage reduced the odds of retirement from part-time employment by 31.4%. Medicare/Medicaid coverage increased the odds of retirement from part-time employment by 27.1% but the effect was not statistically significant.

4.2.4. Demographic Control Variables

Two of the five demographic variables had statistically significant effects on the log-odds of retirement from part-time employment. Age and being female were significant and positively related to retirement from part-time employment. As age increased by one year, the odds of retirement from part-time employment increased by 15.1%. The effect of being female is different for women who experience a marital status shock and women who do not. The odds of retirement from part-time employment were 30.6% higher for women who experienced a marital status shock, and 80.2% higher for women who did not experience a shock to marital status.

Education was positively associated with retirement from part-time employment. Each additional year of education increased the odds of reverse retirement by 0.7%. The coefficients for the race and ethnicity control variables were not statistically significant. Based on the multinomial Logit results, the odds of retirement from part-time employment were 4.9% higher for Blacks and 29.4% lower for Hispanics compared to Whites.

4.2.5. Environmental Control Variables

The household asset adequacy level was significant and positively associated with the odds of retirement from part-time employment compared to traditional retirement. A one unit increase in adequacy of assets increased the odds of retirement from part-time employment compared to traditional retirement by 0.9%. The effect of the unemployment rate was positive but was not significant. A 1% increase in the unemployment rate raised

the odds of retirement from part-time employment compared to traditional retirement by 9%.

The multinomial Logit predicted retirement from part-time employment for 728 (28.96%) of the 2,514 respondents (Table 4.1). The actual numbers of retirements from part-time employment in the sample was 711 (28.28%). Of the 711 people who retired from part-time employment, 309 (43.46%) were correctly predicted.

4.3. Odds of Partial Retirement vs. Traditional Retirement

4.3.1. Shocks to Human Resources

Loss of a spouse decreased the odds of partial retirement by 19.3% for men and by 83.7% for women, though these effects were not statistically significant. Experiencing a health loss was significant and negatively associated with partial retirement. The odds of partial retirement were 76.5% lower for people who experienced a health loss.

4.3.2. Shocks to Financial Resources

Financial shocks had fewer significant effects on the odds of partial retirement compared to traditional retirement. Only the main response effect of an income decline was statistically significant. Unexpected, or shocking, declines in income slightly augmented the effect of income reductions. A one percent decline in income was associated with a 1% decline in the odds of partial retirement. When that decline in income was unexpected, the shock augmented the response to the decline in income by 0.001 (the sensitivity effect) increasing the response effect to1.1%.

The direction effect of a negative income shock reduced the odds of partial retirement compared to traditional retirement by 20.2%. The total direction effect consisted of a negative 18% shock effect and a negative 2.2% size effect. For shocking income declines, both the response effect and the direction effect were negative. Thus, shocking declines in income reduced the odds of partial retirement compared to traditional retirement.

Asset reductions had an insignificant effect on the odds of partial retirement. A one percent asset reduction reduced the odds of partial retirement by 0.2%. When the asset reduction was a shock, a one percent asset reduction increased the odds of partial retirement by 0.005 (the sensitivity effect) to 0.3%. When the asset reduction was unexpected the response effect changed from negative to positive. The direction effect of a negative asset shock was 36%. The direction effect consisted of a 20.7% shock effect and a 15.3 % size effect. For shocking asset reductions, both the response effect and the direction effect were positive. Thus shocking asset reductions increase the odds of partial retirement.

Increases in income, expected or not, had no significant effects on the odds of partial retirement. As income increased by 1%, the odds of partial retirement increased by 0.3%. When the increase in income was unexpected, a one percent increase in income reduced the odds of partial retirement by 0.001 (the sensitivity effect) for a response effect of 0.2%.

The direction effect of a positive income shock was a positive 5.5%. The direction effect of a positive income shock consisted of a positive 7.4% shock effect and a negative 1.9% size effect. For positive income shocks, the response effect and the direction effect

were both positive. Thus positive income shocks increase the odds of partial retirement compared to traditional retirement.

Increases in assets, expected or not, had no significant effects on the odds of partial retirement. A one percent increase in assets decreased the odds of partial retirement by 0.03%. When the increase in assets was unexpected, a one percent increase in assets increased the odds of partial retirement by .001 to 0.07%. When the asset increase was unexpected the response effect changed from negative to positive.

The direction effect of a positive asset change was a positive 5.3% and consisted of a -1.8% shock effect and a 7.1% size effect. For positive asset shocks, the response effect and the direction effect were both positive. Thus positive asset shocks increase the odds of partial retirement compared to traditional retirement.

4.3.3. Institutional Variables

Institutional variables were important determinants of partial retirement. Being self-employed increased the odds of partial retirement by 252.7%. Flexible employment hours increased the odds of partial retirement by 197.6%. Having either a defined benefit pension plan or a defined contribution pension plan was positively associated with partial retirement, but the effect was statistically significant only for the defined contribution pension plan. Having a defined benefit pension plan increased the odds of partial retirement by 12.1%; having a defined contribution pension plan increased the odds of partial retirement by 55.8%. Government health insurance and private health insurance had opposite effects on the odds of partial retirement, though neither effect was

statistically significant. Medicare/Medicaid coverage decreased the odds of partial retirement by 30.2%. Private insurance increased the odds of partial retirement by 14.2%.

4.3.4. Demographic Control Variables

All of the demographic variables, except the variable for Black, had statistically significant effects on partial retirement. Age was positively associated with the odds of partial retirement. As age increased by one year, the odds of partial retirement increased by 6.2%. The odds of partial retirement were 89% higher for women who experienced a marital status shock, and 24.6% higher for women who did not experience a shock to marital status.

Education was positively associated with partial retirement. Each additional year of education increased the odds of partial retirement by 6.7%. The odds of partial retirement were 79.9% lower for Hispanics compared to Whites. The odds of partial retirement were 4.5% lower for Blacks compared to Whites, but the effect was not statistically significant.

4.3.5. Environmental Control Variables

The household asset adequacy level was significant and negatively associated with the odds of partial retirement. A one unit increase in asset adequacy reduced the odds of partial retirement over traditional retirement by 1%. A 1% increase in the unemployment rate raised the odds of partial retirement over traditional retirement by 2%, but the effect was not significant.

The multinomial Logit predicted partial retirement for 228 (9.69%) of the 2,154 respondents (Table 4.1). The actual number of partial retirement transitions was 393 (15.63%). Of the 393 actual partial retirement transitions, 100 were correctly predicted (25.5%).

The results presented in Table 4.1 were from the multinomial Logit that compared traditional retirement to each of the other three transitions: reverse retirement, retirement from part-time employment, and partial retirement. Results from multinomial Logits that allow comparisons between reverse retirement and partial retirement, between reverse retirement and retirement from part-time employment, and between partial retirement and retirement from part-time employment are reported in Table 4.2. The marginal effects of each independent variable on the log odds for each pair of transitions are presented in the last three columns of Appendix Table A1.

4.4. Odds of Retirement from Part-time Employment vs. Partial Retirement

4.4.1. Shocks to Human Resources

The loss of a spouse for females and health shocks had significant effects on the odds of retirement from part-time employment over partial retirement. The odds of retirement from part-time employment were 60.5% higher for men who experienced the loss of a spouse. Females who experienced the loss of a spouse had 53.5% lower odds of retirement from part-time employment. The odds of retirement from part-time employment over partial retirement were 96.1% higher for people who experienced a health shock.

	Part-time to No Employment vs. Partial Retirement		Part-time to No Employment vs. Reverse Retirement		Partial Retirement vs. Reverse Retirement	
Variable	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Constant	-4.146**	1.691	-4.059***	1.29247	0.087	1.662
Shocks to Human Resources						
WIDDIVSP	0.605	0.439	1.227***	0.466	0.621	0.559
FEWIDDIV	-1.140*	0.651	-1.976***	0.607	-0.836	0.707
HEALTHLS	0.961***	0.287	1.036***	0.217	0.075	0.317
Shocks to Financial Resources						
REDUINCP	0.001	0.003	0.010***	0.003	0.008**	0.003
NEGINSHC	0.501	0.359	0.027	0.289	-0.474	0.357
CHINCNEG	-0.007	0.008	-0.006	0.007	0.001	0.008
REDUASTP	0.001	0.002	-0.001	0.001	-0.002	0.002
NEGATSHC	0.020	0.304	0.786***	0.314	0.767**	0.312
CHASTNEG	-0.002	0.003	-0.003	0.003	-0.002	0.003
INCRINCP	-0.006**	0.003	-0.007***	0.002	-0.002	0.002
POSINSHC	-0.260	0.347	-0.050	0.279	0.209	0.323
CHINCPOS	0.008	0.006	-0.002	0.005	-0.010*	0.006
INCRASTP	-0.001	0.001	-0.001	0.001	0.0004	0.001
POSATSHC	0.050	0.274	0.942***	0.259	0.892***	0.296
CHASTPOS	-0.002	0.002	-0.004**	0.002	-0.002	0.002
Institutional Variables						
SELFEMP	-1.589***	0.188	-0.626***	0.146	0.963***	0.183
FLEXIBLE	-0.954***	0.174	-0.196	0.128	0.758***	0.174
DB	-0.843***	0.262	-0.480**	0.236	0.363	0.238
DC	-1.431***	0.239	-0.614***	0.232	0.817***	0.207
GOVHI	0.572***	0.192	-0.231	0.169	-0.803***	0.193
PRIVIHI	-0.456***	0.160	-0.066	0.127	0.390**	0.154
Demographic Control Variables						
AGE	0.089***	0.026	0.068***	0.020	-0.021	0.026
FEMALE	0.555***	0.143	0.394***	0.117	-0.161	0.138
EDU	-0.073***	0.026	-0.013	0.020	0.060**	0.026

Continued

Table 4.2: Selected Multinomial Logit Results of Retirement Transition with Base Groups, Reverse Retirement and Partial Retirement

Table 4.2 continued

BLACK	0.094	0.215	0.016	0.167	-0.078	0.203
HISPANIC	0.505	0.374	-0.052	0.243	-0.557	0.370
Environmental Control Variables						
ADEQAST	-0.004***	0.004	0.015***	0.004	0.019***	0.004
UNEMRATE	-0.122	0.078	-0.052	0.068	0.070	0.081

*Significant at the 0.1 level **Significant at the 0.05 level ***Significant at the 0.01 level

4.4.2. Shocks to Financial Resources

Across all of the financial shock variables, only the main effect of increased income had a statistically significance effect on the odds of retirement from part-time employment. Income reductions increased the odds of retirement from part-time employment. Unexpected, or shocking, declines in income offset the effect of income reductions. With a one percent decline in income, the odds of retirement from part-time employment increased by 0.1%. However, a one percent shocking decline in income decreased the odds of retirement from part-time employment by 0.007 (the sensitivity effect) for a response effect of negative 0.6%.The response effect changed from positive to negative when the income decline was unexpected.

