University of Michigan Retirement Research Center

Working Paper
WP 2006-127

How Changes in Social Security Affect Retirement Trends

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MRRC

Project #: UM06-02

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September 2006

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Acknowledgements

This work was supported by a grant from the Social Security Administration through the Michigan Retirement Research Center (Grant # 10-P-98358-5). The findings and conclusions expressed are solely those of the author and do not represent the views of the Social Security Administration, any agency of the Federal government, or the Michigan Retirement Research Center.

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Abstract

For married men, we find the conventional view of retirement trends – that the long term trend to early retirement has been reversed -- is partially contradicted by recent data. Specifically, descriptive data collected from both the Census and the Health and Retirement Study (HRS) suggest that for those in their fifties, over the periods 1992 to 1998 and 1998 to 2004, the trend to early retirement reasserted itself and labor force participation fell. In contrast, for those in their sixties, there was an increase in work. Similarly, for those 65 and over, the amount of work increased.

Simulations with a structural retirement model suggest that the recent acceleration of the trend to early retirement for those in their fifties is not the result of the change in Social Security rules. According to our model, changes in Social Security rules are expected to reduce the number of those in their early sixties who are working. This suggests that forces other than changing Social Security rules account for the observed increase in work by those in their early sixties, and that the effects of these forces are stronger than those suggested by the trends in descriptive data. Lastly, the analysis suggests that changing Social Security rules do help to explain the increase in work by those age 65 and older. The effects of these rule changes encourage workers to remain in their long term jobs for a longer time, encourage some to return from retirement to full time work, and encourage more partial retirement. Nevertheless, the changes in retirement induced by Social Security changes have been modest. Due to Social Security changes, the number of 65 year old married men at work increases by about two percentage points at ages 65 and 66, with slightly smaller changes at 67 to 69. Given the low basic labor force participation at 65 and 66, with 20 to 25 percent at full time work, and another 17 percent at part time work, the percentage increases in work due to Social Security changes are three or four times higher.

I. Introduction

Most of the twentieth century was characterized by a decline in the labor force participation rates of older men (Costa, 1998). After 1985, the trend to earlier retirement of men seems to have ceased (Quinn, 2002). There has been disagreement over whether the leveling of the trend to earlier retirement is permanent or temporary (Costa 1999 vs. Quinn 1999). But there is no controversy in the literature over the observation that the trend has at least leveled (U.S. Social Security Administration, Technical Report of Expert Panel, 2003). There is much less controversy over the observation that labor force participation of older women has been increasing in recent decades, a finding that goes hand-in-hand with the large increase in the labor force participation of women of all ages over recent decades.

Now a variety of researchers are finding that the trend to earlier retirement of men may not only have stabilized, but may have recently reversed. Much of the evidence for a reversal of the retirement trend is based on data on retirement expectations by those who are still in the labor force (Willis in ongoing work for the HRS, and Maestas, 2006).

What is happening to the labor force participation rate of older men, and why it is happening, is an empirical question that must sort through the effects of conflicting forces. Market pressures created by the aging of the baby boomers are encouraging later retirements. Government policies have been changed to encourage delayed retirement. These include the abolition of mandatory retirement and the adoption of rules prohibiting age discrimination. Firm and government policies together have fostered trends in pensions away from defined benefit plans and toward defined contribution and hybrid pensions that also encourage later retirement. On the other side of the ledger, rising incomes encourage earlier retirement. Rapid advances in technology, the rise of international competition and the decline of unionized, durable goods and other industries are also exerting pressures fostering earlier retirement.

This paper faces two challenges. The first is to accurately describe recent retirement trends, and to put those trends in context. While the path for women is clear, the challenge here is to determine whether the reversal in the trend to earlier retirement for men has continued into recent years, or whether the trend to earlier retirement has again reasserted itself.

The second challenge is to isolate the contribution of changing Social Security rules in shaping these trends. The balance of changes in Social Security policies introduced over the past two decades increase the reward to those who defer receipt of Social Security benefits, encouraging delayed retirement. Other changes in Social Security policies, such as the reduction in the overall level of benefits associated with the increase in normal retirement age, also encourage delayed retirement.

Although we know the overall direction of the effects of Social Security changes on retirement, the challenge is to determine the size of these effects. A wide array of forces is shaping retirement behavior. To isolate the retirement effects of changes in Social Security policies, we must standardize for the effects of all of these other forces. To accomplish this goal, we estimate a model dynamic, stochastic model of retirement and saving. With this model we can hold constant the preferences of potential retirees. We also can hold constant all the other forces specified in the budget constraint, wages, incentives from pensions, layoffs and other factors influencing retirement. We then simulate the effects of changes in Social Security rules. In particular, using a consistent set of preferences and standardizing for other determinants of retirement incentives in the budget set, simulations are run using Social Security rules applicable to the original HRS cohort, and then again to those born six and twelve years later. The retirement changes simulated by the model are then matched against those observed in the descriptive data.

This methodology allows us to standardize for the influence of time effects; that is of events that uniquely affect the different cohorts because they occur at different ages for the members of the different cohorts. Our approach standardizes not only for the effects of changes in demand for members of different cohorts over time, but also for unique events such as the stock market boom which affected members of different cohorts at different stages of their life cycles, allowing those in some cohorts to recover more easily than others.

II. Descriptive Statistics

This section presents descriptive data on retirement outcomes. The analysis is based on data from the Health and Retirement Study and CPS data.

The Health and Retirement Study adds a new cohort every six years, which determines the spread between cohorts in our analysis. Table 1 shows the various birth cohorts to be compared, the years in which the comparisons will be made, 1992, 1998 and 2004, and the ages of members of each cohort in the indicated years. There are three groups of 50 to 56 year olds. They include the younger half of the original HRS cohort, those born from 1936 to 1941 who were 50 to 56 in 1992. Members of the war baby cohort born from 1942 to 1947 were 50 to 56 in 1998. Lastly, members of the early boomer cohort, born from 1948 to 1953, were 50 to 56 in 2004. There also are three groups of 56 to 62 year olds.[1] One group, born in 1932 to 1937, was 56 to 62 in 1994.[2] Those born in 1936 to 1941 were 56 to 62 in 1998, and those born from 1942

[1] Notice that when using birth years to define cohorts, given that the survey was mid-year, there is some overlap in reported age between cohorts.

[2] For the 56-62 year olds, there are no 62 year-old eligibles in the original HRS cohort in 1992. It didn't seem wise to shift the age range, so the first group of 56-62 year olds relates to the 1932-1937 cohorts in 1994, not 1992. The underlying reason for this problem is that the original cohort contained

to 1947 were 56 to 62 in 2004. Finally, there are two groups of 61 to 67 year olds. They include those born from 1931 to 1936 in 1998, and those born from 1937 to 1942 in 2004.[3]

The descriptive data are presented in Table 2. There we defined full time work, partial retirement and full retirement using hours per year of work. A person is said to work full time if hours per year of work are 1250 or higher; to be partially retired if hours of work range from 100 to 1249, and are fully retired if hours of work are 99 or lower.

