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Nicole Maestas and Xiaoyan Li

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Nicole Maestas
RAND

Xiaoyan Li
RAND

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Michigan Retirement Research Center
University of Michigan
P.O. Box 1248
Ann Arbor, MI 48104
http://www.mrrc.isr.umich.edu/
(734) 615-0422

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Abstract

We introduce the process of psychological burnout and recovery as an explanation for the phenomenon known as unretirement. We illustrate theoretically how predictable time variation in burnout could generate retirement and subsequent re-entry in a standard retirement model. We apply this model to the longitudinal Health and Retirement Study, presenting a novel measure of burnout, the Burnout EX3 Index. The index is correlated with different types of work stressors, and its time profile discriminates among different types of retirees. For example, prior to retirement, burnout rises steeply for future unretirees then falls rapidly after retirement; whereas burnout among future partial retirees is low and changes little over time. Using a series of econometric models derived from our theoretical model, we show that as burnout rises, retirement becomes more probable, and as burnout recedes following retirement, re-entry becomes more probable. While access to public and private pension benefits increases the likelihood of retirement for all retirees, pension accruals are least important for those who will later unretire, suggesting that unretirees are more willing to trade future gains in pension wealth for leisure than other retirees. Indeed, for this group, the effect of burnout dominates that of the net return to work.

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1. Introduction

A curious aspect of retirement behavior is that about one-quarter of retirees later return to work (Maestas, 2007a). Most of these so-called "unretirement" transitions are anticipated prior to retirement, ruling out a dominant role for post-retirement financial shocks (Maestas, 2007a). Optimal *planned* unretirement could occur in the presence of either nonlinear retirement incentives and/or time-varying preferences for leisure. It is well known that nonlinear labor supply incentives exist in many private defined benefit pension plans (Stock and Wise, 1990) and in the Social Security earnings test (Friedberg, 2000). Less obvious, however, is the source of time-varying preferences for leisure. In this paper, we introduce a process well known in psychology and medicine, but unfamiliar in economics, known as "psychological burnout."

Burnout is a psychological response to chronic work-related stressors, and is characterized by feelings of exhaustion, cynicism, and inefficacy (Maslach et al., 2001). It is thought to originate in workplace conflicts arising with respect to workload, control, rewards, community, fairness, or values (Maslach and Leiter, 1997). Burnout has been linked to subsequent onset of stress-related physical diseases, such as cardiovascular disease (Melamed et al., 2006).

Burnout is potentially important for retirement behavior for at least two reasons. First, since burnout is work-related, it rises with continued exposure to work-related stressors but should dissipate once the individual leaves the job. If burnout affects the marginal utility of leisure, then it could cause the marginal utility of leisure to rise before retirement and fall afterward. If the marginal utility of leisure declines sufficiently, then labor force participation may at some point become attractive again. The fact that burnout should cycle with labor force participation distinguishes it from other time-varying processes that affect the marginal utility of leisure, such as age and possibly physical health. Second, burnout may have a stronger effect on labor supply behavior at older ages compared to younger ages, since the dawning availability of retirement benefits may offer the burned out worker a financially feasible and perhaps culturally acceptable way of exiting a career that is no longer fulfilling. For those who are not ready to stop working altogether, a temporary retirement may offer the possibility of taking time out to introspect, perform research or take classes, develop a new business idea, or conduct a job search. This interpretation is supported by evidence indicating that 60 percent of unretirees change occupations after retirement (Maestas, 2007a).

In this paper, we present a structural retirement model with burnout in order to show how a burnout and recovery process could affect the likelihood of retirement and subsequent unretirement. We introduce the Burnout EX3 Index, which can be constructed from existing Health and Retirement Study (HRS) variables, then apply our model to HRS panel data in order to test the effect of time-varying burnout on labor supply. Importantly, we also undertake careful modeling of public and private pension incentives. The addition of burnout as a preference parameter distinguishes this model from those in the retirement literature that have primarily allowed reverse transitions to arise through stochastic realizations of the budget constraint, and not through systematic preferences for leisure.[1]

We show that our burnout index is correlated with sources of conflict in the job environment, and that the time profile of burnout around retirement is different for different types of retirees. Notably, among future unretirees burnout rises steeply prior to retirement then drops rapidly following retirement. Among complete retirees, burnout also rises prior to retirement, but is surprisingly persistent following retirement. Among partial retirees, burnout is low and remains relatively flat over time.

[1] See Gustman and Steinmeier (2002) for an example of a model allowing stochastic preferences for leisure and reverse transitions.

Overall, our results point to a pattern consistent with our hypothesis: as burnout rises an individual is more likely to retire, and once burnout recedes and recovery occurs, the individual is more likely to return to the labor force. In addition, we find that pension incentives are not equally important for all classes of retirees. They are quite important for partial retirees (who have low levels of burnout) and complete retirees, but less important for those who will unretire. This suggests future unretirees are more willing to trade pension wealth for leisure than other retirees. In fact, the total effect of the net return to work is dominated by psychological health issues for this group. Of particular interest is our finding that the presence of physical comorbidities distinguishes which burned out retirees will stay retired, and which will return to work.

2. What is *Burnout*?

Burnout is a psychological response to chronic work-related stressors. It was first identified as a psychological phenomenon in the mid-1970s, and has since been the subject of a large body of research in psychology and medicine. Burnout is characterized by three latent factors: overwhelming exhaustion, feelings of cynicism or detachment from the job, and a sense of ineffectiveness and lack of accomplishment (Maslach, Schaufeli and Leiter, 2001). Of the three factors, exhaustion is viewed as the defining characteristic, and some have argued that exhaustion alone, described as feelings of physical fatigue, emotional exhaustion, and cognitive weariness, is sufficient to characterize burnout (Shirom, 1989).[2] Notably, burnout symptoms are work-related, and they manifest in persons with no prior history of psychopathogy (Maslach and Schaufeli, 1993). Although theoretically distinct, burnout is highly correlated with related

[2] Indeed, exhaustion generally precedes and causes development of the other two aspects (Maslach, Schaufeli and Leiter, 2001).

constructs such as depression and job satisfaction.[3] Recent research has expanded the burnout construct to encompass its positive antithesis, job engagement. Under this expanded interpretation, burnout is defined as the loss of engagement with one's job, where engagement is defined as energy, involvement, and efficacy (Maslach, Schaufeli and Leiter, 2001).

What causes burnout? Maslach and Leiter (1997) propose that burnout is caused by a mismatch between an individual and his job environment. The job environment is characterized by six domains: workload, control, reward, community, fairness, and values. A mismatch in one or more of these domains, defined as a conflict between expectations and perceived reality, is a precursor of burnout. As it was first identified among workers in the health and human service professions, burnout was initially thought to reflect the disillusionment of idealistic individuals. Subsequent research revealed that burnout was widespread across many different occupations and that individuals suffering from burnout typically complained of multiple obligations, increasing external pressures, inadequate financial rewards, and insufficient opportunities for personal advancement (Farber, 2000).

Recent national estimates of the incidence of burnout are difficult to come by since much of the research to date has been occupation-specific. For example, one cross-national study recorded the incidence of burnout among U.S. physicians at 22 percent (Linzer et al., 2001), compared to 11-20 percent among Dutch physicians. A survey fielded at 63 non-public sector work sites (N=24,080) in North America in the mid-1990s found that 41 percent of workers were in the most advanced phase of burnout (Golembiewski et al., 1998). The burnout rate was

[3] Job satisfaction refers to the extent to which work is a source of need fulfillment or contentment, and does not capture an individual's relationship with the work itself. Depression generally affects all areas of life, whereas burnout is specific to the work context (Maslach, Schaufeli and Leiter, 2001).

similar at public sector work sites. While certainly suggestive of a widespread phenomenon, these figures seem too large, perhaps due to the nonrandom nature of the samples.

Burnout has been linked to important outcomes, notably physical health and job performance. Although burnout emphasizes mental symptoms over physical symptoms, a number of studies have linked burnout to cardiovascular disease, risk factors for Type 2 diabetes, hypocortisolism, inflammation, and susceptibility to infections disease (see Melamed et al., (2006) for a review).

With respect to job performance, burnout has been associated with higher attrition rates in a number of occupation-specific studies. Although burnout has been identified in younger as well as older workers, its origin in chronic exposure to stressors suggests it should arise relatively later in careers (Maslach, Schaufeli and Leiter, 2001), and recent evidence suggests this is true, at least in Finland (Ahola et al., 2006). Nonetheless, few studies have examined the link between burnout and retirement behavior.[4] Burnout is particularly interesting in the context of retirement behavior because the prospect of retirement may offer a culturally acceptable and financially feasible "out" to the burned out worker. With access to retirement benefits, a worker who previously felt trapped in his job or career for financial reasons may now have the means to leave his job. If, however, he is not ready to fully withdraw from the labor force, he may use his retirement as a time to not only restore mental health, but to research his next step, pursue skill development, and/or search for a new job. In the data, we would observe these individuals retire then subsequently, unretire.

[4] In the gerontology and public health literature, Wray (2003) and Tian (2006) examined the effect of general depression on labor force exits by older workers in the Health and Retirement Study, but did not focus on burnout *per se*.

Rather than "retire" between jobs, many transition directly to part-time jobs, either with their current employer (46 percent), or a new employer (54 percent). These partial retirees form an interesting comparison group. Because they continue working (typically in the same occupation (Maestas, 2007a), they are either less burned out, they recover from burnout faster (i.e., instantaneously), or they are just as burned out but they get lucky on the job market.