The direction effect of a negative income shock increased the odds of retirement from part-time employment over partial retirement by 34.4%. The total direction effect consisted of a 50.1% shock effect and a negative 15.7% size effect. Because the response effect (-0.006) and the direction effect (0.344) had opposite signs, small declines in income had a different effect from large declines in income. Shocking declines in income up to 57.4% increased the odds of retirement from part-time employment compared to

partial retirement. Declines in income larger than 57.4% reduced the odds of retirement from part-time employment.

Asset reductions, expected or not, had no significant effect on the odds of retirement from part-time employment over partial retirement. A one percent asset reduction increased the odds of retirement from part-time employment by 0.1%. When the asset reduction was a shock, a one percent asset reduction reduced the odds of retirement from part-time employment by 0.002 (the sensitivity effect) for a response effect of negative 0.1%. When the reduction in assets was unexpected, the response effect changed from positive to negative.

The direction effect of a negative asset shock was -4.1%. The direction effect consisted of a positive 2% shock effect and a negative 6.1% size effect. For shocking asset reductions, the response effect and the direction effect were both negative. Consequently, unexpected asset reductions decreased the odds of retirement from part-time employment

Increases in income had a significant effect on the odds of retirement from part-time employment over partial retirement. A one percent increase in income decreased the odds of retirement from part-time employment by 0.6%. Unexpected income increases had no statistically significant sensitivity and direction effects on the odds of retirement from part-time employment over partial retirement. When the increase in income was unexpected, a one percent increase in income increased the odds of retirement from part-time employment by 0.008 (the sensitivity effect) for a response effect of 0.2%. When the increase in income was unexpected, the response effect changed from negative to positive.

The direction effect of a positive income change was negative 10.6% and consisted of a negative 26% shock effect and a positive 15.4% size effect. For positive income shocks, the direction effect (-0.106) was larger than the response effect (0.002) and opposite in sign. Positive income shocks up to a 53.1% decreased the odds of retirement from part-time employment. Positive income shocks of 53.1% or more increased the odds.

Asset increases, expected or not, had no significant effects on the odds of retirement from part-time employment over partial retirement. In the absence of a shock, a one percent increase in assets decreased the odds of retirement from part-time employment by 0.1%. However, when the increase in assets was unexpected, a one percent increase in assets reduced the odds of retirement from part-time employment by 0.002 (the sensitivity effect) for a response effect of negative 0.3%.

The direction effect of a positive asset shock was negative 9.3%. The direction effect of a positive asset shock consisted of a 5% shock effect and a negative 14.3% size effect. The response effect (-0.003) and the direction effect (-0.093) were both negative. Consequently, unexpected asset increases decreased the odds of retirement from part-time employment

4.4.3. Institutional Variables

All of the institutional factors had statistically significant effects on the odds of retirement from part-time employment over partial retirement. Being self-employed and having flexible employment hours decreased the odds of retirement from part-time employment. Being self-employed decreased the odds of retirement from part-time

employment by 158.9%. The odds of retirement from part-time employment over partial retirement were 95.4% lower for employees who were able to reduce or increase their employment hours. Having a defined benefit pension plan decreased the odds of retirement from part-time employment by 84.3%; having a defined contribution pension plan decreased the odds of reverse retirement by 143.1%. The health insurance variables were significant, but government insurance and private insurance had opposite effects on the odds of retirement from part-time employment. Medicare/Medicaid coverage increased the odds of retirement from part-time employment by 57.2%. Private insurance coverage reduced the odds of retirement from part-time employment by 45.6%.

4.4.4. Demographic Control Variables

Three of the five demographic control variables had statistically significant effects on the log odds of retirement from part-time employment over to partial retirement. Age and being female had significant effects on the odds of retirement from part-time employment. As age increased by one year, the odds of retirement from part-time employment increased by 8.9%. The effect of being female had a negative effect for women who experienced a marital status shock but a positive effect for women who did not. The odds of retirement from part-time employment were 58.5% lower for women who experienced a marital status shock; the odds were 55.5% higher for women who did not experience a shock to marital status.

Education was negatively associated with the odds of retirement from part-time employment over partial retirement. Each additional year of education reduced the odds of retirement from part-time employment by 7.3%. The coefficients for the race and

ethnicity control variables were not statistically significant. Based on the multinomial Logit results, the odds of retirement from part-time employment were 9.4% higher for Blacks and 50.5% higher for Hispanics compared to Whites.

4.4.5. Environmental Control Variables

The effect of the household asset adequacy level was significant and negative. A one unit increase in asset adequacy reduced the odds of retirement from part-time employment by 0.4%. The effect of the unemployment rate was not statistically significant. A 1% increase in the unemployment rate reduced the odds of retirement from part-time employment over partial retirement by 12.2%%.

4.5. Odds of Retirement from Part-Time Employment vs. Reverse Retirement

4.5.1. Shocks to Human Resources

Shocks to human resources had significant effects on the odds of retirement from part-time employment over reverse retirement. The loss of a spouse had significant effects, but in opposite directions, for men and women. Health shocks had significant effects in the expected direction. Experiencing the loss of a spouse increased the odds of retirement from part-time employment for men by 122.7%. For women, the loss of a spouse decreased the odds of retirement from part-time employment over reverse retirement by 74.9%. Experiencing a health loss was statistically significant for the odds of retirement from part-time employment over reverse retirement. Experiencing a health loss increased the odds of retirement from part-time employment by 103.6%.

4.5.2. Shocks to Financial Resources

Income reductions were significantly associated with increased odds of retirement from part-time employment over reverse retirement. Unexpected, or shocking, declines in income moderated the effect of income reductions. A one percent decline in income was associated with a 1% increase in the odds of retirement from part-time employment. Unexpected declines in income reduced the effect of income reductions. When that decline in income was unexpected, a one percent decline decreased the odds of retirement from part-time employment by 0.006 (the sensitivity effect) for a response effect of only 0.4%.

The direction effect of a negative income shock decreased the odds of retirement from part-time employment over reverse retirement by 10.7%. The total direction effect consisted of a 2.7% shock effect and a negative 13.4% size effect. Because the response effect (0.004) and the direction effect (-0.107) had opposite signs, small declines in income had a different effect from large declines in income. Shocking declines in income up to 26.9% decreased the odds of retirement from part-time employment Larger declines in income increased the odds of retirement from part-time employment over reverse retirement.

Asset reductions had an insignificant effect on the odds of retirement from part-time employment. However, when asset reductions were a shock, the effect of a one percent asset reduction on the odds of retirement from part-time employment was significantly larger. A one percent asset reduction decreased the odds of reverse retirement by 0.1%. When the asset reduction was a shock, a one percent asset reduction

reduced the odds of reverse retirement 0.4%. There was a 300% increase in the response effect to an asset decline when that decline was unexpected.

The direction effect of a negative asset shock was 69.4%. The direction effect consisted of a 78.6% shock effect and a negative 9.2 % size effect. Because the response effect (-0.004) and the direction effect (0.694) had opposite signs, shocking asset declines of less than 173.5% increased and shocking asset declines greater than 173.5% decreased the odds of retirement from part-time employment over reverse retirement.

Increases in income had a significant effect on the odds of retirement from part-time employment over reverse retirement. Unexpected positive income changes augmented the effect of income increases, but the effect was not statistically significant. As income increased by 1%, the odds of reverse retirement declined by 0.7%. When the increase in income was unexpected, the effect of the increase in income decreased by 0.002 (the sensitivity effect) to 0.9%

The direction effect of a positive income change was negative 8.9%. The direction effect of a positive income shock consisted of a negative 5% shock effect and a negative 3.9% size effect. For shocking income increases, both the response effect (-0.009) and the direction effect (-0.089) were negative. Thus positive income changes decreased the odds of retirement from part-time employment over reverse retirement.

Expected increases in assets had a significant effect on the odds of retirement from part-time employment. However, unexpected asset increases had significant sensitivity and direction effects on the odds of retirement from part-time employment over reverse retirement. An expected one percent increase in assets decreased the odds of retirement from part-time employment by 0.1%. When the increase in assets was

unexpected, a one percent increase in assets decreased the odds of reverse retirement by0.5%. There was a 400% increase in the negative effect of an asset increase on the odds of retirement from part-time employment when there was a shocking increase in assets.

The direction effect of a positive asset shock was 65.7% and consisted of a 94.2% shock effect and a negative 28.5% size effect. The direction effect (0.657) was larger than the response effect (-0.005) and opposite in sign. Positive asset shocks up to 131.3% increased the odds of retirement from part-time employment. Only when a positive asset shock exceeded 131.3% did the odds of retirement from part-time employment relative to reverse retirement decline.