Contrary to the suggestions in the current literature, according to the data in Table 2, those 50 to 56 are retiring *at younger ages* in 2004 than in previous years. Consider first the overall change between 1992 and 2004. Over this period, there was a decline in the percentage of 50 to 56 year old men who are not retired – that is, working 1250 hours or more, from 77.1 to 75.5 percent. The corresponding change in full retirement was an increase of 1.7 percentage points, a change that is consistent with the long run trend toward earlier retirement. Consider next the change between 1998 and 2004. In 2004, 75.5 percent of males 50 to 56 years old worked 1250 hours or more, while 80.4 percent worked 1250 hours or more in 1998. Almost two percentage points of the decline in the number working full time are found in an increase in the share of 50 to 56 year old males working part time (defined as working 100 to 1249 hours). But again, in contradiction to the findings in the current literature, the fraction of 51 to 56 year old males fully retired (i.e., working less than 100 hours per year) increased from 16.2 percentage points in 1998 to 19.4 percent in 2004. With standard deviations of between 0.8 and

only 11 birth years, so it could not be divided up into two 6 year groups corresponding to the later cohorts. As a result, as the HRS cohorts are moved through time, one has to change either the birth cohorts or the age ranges.

[3] For similar reasons to those noted in footnote 2, the 61-67 group in 2004 was born in 1937-1942, not 1936-1941. That is, in order to keep the same age range in 2004 as in 1998, we borrowed a birth year from the war babies cohort.

1.2 years, the retirement rates observed between 1998 and 2004 are significantly different from each other.

Differences in retirement behavior may arise between different cohorts either because of differences between the cohorts, or because of differences in the economy or other events in the years the cohorts reached the age of interest. It is useful to consider the different circumstances facing the two cohorts. For example, those who were in their fifties in 1998 were still experiencing the stock market boom. Also those working in 1998 enjoyed greater coverage by DB plans, and thus stronger early retirement incentives from their pensions. In 2004 the stock market boom was long behind those 50 to 56 and DB plans were somewhat less common. Both factors would lead to earlier retirement in 1998 than in 2004. Yet we find that for those 50 to 56, retirement was accelerated in 2004.

Consistent with the literature, those over 65 are retiring *later* in 2004 than in 1998. Many of those 65 to 67 in 2004 based their retirement decisions on economic conditions and retirement program incentives prevalent in the late 1990s. Those who were 65 to 67 in 1998 based their decisions on economic circumstances and retirement incentives from the early 1990s. The greater prevalence of DB plans in the early 1990s would have lead to earlier retirements in 1998 than in 2004. The somewhat weaker condition of the stock market in the early 1990s might have lead to observing greater retirements for this age group in 2004, but much depends on how expectations of further stock market gains were formed. Thus for those 65 to 67 in the two different years, the simple comparison might explain the later retirements in 2004 by the change in pension plan composition.

Of course, we also know that changes in Social Security are encouraging later retirement. The question will be whether the changes in Social Security help to explain the outcomes, why those in their fifties are retiring earlier in later years and those over 65 are retiring later; or whether the effects of the changes in Social Security will add to the mystery.

Comparing Retirement Trends in HRS data to those in CPS data.

It is useful to compare the descriptive findings based on the Health and Retirement Study with data from the Current Population Survey. Although the CPS data cannot be used to construct the model of retirement and saving, they are an obvious standard of comparison. Finding the same trends in CPS and HRS data will help to establish the relevance of using HRS data to understand these trends.

Table 3 presents the trends for those 50 to 54 years old in the HRS and CPS. Figure 1 reports comparisons for other age groups. The retirement trends are similar between the two surveys. Most important from the perspective of the present study, for men in their early fifties, employment population ratios decline between 1992 and 2004, and for those in their late fifties, there is a decline between 1998 and 2004. In contrast, for those in their sixties, there is an increase in the employment population ratio, with the strongest increase for those 65 and over.

Figure 2 shows that for women fifty and over, the trend to increased labor force participation is found consistently through all age groups.

III. Empirical Estimates of the Retirement Model.[4]

Our strategy is to use a structural model of retirement and saving, estimated with data from the Health and Retirement Study, to simulate the effects of changing the rules for Social Security. In this standard life cycle model individuals maximize expected utility subject to an

[4] The model we use was estimated in a previous paper for the Michigan Retirement Research Center, Gustman and Steinmeier (2006). The description of the model and the baseline estimation in Section III are taken directly from our earlier study. The simulations in Section IV are original to this paper.

asset evolution constraint. Consumption and leisure over the lifetime are the choice variables in the model. The stochastic variables include the returns to assets, mortality outcomes, and retirement preferences. Potential wages and health are treated as exogenous and non-stochastic.

In the model, for each year i, the individual chooses consumption C and leisure L to maximize expected utility:

$$EU_i = E_i\left[\sum_{t=i}^{T} \left\{ e^{-\rho t} \sum_{m=1}^{3} s_{m,t} \left(\tfrac{1}{\alpha} C_{m,t}^{\alpha} + h_t L_{m,t}^{\gamma} \right) \right\} \right]$$

L takes on a value of 1 if the individual is retired, 0 if he or she is working, and 0.5 if the individual is partially retired. h_t indicates the strength of the individual's preference for retirement, which may vary from one person to the next. ρ is the time preference rate, which also may vary from one person to the next.

The model is estimated for married men. The income of the spouse is assumed to be exogenous and non-stochastic. The index m takes on three values indicating whether both members of the couple survive until year t, only the husband survives, or only the spouse survives. $s_{m,t}$ is the probability that the household will have the composition described by m in year t. T corresponds to the maximum age beyond which the household's survival probabilities are too small to matter.

The asset constraint is given by

$$A_t = (1 + r_t) A_{t-1} + W_t (1 - L_{m,t}) + E_{m,t} + B_{m,t} - C_{m,t}$$

A_t is the level of assets in year t, and r_t is the stochastic return on those assets in year t. Assets are assumed to start out at 0 at the beginning of the working life and are not permitted to be negative. W_t is the wage rate at time t, which will depend on whether the individual has stayed on his or her career job, which we also label as his or her main job, or has previously retired and is going back to work. The career (main) job is considered to be the job the individual holds until he fully or partially retires for the first time. The term $E_{m,t}$ is the income accruing to the spouse, including earnings and pensions. The spouse is assumed to have a retirement date unaffected by the individual's choices, and the term is taken to be zero in states where the spouse is no longer alive.

$B_{m,t}$ is the amount of the individual's pension and the household's Social Security benefits, both of which will be affected by the individual's retirement decisions. For defined benefit pensions, the benefit amount is determined by the retirement date and continues until death. For defined contribution pensions, the contributions are put into an account and allowed to accrue subject to the same stochastic return as is applied to assets. The account is assumed to be made available to the individual when the individual retires from the career job. Household Social Security benefits are calculated according to the Social Security rules, depending on previous retirement decisions and the composition of the surviving household. Since most individuals claim benefits as soon as eligible (Coile et al., 2002; Gustman and Steinmeier, 2002), we do not try to model the acceptance decision here and instead assume that the individuals will claim the benefits as soon as they can, consistent with the earnings test.

Individuals are assumed to be heterogeneous with regard to both their time preference rate and their retirement preferences. With regard to time preference, we assume that ρ has a different value for different individuals and essentially treat it as a fixed effect in the estimation.[8] Retirement preferences are reflected in the coefficient to the leisure term in the utility function and are characterized by

$$h_t = e^{\beta X_t + \varepsilon_t}$$

[8] In a different context, Ippolito (1997) makes differential time preference rates a central focus. His analysis concerns the employer demand for labor and the structure of pensions.