3. A Retirement Model with "Burnout and Recovery"

3.1 Theoretical Model

We next present a model of retirement that illustrates how burnout and recovery might affect retirement and unretirement transitions. Suppose that in each period *t=1,2,…,T,* an individual's utility depends on consumption c_t and the number of hours worked in the period h_t. Let the within-period utility function take the following form, which is similar to that used by Gustman and Steinmeier (2004):

$$u_t = \frac{1}{\alpha} c_t^{\alpha} + e^{(\phi(g_t)+x_t\beta+\varepsilon_t)} \frac{1}{\gamma}(1-h_t)^{\gamma}. \quad (1)$$

The time endowment is normalized to 1, such that $(1-h_t)$ is the amount of leisure consumed in period *t*. The term g_t is a time-varying burnout index that affects the marginal utility of leisure in every period via the function $\phi(\cdot)$. The vector x_t captures other variables that may affect the marginal utility of leisure, such as age, socioeconomic status or physical health, and ε_t captures random variation in the marginal utility of leisure. The parameters α and γ are utility function parameters, where $\alpha, \gamma < 1$.

The period budget constraint is:

$$A_{t+1} = A_t(1+r_t) + (w_t - \kappa_t B_t + a_t)h_t + B_t + y_t - c_t , \qquad (2)$$

where A_t represents the stock of financial assets in period *t* (which includes DB, DC, and Social Security pension wealth); r_t is the rate of return averaged across the entire portfolio of financial assets; w_t is earnings; B_t is the value of defined benefit pension payments from Social Security and private pensions if the individual is eligible to claim in period *t*; and y_t is other income, which could include transfers, spousal earnings and spousal pension payments. The term $(w_t - \kappa_t B_t + a_t)$ is a "net wage," which adjusts the return to work for defined benefit pension incentives, both public and private. The multiplier κ_t allows the benefit amount to be reduced due to delayed claiming or an earnings test, and a_t is the change in pension wealth due to the additional period of work (i.e., the pension accrual), which may be positive or negative. As such, this allows there to be a "return" on pension wealth associated with work in each period. The net wage works in the following ways. In a typical defined benefit setting one cannot continue working at the same job and simultaneously receive pension benefits; therefore working past the early or normal retirement age entails loss of the entire pension benefit available in that period ($\kappa_t = 1$), and also potentially some loss in pension wealth. Similarly, a 62-year-old who claimed Social Security benefits and continued working would find his benefit reduced by the Social Security earnings test ($\kappa_t = 0.5$), and on average experience no change in pension wealth because of the actuarially fair structure of the Social Security program.[5]

Utility is maximized if the following first order condition holds in period *t*:

$$e^{(\phi(g_t)+x_t\beta+\varepsilon_t)}(1-h_t)^{\gamma-1} = (w_t - \kappa_t B_t + a_t)\lambda \qquad (3)$$

[5] Although amounts withheld due to the earnings test are later returned, it appears people are not aware of this rule, and thus behave as though the earnings test were a tax on earnings.

The right-hand side of (3) is the marginal benefit of working h_t hours, which is composed of earnings net of foregone pension benefits and changes in pension wealth. The Lagrange multiplier λ represents the marginal utility of wealth, and does not vary over time. Consumption and labor supply decisions in a given period are affected by other periods only through λ, which summarizes all past and future information about lifetime earnings and assets, and consequently may be interpreted as a measure of "permanent wealth" (MaCurdy, 1981). The left-hand side is the marginal utility of leisure in period *t*, or alternatively the utility cost of working h_t hours, which depends on the level of burnout g_t as well as x_t. The model implies that if the marginal cost of working h_t hours exceeds the marginal benefit in period *t*, the individual will reduce his hours, and if the opposite is true, she will increase hours until either equation (3) is satisfied or a corner solution is obtained.

In practice, individuals do not typically have the ability to continuously adjust hours because of minimum hours constraints imposed by firms (Gustman and Steinmeier, 1983, 2004, 1984). As a result, the hours choice is typically between continued full-time work for the same employer in period *t*, part-time work for a different employer (or for the same employer but on a different job), or complete retirement. If we take h_t to be a latent continuous variable underlying a discrete choice structure, then (3) suggests that individuals will continue working until the marginal utility cost of working exceeds the marginal benefit, at which point they will retire. As described earlier, burnout results from chronic exposure to work stressors. Each additional period of exposure to work stressors increases the burnout index g_t, raising the marginal cost of working, and consequently the probability of retirement. At retirement, work stressors are abruptly eliminated and g_t declines ("recovery"). In a resilient individual, g_t may decline rapidly after retirement, and at some point the marginal benefit of working may exceed the marginal cost, and the individual will return to work. In the extreme case of instantaneous recovery accompanied by a job opportunity providing sufficient net benefit, the individual may transition directly to partial retirement. In a less resilient individual, or in someone for whom the effect of other factors in x_t dominates the effect of g_t, the net benefit of working is less likely to ever again exceed the marginal cost of working, and consequently unretirement is less probable. It is important to distinguish g_t from x_t: although both are time-varying, x_t contains elements such as age and health which steadily raise the utility cost of working over time, whereas the burnout index g_t *rises and falls* with labor force participation. Non-wage job characteristics can be directly incorporated in x_t, in either fixed or time-varying form.

The top panel of Figure 1 graphically illustrates the time path of the marginal cost of working (or the marginal utility of leisure) in the presence of a burnout process. As individuals accrue many years on the job, mounting burnout along with other factors cause the utility cost of an additional period of work to steadily rise. Eventually, the marginal cost of continued work surpasses the marginal benefit, and retirement occurs (point r_1). After retirement, the absence of work-related stressors causes burnout to fall, and the marginal utility cost of future work declines. If it falls below the marginal benefit of work in any period, re-entry may occur (point *w*), and individuals will work until the cost of continued work again exceeds the benefit (point r_2. In this example, recovery occurs over time; however, recovery could also be instantaneous, in which case the individual might transition directly to a new job (e.g., partial retirement).

The bottom panel of Figure 1 shows how one could introduce uncertainty into the marginal benefit of work, perhaps by allowing a stochastic process in post-retirement job offers.[6] The picture shows a case in which an unexpectedly high wage offer is received shortly after retirement, which causes the marginal benefit of work to rise discretely, surpassing the marginal cost of work. If instead an unexpectedly low wage offer is received, it is possible that even with recovery from burnout, the marginal benefit of work never again exceeds the marginal cost of working, and retirement becomes an absorbing state.

3.2 Empirical Implementation

Taking logs of equation (3) and rearranging yields the following linear expression for the optimal leisure choice for individual *i* at time *t*:

$$\log(1-h_{it}) = -\frac{\phi}{\gamma-1}g_{it} - \frac{\beta}{\gamma-1}x_{it} + \frac{1}{\gamma-1}\log(w_{it} - \kappa B_{it} + a_{it}) + \frac{1}{\gamma-1}\log(\lambda_i) - \varepsilon_{it}\,. \qquad (4)$$

This linear relation is directly estimable in continuous or discrete form once we construct all key variables, the details of which are presented in the following section.

4. Data and Sample Construction

4.1 Sample

As noted earlier, we use the Health and Retirement Study (HRS). Our analysis is based on the first seven waves, representing biennial interviews over the period 1992-2004. We use the original HRS cohort (b. 1931-1341) in order to observe labor supply transitions over as long a period as possible. Our sample consists of age-eligible respondents who were a) working for pay at the baseline interview in 1992, and b) who did not describe themselves as retired at the baseline interview, and c) who did not in any survey wave provide a retirement date that

[6] Maestas and Li (2006) show that about half to two-thirds of older jobseekers successfully find jobs.

occurred before their baseline interview or prior to age 50. The last two restrictions are for the purpose of obtaining a sample of individuals who have not yet begun their retirement process as of the baseline interview. As we will describe in section 4.3, we are unable to construct a our burnout index for Wave 1; this necessitates using only observations from waves 2-7 in all analyses. Although we do not require a balanced panel, we restrict the sample to respondents who are present in at least two adjacent survey waves. This is a consequence of the two-year periodicity of the HRS; because a retirement observed at *t+2* may have occurred at any point between *t* and *t+2*, retirement incentives, as well as burnout, must be measured at time *t* to ensure that they precede the retirement transition. This lag structure effectively limits us to modeling outcomes observed in waves 3-7, using lagged data from waves 2-6. After dropping observations based on proxy interviews and those with missing data on key variables, we obtain a final estimation sample of 20,745 person-wave observations.

4.2 Labor Supply Definitions

An individual is classified as *completely retired* if 1) he reports not working for pay; and 2) he describes himself as retired (as opposed to unemployed, disabled or not in the labor force).[7] An individual is classified as *partially retired* if 1) she reports working for pay; 2) she works part-time (defined as working fewer than 35 hours per week or fewer than 36 weeks per year); and 3) she describes herself as retired. If she makes no mention of retirement, then she is classified as working part-time, rather than partially retired. Unretirement is defined as having experienced any of three possible transitions: 1) complete retirement to full-time employment; 2) complete retirement to partial retirement/part-time employment; and 3) partial retirement to full-

[7] For example, only 64 percent of those who were not working for pay in Wave 2 also said they were retired; the remaining 36 percent said they were unemployed, disabled, or "not in the labor force." Although the fraction of nonworkers who say they are retired grows over time, even by Wave 6, only 87 percent of nonworkers say they are retired.

time employment. In our nomenclature, partial retirement refers to direct transitions from full-time work to partial retirement. Transitions are identified on the basis of wave-to-wave changes in labor force status.[8]

4.3 The Burnout EX3 Index

Burnout is typically measured using the Maslach Burnout Inventory-General Survey (MBI-GS), which is based on 16 items that load on the three factors of exhaustion, cynicism, and professional efficacy. Items loading on the exhaustion factor include feeling emotionally drained, feeling used up at the end of the day, feeling tired facing another day, feeling that working is a strain, and feeling burned out. Items loading on cynicism ask about interest and enthusiasm for one's work, as well as feeling cynical about one's contributions or doubting the significance of one's work. Items loading on professional efficacy, ask about feelings of effectiveness, confidence, and being good at one's job (Barnett et al., 1999).