4.5.3. Institutional Variables

Some of the institutional variables had statistically significant effects on the odds of retirement from part-time employment over reverse retirement. Being self-employed reduced the odds of retirement from part-time employment over reverse retirement by 62.6%. Flexible employment hours decreased the odds of retirement from part-time employment by 19.6%, but the effect was not significant. The effects of having either a defined benefit pension plan or a defined contribution pension plan were negative and statistically significant. Having a defined benefit pension plan decreased the odds of retirement from part-time employment by 48%; having a defined contribution pension plan decreased the odds of retirement from part-time employment by 61.4%. The health insurance variables were not significant. Medicare/Medicaid coverage reduced the odds

of retirement from part-time employment by 23.1%; private insurance coverage reduced the odds of retirement from part-time employment by 6.6%.

4.5.4. Demographic Control Variables

Two of the five demographic control variables had statistically significant effects on the log odds of retirement from part-time employment over reverse retirement. Age and being female had significant effects on the odds. As age increased by one year, the odds of retirement from part-time employment over reverse retirement increased by 6.8%. The effect of being female had a negative effect for women who experienced a marital status shock but a positive effect for women who did not. The odds of retirement from part-time employment were 158.2% lower for women who experienced a marital status shock; the odds were 39.4% higher for women who did not experience a shock to marital status.

Education was negatively associated with the odds of retirement from part-time employment over reverse retirement. Each additional year of education reduced the odds of retirement from part-time employment by 1.3%. The coefficients for the race and ethnicity control variables were not statistically significant. Based on the multinomial Logit results, the odds of retirement from part-time employment over reverse retirement were 1.6% higher for Blacks and 5.2% lower for Hispanics compared to Whites.

4.5.5. Environmental Control Variables

The effect of the household asset adequacy level was significant and positive. A one unit increase in asset adequacy increased the odds of retirement from part-time

employment over reverse retirement by 1.5%. The effect of the unemployment rate was not statistically significant. A 1% increase in the unemployment rate reduced the odds of retirement from part-time employment over reverse retirement by 5.2%%.

4.6. Odds of Partial Retirement vs. Reverse Retirement

4.6.1. Shocks to Human Resources

Shocks to human resources had insignificant effects on the odds of partial retirement over reverse retirement. Experiencing the loss of a spouse increased the odds of partial retirement compared to reverse retirement by 62.1% for men. For women, the loss of a spouse reduced the odds of partial retirement over reverse retirement by 21.5%. Experiencing a health loss increased the odds of partial retirement by 7.5%.

4.6.2. Shocks to Financial Resources

Income reductions were significantly associated with increased odds of partial retirement over reverse retirement. Unexpected, or shocking, declines in income augmented the effect of income reductions. A one percent reduction in income was associated with a 0.8% increase in the odds of partial retirement over reverse retirement. When the decline in income was unexpected, the effect of the decline in income increased by 0.001 (the sensitivity effect) to 0.9%.

The direction effect of a negative income shock decreased the odds of partial retirement over reverse retirement by 45.2%. The total direction effect consisted of a negative 47.4% shock effect and a positive 2.2% size effect. Because the response effect (0.009) and the direction effect (-0.452) had opposite signs, shocking income declines of

less than 50.2% decreased and shocking income declines greater than 50.2% increased the odds of partial retirement.

Asset reductions had an insignificant effect on the odds of partial retirement. However, when asset reductions were a shock, the effect of a one percent asset reduction on the odds of partial retirement was larger. A one percent asset reduction decreased the odds of partial retirement by 0.2%. When the asset reduction was a shock, a one percent asset reduction reduced the odds of reverse retirement by 0.4%. There was a 100% increase in the response effect of an asset decline when that decline was unexpected.

The direction effect of a negative asset shock was 70.6%, and consisted of a 76.7% shock effect and a negative 6.1% size effect. Because the response effect (-0.004) and the direction effect (0.706) had opposite signs, shocking asset declines of less than 176.4%, decreased and shocking asset declines greater than 176.4% increased the odds of partial retirement over reverse retirement.

Unexpected income increases had significant sensitivity effects on the odds of partial retirement. Expected increases in income did not have a significant effect on the odds of partial retirement. A one percent increase in income decreased the odds of partial retirement by 0.2%. When the increase in income was unexpected, a one percent increase in income reduced the odds of reverse retirement by 0.01 (the sensitivity effect) for a response effect of negative 1.2%.

The direction effect of a positive income change was a positive 1.7%, and consisted of a 20.9% shock effect and a negative 19.2% size effect. Because the response effect (-0.012) and the direction effect (0.017) had opposite signs, shocking income

increases of less than 1.4% increased the odds and shocking income increases greater than 1.4% decreased the odds of partial retirement over reverse retirement.

Unexpected asset increases had a significant direction effect on the odds of partial retirement over reverse retirement. Expected increases in assets did not have a significant effect on the odds of partial retirement. A one percent increase in assets increased the odds of partial retirement 0.04%. When the increase in assets was unexpected, a one percent increase in assets reduced the odds of partial retirement by 0.2%. Not only did the response effect of a change in assets quadruple the odds of partial retirement, the response effect also changed from positive to negative when the asset increase was unexpected.

The direction effect of a positive asset change was 74.9%, and consisted of an 89.2% shock effect and a negative 14.3% size effect. The direction effect of a positive asset shock (0.749) was greater than the response effect (-0.002) and opposite in sign. The direction effect and the response effect offset each other in such a way that positive asset shocks increased the odds of partial retirement up to a 468% increase in assets.

4.6.3. Institutional Variables

All the institutional variables, with the exception of a defined benefit pension plan had significant effects on the odds of partial retirement over reverse retirement. Being self-employed increased the odds of partial retirement over reverse retirement by 96.3%. Flexible employment hours increased the odds of partial retirement over reverse retirement by 75.8%. Having a defined benefit pension plan increased the odds of partial retirement 36.3% but the effect was not significant. Having a defined contribution

pension plan increased the odds of partial retirement by 81.7%. The health insurance variables were significant, but government insurance and private insurance had opposite effects on the log odds of partial retirement. Medicare/Medicaid decreased the odds of partial retirement by 80.3%. Private insurance increased the odds of partial retirement by 39%.

4.6.4. Demographic Control Variables

Only one demographic control variable, education, had a statistically significant effect on the log odds of partial retirement over reverse retirement. As age increased by one year, the odds of partial retirement decreased by 2.1%. The effect of being female is different for women who experience a marital status shock and women who do not. The odds of partial retirement were 16.1% lower for women who did not experience a shock to marital status and 99.7% lower for women who experienced a marital status shock.

Education was positively associated with partial retirement. Each additional year of education increased the odds of partial retirement by 6%. The coefficients for the race and ethnicity control variables were not significant. Based on the multinomial results, the odds of partial retirement were 7.8% lower for Blacks and 55.7% lower for Hispanics compared to Whites.

4.6.5. Environmental Control Variables

The effect of the household asset adequacy level was significant and positive. A one unit increase in asset adequacy increased the odds of partial retirement compared to reverse retirement by 1.9%. The effect of the unemployment rate was not statistically

significant. A 1% increase in the unemployment rate increased the odds of partial retirement compared to reverse retirement by 7%.

This chapter summarized the results from the multinomial Logit estimation. To evaluate the effect of each independent variable on the log odds of a transition, marginal effects were derived and interpreted. The marginal effect may be interpreted as the percentage change in the odds per unit change in the explanatory variable. The final chapter will present a discussion of the results and the conclusions.

CHAPTER 5

DISCUSSION

5.1. Summary and Conclusion

The role of shocks to household resources in affecting retirement transitions among older employees was analyzed using data from the Health and Retirement Study (HRS). The relative importance of shocks, or unexpected changes, to health, family composition, income and assets was analyzed. The transitions of reverse retirement and partial retirement were of particular interest, and were contrasted with retirement from full-time employment and retirement from part-time employment.

The empirical results partially supported the theoretical or conventional expectations. The discussion of results focuses mainly on the effects of shocks to household resources on reverse retirement and partial retirement.

5.1.1. The Role of Shocks to Human Resources

Shocks to martial status had larger effects on retirement transitions for women than for men. Termination of marriage increased the odds of reverse retirement for women but reduced the odds of reverse retirement for men. Even women who did not experience a shock to martial status had higher odds of reverse retirement over traditional

retirement. Women are more likely to spend their retirement years alone due to gender differences in mortality and remarriage rates after divorce; this may magnify the poverty problem that is already seen among older unmarried women (U.S. Census Bureau, 2000). Retirement education should be targeted to women. Retirement education covers information on asset allocation, financial risk and risk tolerance, calculation of retirement income and needs in retirement and strategies for maintaining the purchasing power of retirement income. These topics may help workers determine their desired retirement age.

Health shocks were the most influential obstacle to participating in paid employment, either part-time or full-time. This finding was expected, in light of past research (e.g., Hayward, 1986). Throughout previous studies, health has served as a good predictor of the labor force participation of older people. In this study, health loss was found to decrease the odds of reverse retirement. Health loss also decreased the odds of transition into partial retirement compared to traditional retirement. Most previous studies have looked at health status or health limitation, not health loss as an acute event. A self-reported "good health" status was positively associated with partial retirement (Gustman & Steinmeier, 1984), but health limitations also affected partial retirement positively (Honig & Hanoch, 1985). Acute health loss events seemed to differ from health limitations in terms of the effects on partial retirement transition.

5.1.2. The Role of Shocks to Financial Resources

This study found that financial shocks had the largest effects on reverse retirement transitions. Prior expectations did not always hold for income shocks. Negative shocks were expected to increase the odds of reverse retirement and positive shocks were

expected to decrease the odds of reverse retirement. Shocking reductions in income up to 12.46% increased the odds of reverse retirement over traditional retirement. However, unexpected increases in income raised the odds of reverse retirement. Expectations were partially met for asset shocks. Positive shocks to assets up to 348% decreased the odds of reverse retirement as anticipated. However, unexpected asset declines of less than 53.7% increased the odds of reverse retirement over traditional retirement.

There were no prior expectations about the odds of partial retirement over traditional retirement. The magnitudes of effects for partial retirement were smaller than those for reverse retirement transitions. Negative income shocks decreased the odds of partial retirement compared to traditional retirement. Unexpected increases in income increased the odds of partial retirement compared to traditional retirement. Both negative and positive asset shocks were positively associated with the odds of partial retirement over traditional retirement.