The linear form βX_t has three terms: a constant, age, and health status. The coefficient of age is taken to be positive, so that retirement gradually becomes more desirable as the individual ages and suffers from the cumulative effects of nature's aging. Note that there is no term which makes the individual suddenly more desirous of retirement at 62, 65, or any other particular age; this means that any spikes in retirement in the simulations are the result of idiosyncracies in the opportunity set, and not the result of preferences.

The ε_t term in h_t reflects the individual's relative preference for leisure. An individual starts out with a value of ε drawn from a distribution with mean 0 and standard deviation σ_ε and keeps this value until he or she retires from the career job. Upon retirement, the individual may find that retirement is more or less fulfilling than anticipated, or perhaps the individual may find that he values consumption relatively more than he had thought. In any case, experience allows the value of ε to change after retirement, and the model reflects this by allowing the value of ε_t to vary after retirement, with values in successive years correlated with a correlation parameter ρ_ε. If the individual finds that retirement is substantially less fulfilling than anticipated, a return to work, albeit at a reduced wage as compared to the career job, may be the optimal decision.

L^γ is proportional to the utility value of leisure. It has a value of zero if the individual is working full time $(L = 0)$ and a value of one if the individual is fully retired $(L = 1)$. If the individual is partially retired $(L = \frac{1}{2})$, $L^\gamma = (\frac{1}{2})^\gamma$ should take on a value between 0.5 and 1 if diminishing marginal utility of leisure is to be satisfied. Call this value V_p. If V_p is close to unity, full time work is particularly onerous compared to partial retirement work, and most people should go through a period of partial retirement. If, on the other hand, V_p is close to 0.5, the marginal disutility of work is rising very slowly with additional work. As with time preferences and ε, we assume that individuals are heterogeneous with regard to their valuation of partial retirement leisure. For any individual, V_p comes from a random draw from the truncated exponential distribution $f(Vp) = ke^{\delta V_p}$, defined on the interval 0.5 to 1. For a given δ, k is the value needed to make the distribution function integrate to unity over the interval. If δ is positive, values of V_p toward unity will be more common, while if δ is negative, values near 0.5 will be more common.

The data suggest that partial retirement becomes relatively more common at later ages. At age 60, partially retired workers are 10% of those working, with the figure rising to 19% at age 62 and 54% at age 68. To accommodate the evidently increasing relative attractiveness of part-time work, we make δ a function of age: $\delta = \delta_0 + \delta_a$ Age. If δ_a is positive, the distribution of V_p shifts to the right over time, so that part-time work becomes relatively more attractive to full-time work, and hence more common. Individuals are assumed to maintain the same relative position in the distribution of V_p's even as that distribution shifts over time. The heterogeneity relates to where they are in that distribution. A similar problem occurs with respect to health, which when adverse greatly reduces the amount of partial retirement. When we tried to introduce health into the δ term in the same way we introduced age, the coefficient tended toward minus infinity, indicating that when a health problem causes an individual to retire, it usually causes complete retirement rather than partial retirement. To reflect these results, the value of V_p is set to 0.5 for individuals with health problems.

The individual carries several state variables from one period to the next; these are variables which are consequences of past decisions and random events which have a bearing on the current decision. Five state variables are applicable in all periods. These are the level of assets A_t, the time preference rate ρ, the level of overall leisure preferences ε_t, the relative utility of part-time leisure V_p, and whether or not the individual is still in the career job. If the individual is still in the career job and that job has a defined contribution pension, there is another state variable relating to the size of the defined contribution balance. After the individual has left the career job, additional state variables related to the value of defined benefit pension amounts and Social Security benefits are introduced. Before retirement from the career job, the defined benefit and Social Security amounts are completely determined from the fact that the individual is still in the career job and thus do not have to be included as separate state variables.

To summarize, the utility function contains three elements which are heterogeneous between different individuals. They are (1) the time preference rate ρ, (2) the initial value of the overall leisure preference term ε, and (3) the relative attractiveness of part-time vs. full time work, as reflected in V_p. In the estimation and subsequent simulations, the time preference rate is taken as a fixed effect whose value is calculated for each individual, while V_p and the initial value of ε are treated as random effects whose values are drawn from the specified distributions.

As with any stochastic dynamic model, the solution of the model proceeds backwards. In the estimations and simulations, the model uses a grid with 40 points for assets, 10 for defined contribution balances, 17 for overall retirement preferences, 6 for partial retirement preferences, and 4 each for pensions and Social Security values. The number of calculations each period is related to the product of the number of points for each of these variables, multiplied again by the two categories for the career job variable.

The Data

The model is estimated with data from the Health and Retirement Study (HRS). The survey started in 1992 with about 7,600 households with at least one individual who was 51 to 61 years old at the time. The households have been surveyed at two year intervals since then; we use information through the 2002 survey. The survey has matched Social Security and pension records for many respondents.

In the data, individuals working at least 30 hours per week and 1560 hours per year are counted as full-time. Individuals working at least 100 hours per year but no more than 25 hours per week or 1250 hours per year are counted as part time, and individuals not doing any work at all are counted as fully retired. Individuals who fall between full time and part time or between part time and retired are classified on the basis of self reports. This means, for instance, that a teacher working 36 weeks at 35 hours per week (1260 total hours per year) would be counted as full-time if the self reported retirement status was "not retired at all." In order to reduce classification error, all work measurements used in the estimation are taken as of the survey dates. We do not try to interpolate the actual work effort to dates between the surveys or before the first survey.

Wealth is measured in the 1992 survey and is used only to get an estimate of the respondent's time preference, which as indicated before is regarded as a fixed effect in the model. Roughly speaking, time preference is taken to be the value for which the observed wealth is consistent with the wealth that would be generated by the model. In this regard, wealth is considered to be wealth that could be used to finance retirement beyond the amounts available from pension and Social Security income, and includes financial wealth, real estate, and business assets. Given the likelihood of measurement error in the wealth of individual respondents, we do not try to use information about the measured increases or decreases in wealth between surveys in the course of estimating the model.

Lifetime resources include a number of components. For about three-quarters of the sample, earnings are reflected in attached Social Security records, adjusted by self reported information for cases over the earnings maximum or for uncovered jobs. The remaining individuals have earnings histories constructed from self reports about current and last jobs, other jobs lasting longer than 5 years, and information about the total number of years worked. Projecting the future potential earnings that the worker would have on the career job is done by using the experience and tenure coefficients from estimated wage equations.[3] Projecting the potential earnings for a worker who retires and then returns to full-time work is done by adjusting the tenure coefficients to zero.

Pension information is available for about two-thirds of individuals with pensions. For defined benefit pensions, the annuity is calculated based on the summary plan description provided by the firm. For defined contribution pensions, the contribution amounts are calculated year by year, and the balances are allowed to grow within the model at the stochastic rate of return. Social Security benefit amounts for various potential retirement dates are calculated according to the Social Security rules, assuming the respondents collect benefits when eligible to do so and allowing for the earnings test.

The earnings and pension income of the spouse are calculated and, for the purposes of this model, are taken as exogenous and non-stochastic in order to keep the model computationally tractable. Also taken as exogenous are inheritances and other types of income.

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[3] The wage equation is reported in Appendix Table 1 in Gustman and Steinmeier (2005). This equation suggests a wage drop of about 25 percent for an individual with 20 years of tenure who retires and then tries to return to work.