The HRS does not include any of the exact items found on the MBI-GS, however it does include related items. In particular, it contains three items measuring emotional/physical exhaustion from the CES-D depression scale: 1) feeling like everything was an effort; 2) experiencing restless sleep; and 3) feelings of not being able to get going. Respondents are asked whether or not they experienced these feelings much of the time during the past week. These items are asked in consistent form beginning in wave 2.[9] The full CES-D scale consists of 8 items asked consistently across waves. The other items ask about feeling depressed, lonely,

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[8] As Blau (1994) has noted, wave-to-wave transition measures miss short unretirement spells that occur between waves, and whose importance is debatable. Using the detailed between-wave job history information to identify short unretirement spells in the HRS, we found that while about five percent of retirees re-enter and exit the labor force between waves, their spells were of very short duration and associated with extremely low annual earnings.

[9] After wave 1, HRS converted from a 4-point response scale to a yes/no response scale. The change in format creates spurious differences between wave 1 and the other waves. In addition, a ninth item asking about energy level was added in wave 3, but use of this item in our analysis (although clearly relevant) would necessitate dropping an additional wave of data.

sad, happy, and enjoying life. Factor analysis shows that the three exhaustion items we have selected load on a common factor ("somatic"), distinct from the other five items ("depressive mood") (Steffick, 2006). We form an additive index of these three items using equal weights (consistent with their approximately equal factor loadings (Steffick, 2006)) to form a burnout scale ranging from 0 to 3. We name this index Burnout EX3, to highlight the fact that our burnout index consists of three items measuring the exhaustion construct of burnout. Chronbach's alpha for the three-item scale is 0.57. In principle, we could use the entire CES-D scale, however, as noted above burnout and depression are theoretically distinct. While, depression pervades all domains of life, burnout relates to the work domain. Of the three factors underlying classical burnout (exhaustion, cynicism, and inefficacy), only exhaustion is common to the CES-D scale. Our Burnout EX3 Index has one distinct advantage over the standard MBI-GS burnout scale: it can be used both before and after retirement, since the items forming the scale are not conditioned on labor force participation. Thus, we can examine their evolution before and after retirement for different types of retirees, and relate rising and falling levels of burnout to transitions in and out of the labor force.

4.4 Net Wage and λ

The net wage has three components; potential earnings at time *t*, potentially foregone retirement benefits if claiming is delayed or if an earnings test applies, and the pension accrual, which is defined as the change in pension wealth between time *t* and *t+1*. Potential earnings are assumed to be the same as in the previous period (assuming zero real earnings growth). Private DB pension benefits at time *t* are calculated using the HRS Pension Calculator and associated data from restricted employer summary plan descriptions. Social Security benefits at time *t* are calculated by feeding the restricted HRS-SSA earnings data into a Social Security benefit computation routine developed by Maestas (2007b). Pension wealth at time *t* is the present discounted value of Social Security and private pension benefits using life table survival probabilities and a discount rate of 3 percent. Details about this construction are provided in the Data Appendix.

As noted earlier, λ_i is the marginal utility of wealth. As such, λ_i can be thought of as a measure of an individual's "permanent wealth" akin to the concept of permanent income, and in a model like ours it forms the link between behavior at time *t*, and behavior in other periods (MaCurdy, 1981). We model λ_i as the inverse of annuitized, full retirement wealth. Full retirement wealth is the wealth that would obtain if an individual worked until age 70, and includes DB and DC wealth, Social Security wealth, potential savings from projected earnings, and current financial assets projected forward to age 70 at an assumed rate of return of 3 percent. We first annuitize full retirement wealth then take its inverse to obtain λ_i. The last step ensures that the marginal utility of wealth is decreasing in wealth. Further details about this construction are provided in the Data Appendix.

4.5 Sample Means

Table 1 presents means and standard deviations of key variables for our estimation sample. At time *t+2,* 59.2 percent of respondents are working for pay, nearly all full-time. Eleven percent are partially retired at *t+2*, and 36.2 percent are completely retired. The mean score on the burnout index is 0.6, with a frequency distribution as follows: 0 (60 percent), 1 (24 percent), 2 (10 percent) and 3 (5 percent). Thus about 40 percent of the sample has at least one symptom of burnout. On average, sample respondents have worked 84.3 percent of their potential labor force tenure, defined as the total number of years between the end of their formal education and time *t.* This variable serves as a proxy for unobserved labor force attachment. Fair or poor health is reported by 16.5 percent of respondents. The mean net wage for the sample is $45,814. Of its three components, mean potential earnings are $ 39,838, mean potentially foregone retirement benefits are $5,769, and the mean pension accrual is $11,746.[10] Seventy-two percent of the sample reports the availability of health insurance if they should not work at time *t+2*. Sources of health insurance include retiree health insurance provided by the former employer or union, Medicare or other government health insurance, or insurance obtained through a spouse's employer. The average age of the sample at time *t* is 60.9 years.

5. Descriptive Evidence of Burnout

5.1 Relationship between Burnout and the Job Environment

As noted above, burnout is thought to originate from a perceived conflict or mismatch between the individual's expectations and the realities of the work environment. We have available four measures of potential job-related conflict in the HRS: 1) whether the job is stressful;[11] 2) whether the job has become more difficult;[12] 3) whether the individual would like to reduce his hours but is not able to;[13] and 4) whether the individual perceives age

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[10] These means are for the entire pre-retirement sample. Note that potentially foregone pension benefits are not a measure of the average pension benefit available at time *t*, rather they are the amount potentially foregone if the respondent works at *t*. For many people in our sample this amount is zero because they either do not have access to a private pension or they are not eligible to claim at time *t*.

[11] Respondents were asked: My job involves a lot of stress. (Do you strongly agree, agree, disagree or strongly disagree with that statement?) We created a binary measure by combining "strongly agree" with "agree" and "disagree" with "strongly disagree."

[12] Respondents were asked: "My job requires me to do more difficult things than it used to. Do you strongly agree, agree, disagree or strongly disagree with that statement?" We created a binary measure by combining "strongly agree" with "agree" and "disagree" with "strongly disagree."

[13] Respondents were first asked, "Could you reduce the number of paid hours in your regular work schedule?" If they said no, they were asked "Would you like to do so even if your earnings were reduced in the same proportion?" We classify those who answered "no" to the first question and "yes" to the second question as those who face a *binding* minimum hours constraint.

discrimination in promotions.[14] This set of variables does not include the physical difficulty variables used by Gustman and Steinmeier (2004) (e.g., lifting heavy loads, etc.). Although those variables describe the overall job difficulty, they do not indicate whether the characteristic is a source of difficulty for a particular individual, which is the relevant criteria in our context. Table 1 shows that prior to retirement, 60.9 percent of respondents say their job is stressful; 48.2 percent report their job has gotten more difficult; 21.0 percent perceive age discrimination in promotions; and 12.7 percent face a binding minimum hours constraint.

If burnout is caused by work-related mismatch, then we should at the very least observe a correlation between burnout and the presence of job-related conflict. Figure 2 presents four panels, each showing the time profile in burnout by the presence or absence of each type of mismatch, as determined at the wave before retirement. In order to control for covariates, we plot the residuals from a regression of the burnout index on age and age squared, sex, income, net worth, an indicator for fair/poor health, a married indicator, years of schooling, and interactions between significant first order terms. The time points consist of the wave just before retirement (approx. 1-2 years), two waves before (approx. 3-4 years), and three waves before (approx. 5-6 years).

Panel A of Figure 2 shows that over the entire six-year period prior to retirement, burnout is greater among those who report having a stressful job compared to those who do not. In addition, burnout is rising in the period prior to retirement for those with stressful jobs, whereas it is declining for those without stressful jobs. Similarly, Panel B shows that burnout is higher for those whose jobs have gotten more difficult than for those whose jobs have not gotten more

[14] Respondents were asked: "In decisions about promotion, my employer gives younger people preference over older people. (Do you strongly agree, agree, disagree or strongly disagree with that statement?)" We created a binary measure by combining "strongly agree" with "agree" and "disagree" with "strongly disagree."

difficult. Again, burnout is rising prior to retirement for the former group, whereas it is flat for the latter group. Panel C tells a similar story with respect to desiring to reduce working hours but being unable to do so. Although burnout is rising for both groups, it is rising more steeply for those whose hours choice is constrained compared to those who are unconstrained. Finally, in panel D, burnout is substantially higher in all periods among those who perceive age discrimination on the job compared to those who do not.