Generally, the effects on the odds of reverse retirement over traditional retirement were greater than the effects on the partial retirement odds in terms of magnitude. When compared to traditional retirement, the response effects of reverse retirement were the largest among the three transitions. Also, the direction effects for reverse retirement were largest for a negative income shock, a negative asset shock and a positive asset shock. The shock effects for asset changes were very large. For example, the odds of reverse retirement were 56% lower for those who experienced a negative asset shock, and these odds were 91% lower for people who experienced a positive asset change. Financial shocks had similar effect on partial retirement and traditional retirement. The magnitudes

of the response effects and the direction effects were very small across the four financial shocks.

When comparing partial retirement with reverse retirement, both shock effects and response effects of income declines were large in magnitude but their directions were not clear. Shocking income declines of less than 50.2% decreased but shocking income declines greater than 50.2% increased the odds of partial retirement. Shocking asset decline of less than 176.4% decreased the odds of partial retirement. Shocking income increases greater than 1.4% decreased the odds of partial retirement over reverse retirement. Shocking asset changes also had large effects on the odds of partial retirement compared to reverse retirement. Positive asset shocks increased the odds of partial retirement over reverse retirement up to a 468% increase in assets. For the majority of persons, positive income shocks decreased the odds of partial retirement but positive asset shocks increased the odds of partial retirement compared to reverse retirement.

Negative financial shocks were expected to have larger effects than positive financial shocks. This expectation was met for unexpected income changes, but not for unexpected asset changes. Compared to traditional retirement, resource losses had larger effects than resource gains across both response effects and direction effects for all three retirement transitions. Moreover, three of the four shock effects were larger for income losses than for income gains. Only the sensitivity effect and the size effect for the odds of reverse retirement over traditional retirement had larger impacts for positive income changes than for negative income changes.

The empirical findings were generally consistent with expectations for the odds of partial retirement over reverse retirement. The direction effects for the odds of partial

retirement over reverse retirement were larger for income reductions than for income increases. The shock effects for the odds of partial retirement over reverse retirement were larger for negative income than positive income.

However, prior expectations were not confirmed for asset changes. The odds of reverse retirement over traditional retirement showed larger shock, size and direction effects for positive asset changes than for negative asset changes. The odds of partial retirement over traditional retirement showed larger magnitudes for asset losses than for asset gains across all effects.

When comparing partial retirement with reverse retirement, positive asset changes had larger effects than negative asset changes. Negative asset changes had larger main effects and response effects than positive asset changes for the odds of partial retirement over reverse retirement.

Negative income shocks and positive income shocks generally had opposite effects on retirement transitions. For example, the shock effect of a negative income change was positively associated with the odds of reverse retirement over traditional retirement but the shock effect of a positive income change was negatively related with the odds of reverse retirement. For income changes the response effects and direction effects were generally opposite in sign across transitions. The odds of partial retirement over traditional retirement were negatively associated with unexpected income losses but positively associated with unexpected income gains. Likewise, negative income shocks reduced but positive income shocks increased the odds of partial retirement over reverse retirement.

However, for most of the asset changes, the impact of negative shocks and positive shocks were in the same directions. Across all effects with the exception of the main effect, both asset losses and asset gains were in the same directions for the odds of reverse retirement over traditional retirement, and for the odds of partial retirement over reverse retirement.

The current unclear results of asset shocks may be explained by the permanent-income hypothesis. People will try to decide whether or not a change in resources is temporary. If they think the change is temporary, the effect on consumption and labor supply is small, but when they become convinced that the change is permanent, and then the change in resources will have a larger impact on consumption and labor supply. People may react to financial shocks in some way, but their behaviors seem to be inconsistent during short periods of transition, and immediate effects may differ from long-term effects.

5.1.3. Other Control Variables

A central finding of this study is that partial retirement and reverse retirement transitions are determined in different ways. While shocks to human resources and financial resources often induced reverse retirement, institutional supports like pension plans were key determinants of partial retirement. From the strong relationship between defined contribution plans and partial retirement, one may see that flexibility is one key factor affecting partial retirement. Partial retirement was much more likely to occur among educated people, and much less likely to occur among older Hispanic workers. The current study did not consider whether the partial retirement decision is part of an

employer-provided formal program, or if older workers are crafting their own phased-retirement plans by taking full retirement benefits from one employer and going to work for another. Previous research suggests that pension plans and education are positively associated with a formal partial retirement program. Educated older employees had higher odds of working full-time and a lower odds of taking full retirement, based on previous findings (Bartel & Sicherman, 1993; Hardy, 1984). Ruhm (1990) stated that higher education increases the probability of partial retirement, and that people with low levels of education are less likely to choose partial retirement. Also, Honig and Hanoch (1985) reported significant and positive effects of education on partial retirement of male workers aged 62-67. The effect of education was also found for female employees' retirement decisions; Honig (1985) found that higher education significantly reduces the likelihood of full retirement, and that educated female employees aged 62-67 tended to choose partial retirement.

Other statistically significant predictors of retirement transitions were consistent with results reported in previous studies. Having a pension plan, defined benefit or defined contribution, increased the odds of retirement. Pensions are additional income sources that increase retirement income. Having a pension plan may be an indicator of employment status or occupational status, since regular part-time workers are less likely to have pension plans than full-time workers.

5.2. Implications for Retirement Policy

Government is taking the lead and looking at age issues in various ways. Current research provides some answers to two broad policy issues: *What can be done to*

encourage the maintenance of older workers in employment? and *What can be done to make it possible for older people to re-enter the work force after leaving employment?* Although workers who are close to pension and Social Security benefit eligibility are most likely to leave full-time employment, the age effect is more complex when it comes to reverse retirement and partial retirement. In the current analysis, reverse retirement odds increased with respect to age.

The paths to retirement are diverse and complex, and so are their determinants. The increased work attachment patterns of older people in recent years have contributed to this complexity by introducing changes in retirement policy, like earning tests, health insurance eligibility, pension rules, and a paused retirement program as one pattern of retirement. Since employment and retirement policy vary across employment opportunities, it is increasingly important to consider family factors including outside and inside employment-related factors. Retirement is both a societal and familial phenomenon; it is rooted in early family life-course patterns that have enduring effects, and the institutional environments that support the families and employees. The retirement transition is anchored in long-term work and family commitments that have development outcomes, and among these outcomes are the increased odds of non-traditional retirement (especially for disadvantaged households). For instance, the current analysis showed that negative shocks to human resources were important for reverse retirement. From a life-course perspective, a retirement pattern includes the analysis of diverse pathways to this complex and often prolonged transition.

There are a number of existing policy initiatives that are considering partial retirement and reverse retirement. Disabled people or people with health problems should

be able to re-enter employment after they are out of labor force; of more relevance to this discussion are policies that help people remain employed. These initiatives could aid people who are in the labor force, but who have health problems; these initiatives could seek to prevent people from losing their jobs by either organizing early medical intervention or by re-organizing jobs to minimize the consequences of the health problem on company performance. While such initiatives are costly in the early stage of development, given the important impact of health loss, they have a potentially important role in preventing a possible retirement crisis.

Given the results that the odds of reverse retirement did not decrease with advanced age, no direct evidence of age discrimination was found. From a positive association between age and reverse retirement, one may see that the age-neutral choice is becoming common among members of the older population. However, there is still a question of the possible existence of forced retirement, due to loss of health or because of unwanted full retirement (due to a lack of a partial retirement option). The current analysis showed that a partial retirement decision is distinguished from other transition decisions in terms of the affecting factors like worker's ethnicity, and education; further research is needed, as well as changes to social policy. In their recognition of the reciprocal effects of family background and retirement pattern – and attention to joint effects of such involvements – researchers utilizing an interactive model of these relationships will provide a greater understanding of these complex interconnections. Further development of the model relies on the degree to which researchers take into adequate consideration how such connections may vary for members of different social groups. One example is the opposite directions between education and Hispanic ethnicity

with respect to the partial retirement decision: if less educated or Hispanic individuals do not want to continue working full-time, but have no partial retirement options, they must create their own opportunities by taking their skills to the competition. While partial retirement did not make up the majority of cases, there was a strong overall tendency for older workers who moved out of permanent full-time employment to move into part-time employment, rather than leaving work permanently.

The estimated results suggested that the loss of spouse affects women's reverse retirement more than men who experience the same shock, even when controlling for various other differences. The comparable effect of widowhood approached statistical significance, in the consistent direction for retirement. Thus, the absence of a personal pension or adequate assets among newly-widowed women is expected to cause greater changes in their later retirement years, indicating higher re-planned ages for retirement.

In terms of policy, these results reinforce the key role played by the economic support system in shaping older women's retirement decisions. This is important in learning about the eligibility for Social Security or pension benefits, and the effects of having these retirement benefits on retirement among employed women, either part-time or full-time. This is vital for women, because interruptions in labor force participation (e.g., from caring for children or aged relatives) that often delay or preclude pension eligibility may also delay these women's retirements. Concerns should also be raised by formerly married women – later widowed or divorced – regarding the sources of retirement income they expect. If unmarried women rely solely on Social Security, then provisions for economic support in retirement must also focus on ameliorating the

poverty among the growing number of divorced or widowed women in their retirement years.

5.3. Suggestions for Future Research

The current research provides information on how older workers respond when their expectations are not met. Educators and practitioners who work with older individuals and families can use this information in several ways: retirement educators and service providers, for example, can set up family events on retirement decisions – events that invite workers and their spouses to pre- and post-retirement workshops and educational programs that are designed to assist them in the transition to retirement. Information on changes in life-course and financial status, as well as on health, is helpful in the transition to retirement, as it focuses on mitigating the adverse impacts of these shocks at the end of the life cycle. It is very important that retirement be not just a personal decision, but a matter that touches society as a whole.