Income and capital gains related to assets, of course, are treated as part of the stochastic rate of return to assets.

The prospective distribution of rates of return is based on the historical series calculated by Ibbotson Associates (2002) for various asset classes from 1926 through 2001. To combine these figures into a single rate of return, we look at households in the HRS who had at least some stocks and/or bonds. We rank these households by total financial assets and take the middle 10 percent of the households to assess the distribution of assets among stocks, long-term bonds, and short-term financial instruments. We find that, on average, about 50 percent of these assets are in stocks, 5 percent in bonds, and 45 percent in bank accounts and certificates of deposit. We proxy the returns on these assets by using the Ibbotson returns for large company stocks, long-term government bonds, and treasury bills, respectively. The arithmetic mean of the returns for this weighted average of securities is 5.3% with a standard deviation of 11%, and the geometric mean is 4.7%. These returns are assumed to be uncorrelated year-to-year, which is approximately true in the actual data. Assuming zero correlation has the advantage that it eliminates the necessity to introduce another state variable for the returns to assets.

The final sample consists of 2,231 respondents for whom we can construct, at least approximately, the details of their earnings and income opportunities, and for whom the model seems appropriate. This is slightly less than half of the number of married men available in the original HRS sample.

Estimation of the model.

The parameters estimated for the model include the consumption parameter α, the standard deviation σ_ε for the retirement preference variable ε, the correlation ρ_ε of the values of ε once the individual leaves the main job, the two coefficients δ_0 and δ_a which describe the distribution of V_p, and the coefficients in the linear term βX_t which affects retirement preferences. These coefficients include β_o, the constants, β_a, the coefficient of age, and β_h, the coefficient of health.

Each of these parameters have specific implications for the observed pattern of retirement. The estimation procedure in effect uses these implications to help to identify the values of the parameters. β_o determines the average age of retirement, and σ_ε governs the range of retirement ages. β_a is perhaps the most important parameter for our purposes, since it determines the sensitivity of retirement to economic incentives. In this model, the individual retires when the utility from retirement grows to more than offset the utility of the extra income from working. If β_a is high, the utility of retirement is increasing very rapidly with age, and changes in economic incentives would have to be very large in order to affect the retirement age by much. The opposite is true if β_a is relatively low. ρ_ε affects the probability of returning to work after retirement; if ρ_ε is low, then individuals may experience large shifts in retirement preferences after retiring, and a return to work is more likely. δ_0 mainly affects the percentage of individuals who partially retire, and δ_a governs how this percentage changes with age. α affects how retirement varies with general lifetime income. If α is near unity, then the marginal utility of income diminishes little at high income levels, and high income workers should retire later in order to reap the benefits of their higher wages. The opposite is true if α is non-trivially negative. Finally, β_h reflects the degree to which bad health encourages retirement, over and above its impact through earnings.

To estimate these parameters, we use the Generalized Method of Moments (GMM) method. The GMM estimator begins with a series of moments, which are nothing more that the difference between some observed characteristic of the sample and the expected value of that characteristic implied by the model. The chosen moments are grouped into a vector **m**.[4] For the present model, the moment vector includes full retirement at all ages between ages 54 and 66. For ages 55, 58, 60, 62 and 65, the vector also includes full or partial retirement, full retirement if the observation is in the upper third of lifetime income, full retirement if the observation is in the lower third of lifetime income, and full retirement if the individual is in poor health, and full or partial retirement if the individual is in poor health. The final set of moments in the vector is a measure of the frequency with which individuals return to full-time work in one survey, given that they were fully or partially retired in the previous survey. All in all, we use 43 moments in the vector **m**.

Generalized method of moments seeks to minimize the quantity

$$q = \mathbf{m}N\ \mathbf{w}^{-1}\ \mathbf{m}$$

where

$$\mathbf{w} = \sum_{i=1}^{n} \mathbf{m}_t\, \mathbf{m}_t'$$

If the model is correct, then each moment is a measure of an observed value around its expected value. In the limit, **m** should have a multivariate normal distribution. In the expression for **w**, $\mathbf{m}_i$ is the vector of moments of a single observation, so that **w** is essentially an estimate of the variance-covariance matrix of **m**. q is thus approximately a quadratic form and, if the model is correct, it should have a χ^2 distribution with the degrees of freedom given by the number of moments less the number of parameters being estimated. The variance of the estimates is given by

$$\text{Var}\ (\boldsymbol{\theta}) = [\mathbf{G}\ \mathbf{w}^{-1}\ \mathbf{G}]^{-1}$$

[4] The notation for the discussion of GMM is taken from Greene (2000) but is similar to the notation in many other econometric texts.

where $\boldsymbol{\theta}$ is the vector of parameters to be estimated and $\mathbf{G}$ is the derivative of the moments with respect to the parameters.

We note a couple of caveats with regard to the estimation procedure. The first has to do with the time preference parameter, which we mentioned before would be treated as a fixed effect in the estimation. As a result, there is no single estimated parameter for time preference. Rather, for each individual, the value of the time preference parameter is such that, given the values of the other parameters, the resulting value of calculated wealth in 1992 is just equal to the actual value of wealth. In general, high values of wealth are associated with low time preference rate parameters and vice verse, although this relationship may be affected if the individual is expecting high pension or Social Security benefit streams. In some cases, assets are higher than would be expected even at a zero time preference rate; we take this as evidence that the time preference rate is low and assign it a value of zero. At the other extreme, an individual with zero assets is assigned a high enough time preference rate to insure that such an individual consumes all income in every period.

To simplify the calculation of time preference and keep the calculations tractable, we ask what time preference would generate the savings corresponding to the respondent's observed level of assets in 1992, given the expected retirement date and its associated income flows. To do this, we calculate a simplified version of the model with stochastic returns but with labor supply fixed at the expected (or actual) retirement date. The solution of the model is a contingent decision tree with consumption at any age contingent on assets and realized returns.[5] To get the computed assets at any age, we assume that the individual initially has zero assets. In each year, the assets from the previous year are increased by the observed return that year, and

[5]Note that with the path of work effort fixed, consumption no longer depends on ε.

the contingent consumption decision implies the amount of assets that will be carried over into the next year. This process is continued until 1992, when the asset level is observed. The contingent decision tree for the model depends on the individual's time preference rate, and the time preference rate can be adjusted until the calculated assets just match the observed assets.

We simulate the model 10,000 times for each observation. For each simulation, we start the individual with zero assets and take a random draw for the unobserved stochastic retirement preference variable ε. For each year, given the assets at the beginning of that year, the consumption and work decisions are given by the contingent decision tree, using the observed values of the rate of return. The retirement distribution is cumulated over the simulations and is used to calculate the moments. More properly, this estimation technique should be called the Generalized Method of Simulated Moments, since we use simulated moments rather than theoretical moments. Since the number of simulations is large, however, the simulated moments should be very good approximations to the theoretical moments, and the resulting estimates should be almost identical to those using theoretical moments.

Parameter estimates.

The coefficients estimated by the simulated GMM procedure are reported in Table 4. The estimated coefficients are all significantly different from zero by conventional standards. Of particular importance, the coefficient of the age variable implies that retirement leisure is increasing in value by 5.4 percent per year. This relatively low value means that economic incentives should be able to have considerable influence on retirement. The autocorrelation coefficient for the leisure preference term is significantly less than unity, which means that individuals can experience changes in their perception of retirement after they begin to experience it. If they find retirement less attractive than anticipated, they may well reverse course and go back to work for a while, at least until the inexorable march of age finally makes retirement appealing again. Poor health increases the value of retirement leisure by approximately the same amount as being over seven years older.