In Figure 3, we examine within-individual changes in job mismatch and burnout, with the aim of establishing that changes in mismatch are associated with changes in burnout. Again, each panel of the figure pertains to one of the four types of job mismatch. Panel A shows that *onset* of stress between t and t+2 relates to a sizable rise in burnout, whereas elimination of job stress relates to a decline in burnout. Burnout is relatively flat for those experiencing no change in job stress. In Panel B, burnout rises when the job is newly reported to have gotten more difficult, and falls somewhat when it is reported to have not gotten more difficult after reporting two years earlier that the job had gotten more difficult. Again, there is little change in burnout for those with no change in their response. The same pattern holds for onset and elimination of binding minimum hours constraints (Panel C) and perceived job discrimination (Panel D) between waves. In sum, burnout is correlated not only with the level of job-related stress and conflict, but with changes in job-related stress and conflict as well.

5.2 Relationship between Burnout and Retirement Path

We next examine the time profile of burnout by the type of retirement path chosen by the respondent. We organize respondents into three groups: those who partially retire, those who retire and subsequently unretire, and those who remain retired (for these respondents unretirement is effectively censored). Time is measured from two waves prior to retirement to two waves after retirement (a period of approximately 12 years) in order to show how burnout evolves both before and after retirement. It is important to note that retirement occurs at some point *between* the time points marked *Retwv-1* and *Retwv;* thus *Retwv* denotes the first retirement wave. As before, we plot regression-adjusted burnout. Panel A of Figure 4 reveals striking differences between the three groups. Burnout is lowest before and after retirement for those who partially retire, and there is surprisingly little change in the index over time. For those who retire and are never observed to return to work, burnout rises substantially during the period prior to retirement, peaks at the retirement wave, and remains elevated after retirement with only a slight decline. This pattern indicates little recovery for this group. In contrast, among those who will at some point unretire, burnout is rising quite steeply prior to retirement, but drops after retirement (between *Retwv-1* and *Retwv*) and continues falling to below average by *Retwv+1* (approximately 3 years after retirement). Burnout remains low during the next two years. This pattern shows steeply rising burnout prior to retirement, then rapidly falling burnout afterward. This pronounced recovery phase stands in sharp contrast to the lack of recovery among those who do not unretire, indicating that burnout may help explain why some individuals return to work after retiring and others do not. For comparison, in Panels B and C we plot the profiles in an index formed of the five CES-D items excluded from the Burnout EX3 Index (those measuring the depressive mood construct) and in an indicator for self-reported fair or poor health. Both variables are likely to be correlated with our burnout index. Whereas burnout was highest among future unretirees in the wave before retirement, depressive mood symptoms are highest among complete retirees in all periods before and after retirement. In addition, the time pattern in depressive mood symptoms is similar for complete retirees and unretirees; both groups show evidence of recovery from depression after retirement, whereas recovery from burnout appears only among unretirees. The time pattern in self-reported fair or poor health is also distinct from that of burnout (Panel C). Four to five years prior to retirement, the prevalence of fair/poor health is similar among the groups. However, leading up to retirement the prevalence of fair/poor health is rising most steeply for complete retirees, followed by partial retirees and unretirees. After retirement, self-reported health quickly reverts to its pre-retirement level for both partial retirees and unretirees, but this is not the case for complete retirees. In short, Panels B and C show that our burnout index is distinct from self-reported health and depression, and that its time pattern can effectively distinguish the three types of retirees. Finally, Panel D shows the time profile in work enjoyment in the waves leading up to retirement for the three types of retirees. Work enjoyment is related to the positive antithesis of burnout, job engagement; however, we do not include it in our burnout index because it is by definition only available before retirement.[15] Nevertheless, we find that it too shows a pattern consistent that of the burnout index. Work enjoyment is highest among partial retirees and declines little prior to retirement. Work enjoyment is declining more rapidly for complete retirees, and most rapidly of all for future unretirees.

6. Estimation Results

Ideally, we could directly estimate equation (4) using panel data methods.[16] There are at least two reasons why this is not advisable. The first and most important reason is that leisure hours represent a latent continuous variable, which is most appropriately modeled in a discrete choice framework. A second issue relates to the panel approach. A major reason why panel

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[15] Respondents were asked: “Here are some statements that are true for some people's jobs but not for others. Thinking of your job, please indicate how much you agree or disagree with each statement: I really enjoy going to work (Do you strongly agree, agree, disagree or strongly disagree with that statement?)”

[16] Even more ideal might be dynamic programming estimation; however, this is beyond the scope of the current effort.

methods are so appealing is that they allow the use of a fixed effects (FE) estimator to account for time-invariant unobserved heterogeneity. In our application, the FE estimator would use within-individual variation in burnout and the net wage for identification. While in principal appealing, in practice this variation is problematic. Prior to retirement, pension incentives vary over time according to pension plan rules that are exogenous. But once the individual retires, pension incentives vanish, creating a potentially large discrete change in the return to work in the period following retirement. This change in the net wage is endogenous because it is caused by the retirement transition itself and consequently leads to a spuriously large correlation between changes in the net wage and the probability of retirement. The problem is compounded if potential earnings drop discretely after retirement as a consequence of the retirement transition, or if earnings-test related benefit reductions are eliminated.

An alternative is to estimate two separate panel models, one for the pre-retirement period, and the other for the post-retirement period. In the case of the pre-retirement model, each sequence of observations ends with either retirement or censoring, which is essentially a hazard model structure. The same is true for the post-retirement period, where we would model the hazard of unretirement. A well known drawback of hazard models is that because transitions only occur in one direction, it is not possible to use include a fixed effect to control for unobserved heterogeneity. One solution is to use the initial conditions of key time-varying processes as controls for unobserved heterogeneity. If this solution is adequate, one can then also include a random effect.

6.1 Retirement Hazard Models

In the sections that follow, we present results from two classes of discrete-time retirement hazard models. In the first, we model retirement as a binary choice, where partial retirement is grouped with complete retirement. Because phased retirement programs are uncommon in the United States, partial retirement transitions are often transitions to new part-time jobs (either within the same firm or at new firms), as opposed to reductions in hours spent on pre-retirement jobs. Thus, both partial and complete retirement usually involve leaving the career job, and if available, the claiming of DB pension benefits. Indeed, owing to federal regulations prohibiting the claiming of pension benefits by regular employees, often the only way an individual can claim pension benefits is by separating from his job. The incentives embedded in plan rules often reinforce the desirability of leaving at key retirement ages by "taxing" continued work through large negative accruals. We compare the performance of this model with an ordered logit model, comprised of three discrete categories, naturally ordered on the hours dimension: continued FT work, partial retirement, and complete retirement.

In our second set of discrete-time hazard models, we consider an unordered choice set, in which we assume that individuals are choosing between four retirement paths: continued work, partial retirement, complete retirement, or complete retirement with subsequent unretirement. In other words, based on the evidence that unretirement transitions are largely anticipated, the choice structure assumes individuals decide upon whether or not to subsequently unretire *at the time of retirement*. The unordered choice set leads naturally to a multinomial logit framework; however, this raises the issue of the Independence of Irrelevant Alternatives (IIA) assumption. Not surprisingly, IIA is rejected in our model. To relax IIA, we attempted multinomial probit estimation, applying scale and location normalizations as required for formal identification, and constructing a choice-based regressor based on the expected earnings associated with each alternative. However, as is typical of multinomial probit models where most of the variation is across individuals, rather than choices, this model proved unstable (see Keane (1992)).

Table 2 shows estimated coefficients from our binary retirement hazard model using the RE Logit estimator. Because actual retirement transitions occur between waves, we model the retirement hazard at time *t+2*, conditional upon explanatory variables measured at time *t.* The baseline hazard is modeled flexibly using a set of time dummies for each survey wave. Initial conditions include the baseline levels of burnout, fair/poor health, number of major health conditions, percent of potential tenure worked (as a proxy for labor force attachment), and age at baseline. As noted earlier, the medical literature has related burnout to onset of stress-related physical diseases, most notably cardiovascular disease. This means that burnout and physical health are likely to be correlated. Self-reported health in particular, being a global measure of health, may absorb the effect of burnout. Thus including both our burnout index and health measures in the same model may understate the total effect of burnout. On the other hand, including the burnout index but not physical health measures may overstate the importance of burnout if the exhaustion items forming the burnout index are correlated with physical diseases whose onset is orthogonal to the job environment. We therefore present two specifications of each model, one excluding the health variables, and one including them. In both specifications, the coefficient on the burnout index is highly statistically significant, and as expected is substantially larger when the time-varying health variables are omitted. The coefficients imply that the marginal effect of a one-unit increase in the burnout index raises the base retirement hazard at time *t* by between 9.8 percent (with health) and 15.6 percent (without health). The fact that burnout remains large and statistically significant even when controlling for health is evidence that it measures a construct distinct from physical health. In Appendix Table 1, we show that the burnout coefficient is also robust to inclusion of an index formed of the five (unused) depression-related items from the CES-D. The coefficient on the depression index itself is small and in most cases insignificantly different from zero.[17]

Other coefficients of note include those for the net wage and $\log(\lambda)$. Both are negative, and highly statistically significant, implying that retirement between *t* and *t+2* is less likely when the return to work in period *t* is large, or when the marginal utility of wealth is high. Interestingly, after we condition on permanent wealth with the $\log(\lambda)$ term, transitory wealth has no effect on retirement. Also of note is the large and statistically significant effect of post-retirement health insurance coverage at *t+2*.

The specification for the ordered logit model is the same as for the binary logit. The burnout coefficient is also highly statistically significant both with and without health, and as before it declines (by about half) once we add the health variables. The coefficients on the net wage and permanent wealth ($\log(\lambda)$) are also highly statistically significant, and as before, after conditioning on permanent wealth, transitory changes in wealth have little effect on retirement. The implied marginal effects of a one-unit change in the burnout index on the hazard of partial and complete retirement are 5.2 percent and 8.5 percent respectively in the model with health and 9.6 percent and 15.7 percent in the model without health. Here we see that the effect of burnout is strongest with respect to complete retirement.