In future research, it is important to think about retirement as more than just a personal decision, and that it occurs in a complex situational environment made up of (1) society's macrosocial retirement institution, incentives and disincentives for working in late lifetime, and response to the business cycle and (2) personal experiences consisting of marital history, family structure and functions, individuals' styles for coping with personal and financial shocks, and abilities in adjusting to unexpected changes.

Future research on retirement patterns must also take into account the varying routes that lead people take to desirable retirement. Most people might retire because they want to, but unwanted employment arrangements, age discrimination, and poor health

and disability can all also lead to retirement. What type of retirement the worker experiences may be associated with whether that worker experiences stress or not from an unexpected shock. Retirement – as a transition process, not as a one-time event – may be unique in inspiring expectations of greater environmental change under uncertainty. Widowhood, termination of marriage, health loss, and financial loss may provide more consequential changes in retirement transition than commonly anticipated. All such conjectures await investigation through future research.

APPENDIX A

TABLE A.1: MARGINAL EFFECTS ON LOG-ODDS

	Reverse Retirement vs. Traditional Retirement	Part-time to No Employment vs. Traditional Retirement	Partial Retirement vs. Traditional Retirement	Part-time to No Employment vs. Partial Retirement	Part-time to No Employment vs. Reverse Retirement	Partial Retirement vs. Reverse Retirement
Shocks to Human Resources						
Shock to Marital Status for Men	-0.429	0.798	0.193	0.605	1.227	0.621
Shock to Martial Status for Women	1.051	0.302	0.837	-0.535	-0.749	-0.215
Health loss	-0.840	0.196	-0.765	0.961	1.036	0.075
Shocks to Financial Resources						
Negative Income Shock						
Main effect of change[a]	-0.018	-0.009	-0.01	0.001	0.01	0.008
Sensitivity effect[b]	-0.002	-0.008	-0.001	-0.007	-0.006	0.001
Response effect	-0.02	-0.017	-0.011	-0.006	0.004	0.009
Shock effect[c]	0.294	0.321	-0.18	0.501	0.027	-0.474
Size effect[d]	-0.045	-0.179	-0.022	-0.157	-0.134	0.022
Direction effect	0.249	0.142	-0.202	0.344	-0.107	-0.452
Negative Asset shock						
Main effect of change[a]	0.001	-0.0003	-0.002	0.001	-0.001	-0.002
Sensitivity effect[b]	0.006	0.003	0.005	-0.002	-0.003	-0.002
Response effect	0.007	0.003	0.003	-0.001	-0.004	-0.004
Shock effect[c]	-0.56	0.227	0.207	0.02	0.786	0.767
Size effect[d]	0.184	0.092	0.153	-0.061	-0.092	-0.061
Direction effect	-0.376	0.319	0.360	-0.041	0.694	0.706
Positive Income Shock						
Main effect of change[a]	0.005	-0.002	0.003	-0.006	-0.007	-0.002
Sensitivity effect[b]	0.009	0.007	-0.001	0.008	-0.002	-0.01
Response effect	0.014	0.005	0.002	0.002	-0.009	-0.012
Shock effect[c]	-0.134	-0.185	0.074	-0.26	-0.05	0.209
Size effect[d]	0.173	0.135	-0.019	0.154	-0.039	-0.192
Direction effect	0.039	-0.050	0.055	-0.106	-0.089	0.017

Continued

Table A.1: Marginal Effects on Log-odds

Table A.1 continued

Positive Asset Shock						
Main effect of change[a]	-0.001	-0.001	-0.0003	-0.001	-0.001	0.0004
Sensitivity effect[b]	0.003	-0.001	0.001	-0.002	-0.004	-0.002
Response effect	0.002	-0.002	0.0007	-0.003	-0.005	-0.002
Shock effect[c]	-0.91	0.032	-0.018	0.05	0.942	0.892
Size effect[d]	0.214	-0.071	0.071	-0.143	-0.285	-0.143
Direction effect	-0.696	-0.039	0.053	-0.093	0.657	0.749
Institutional Variables						
Self-employed	1.564	0.938	2.527	-1.589	-0.626	0.963
Flexibility	1.218	1.022	1.976	-0.954	-0.196	0.758
DB pension	-0.242	-0.722	0.121	-0.843	-0.480	0.363
DC pension	-0.259	-0.873	0.558	-1.431	-0.614	0.817
Medicare/Medicaid	0.502	0.271	-0.302	0.572	-0.231	-0.803
Private insurance	-0.248	-0.314	0.142	-0.456	-0.066	0.390
Demographic Control Variables						
Age	0.083	0.151	0.062	0.089	0.068	-0.021
Women had no shock to marital status	0.407	0.802	0.246	0.555	0.394	-0.161
Women had shock to marital status	1.887	0.306	0.89	-0.585	-1.582	-0.997
Education	0.006	-0.007	0.067	-0.073	-0.013	0.060
Black	0.033	0.049	-0.045	0.094	0.016	-0.078
Hispanic	-0.242	-0.294	-0.799	0.505	-0.052	-0.557
Environmental Control Variables						
Adequate asset level	-0.006	0.009	-0.010	-0.004	0.015	0.019
Unemployment rate	0.142	0.090	0.020	-0.122	-0.052	0.070

Notes. [a] Marginal effect in the absence of a shock
[b] Adjustment in the main effect due to the shock
[c] Main effect due to the shock itself
[d] Adjustment in the main effect of the shock due to the unexpected amount of change