The overall fit of the model is measured by the q-statistic. If the model is correct, the departures of the observed moments from their theoretical means should be random, and the q-statistic should be distributed as a χ^2 with degrees of freedom equal to the number of moments less the number of parameters. In the present context, there are 43 moments and 8 parameters, so the degrees of freedom are 35. The statistic of 41.56 is well within the bounds of a χ^2 with 35 degrees of freedom, which has a 5 percent critical value of 49.80. This means that, at least among the moments considered in the estimation, there is no evidence that the model does not fit the data well.

A key to understanding the distribution of full and partial retirement with age is in the time preference rates. These rates are quite heterogeneous. Half the population exhibits time preference rates below 5 percent and may be expected to respond relatively strongly to delayed incentives. On the other hand, over a third exhibits time preference rates of 20 percent or greater and may be expected essentially to respond only to incentives which affect current consumption.[5]

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[5]

Distribution of time preference rates

Lower limit of range		Lower limit of range		Lower limit of range		Lower limit of range		Lower limit of range	
0.00	1125	0.25	17	0.50	3	0.75	0	1.00	675
0.05	236	0.30	5	0.55	3	0.80	0		
0.10	73	0.35	8	0.60	1	0.85	2		
0.15	34	0.40	4	0.65	4	0.90	4		
0.20	26	0.45	7	0.70	2	0.95	2		

Lower limits of range of time preference rates are shown.

Table 5 reports observed retirement outcomes, and simulated retirement outcomes under the current program, with each included individual having the work history actually experienced, and reflected in own Social Security earnings record and reported job history. The spike in retirements from full time work at age 62 is approximately the right height, although the spike at age 65 is a couple of percentage points too low. Comparing the flow into full retirement, the spike at 62 is a couple of points low, but the spike at 65 is approximately the right height.

The simulations also do a fairly good job of matching reverse flows.[6] For example, 3.3 percent of the respondents who were between 54 and 66 in 1994 and 1996 were observed to be working full-time in 1996 and either fully or partially retired in 1994. In the simulations, 3.2 percent of the respondents who were between 54 and 66 in 1994 and 1996 were simulated to be working full-time in 1996 and fully or partially retired in 1994.

IV. Simulating the Effects of Social Security Rule Changes on Retirement Trends

The effects on retirement of evolving Social Security policies are simulated by altering the budget constraint described above. We begin with the assumption that each person in the Health and Retirement Study is covered by whatever set of Social Security rules has governed the benefits the person is actually scheduled to receive. We then ask what happens to retirement outcomes when these rules are changed. In particular, we consider the effects of changing the normal retirement age, the earnings test and the delayed retirement credit. (We did not consider the effects of changing the covered earnings limits.)

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[6] Reversals from full or partial retirement in one year to full time work in the next.

Year	1992-1994	1994-1996	1996-1998	1998-2000	2000-2002
Observed	2.3	3.3	3.0	3.6	2.3
Simulated	3.9	3.2	2.7	3.1	3.3

Our approach is to present the numbers falling in different retirement states by age in Table 6, and the corresponding flows among retirement states in Table 7. Under each outcome, we present the simulated numbers first for the actual rules that governed the behavior of the person during their lifetime, then in the following column advancing the Social Security rules as if they came from a cohort six years younger, and in a final comparison advancing the rules by another six years, applying the Social Security rules that would apply to a cohort twelve years younger. We leave all other aspects of earnings, pensions and health constant.

To facilitate an understanding of how the changing Social Security rules affect retirement outcomes, Tables 8 and 9 present the differences in the outcomes, using outcomes under Social Security rules for those six years younger compared to the baseline outcome (zero years younger), then comparing outcomes using Social Security rules for those twelve years younger than the HRS cohort compared to outcomes under Social Security rules for those six years younger, and finally comparing outcomes under Social Security rules for those twelve years younger compared to the outcomes under the baseline Social Security rules.

A. Baseline Results

First consider baseline results where retirement outcomes are predicted using the actual rules that will apply to each of the relevant individuals in the Health and Retirement Study. Columns 1, 4, 7 and 10 of Table 6 show retirement outcomes under actual rules that applied to the HRS cohort, which include the normal retirement age and delayed retirement credit dependent on year of birth, and the earnings test as the respondent experienced it. By age 60, from columns 1 and 4, 60.3 percent are still working full time, with 50.4 percent still on their long term job, and another 9.9 percent of the population working on a full time job after having retired. Still another 9.9 percent is partially retired, leaving 29.8 percent completely retired. By age 62, the fraction working on the main job declines to about one third, with another 7.4 percent working full time after retiring, and 15.3 percent partially retired, so that 56.1 percent of the population is working at all, with 60 percent of them still on their main job. By age 65, only 15.9 percent are working on their main job, with 7.4 percent working full time after having retired, and 17.1 percent partially retired. Thus by 65 as many older men are partially retired as are working on their main job. By age 65, 59.6 percent of the married male population is fully retired, out of the labor force entirely. By age 69, 7.9 percent are working full time on their main job, 8.3 percent are working full time after having retired, and 16.6 percent are partially retired.

Table 7, columns 1, 4, 7, 10 and 13 show a number of flows among various retirement states under the rules that were in place during the work life of the respondent. With four retirement states in each year, at each year of age there are 16 different retirement flows. For brevity, we highlight only five of them, most combining more than one flow. Column 1 reports the net flow out of full time work (flow out minus flow in). At age 62, where the respondent is first eligible to receive Social Security benefits, 14.6 percent of the population leaves full time work. The net flow into full retirement, as shown in column 4, is 10.2 percent. As seen in column 7, the percentage newly returning to full time work increases slightly with age, with the flow ranging between 2 and 4 percent of the population. In most years, the percent flowing into part time work is of the same order of magnitude, and is shown in column 10. However, there is a spike in the flow into part time work at age 62, with 8.7 percent of the population entering part time work. As can be seen by comparing columns 1, 10 and 13, until age 65 most of those entering part time work come from full employment. After age 65, more than half of those entering part time work come from full retirement.

It is also of interest to compare the flows in Table 7 with the corresponding stocks in Table 6. From age 62 on, the fraction partially retired in Table 6 is roughly 15 percent to 17 percent. After age 62, the flow into partial retirement from Table 7 is about 4 percentage points each year. This suggests an average duration of partial retirement of about four years.

B. Changes in Retirement Outcomes with Changing Social Security Rules

Remembering that the underlying levels of outcomes and flows are available in Tables 6 and 7, we turn now to the differences in retirement outcomes and retirement flows that result from differences in Social Security rules affecting each cohort. These differences in retirement outcomes are shown in Table 8 and 9. The first clear finding from the top half of each table, i.e., through age 61, is that differences in the Social Security rules that apply to different cohorts have virtually no effect on retirement outcomes or flows. Although the forward looking agents simulated in this model will shape their behavior at younger ages in light of Social Security rules that will affect their benefits in later years, there appears to be no differences in incentives resulting from differences in the rules among cohorts. Thus the trend to earlier retirement observed for those in their fifties in the underlying data is not the result of changing Social Security rules.