Table 3 presents estimated parameters from the multinomial logit model, where the reference category is set to "continue working." The set of regressors is the same as in Table 2.

[17] Wray (2003) used the entire 8-item CES-D index, including the items in our Burnout EX3 Index, in her study of the effect of levels and changes in mental health on labor force exits. Although mental health is not consistently significant in all specifications, our results suggest that the effects she documents are being driven by levels and changes in the burnout portion of the index. Tian (2006) used a depression dummy (=1 if total CES-D score>=4) and found no effect of depression on the probability of complete retirement for HRS respondents after controlling for pain from associated comorbidities.

This model offers a useful refinement over the binary and ordered choice models in Table 2: we see that burnout is significantly related to the probability of unretirement and complete retirement, but not partial retirement. A one-unit change in the burnout index is associated with a 12.7 (with health) to 11.2 (without health) percent increase in the base hazard of unretirement and a 10.2 (with health) to 19.8 (without health) percent increase in the base hazard of complete retirement. Also of interest are the relative effects of the health variables: the health coefficients are large and highly significant for the complete retirement alternative, but small and statistically insignificant for the unretirement path. The combined pattern of burnout and health effects is quite striking: while the burnout process indeed governs retirement, the presence or absence of physical comorbidities distinguishes which retirees will unretire and which will not. Further research is necessary to assess whether the physical comorbidities are caused by burnout itself or other factors. The relative effects of the net wage are also of note. A rising return to work at time *t* strongly reduces the probability of partial retirement relative to continued work at *t+2,* but, surprisingly, does not similarly reduce the probabilities of complete retirement or unretirement. However, when we decompose the net wage into its three components, potential earnings, potentially foregone retirement benefits, and the pension accrual, we find that although potential earnings have little effect on the hazards of unretirement and complete retirement, the foregone pension benefit has a sizable effect. This is consistent with our hypothesis that access to retirement benefits makes leaving one's job financially and culturally acceptable. Interestingly, a positive pension accrual has a much larger deterrent effect on complete retirement than unretirement, suggesting that unretirees are more willing to trade pension wealth for leisure. These results are shown in Appendix Table 2.

Finally, as expected, the marginal utility of wealth is negatively correlated with all of the three retirement transitions relative to continued work; however, the magnitude of the coefficients suggests that it is most strongly related to partial retirement followed by unretirement, and complete retirement. In other words, respondents with higher permanent wealth are less likely to choose the traditional path of complete retirement. Finally, the availability of health insurance coverage at time *t+2* has a large effect on the probability of unretirement and complete retirement, but not partial retirement.

Overall, these results suggest that while pension incentives are an important factor for all retirees, they are less important for those who will eventually unretire. In fact, the total effect of the net return to work (i.e., the net wage) appears to be dominated by psychological health issues for this group. Consistent with this interpretation, while permanent wealth is an important decision variable for all types of retirees, it is less important for the two groups that exit the labor force at retirement. In contrast, access to subsidized health insurance (whether through employer-provided retiree health insurance, Medicare, or a spouse) is a critical decision variable for this group, which is not surprising given the dominant role played by psychological and physical health in their retirement decision.

As a final point of comparison, we tabulated expenditure and time use data during retirement for a subsample of complete retirees and future unretirees, using the HRS Consumption and Activities Mail Survey (CAMS). CAMS is a supplemental mail survey administered to a 30% subsample of Wave 5 HRS households during the off-survey years of 2001, 2003 and 2005. Table 4 shows that unretirees differ from complete retirees in several notable ways. Complete retirees spend significantly more hours per month managing a medical condition than do unretirees (7.80 v. 2.97), consume more hours of passive leisure (e.g., watching television) (22.7 v. 19.4 hours/week), fewer hours of active leisure (e.g., sports/exercise) (2.06 v. 3.31 hours/week), and more time and money on travel. These findings reinforce the conclusion that physical health is a key discriminating factor separating complete retirees from future unretirees.

6.2 Unretirement Hazard Models

In Tables 2 and 3 we established that burnout increases the probability of retirement, and that burnout combined with an absence of comorbidities differentiates those who choose the unretirement path from those choose the complete retirement path. While interesting, these results relate time variation in burnout only up to the point of retirement; it remains to be examined whether falling burnout after retirement (i.e., recovery) is associated with re-entry into the labor force. Hence, in this section we estimate a set of unretirement hazard models to examine how recovery from burnout relates to the hazard of unretirement.

We restrict our re-entry analysis to respondents who exit the labor force at retirement (i.e., both complete retirees and future unretirees), thus excluding partial retirees. We do this for two reasons: the choice set for partial retirees is different (they can either transition to part-time work or exit the labor force completely) from that of complete retirees, and because if burnout is not a relevant process for partial retirees (as our earlier results suggest), recovery from burnout will not be either.

Table 5 presents unretirement hazard models for the binary choice of increasing labor supply for complete retirees. Initial conditions include the level of burnout observed in the retirement wave, fair/poor health in the retirement wave, number of major health conditions in the retirement wave, percent of potential tenure worked (as a proxy for labor force attachment) as of the retirement wave, and age of retirement. Since private pension incentives are no longer relevant, the net wage for this sample consists only of potential earnings net of the Social Security earnings test, if applicable at time *t*. For potential earnings, we use log earnings in the wave before retirement. Although potential earnings after retirement are typically lower than pre-retirement earnings, in part because individuals choose part-time jobs, prior earnings are our best measure of a respondent's underlying labor productivity.

Consistent with our theory model, the burnout coefficient is negative, suggesting that those with lower burnout are more likely to return to work. Because of the much smaller sample sizes for these models, standard errors are large, and the burnout coefficient is statistically significant only in the model without health. Nevertheless, the estimated burnout coefficients in the models with and without health suggest that a one-unit *decrease* in burnout raises the unretirement hazard by 13.8 to 20.6 percent (depending on whether health is included). Again we find that permanent wealth is related to the probability of unretirement, whereas transitory wealth at time *t* conditional on permanent wealth is not. Those with greater permanent wealth (lower marginal utility of wealth) are more likely to unretire, as are those with higher education. Also of interest is the coefficient on our initial condition measure of labor force attachment, the percent of potential tenure worked, measured at retirement. Those with higher labor force attachment are strongly and significantly more likely to unretire. These findings are consistent with earlier work by Maestas (2007a). Surprisingly, potential earnings are not related to the hazard of unretirement; this again underscores the relative importance of non-economic factors in the retirement decision. A clear exception, however, is access to health insurance: unretirement at *t+2* is more likely among those without health insurance coverage at *t+2*. The ordered logit specification, based on the discrete hours classification (0 hours, part-time, full-time), yields quantitatively similar results. The marginal effect of burnout on the hazard of unretiring to part-time work is between -10.7 to -17.1 (with and without health respectively). The marginal effect of burnout on the hazard of unretiring to full-time work is -12.4 to -20.0 (with and without health respectively).

Our final set of models, shown in Table 6, are multinomial logit models of the hazard of unretirement to either part-time or full-time work. Again, we restrict the analysis to complete retirees, and the specification is the same as in Table 5. As before, the unordered choice model presents a more nuanced story than the ordered choice models. Unlike the ordered choice model, in the unordered choice model burnout has a large and statistically significant negative effect on the likelihood of re-entry to part-time work, but no relationship to the hazard of re-entering full-time work. For re-entry to part-time work, the marginal effects range from -15.7 to -21.9 percent (with and without health), and for re-entry to full-time work, the marginal effects are not statistically different from zero. The burnout effect is statistically significant even controlling for the time-varying health variables, which, surprisingly, are not themselves statistically different from zero. Again, the coefficient on potential earnings is small and insignificant. The coefficient on the marginal utility of wealth is significant in the model without health, and marginally so in the model with health. Although not statistically significant, the coefficients on transitory wealth suggest that transitory reductions in wealth may play a role in re-entry into full-time work, but not part-time work.

In sum, time variation in burnout after retirement is strongly related to the probability of re-entry, in particular re-entry into part-time work. The coefficients imply that as retirees recover from burnout, the hazard of re-entering the labor force in a part-time position rises. It appears that different processes may govern the two types of re-entry transitions. Recovery from burnout governs re-entry to part-time work, whereas we offer the tentative suggestion that wealth shocks may govern transitions back to full-time work.

7. Conclusion

In this paper we have introduced the process of psychological burnout and recovery as an explanation for the phenomenon known as unretirement. Because burnout rises with continued exposure to work stressors, it should peak just prior to retirement, then decline after the individual leaves the work environment. We demonstrate how burnout might be incorporated into a standard structural retirement model to illustrate how burnout and recovery could cause the marginal utility of leisure to cycle with labor force participation. As such, an individual for whom burnout is high enough to induce retirement may later unretire if his marginal utility of leisure falls below the expected gain from work.

We present a novel measure of burnout, the Burnout EX3 Index, and demonstrate that both levels and changes in the index are correlated with levels and changes in likely sources of conflict in the job environment, such stress, having a job that has become more difficult, binding minimum hours constraints, and perceived age discrimination in promotions. In addition, we show that the time profile of burnout around retirement varies across different types of retirees. Notably, among future unretirees burnout rises steeply prior to retirement then drops rapidly following retirement. Among complete retirees, burnout also rises prior to retirement, but it is surprisingly persistent following retirement. Among partial retirees, burnout is low and changes little over time.