APPENDIX B

SPSS SYNTAX FILE FOR VARIABLE CREATION

```
GET
  FILE='C:\WORK\Data\panel1.sav'.
EXECUTE .
"SHOCKS TO HUMAN RESOURCE"
VARIABLE LABELS g6517m1 "1ST EVENTS".
VARIABLE LABELS g6517m2 "2ND EVENTS".
VARIABLE LABELS g6517m3 "3RD EVENTS".
VARIABLE LABELS g6517m4 "4TH EVENTS".
VARIABLE LABELS g6517m5 "5TH EVENTS".
RENAME VARIABLES (var00001=spdeath).
VARIABLE LABELS spdeath "death of spouse".
RECODE
  g6517m1 g6517m2 g6517m3 g6517m4 g6517m5
  (1=1)  INTO  spdeath  spdeath  spdeath  spdeath  spdeath .
EXECUTE .
VARIABLE LABELS divsepar "divorced or separated".
RECODE
  g6517m1 g6517m2 g6517m3 g6517m4 g6517m5
  (4=1)  INTO  divsepar  divsepar  divsepar  divsepar  divsepar .
EXECUTE .
RECODE
  spdeath divsepar  (MISSING=0)  .
EXECUTE .
COMPUTE widdivsp = spdeath + divsepar .
VARIABLE LABELS widdivsp 'widowed or divorced or separated' .
EXECUTE .
RECODE
  widdivsp  (0=0)  (1 thru 2=1)  .
EXECUTE .
COMPUTE fewiddiv = female * widdivsp .
VARIABLE LABELS fewiddiv 'female loss of spouse' .
EXECUTE .
FORMATS hearatt (F14.4).
VARIABLE LABELS heartatt "heart attack".
FORMATS stroke (F14.4).
VARIABLE LABELS stroke "stroke".
FORMATS cancer (F14.4).
VARIABLE LABELS cancer "cancer".

RECODE
  g6517m1 g6517m2 g6517m3 g6517m4 g6517m5
  (5=1)  INTO  heartatt  heartatt  heartatt  heartatt  heartatt .
EXECUTE .
RECODE
  g6517m1 g6517m2 g6517m3 g6517m4 g6517m5
  (6=1)  INTO  stroke  stroke  stroke  stroke  stroke .
EXECUTE .
RECODE
  g6517m1 g6517m2 g6517m3 g6517m4 g6517m5
  (7=1)  INTO  cancer  cancer  cancer  cancer  cancer .
EXECUTE .
VARIABLE LABELS f3115m1 "CURRENT JOB STATUS TIME1".
VALUE LABELS f3115m1
 4.00000000000000 "disabled"
.
```

```
VARIABLE LABELS g3365m1 "CURRENT JOB STATUS TIME2".
VALUE LABELS g3365m1
 4.00000000000000 "DISABLED"
.
RECODE
  f3115m1
  (4=1)  (ELSE=0)  INTO  DATIME1 .
VARIABLE LABELS DATIME1 'DISABLED TIME1'.
EXECUTE .
DO IF (datime1 = 0) .
RECODE
  g3365m1
  (4=1)  INTO  DISABLED .
END IF .
VARIABLE LABELS DISABLED 'BECAME DISABLED AT TIME2'.
EXECUTE .
RECODE
  heartatt stroke cancer disabled  (MISSING=0)  .
EXECUTE .
COMPUTE HEALTHLS = heartatt + stroke + cancer + disabled .
VARIABLE LABELS HEALTHLS 'HEALTH LOSS' .
EXECUTE .
RECODE
  HEALTHLS  (0=0)  (1 thru 4=1)  .
EXECUTE .

"SHOCKS TO FINANCIAL RESOURCE"
VARIABLE LABELS fhhinc "HOUSEHOLD INCOME LCY TIME 1".
COMPUTE adjinc1 = 163*fhhinc / 160.5 .
VARIABLE LABELS adjinc1 '1998 dollar adjusted income at time 1' .
EXECUTE .
VARIABLE LABELS ghhinc "HOUSEHOLD INCOME LCY TIME 2".
COMPUTE adjinc2 = 163*ghhinc /166.6 .
EXECUTE .
VARIABLE LABELS fassets "TOTAL TIME 1 HOUSEHOLD ASSETS AT THE TIME OF
INTERVIEW"
   .
COMPUTE adjast1 = 163*gassets /163 .
EXECUTE .
VARIABLE LABELS adjinc2 "1998 DOLLAR AJSUTED HOUSEHOLD INCOME TIME 2".
VARIABLE LABELS adjast1 "1998 DOLLAR ADJUTSED HOUSEHOLD ASSETS AT THE TIME
OF THE INTERVIEW".
COMPUTE adjast2 = 163*gassets /172.2 .
EXECUTE .
VARIABLE LABELS adjast2 "1998 DOLLAR ADJUSTED ASSETS AT TIME2".
COMPUTE chin = adjinc2 - adjinc1.
VARIABLE LABELS pchin 'change in income' .
EXECUTE .
COMPUTE chat = adjast2 - adjast1 .
VARIABLE LABELS chat 'change in assets' .
EXECUTE .
RECODE
  chin chat
  (0 thru Highest=0)  (ELSE=1)  INTO  reduinc  reduast .
VARIABLE LABELS reduinc 'whether income reduced'.
VARIABLE LABELS reduast 'whether assets reduced'.
```

```
RECODE
  adjinc1 adjast1  (0=500)  .
EXECUTE .
COMPUTE pchin = 100*(adjinc2 - adjinc1) / adjinc1 .
VARIABLE LABELS pchin 'percentage change in income' .
EXECUTE .
COMPUTE pchat = 100*(adjast2 - adjast1) / adjast1 .
VARIABLE LABELS pchat 'percentage change in assets' .
EXECUTE .
COMPUTE abspchin = ABS(pchin) .
EXECUTE .
COMPUTE abspchat = ABS(pchat) .
EXECUTE .
VARIABLE LABELS abspchin 'absolute value of percentage change in income' .
EXECUTE .
VARIABLE LABELS abspchat 'absolute value of percentage change in assets' .
EXECUTE .
VARIABLE LABELS f4571 "EXPECTATION :INC-INFLATION".
VARIABLE LABELS f4611 "EXPECTATION : DOUBLE DIGIT INFLATION ".
RECODE
  f4571 f4611
  (75 thru 100=1)  (ELSE=0)  INTO  CONFIINC  CONFIAST .
EXECUTE .
RECODE
  f4571 f4611
  (0 thru 25=1)  (ELSE=0)  INTO  NCONFINC  NCONFAST .
EXECUTE .

DO IF (confiinc = 1) .
RECODE
  reduinc
  (1=1)  (ELSE=0)  INTO  NEGINSHC .
END IF .
EXECUTE .
DO IF (nconfinc = 1) .
RECODE
  reduinc
  (0=1)  (ELSE=0)  INTO  POSINSHC .
END IF .
EXECUTE .

DO IF (confiast = 1) .
RECODE
  reduast
  (1=1)  (ELSE=0)  INTO  negatshc .
END IF .
VARIABLE LABELS negatshc 'negative asset shock'.
EXECUTE .
DO IF (nconfast = 1) .
RECODE
  reduast
  (0=1)  (ELSE=0)  INTO  posatshc .
END IF .
VARIABLE LABELS posatshc 'positive asset shock'.
EXECUTE .
RECODE
```

```
  neginshc posinshc negatshc posatshc (MISSING=0)  .
EXECUTE .
DO IF (reduinc = 1) .
RECODE
  abspchin
  (ELSE=Copy)  INTO  reduincp .
END IF .
VARIABLE LABELS reduincp 'value of percentage change in income for negative'+
 ' income change'.
EXECUTE .
DO IF (reduinc = 0) .
RECODE
  abspchin
  (ELSE=Copy)  INTO  incrincp .
END IF .
VARIABLE LABELS incrincp 'value of percentage change in income for positive'+
 ' income change'.
EXECUTE .

DO IF (reduast = 1) .
RECODE
  abspchat
  (ELSE=Copy)  INTO  reduastp .
END IF .
VARIABLE LABELS reduastp 'value of percentage change in assets for negative'+
 ' asset change'.
EXECUTE .
DO IF (reduast = 0) .
RECODE
  abspchat
  (ELSE=Copy)  INTO  incrastp .
END IF .
VARIABLE LABELS incrastp 'value of percentage change in assets for positive'+
 ' asset change'.
EXECUTE .
COMPUTE chincneg = reduincp * neginshc .
VARIABLE LABELS chincneg 'interaction term between reduincp and neginshc ' .
EXECUTE .
COMPUTE chincpos = incrincp * posinshc .
VARIABLE LABELS chincpos 'interraction term between incrincp and posinshc ' .
EXECUTE .
COMPUTE chastneg = reduastp * negatshc .
VARIABLE LABELS chastneg 'interraction term between reduastp and negatshc ' .
EXECUTE .
COMPUTE chastpos = incrastp * posatshc .
VARIABLE LABELS chastpos 'interraction term between incrastp and posatshc ' .
EXECUTE .

"DEMOGRAPHIC VARS"
RENAME VARIABLES (var00001=agewave1).
VARIABLE LABELS agewave1 "exact age at time 1".
COMPUTE agewave1 = (f699 + f697 / 12) - (f970a + f968a / 12) .
EXECUTE .
VARIABLE LABELS f699 "CURRENT YEAR ".
VARIABLE LABELS f697 "CURRENT MONTH ".
VARIABLE LABELS f970a "BIRTHDATE YEAR ".
```

```
VARIABLE LABELS f968a "BIRTHDATE MONTH ".
VARIABLE LABELS f469 "R GENDER ".
RECODE
  f469
  (2=1)  (ELSE=0)  INTO  FEMALE .
EXECUTE .
VARIABLE LABELS f987a "R EDUCATION ".
RECODE
  f987a
  (ELSE=Copy)  INTO  EDU .
EXECUTE .
VARIABLE LABELS f1005a "R RACE ".
VALUE LABELS f1005a
 1.00000000000000 "WHITE"
 2.00000000000000 "BLACK"
 7.00000000000000 "OTHER"
 8.00000000000000 "DK"
 9.00000000000000 "RF"
.
RECODE
  f1005a
  (2=1)  (ELSE=0)  INTO  BLACK .
EXECUTE .
VARIABLE LABELS f1002a "HISPANIC ".
VALUE LABELS f1002a
 1.00000000000000 "YES"
 5.00000000000000 "NO"
.
RECODE
  f1002a
  (1=1)  (ELSE=0)  INTO  HISPANIC .
EXECUTE .

"INSTITUTIONAL VARS"
VARIABLE LABELS f3132 "WORK FOR SOMEONE ELSE OR SELF-EMPLOYED".
VALUE LABELS f3132
 1.00000000000000 "SOMEONE ELSE"
 2.00000000000000 "SELF-EMPLOYED"
.
VARIABLE LABELS g3382 "WORK FOR SOMEONE ELSE/SELF-EMPLOYED".
VALUE LABELS g3382
 1.00000000000000 "SOMEONE ELSE"
 2.00000000000000 "SELF-EMPLOYED"
.
RECODE
  f3132
  (2=1)  (ELSE=0)  INTO  SELFEMP .
EXECUTE .
RECODE
  g3382
  (2=1)  INTO  SELFEMP .
EXECUTE .
VARIABLE LABELS f3329 "ABLE TO REDUCE PAID WORK HOURS".
VALUE LABELS f3329