Starting at age 62, there is a small effect of Social Security rule changes on retirement outcomes. From Table 8, columns 3 and 6, accelerating the rules by 12 years would reduce the number working full time at age 62 by 2.1 percentage points; 1.4 percentage points on the main job, and 0.7 percentage points for those working full time after they had previously retired. With 40.8 percent of the 62 year old population working full time under baseline conditions, the reduction in full time work due to Social Security rule changes amounts to 5 percent of the 62 year old workers at full time employment under the baseline rules. In Table 9 there is a corresponding difference in the flow of those retiring from full time work at age 62.

In contrast, for 65 year old workers, we see from Table 8 that the fraction at full time work increases by 1.7 percentage points as a result of changes in the rules over twelve years, with a 1.2 percentage point increase in work on the main job, and another 0.5 percentage point increase in the percent in full time work after retiring. At age 66, rule changes foster an increase of 1.8 percentage points (0.9 + 0.9), which with 20.8 percent of those age 66 at full time work in the baseline (13.0 + 7.8), amounts to an increase of 8.7 percent in the number of 66 year olds at work. At 65 there is a 0.4 percentage point increase in part time work due to Social Security rule changes. There are smaller, but analogous increases in full time work for those 67 to 69, and a one tenth of a percentage point increase in part time work. Turning to Table 9, from 63 to 65, under the Social Security rules applying to younger compared to older cohorts, the net percent retiring from full time work is lower by a point or two. From ages 67 to 69, the percent retiring from full time work is increased by the new rules.

VI. Summary and Conclusions:

For many decades, researchers observed a trend toward earlier retirement. Near the end of the last century, the trend to earlier retirement appears to have ceased. Moreover, respondent reports as to their expected retirement dates suggest that further declines in labor force participation of older workers are unlikely in the near term, and that retirement rates may continue at current levels, or may even decline in the first decade of the twenty first century, increasing labor supply of older workers.

One aim of this paper is to examine descriptive statistics to document recent trends in retirement. The trends for women can be clearly seen in descriptive statistics. Women in the younger cohorts have a greater commitment to the labor market and retire later than do those who were born earlier. Our focus therefore is on the retirement behavior of men in different cohorts.

For married men, we find the conventional view of retirement trends is partially contradicted by recent data. Specifically, descriptive data collected from both the Census and the Health and Retirement Study (HRS) suggest the trends for married men in their fifties, their early sixties, and their late sixties were not uniform between 1992, 1998 and 2004. For those in their fifties in each of these years, in contrast to findings that the trend to early retirement has been reversed, there was a decrease in work over the period. That is, for those in their fifties, the trend to early retirement seems to have reasserted itself. For those in the early sixties, consistent with the conventional view, there was an increase in work. Similarly, for those 65 and over, the amount of work increased.

A second aim of this paper is to isolate the effects of changing Social Security rules on retirement outcomes for the twelve years from 1992 to 2004. We use a dynamic, stochastic model of retirement and saving capable of analyzing full and partial retirement outcomes to simulate the effects of the changing Social Security rules. The model is sufficiently flexible to allow both for individual differences in time preference, and to allow people to change their minds once they retire and to return to full time or part time work. The advantage of using a structural econometric model is that it allows us to standardize for the influence of all other factors except the changing Social Security rules, and then to isolate the effects of the evolving Social Security rules. Once we simulate the effects of Social Security rules in place over the lifetimes of HRS respondents, we can ask what would happen under the rules that would be in place for cohorts six and twelve years younger than the HRS cohort.

Our simulations indicate that even for forward looking agents, changes in Social Security rules should not be expected to affect retirements of those in their fifties. Thus the recent acceleration of the trend to early retirement for those in their fifties does not seem to be a result of the change in Social Security rules.

According to our model, changes in Social Security rules are expected to reduce the number of those in their early sixties who are working. Since the number of those in their early sixties who are working has increased, this suggests that forces other than changing Social Security rules account for the observed increase in work by those in their early sixties, and that the effects of these forces are stronger than those suggested by the trends in descriptive data.

Lastly, the analysis suggests that changing Social Security rules do help to explain the increase in work by those age 65 and older. The effects of these rule changes encourage workers to remain in their long term jobs for a longer time, encourage some to return from retirement to full time work, and encourage more partial retirement. Nevertheless, the changes in retirement induced by Social Security changes have been modest. Due to Social Security changes, the number of 65 year old married men at work increases by about two percentage points at ages 65 and 66, with slightly smaller changes at 67 to 69. Given the low basic labor force participation at 65 and 66, with 20 to 25 percent at full time work, and another 17 percent at part time work, the percentage increases in work by those 65 and older due to Social Security changes are three or four times higher.

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Table 1: Ages of Members of Birth Cohorts Used in Analysis in Indicated Years

	Calendar Year		
Birth Year	1992	1998	2004
1931-36	56-62*	61-67	
1936-41	50-56	56-62	61-67**
1942-47		50-56	56-62
1948-53			50-56

*The values for 56 to 62 year olds are reported for those born from 1932 to 1937 as of 1994. There were no 62 year old age eligibles in HRS in 1992.
**The 61 to 67 year old group in 2004 was born from 1937 to 1942, not 1936 to 1941. See footnotes 2 and 3 for further explanations.

Table 2: Retirement Status of Males by Age and Year Using Hours per Year to Define Retirement

	Not Retired			Partially Retired			Fully Retired		
Age	1992	1998	2004	1992	1998	2004	1992	1998	2004
50-56	77.1	80.4	75.5	5.2	3.4	5.3	17.7	16.2	19.4
56-62	69.9*	62.2	61.9	5.7	7.7	8.2	24.5	30.1	29.9
61-67		33.3	34.9		11.2	11.6		55.6	53.5
65-67		24.5	27.5		11.9	12		63.6	60.5

Data are unweighted. Not retired = 1250+ hours; Partially retired = 100 – 1249 hours; Fully retired = 0-99 hours. This figure refers to 1994, as noted in the footnotes to Table 1.

Table 3: Employment-Population Ratio of Respondents 50 to 54 Years Old in the HRS and CPS

Source	Year	Male	Female
CPS*	1998	84.8	71.1
HRS	1998	85.6	70.9
CPS	2004	82.2	71.8
HRS	2004	79.1	72.3

*The CPS data is the average of four quarters.

Table 4 Estimated Parameter Results			
Symbol	Description	Coefficient Value	t-statistic
α	Consumption parameter	-0.14	3.07
	Parameters in β		
β_0	Constant	-9.61	390.05
β_a	Coefficient of Age[a]	0.054	11.39
β_h	Coefficient of Health[c]	7.23	16.53
ρ_ε	Correlation of ε after retirement	0.84	22.96
	Parameters in δ		
δ_0	Constant	-3.71	7.93
δ_a	Coefficient of Age[b]	0.21	1.88
σ_ε	Standard Deviation of ε[c]	7.98	13.98
	q value	41.5641	
	Number of observations	2231	

Several variables are differenced from their approximate means in the sample in order to facilitate estimation. They are:

[a] The actual variable is age - 62.

[b] The actual variable is age - 65.

[c] These coefficients are all relative to the age coefficient, again to facilitate estimation.