Applying our structural model to longitudinal data from the Health and Retirement Study, we test the relevance of burnout for observed retirement behavior. Overall, our results point to a pattern consistent with our hypothesis: as burnout rises an individual is more likely to retire, and once burnout recedes and recovery occurs, the individual is more likely to return to the labor force. We demonstrate the existence of this pattern in two modeling steps. First, we estimate a set of retirement hazard models. In all specifications, burnout has a strong and statistically significant effect on the retirement hazard, even once we control for physical health. We find that burnout is strongly correlated with the decision to exit the labor force (both complete retirement and unretirement), but uncorrelated with the decision to become partially retired. A one-unit increase in the burnout index is associated with an 11-13 percent rise in the hazard of retirement with subsequent re-entry, and a 10-19 percent rise in the hazard of complete retirement. In contrast, while pension incentives are an important factor for partial retirees, they are less important for those who will eventually unretire. Although access to pension benefits raises the retirement hazard for this group, the total effect of the net return to work (i.e., the net wage) appears to be dominated by psychological health issues for this group. Although the marginal effects of burnout on the choice of the complete retirement or unretirement paths are similar, we show that the discriminating factor between these two retirement paths is physical comorbidities. The presence of burnout combined with physical comorbidities makes complete retirement more probable, whereas burnout without comorbidities makes unretirement more probable.

Second, we estimate a set of unretirement hazard models, in order to confirm that recovery from burnout is associated with labor force re-entry. We find that post-retirement recovery from burnout has a large and statistically significant effect on the hazard of unretirement, in particular re-entry into part-time work. Burnout is not related to re-entry into full-time work; rather, this relatively less common unretirement transition appears to be governed by a distinct process, perhaps one more related to transitory wealth shocks.

We conclude that burnout is an important addition to both theory and empirical models of retirement behavior. It is distinct from physical health or other mental health measures such as depression, and is distinguished by a unique time pattern in which it rises with continued exposure to job-related stressors, and, for those without physical comorbidities, subsequently recedes once exposure to job-related stressors ends at retirement.

Data Appendix

1. Construction of Net Wage

An individual's net wage measures the magnitude of the financial incentive associated with one additional year of work at time *t*. It equals potential earnings (the annual labor income one would earn) minus potential foregone retirement benefits (including Social Security retirement benefits and private DB pension benefits) plus potential pension accrual (any change in the present discounted value of retirement benefits coming from an extra year of work). In other words, it is the marginal return to work adjusted for pension incentives (both public and private). In the following sub-section we describe how we construct respondents' potential retirement benefits and accruals using two HRS restricted datasets.

We the use SSA administrative earnings file for the original HRS cohort[18] to measure the retirement incentives provided by Social Security at time *t* (or age *a* for a given individual). The SSA administrative earnings file contains respondents' annual Social Security covered earnings from 1951 to 1991. We forecast earnings for 1992 and beyond by averaging respondents' two highest years between 1987 and 1991, then projecting the average forward assuming zero real annual growth.[19] The respondents' earnings data are fed into a Social Security retirement benefits computation routine (a set of SAS macros) developed by Maestas (2007b). The routine calculates retirement benefit amounts for any claiming date between ages 62 and 70, or for any combination of valid claiming dates for married respondents. Since we do not model the joint retirement decision of couples, when calculating whether a respondent would receive spouse benefits, we assume her spouse claims at 62. We construct the present value of Social Security

[18] HRS restricted file (HRS Cohort: Respondent Earnings and Benefits), http://hrsonline.isr.umich.edu/meta/years/iy6.php?iyear=1004

[19] Previous work has found relatively flat wage profiles for workers above 50 years of age (Gustman and Steinmeier, 2000) .

benefits at time *t* by adding up the stream of benefits payable at time *t*, weighted by survival probabilities from the 1998 life table[20] and discounted at the real interest rate (3%).[21] To construct Social Security wealth in periods prior to age 62, we assume no further work past time *t* and claiming at age 62.

We use the HRS 1992 Pension Plan Detail Data Set to measure pension incentives embodied in DB pension plans held on current jobs as of Wave 1.[22] HRS makes available a pension estimation program that calculates benefits and present values for each person-plan record on the Pension Plan Detail file under user-defined assumptions.[23] DB pension benefits and present values used in this paper are computed using the following assumptions: zero inflation rate, 3 percent real interest rate, zero real wage growth rate, Pension Calculator default assumptions for plan contribution/program options/IRS limit, and form of payment as single life annuity. A respondent's potential accrual at *t* is the difference between the present value of pension wealth at *t+1* evaluated under two scenarios: 1) the respondent does not work during period *t* and 2) the respondent does work during period *t.*

For respondents in our sample with no matched records in either one of the two restricted datasets, we impute their benefits and accruals using a SAS macro developed by Honggao Cao (2001) based on Wave 1 characteristics (demographics, socio-economic status, labor force

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[20] We use the 1998 life table because 1998 is the middle year of the time range for our panel. The table is available at http://www.cdc.gov/nchs/products/pubs/pubd/nvsr/48/lifetables98.htm.

[21] We ignore survivor benefits and do not use joint-survival probabilities to compute the household level present values.

[22] For simplification, we assume that respondents in our sample would never get a DB plan from any new job after Wave 1. If someone has multiple DB plans on their Wave 1 current job according to the Pension Plan Detail file, benefits and present values from each plan are summed together at each specific age. If someone reports having no DB plan in Wave 1 and has no DB plan record on the Pension Plan Detail file, we assign zero to her DB benefits and present values.

[23] The mortality assumption is based on life tables prepared by SSA (intermediate assumption) and built into the Pension Calculator.

history, and health status) and self-reported information about DB plan participation on the job held at Wave 1.

In periods *t* that occur prior to retirement, potential earnings at *t* are set to current annual earnings,[24] or in the case of an unemployed respondent, annual earnings in the most recent period of work. If Social Security retirement benefits have been claimed prior to *t*,[25] the foregone Social Security benefit and the accrual are set to zero (the Social Security benefit itself would instead enter household non-labor income), and potential earnings would be reduced in accordance with the Social Security earnings test formula applicable in that year.[26] In the case of a married respondent whose spouse would receive spouse benefits on his work record, we multiply his Social Security accrual by 1.5 and zero out her accrual since his labor supply determines the pension wealth of both spouses. For respondents younger than 62 at *t*, the forgone Social Security benefit is always zero, but the Social Security accrual still measures the effect on work at time *t* on Social Security wealth at *t+1*, under the assumption that future benefits will be claimed at age 62. For respondents without Wave 1 employer DB pension plans or who have left their Wave 1 jobs before *t*, forgone DB pension benefits and the DB pension accrual are irrelevant for the labor supply decision at *t* and are assigned to zero. Finally, we assume that everyone claims Social Security retirement benefits and DB pension benefits (if entitled) at age 70 if she has not claimed before; consequently, the net wage after age 69 has only one component – potential earnings.

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[24] HRS respondents can report their rate of pay for periods of different lengths (i.e., per hour, per week, per bi-week, per month, or per year). When the reported time period is not the year, we compute annual wage rates using respondent-reported usual number of hours worked per week and usual number of weeks worked per year.

[25] If HRS respondents report currently receiving Social Security income, the start month/year of the income stream is asked but the type of benefits is not asked in Wave 3 and beyond. We use the benefit start age and information on disability and marital history to impute the benefit type if missing.

[26] We take account of the 2000 repeal of the earnings test above the normal retirement age.

When time *t* occurs after retirement, we assume that public and private pensions have been claimed, so the net wage at that time is just potential earnings, which are assumed to be earnings on the last job minus any amount withheld due to the Social Security earnings test.

2. Construction of Marginal Utility of Wealth, λ

In order to derive a tractable formulation for the marginal utility of wealth, we assume that the utility value of wealth is a logarithmic function of full retirement wealth (the hypothetical maximal retirement wealth that would obtain if an individual worked until age 70[27]), which implies that the marginal utility of wealth is just the inverse of full retirement wealth (Gourinchas and Parker, 2002).

Full retirement wealth is a household level, time-invariant amount. It has the following components: (1) public and private pension wealth assuming work up until and claiming at age 70 (summed over husband and wife in married households);[28] (2) Wave 1 household net worth including housing wealth (from RAND HRS summary variable H1ATOTA[29]) projected forward to age 70 assuming a 3 percent rate of return; (3) Wave 1 DC (and combination plan) pension wealth associated with the current job from the Imputation for Pension Wealth file v2.0;[30] and (4) the sum of potential earnings from 1992 until age 69 for respondent and spouse compounded at a 3 percent real interest rate (i.e., a maximum saving rate of 100 percent). If someone in our sample has missing values for a certain component because she has no matched SSA earnings record or pension plan information, we impute the amount of that component in the manner

[27] We use age 70 instead of actual retirement dates so that λ is a constant for each individual and not dependent on the retirement decision.

[28] When computing the Social Security benefit for a married respondent claimed at 70, we assume that her spouse would claim at an age that can maximize the respondent's benefit level.

[29] RAND HRS webpage: http://www.rand.org/labor/aging/dataprod/#randhrs , RAND HRS codebook: http://www.rand.org/labor/aging/dataprod/randhrsg.pdf.