 1.00000000000000 "YES"
.
```

```
VARIABLE LABELS f3336 "ABLE TO INCREASE WORK HOURS".
VALUE LABELS f3336
 1.00000000000000 "YES"
.
RECODE
  f3329 f3336  (1=1)  (ELSE=0)  .
EXECUTE .
COMPUTE FLEXIBLE = f3329 + f3336 .
EXECUTE .
RECODE
  flexible  (2=1)  (ELSE=0)  .
EXECUTE .

VARIABLE LABELS g3624_1 "TYPE OF PENSION".
VALUE LABELS g3624_1
 1.00000000000000 "TYPE A"
 2.00000000000000 "TYPE B"
 3.00000000000000 "BOTH"
.
RECODE
  g3624_1
  (1=1)  (2=2)  (3=3)  (ELSE=4)  INTO  PENSION .
EXECUTE .
VARIABLE LABELS pension "PENSION TYPE".
VALUE LABELS pension
 1.00000000000000 "DB"
 2.00000000000000 "DC"
 3.00000000000000 "BOTH TYPES"
 4.00000000000000 "NO PENSION"
.
RECODE
  pension
  (1=1)  (3=1)  (ELSE=0)  INTO  DB .
EXECUTE .
RECODE
  pension
  (3=1)  (2=1)  (ELSE=0)  INTO  DC .
EXECUTE .

VARIABLE LABELS g6238 "MEDICARE COVERAGE".
VALUE LABELS g6238
 1.00000000000000 "YES"
.
VARIABLE LABELS g6242 "COVERED BY MEDICAID".
VALUE LABELS g6242
 1.00000000000000 "YES"
.
RECODE
  g6238
  (1=1)  (ELSE=0)  INTO  GOVHI .
EXECUTE .
RECODE
  g6242
  (1=1)  INTO  GOVHI .
EXECUTE .
VARIABLE LABELS g6264 "SELF-EMP INSURANCE".
```

```
VALUE LABELS g6264
 1.00000000000000 "YES"
.
VARIABLE LABELS g6266 "ANY INSURANCE THRU AN EMPLOYER".
VALUE LABELS g6266
 1.00000000000000 "YES"
.
RECODE
  g6264
  (1=1)  (ELSE=0)  INTO  PRIVHI .
EXECUTE .
RECODE
  g6266
  (1=1)  INTO  PRIVHI .
EXECUTE .

"ENVIRONTEMTAL CONTROL VARS"
VARIABLE LABELS g884 " # HH members".
RECODE
  g884
  (1=8316)  (2=10634)  (3=13003)  (4=16660)  (5=19680)  (6=22228)  (7=25257)
  (8=28166)  (9=33339)  INTO  POVTHRES .
VARIABLE LABELS POVTHRES 'POVERTY THRESHOLD LEVEL'.
EXECUTE .
VARIABLE LABELS ADJAST2 '98 DOLLAR ADJUSTED ASSETS AT TIME2' .
EXECUTE .
COMPUTE ADEQAST = adjast2 / povthres .
VARIABLE LABELS ADEQAST 'ADEQUATE ASSET LEVEL' .
EXECUTE .
RECODE
  g770
  (1=4.0)  (2=4.1)  (3=4.0)  (4=3.8)  (5=4)  (6=4)  (7=4)  (8=4.1)  (9=4)
 (10=3.9)  (11=3.9)  (12=3.9)  INTO  UNEMRATE .
VARIABLE LABELS UNEMRATE 'UNEMPLOYMENT RATE AT TIME 2' .
EXECUTE .
GET FILE
"C:\WORK\Data\merge9800nfr.sav"
.
EXECUTE
.
VARIABLE LABELS f3259 "Time 1 HOURS WORK PER WEEK".
VARIABLE LABELS g3509 "Time 2 HOURS WORK PER WEEK".
RECODE
  f3259 g3509
  (1 thru 34=2)  (35 thru 168=3)  (ELSE=1)  INTO  wstatus1  wstatus2 .
VARIABLE LABELS wstatus1 'work status time 1'.
EXECUTE .
DO IF (wstatus1 = 1) .
RECODE
  wstatus2
  (1=1)  (2=2)  (3=3)  INTO  wtransi .
END IF .
VARIABLE LABELS wtransi 'work transition type'.
EXECUTE .
DO IF (wstatus1 = 2) .
RECODE
```

```
  wstatus2
  (1=4)  (2=5)  (3=6)  INTO  wtransi .
END IF .
VARIABLE LABELS wtransi 'work transition type'.
EXECUTE .
DO IF (wstatus1 = 3) .
RECODE
  wstatus2
  (1=7)  (2=8)  (3=9)  INTO  wtransi .
END IF .
VARIABLE LABELS wtransi 'work transition type'.
EXECUTE .
VALUE LABELS wtransi
 1.00000000000000 "no work to no work"
 2.00000000000000 "no work to part time work"
 3.00000000000000 "no work to full time work"
 4.00000000000000 "part to no work"
 5.00000000000000 "part to part"
 6.00000000000000 "part to full time"
 7.00000000000000 "full time to no work"
 8.00000000000000 "full time to part time work"
 9.00000000000000 "full time to full time"
.
RECODE
  wtransi
  (4=2)  (6=1)  (7=0)  (8=3)  (2 thru 3=1)  INTO  transgrp .
VARIABLE LABELS transgrp 'four transition groups'.
EXECUTE .
VALUE LABELS transgrp
 .000000000000000 "full time to no work"
 1.00000000000000 "reverse retirement "
 2.00000000000000 "part time to no work"
 3.00000000000000 "partial retirement"
.
GET
  FILE='C:\WORK\Data\panel2.sav'.
EXECUTE .
"SHOCKS TO HUMAN RESOURCE"
VARIABLE LABELS HW301M01 "1ST EVENTS".
VARIABLE LABELS HW301M02 "2ND EVENTS".
VARIABLE LABELS HW301M03 "3RD EVENTS".
VARIABLE LABELS HW301M04 "4TH EVENTS".
VARIABLE LABELS HW301M05 "5TH EVENTS".
VARIABLE LABELS HW301M06 "6TH EVENTS".
VARIABLE LABELS HW301M07 "7TH EVENTS".

RENAME VARIABLES (var00001=spdeath).
VARIABLE LABELS spdeath "death of spouse".
RECODE
  HW301M01 HW301M02 HW301M03 HW301M04 HW301M05 HW301M06 HW301M07
  (1=1) INTO  spdeath  spdeath  spdeath  spdeath  spdeath .
EXECUTE .
VARIABLE LABELS divsepar "divorced or separated".
RECODE
  HW301M01 HW301M02 HW301M03 HW301M04 HW301M05 HW301M06 HW301M07
  (4=1)  INTO  divsepar  divsepar  divsepar  divsepar  divsepar .
```

```
EXECUTE .
RECODE
  spdeath divsepar  (MISSING=0)  .
EXECUTE .
COMPUTE widdivsp = spdeath + divsepar .
VARIABLE LABELS widdivsp 'widowed or divorced or separated' .
EXECUTE .
RECODE
  widdivsp  (0=0)  (1 thru 2=1)  .
EXECUTE .
COMPUTE fewiddiv = female * widdivsp .
VARIABLE LABELS fewiddiv 'female loss of spouse' .
EXECUTE .
VARIABLE LABELS heartatt "heart attack".
VARIABLE LABELS stroke "stroke".
VARIABLE LABELS cancer "cancer".

RECODE
  HW301M01 HW301M02 HW301M03 HW301M04 HW301M05 HW301M06 HW301M07
  (5=1)  INTO  heartatt  heartatt  heartatt  heartatt  heartatt heartatt  heartatt.
EXECUTE .
RECODE
  HW301M01 HW301M02 HW301M03 HW301M04 HW301M05 HW301M06 HW301M07
  (6=1)  INTO  stroke  stroke  stroke  stroke  stroke stroke  stroke.
EXECUTE .
RECODE
  HW301M01 HW301M02 HW301M03 HW301M04 HW301M05 HW301M06 HW301M07
  (7=1)  INTO  cancer  cancer  cancer  cancer  cancer cancer  cancer.
EXECUTE .
VARIABLE LABELS g3365m1 "CURRENT JOB STATUS TIME1".
VALUE LABELS g3365m1
 4.00000000000000 "disabled"
.
VARIABLE LABELS HJ005M1  "CURRENT JOB STATUS TIME2".
VALUE LABELS HJ005M1
 4.00000000000000 "DISABLED"
.
RECODE
  g3365m1
  (4=1)  (ELSE=0)  INTO  DATIME1 .
VARIABLE LABELS DATIME1 'DISABLED TIME1'.
EXECUTE .
DO IF (datime1 = 0) .
RECODE
  HJ005M1
  (4=1)  INTO  DISABLED .
END IF .
VARIABLE LABELS DISABLED 'BECAME DISABLED AT TIME2'.
EXECUTE .
RECODE
  heartatt stroke cancer disabled  (MISSING=0)  .
EXECUTE .
COMPUTE HEALTHLS = heartatt + stroke + cancer + disabled .
VARIABLE LABELS HEALTHLS 'HEALTH LOSS' .
EXECUTE .
RECODE
```

```
  HEALTHLS  (0=0)  (1 thru 4=1)  .
EXECUTE .

"SHOCKS TO FINANCIAL RESOURCE"
VARIABLE LABELS ghhinc "HOUSEHOLD INCOME LCY TIME 1".
COMPUTE adjinc2 = 163*ghhinc / 166.6.
VARIABLE LABELS adjinc2 '1998 dollar adjusted income at time 1' .
EXECUTE .
VARIABLE LABELS hhhinc "HOUSEHOLD INCOME LCY TIME 2".
COMPUTE adjinc2 = 163*hhhinc /177.1.
EXECUTE .
VARIABLE LABELS gassets "TOTAL TIME 1 HOUSEHOLD ASSETS AT THE TIME OF
INTERVIEW"
   .
COMPUTE adjast1 = 163*gassets /172.2.
EXECUTE .
VARIABLE LABELS adjinc2 "1998 DOLLAR AJSUTED HOUSEHOLD INCOME TIME 2".
VARIABLE LABELS adjast1 "1998 DOLLAR ADJUTSED HOUSEHOLD ASSETS AT THE TIME
OF THE INTERVIEW".
COMPUTE adjast2 = 163*hassets /179.9.
EXECUTE .
VARIABLE LABELS adjast2 "1998 DOLLAR ADJUSTED ASSETS AT TIME2".
COMPUTE chin = adjinc2 - adjinc1.
VARIABLE LABELS pchin 'change in income' .
EXECUTE .
COMPUTE chat = adjast2 - adjast1 .
VARIABLE LABELS chat 'change in assets' .
EXECUTE .
RECODE
  chin chat
  (0 thru Highest=0)  (ELSE=1)  INTO  reduinc  reduast .
VARIABLE LABELS reduinc 'whether income reduced'.
VARIABLE LABELS reduast 'whether assets reduced'.
RECODE
  adjinc1 adjast1  (0=500)  .
EXECUTE .
COMPUTE pchin = 100*(adjinc2 - adjinc1) / adjinc1 .
VARIABLE LABELS pchin 'percentage change in income' .
EXECUTE .
COMPUTE pchat = 100*(adjast2 - adjast1) / adjast1 .
VARIABLE LABELS pchat 'percentage change in assets' .
EXECUTE .
COMPUTE abspchin = ABS(pchin) .
EXECUTE .
COMPUTE abspchat = ABS(pchat) .
EXECUTE .
VARIABLE LABELS abspchin 'absolute value of percentage change in income' .
EXECUTE .
VARIABLE LABELS abspchat 'absolute value of percentage change in assets' .