Table 5: Observed and Projected Retirement Percentages

Observed Retirement Percentages						Projected Retirement Percentages			
	Net Percentage Retiring		Percentage Retired			Net Percentage Retiring		Percentage Retired	
Age	From FT Work	Completely	From FT Work	Completely	Observations	From FT Work	Completely	From FT Work	Completely
50	4.1	3.3	4.1	3.3	243			10.9	8.2
51	0.9	0.0	5.0	3.3	361	0.7	0.2	11.7	8.4
52	2.7	2.2	7.6	5.5	510	0.7	0.4	12.4	8.8
53	2.0	1.1	9.7	6.6	621	1.6	1.2	14.0	10.0
54	2.1	1.3	11.8	7.9	712	1.8	1.2	15.8	11.2
55	3.1	2.7	14.9	10.6	801	3.5	2.6	19.3	13.8
56	1.9	2.1	16.8	12.7	907	2.6	1.9	21.9	15.7
57	4.0	3.2	20.8	15.9	990	3.3	2.6	25.2	18.3
58	3.0	2.1	23.8	18.0	1064	3.8	3.1	29.1	21.4
59	3.6	2.1	27.4	20.1	1132	4.3	3.5	33.4	24.9
60	6.0	6.4	33.4	26.4	1121	6.3	4.9	39.7	29.8
61	6.3	5.5	39.7	31.9	1043	4.9	3.9	44.6	33.7
62	15.1	12.5	54.8	44.4	986	14.6	10.2	59.2	43.9
63	5.6	3.4	60.4	47.9	909	4.4	3.7	63.6	47.6
64	6.7	6.7	67.1	54.6	843	5.8	5.4	69.4	53.0
65	9.1	6.7	76.2	61.3	744	7.4	6.6	76.7	59.6
66	4.5	3.9	80.7	65.2	658	2.5	2.5	79.2	62.1
67	2.8	2.9	83.5	68.1	565	2.5	2.5	81.7	64.6
68	3.1	3.3	86.7	71.4	472	1.7	1.6	83.4	66.2
69	1.7	4.6	88.4	76.0	379	0.4	0.9	83.8	67.2
Total number of observed respondents: 2231									

Table 6: Retirement Outcomes with Social Security Rules Advanced by Zero, Six and Twelve Years
(Baseline is rules that applied to HRS respondents over their lifetime.)

	Percent in Main Job			Percent in Full Time Work After Retiring			Percent in Part Time Work			Percent Completely Retired		
	Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced		
Age	Zero Years	Six Years	Twelve Years	Zero Years	Six Years	Twelve Years	Zero Years	Six Years	Twelve Years	Zero Years	Six Years	Twelve Years
50	89.1	89.1	89.1				2.7	2.7	2.7	8.2	8.2	8.2
51	86.0	86.1	86.1	2.3	2.3	2.3	3.3	3.3	3.3	8.4	8.4	8.4
52	83.6	83.7	83.7	4.0	4.0	4.0	3.6	3.6	3.6	8.8	8.8	8.8
53	81.2	81.2	81.2	4.8	4.8	4.8	4.0	4.0	4.0	10.0	10.0	10.0
54	78.4	78.4	78.4	5.8	5.8	5.8	4.6	4.6	4.6	11.2	11.2	11.2
55	74.1	74.2	74.1	6.6	6.6	6.6	5.5	5.5	5.5	13.8	13.8	13.8
56	70.6	70.6	70.6	7.5	7.5	7.5	6.2	6.2	6.2	15.7	15.7	15.7
57	66.6	66.7	66.6	8.1	8.1	8.2	6.9	7.0	7.0	18.3	18.2	18.2
58	62.0	62.0	62.0	9.0	9.0	9.0	7.7	7.7	7.7	21.4	21.3	21.3
59	57.0	57.1	57.1	9.5	9.6	9.6	8.5	8.5	8.5	24.9	24.8	24.7
60	50.4	50.5	50.5	9.9	9.9	10.0	9.9	9.9	9.9	29.8	29.7	29.6
61	44.7	44.7	44.7	10.6	10.7	10.7	10.9	10.9	10.9	33.7	33.7	33.6
62	33.4	32.6	32.0	7.4	7.0	6.7	15.3	15.9	16.1	43.9	44.6	45.2
63	28.5	28.3	28.1	7.9	8.2	8.5	16.0	16.3	16.4	47.6	47.2	47.0
64	23.0	22.9	22.8	7.6	7.8	8.1	16.4	16.7	16.8	53.0	52.5	52.2
65	15.9	16.8	17.1	7.4	7.6	7.9	17.1	17.4	17.5	59.6	58.3	57.6
66	13.0	13.7	13.9	7.8	8.2	8.7	17.1	17.2	17.2	62.1	61.0	60.1
67	10.8	11.4	11.6	7.5	7.7	8.1	17.0	17.1	17.1	64.6	63.8	63.2
68	9.2	9.7	9.9	7.4	7.6	7.9	17.1	17.1	17.2	66.2	65.5	65.0
69	7.9	8.4	8.5	8.3	8.4	8.6	16.6	16.7	16.7	67.2	66.5	66.1

Table 7: Selected Flows Among Various Retirement States with Social Security Rules Advanced by Zero, Six and Twelve Years
(Baseline is rules that applied to HRS respondents over their lifetime.)

	Net Percent Retiring from Full Time Work			Net Percent Completely Retiring			Percent Newly Returned to Full Time Work			Percent Newly in Part Time Work			Percent Newly Returned to Part Time Work, Previously Retired		
	Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced		
Age	0 Yrs	6 Yrs	12 Yrs	0 Yrs	6 Yrs	12 Yrs	0 Years	6 Yrs	12 Yrs	0 Years	6 Yrs	12 Yrs	0 Years	6 Yrs	12 Yrs
50															
51	0.7	0.7	0.7	0.2	0.2	0.2	2.3	2.3	2.3	1.7	1.7	1.7	0.7	0.7	0.7
52	0.7	0.7	0.7	0.4	0.4	0.4	2.2	2.2	2.2	1.6	1.6	1.6	0.7	0.7	0.7
53	1.6	1.6	1.6	1.2	1.2	1.2	1.8	1.8	1.8	1.8	1.8	1.8	0.6	0.6	0.6
54	1.8	1.8	1.8	1.2	1.2	1.2	2.2	2.2	2.2	2.1	2.1	2.1	0.8	0.8	0.8
55	3.5	3.5	3.5	2.6	2.6	2.6	2.0	2.0	2.0	2.6	2.6	2.6	0.7	0.7	0.7
56	2.6	2.6	2.6	1.9	1.9	1.9	2.3	2.3	2.3	2.6	2.6	2.6	0.8	0.8	0.8
57	3.3	3.3	3.3	2.6	2.5	2.5	2.4	2.4	2.4	2.8	2.8	2.8	0.9	0.9	0.9
58	3.8	3.8	3.8	3.1	3.1	3.1	2.7	2.7	2.7	2.9	2.9	2.9	1.0	1.0	1.0
59	4.3	4.3	4.3	3.5	3.5	3.5	2.8	2.8	2.8	3.1	3.1	3.1	1.0	1.0	1.0
60	6.3	6.2	6.2	4.9	4.9	4.9	2.9	2.9	2.9	3.7	3.7	3.7	1.1	1.1	1.1
61	4.9	5.0	5.0	3.9	4.0	4.0	3.2	3.3	3.3	3.7	3.7	3.7	1.3	1.3	1.3
62	14.6	15.8	16.7	10.2	10.9	11.6	2.8	2.4	2.2	8.7	9.1	9.3	1.0	1.2	1.2
63	4.4	3.1	2.2	3.7	2.7	1.8	3.2	3.6	4.0	4.1	4.1	4.1	1.9	2.1	2.1
64	5.8	5.7	5.7	5.4	5.3	5.2	3.0	3.0	3.1	4.1	4.2	4.2	1.9	2.0	2.0
65	7.4	6.4	6.0	6.6	5.7	5.4	3.3	3.3	3.3	4.8	4.6	4.5	2.3	2.3	2.2
66	2.5	2.5	2.3	2.5	2.7	2.5	3.6	3.9	4.3	4.0	4.1	4.1	2.4	2.5	2.6
67	2.5	2.7	3.0	2.5	2.8	3.0	3.3	3.3	3.4	3.8	3.8	3.9	2.3	2.3	2.3
68	1.7	1.8	2.0	1.6	1.7	1.9	3.4	3.5	3.6	3.6	3.7	3.7	2.3	2.3	2.3
69	0.4	0.5	0.6	0.9	1.0	1.1	4.1	4.1	4.2	3.3	3.4	3.4	2.3	2.3	2.3