[30] HRS publicly-available file (Metadata Summary for Imputations for Pension Wealth) , http://hrsonline.isr.umich.edu/meta/years/iy2.php?iyear=P5

described in Data Appendix 1.2. Finally, we annuitize full retirement wealth over 30 years at a 3 percent real interest rate. The marginal utility of wealth is the inverse of the logarithm of this annuity.

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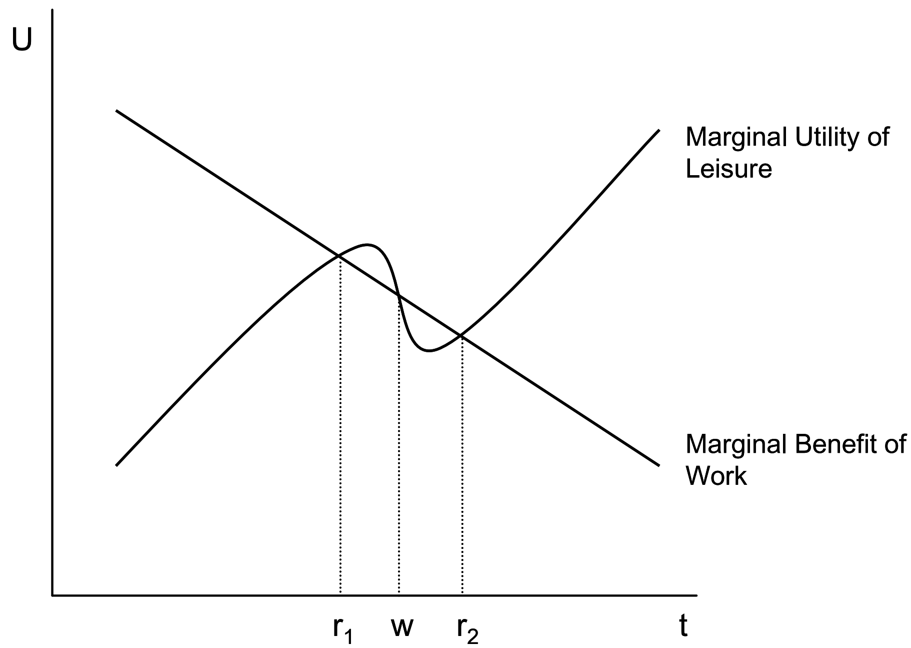
Figure 1. A Model of Retirement with Burnout and Recovery