EXECUTE .
VARIABLE LABELS g4984 "EXPECTATION :INC-INFLATION".
VARIABLE LABELS g5024 "EXPECTATION : DOUBLE DIGIT INFLATION ".
RECODE
  g4984 g5024
  (75 thru 100=1)  (ELSE=0)  INTO  CONFIINC  CONFIAST .
EXECUTE .
```

```
RECODE
  g4984 g5024
  (0 thru 25=1)  (ELSE=0)  INTO  NCONFINC  NCONFAST .
EXECUTE .

DO IF (confiinc = 1) .
RECODE
  reduinc
  (1=1)  (ELSE=0)  INTO  NEGINSHC .
END IF .
EXECUTE .
DO IF (nconfinc = 1) .
RECODE
  reduinc
  (0=1)  (ELSE=0)  INTO  POSINSHC .
END IF .
EXECUTE .

DO IF (confiast = 1) .
RECODE
  reduast
  (1=1)  (ELSE=0)  INTO  negatshc .
END IF .
VARIABLE LABELS negatshc 'negative asset shock'.
EXECUTE .
DO IF (nconfast = 1) .
RECODE
  reduast
  (0=1)  (ELSE=0)  INTO  posatshc .
END IF .
VARIABLE LABELS posatshc 'positive asset shock'.
EXECUTE .
RECODE
  neginshc posinshc negatshc posatshc (MISSING=0)  .
EXECUTE .

DO IF (reduinc = 1) .
RECODE
  abspchin
  (ELSE=Copy)  INTO  reduincp .
END IF .
VARIABLE LABELS reduincp 'value of percentage change in income for negative'+
 ' income change'.
EXECUTE .
DO IF (reduinc = 0) .
RECODE
  abspchin



  (ELSE=Copy)  INTO  incrincp .
END IF .
VARIABLE LABELS incrincp 'value of percentage change in income for positive'+
 ' income change'.
EXECUTE .
```

```
DO IF (reduast = 1) .
RECODE
  abspchat
  (ELSE=Copy)  INTO  reduastp .
END IF .
VARIABLE LABELS reduastp 'value of percentage change in assets for negative'+
 ' asset change'.
EXECUTE .
DO IF (reduast = 0) .
RECODE
  abspchat
  (ELSE=Copy)  INTO  incrastp .
END IF .
VARIABLE LABELS incrastp 'value of percentage change in assets for positive'+
 ' asset change'.
EXECUTE .
COMPUTE chincneg = reduincp * neginshc .
VARIABLE LABELS chincneg 'interaction term between reduincp and neginshc ' .
EXECUTE .
COMPUTE chincpos = incrincp * posinshc .
VARIABLE LABELS chincpos 'interraction term between incrincp and posinshc ' .
EXECUTE .
COMPUTE chastneg = reduastp * negatshc .
VARIABLE LABELS chastneg 'interraction term between reduastp and negatshc ' .
EXECUTE .
COMPUTE chastpos = incrastp * posatshc .
VARIABLE LABELS chastpos 'interraction term between incrastp and posatshc ' .
EXECUTE .

"DEMOGRAPHIC VARS"

RENAME VARIABLES (var00001=agewave1).
VARIABLE LABELS agewave1 "exact age at time 1".
COMPUTE agewave1 = (g770 + g768 / 12) - (g1053a + g1051a / 12) .
EXECUTE .
VARIABLE LABELS g770 "CURRENT YEAR ".
VARIABLE LABELS g768 "CURRENT MONTH ".
VARIABLE LABELS g1053a "BIRTHDATE YEAR ".
VARIABLE LABELS g1051a "BIRTHDATE MONTH ".
VARIABLE LABELS f469 "R GENDER ".
RECODE
  g490
  (2=1)  (ELSE=0)  INTO  FEMALE .
EXECUTE .
VARIABLE LABELS G1074A "R EDUCATION ".
RECODE
  G1074A
  (ELSE=Copy)  INTO  EDU .
EXECUTE .
VARIABLE LABELS G1092A "R RACE ".
VALUE LABELS G1092A
 1.00000000000000 "WHITE"
 2.00000000000000 "BLACK"
 7.00000000000000 "OTHER"
 8.00000000000000 "DK"
 9.00000000000000 "RF"
```

```
.
RECODE
  G1092A
  (2=1)  (ELSE=0)  INTO  BLACK .
EXECUTE .
VARIABLE LABELS g1089A "HISPANIC ".
VALUE LABELS g1089A
 1.00000000000000 "YES"
 5.00000000000000 "NO"
.
RECODE
  G1089A
  (1=1)  (ELSE=0)  INTO  HISPANIC .
EXECUTE .

"INSTITUTIONAL VARS"
VARIABLE LABELS g3382 "WORK FOR SOMEONE ELSE OR SELF-EMPLOYED".
VALUE LABELS g3382
 1.00000000000000 "SOMEONE ELSE"
 2.00000000000000 "SELF-EMPLOYED"
.
VARIABLE LABELS  HJ021 "WORK FOR SOMEONE ELSE/SELF-EMPLOYED".
VALUE LABELS HJ021
 1.00000000000000 "SOMEONE ELSE"
 2.00000000000000 "SELF-EMPLOYED"
.
RECODE
  G3382
  (2=1)  (ELSE=0)  INTO  SELFEMP .
EXECUTE .
RECODE
  HJ021
  (2=1)  INTO  SELFEMP .
EXECUTE .
VARIABLE LABELS G3589 "ABLE TO REDUCE PAID WORK HOURS".
VALUE LABELS G3589
 1.00000000000000 "YES"
.
VARIABLE LABELS G3596  "ABLE TO INCREASE WORK HOURS".
VALUE LABELS G3596
 1.00000000000000 "YES"
.
RECODE
  G3589 G3596 (1=1)  (ELSE=0)  .
EXECUTE .
COMPUTE FLEXIBLE = G3589 + G3596 .
EXECUTE .
RECODE
  flexible  (2=1)  (ELSE=0)  .
EXECUTE .

VARIABLE LABELS HJ090_1 "TYPE OF PENSION".
VALUE LABELS HJ090_1
 1.00000000000000 "TYPE A"
 2.00000000000000 "TYPE B"
 3.00000000000000 "BOTH"
```

```
.
RECODE
   HJ090_1
  (1=1)  (2=2)  (3=3)  (ELSE=4)  INTO  PENSION .
EXECUTE .
VARIABLE LABELS pension "PENSION TYPE".
VALUE LABELS pension
 1.00000000000000 "DB"
 2.00000000000000 "DC"
 3.00000000000000 "BOTH TYPES"
 4.00000000000000 "NO PENSION"
.
RECODE
  pension
  (1=1)  (3=1)  (ELSE=0)  INTO  DB .
EXECUTE .
RECODE
  pension
  (3=1)  (2=1)  (ELSE=0)  INTO  DC .
EXECUTE .

VARIABLE LABELS HN001 "MEDICARE COVERAGE".
VALUE LABELS HN001
 1.00000000000000 "YES"
.
VARIABLE LABELS HN006 "COVERED BY MEDICAID".
VALUE LABELS HN006
 1.00000000000000 "YES"
.
RECODE
  hn001
  (1=1)  (ELSE=0)  INTO  GOVHI .
EXECUTE .
RECODE
  hn006
  (1=1)  INTO  GOVHI .
EXECUTE .
VARIABLE LABELS HN033_1 "SELF-EMP INSURANCE".
VALUE LABELS HN033_1
 1.00000000000000 "YES"
.
VARIABLE LABELS "ANY INSURANCE THRU AN EMPLOYER".
VALUE LABELS HN034_1 HN035_1
 1.00000000000000 "YES"
.
RECODE
  HN033_1
  (1=1)  (ELSE=0)  INTO  PRIVHI .
EXECUTE .
RECODE
  HN034_1
  (1=1) INTO  PRIVHI .
EXECUTE .
RECODE
  RECODE
  HN035_1
```

```
  (1=1) INTO  PRIVHI .
EXECUTE .
  (1=1)  INTO  PRIVHI .
EXECUTE .

"ENVIRONTEMTAL CONTROL VARS"
VARIABLE LABELS g884 " # HH MEMBERS".
RECODE
  g884
  (1=8316)  (2=10634)  (3=13003)  (4=16660)  (5=19680)  (6=22228)  (7=25257)
  (8=28166)  (9=33339)  INTO  POVTHRES .
VARIABLE LABELS POVTHRES 'POVERTY THRESHOLD LEVEL'.
EXECUTE .
VARIABLE LABELS ADJAST2 '98 DOLLAR ADJUSTED ASSETS AT TIME2' .
EXECUTE .
COMPUTE ADEQAST = adjast2 / povthres .
VARIABLE LABELS ADEQAST 'ADEQUATE ASSET LEVEL' .
EXECUTE .
DO IF (ha501 = 2002) .
RECODE
  ha500
  (1=5.6)  (2=5.7)  (3=5.7)  (4=5.9)  (5=5.8)  (6=5.8)  (7=5.8)  (8=5.7)(9=5.7)
 (10=5.7)  (11=5.9)  (12=6.0)  INTO  UNEMRATE .
END IF .
EXECUTE .
DO IF (ha501 = 2003) .
RECODE
  ha500
  (1=5.8)  (2=5.9)  (3=5.8)  INTO  unemrate .
END IF .
EXECUTE .

VARIABLE LABELS G3509 "Time 1 HOURS WORK PER WEEK".
VARIABLE LABELS HJ172 "Time 2 HOURS WORK PER WEEK".
RECODE
  g3509 HJ172
  (1 thru 34=2)  (35 thru 168=3)  (ELSE=1)  INTO  wstatus1  wstatus2 .
VARIABLE LABELS wstatus1 'work status time 1'.
EXECUTE .
DO IF (wstatus1 = 1) .
RECODE
  wstatus2
  (1=1)  (2=2)  (3=3)  INTO  wtransi .
END IF .
VARIABLE LABELS wtransi 'work transition type'.
EXECUTE .
DO IF (wstatus1 = 2) .
RECODE
  wstatus2
  (1=4)  (2=5)  (3=6)  INTO  wtransi .
END IF .
VARIABLE LABELS wtransi 'work transition type'.
EXECUTE .
DO IF (wstatus1 = 3) .
RECODE
  wstatus2
```

```
  (1=7)  (2=8)  (3=9)  INTO  wtransi .
END IF .
VARIABLE LABELS wtransi 'work transition type'.
EXECUTE .
VALUE LABELS wtransi
 1.00000000000000 "no work to no work"
 2.00000000000000 "no work to part time work"
 3.00000000000000 "no work to full time work"
 4.00000000000000 "part to no work"
 5.00000000000000 "part to part"
 6.00000000000000 "part to full time"
 7.00000000000000 "full time to no work"
 8.00000000000000 "full time to part time work"
 9.00000000000000 "full time to full time"
.
RECODE
  wtransi
  (4=2)  (6=1)  (7=0)  (8=3)  (2 thru 3=1)  INTO  transgrp .
VARIABLE LABELS transgrp 'four transition groups'.
EXECUTE .
VALUE LABELS transgrp
 .000000000000000 "full time to no work"
 1.00000000000000 "reverse retirement "
 2.00000000000000 "part time to no work"
 3.00000000000000 "partial retirement"
.
ADD FILES /FILE=*
 /FILE='C:\Documents and Settings\Administrator\My Documents\panel1.sav'.
EXECUTE.
```

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