Table 8: Differences in Labor Force Outcomes Associated with Changing Social Security Rules

	Percent in Main Job			Percent in Full Time Work After Retiring			Percent in Part Time Work			Percent Completely Retired		
	Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced			Social Security Rules Advanced		
Age	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0.1	0	0.1	0	0	0	0	0	0	0	0	0
52	0.1	0	0.1	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0
55	0.1	-0.1	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0
57	0.1	-0.1	0	0	0.1	0.1	0.1	0	0.1	-0.1	0	-0.1
58	0	0	0	0	0	0	0	0	0	-0.1	0	-0.1
59	0.1	0	0.1	0.1	0	0.1	0	0	0	-0.1	-0.1	-0.2
60	0.1	0	0.1	0	0.1	0.1	0	0	0	-0.1	-0.1	-0.2
61	0	0	0	0.1	0	0.1	0	0	0	0	-0.1	-0.1
62	-0.8	-0.6	-1.4	-0.4	-0.3	-0.7	0.6	0.2	0.8	0.7	0.6	1.3
63	-0.2	-0.2	-0.4	0.3	0.3	0.6	0.3	0.1	0.4	-0.4	-0.2	-0.6
64	-0.1	-0.1	-0.2	0.2	0.3	0.5	0.3	0.1	0.4	-0.5	-0.3	-0.8
65	0.9	0.3	1.2	0.2	0.3	0.5	0.3	0.1	0.4	-1.3	-0.7	-2
66	0.7	0.2	0.9	0.4	0.5	0.9	0.1	0	0.1	-1.1	-0.9	-2
67	0.6	0.2	0.8	0.2	0.4	0.6	0.1	0	0.1	-0.8	-0.6	-1.4
68	0.5	0.2	0.7	0.2	0.3	0.5	0	0.1	0.1	-0.7	-0.5	-1.2
69	0.5	0.1	0.6	0.1	0.2	0.3	0.1	0	0.1	-0.7	-0.4	-1.1

Table 9: Differences in Labor Force Flows Associated with Changing Social Security Rules

	Net Percent Retiring from Full Time Work			Net Percent Completely Retiring			Percent Newly Returned to Full Time Work			Percent Newly in Part Time Work			Percent Newly Returned to Part Time Work, Previously Retired		
Age	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs	6-0 Yrs	12-6 Yrs	12-0 Yrs
50															
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	-0.1	0	-0.1	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	-0.1	0	-0.1	0	0	0	0	0	0	0	0	0	0	0	0
61	0.1	0	0.1	0.1	0	0.1	0.1	0	0.1	0	0	0	0	0	0
62	1.2	0.9	2.1	0.7	0.7	1.4	-0.4	-0.2	-0.6	0.4	0.2	0.6	0.2	0	0.2
63	-1.3	-0.9	-2.2	-1	-0.9	-1.9	0.4	0.4	0.8	0	0	0	0.2	0	0.2
64	-0.1	0	-0.1	-0.1	-0.1	-0.2	0	0.1	0.1	0.1	0	0.1	0.1	0	0.1
65	-1	-0.4	-1.4	-0.9	-0.3	-1.2	0	0	0	-0.2	-0.1	-0.3	0	-0.1	-0.1
66	0	-0.2	-0.2	0.2	-0.2	0	0.3	0.4	0.7	0.1	0	0.1	0.1	0.1	0.2
67	0.2	0.3	0.5	0.3	0.2	0.5	0	0.1	0.1	0	0.1	0.1	0	0	0
68	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0	0.1	0	0	0
69	0.1	0.1	0.2	0.1	0.1	0.2	0	0.1	0.1	0.1	0	0.1	0	0	0

Figure 1: Trends in Retirement for Males

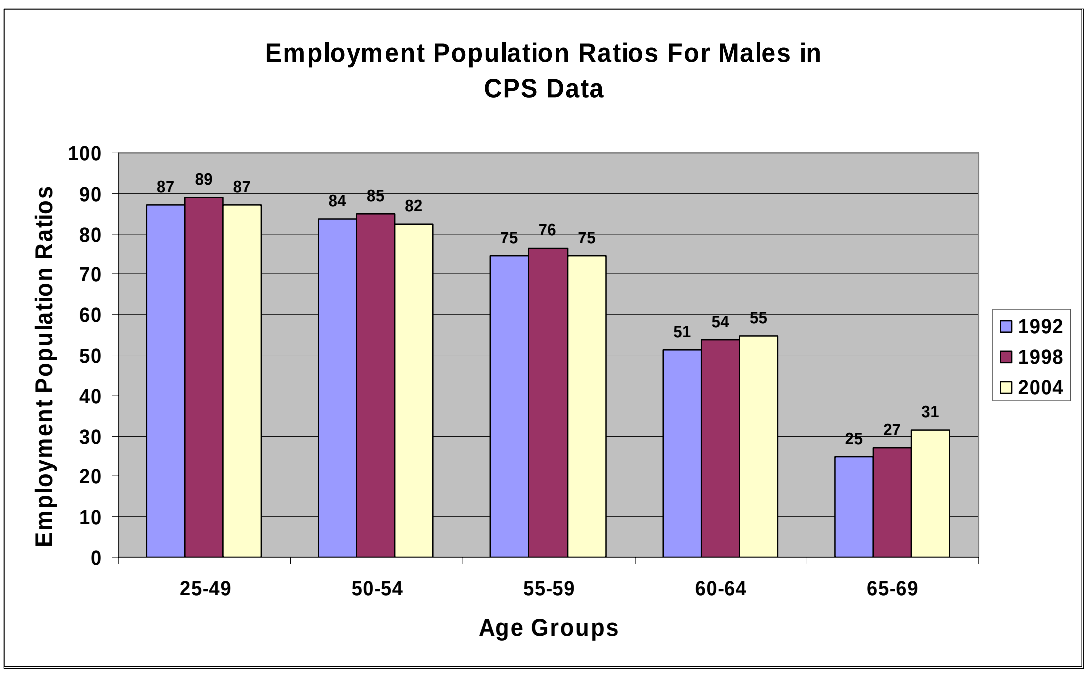

Figure 2: Trends in Retirement for Females