A. Burnout and Recovery with No Uncertainty



B. Burnout and Recovery with Uncertainty

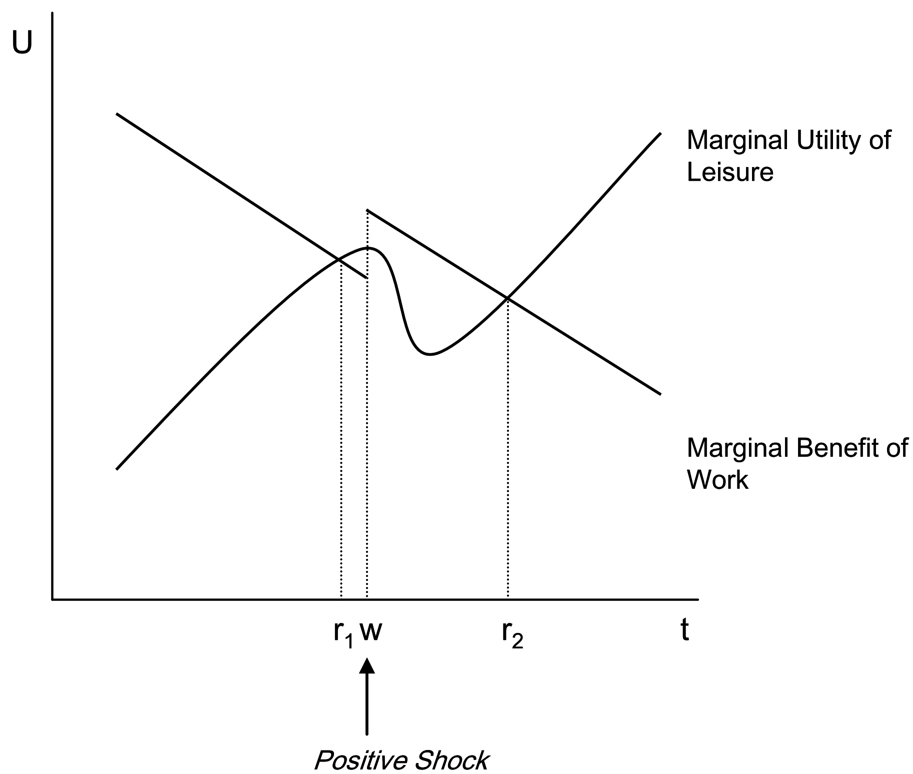


Figure 2. Pre-Retirement Time Profile of Burnout by Job Mismatch

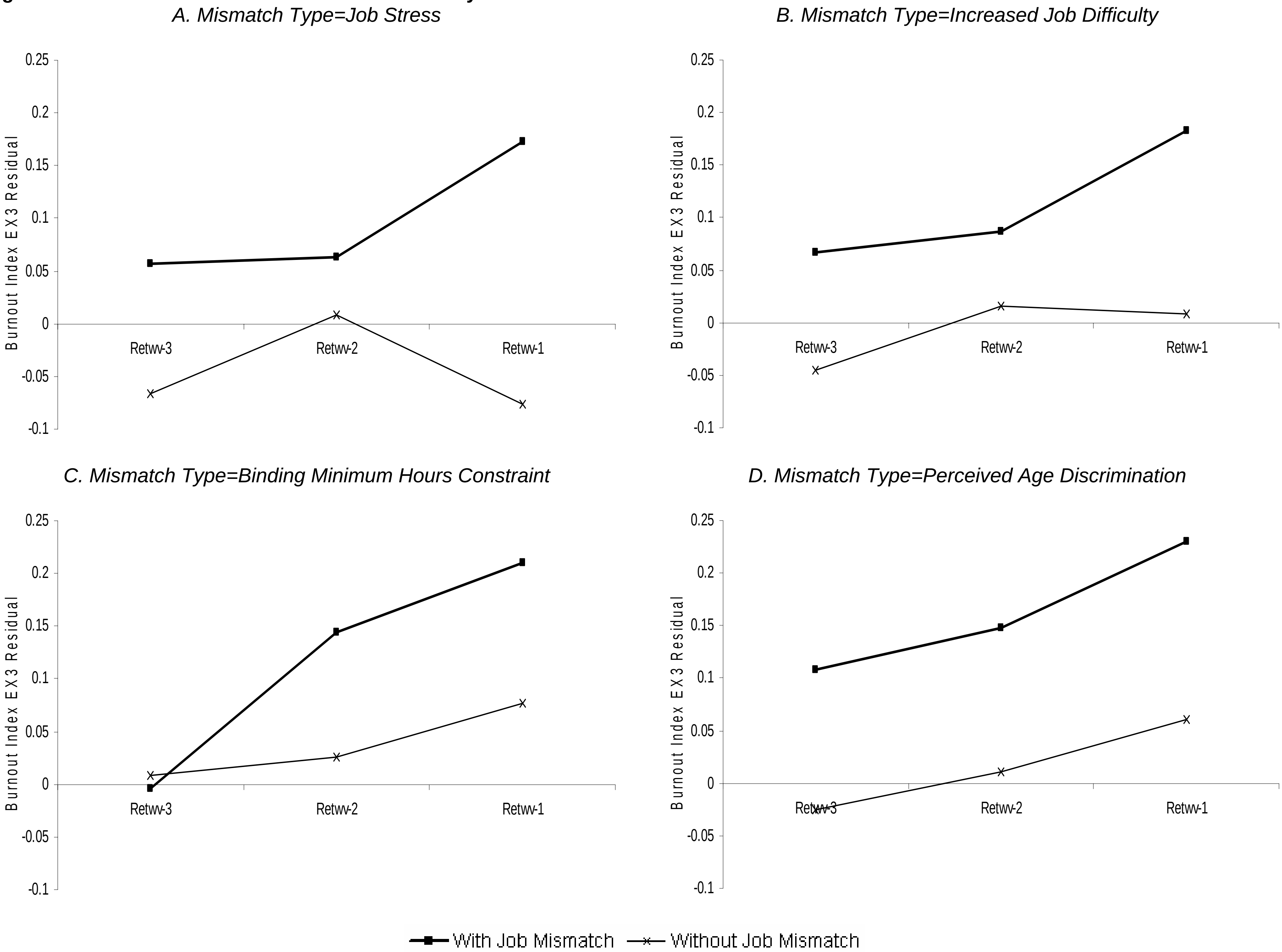


Figure 3. Within-Individual Correlation of Burnout and Job Mismatch

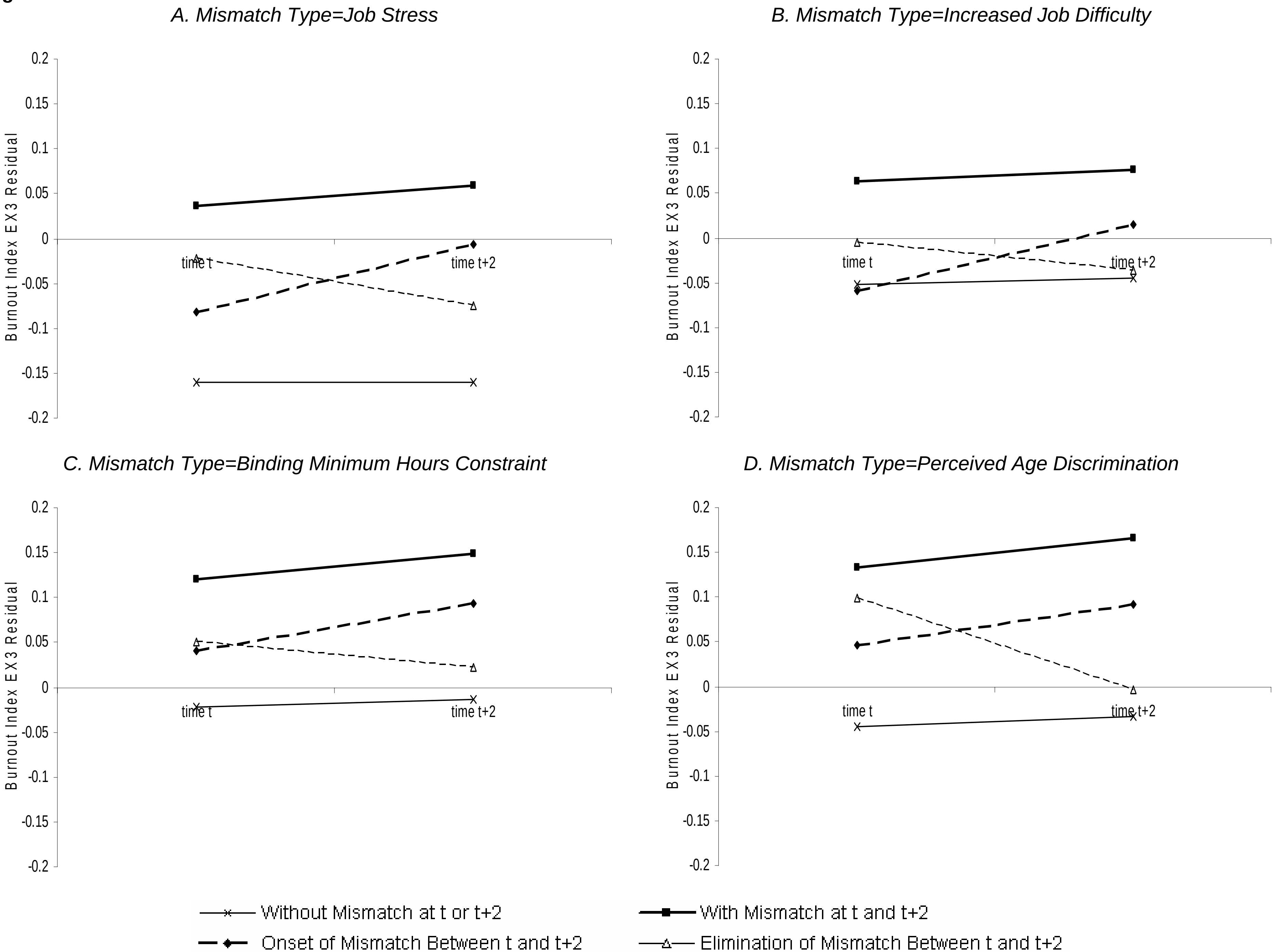


Figure 4. Time Profile of Burnout by Retirement Path

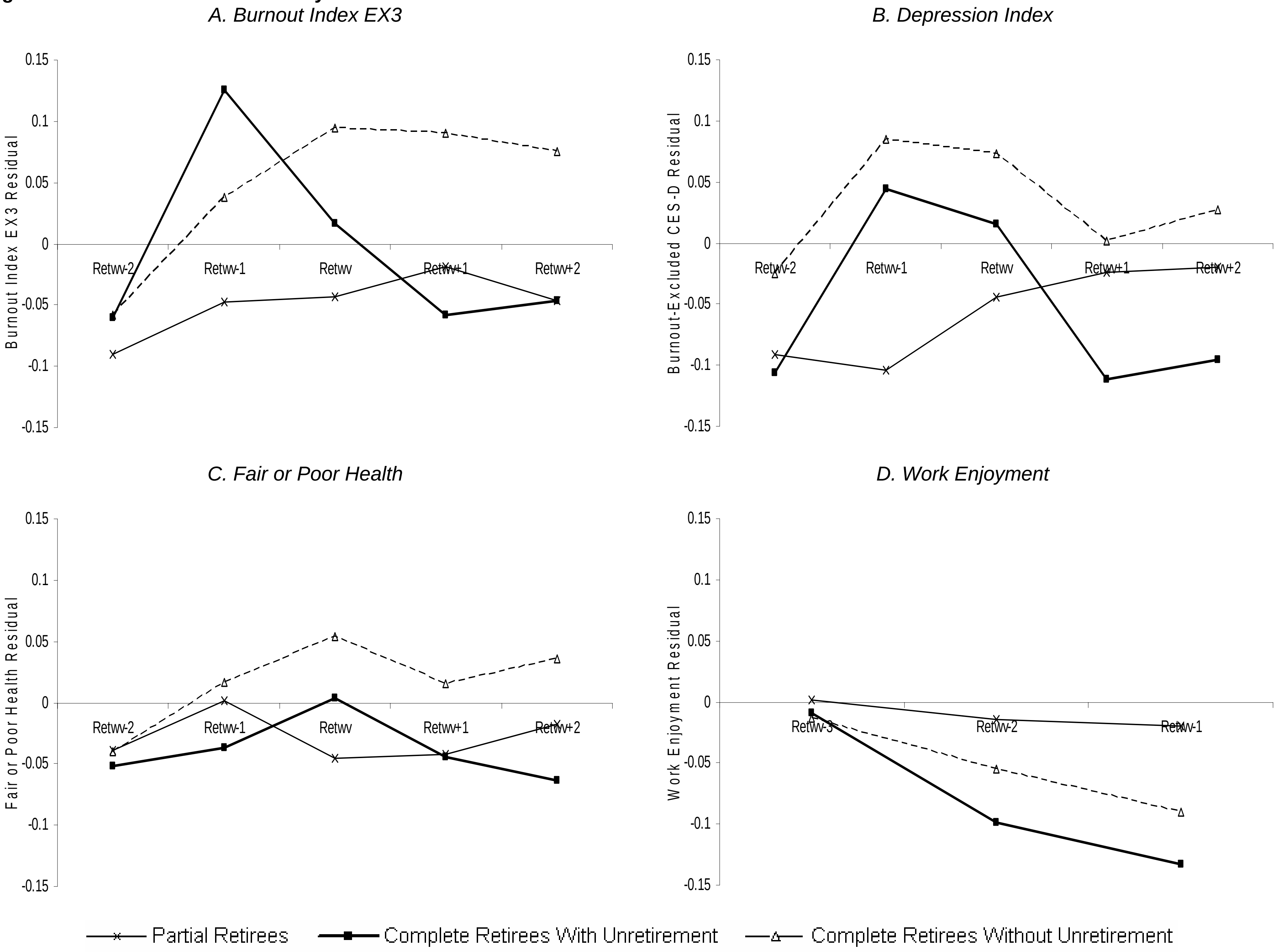


Table 1. Descriptive Statistics of Estimation Sample

	All	
	Mean	Standard Deviation
Labor Force Status at t+2		
% Working for Pay	59.2	49.2
% Working FT	41.5	49.3
% Working PT	7.0	25.5
% Partially Retired	10.7	30.9
% Completely Retired	36.2	48.1
Burnout at t		
Burnout Index EX3 [0-3]	0.6	0.9
Depression Index [0-5]	0.6	1.1
% of Potential Tenure Worked	84.3	20.3
Health at t		
Self-Reported Fair or Poor Health (%)	16.5	37.1
Sum of Major Health Conditions [0-8]	1.3	1.2
Economic Variables at t		
Net Wage	$ 45,814	$ 75,954
Potential Earnings	$ 39,838	$ 73,841
Potentially Forgone Retirement Benefits	$ 5,769	$ 13,671
Pension Accrual	$ 11,746	$ 19,468
λ*1,000,000	19.0	198.1
Net Worth	$ 325,441	$ 914,357
Household Non-Labor Income	$ 22,259	$ 49,499
Health Insurance Coverage at t+2 if Stop Working	72.4	44.7
Demographics at t		
Female	49.9	50.0
Years of Education	12.7	3.0
Married	70.8	45.5
Age	60.9	4.1
Job Environment Mismatch at t		
Job Stress	60.9	48.8
Increased Job Difficulty	48.2	50.0
Binding Minimum Hours Constraint	21.0	21.0
Perceived Age Discrimination	12.7	33.3
Person-Wave Observations	20745	

Notes: The estimation sample includes person-wave observations with non-missing burnout index and responding at both *t* and *t+2.* Net wage, net wage components and job environment mismatch measures only have non-missing values for observations working for pay at *t* (#=12,760). Depression index is the summation of the five depression-related CES-D items (in other words, depression index (scale: 0-5)=total CES-D score (scale: 0-8)-Burnout Index EX3 (scale: 0-3)). Major health conditions include high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, psychiatric problems, and arthritis. Forgone retirement benefits and the pension accrual refer to both public and private pensions. All dollar amounts are expressed in 2002 dollars.

Table 2. Random Effect Logit and Ordered Logit Model of Retirement Hazard

	Random Effect Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
Burnout and Health at t				
Burnout Index EX3	0.135***	0.216***	0.108***	0.200***
	(0.040)	(0.039)	(0.028)	(0.028)
Self-Reported Fair or Poor Health	0.527***		0.548***	
	(0.100)		(0.073)	
Sum of Major Health Conditions	0.306***		0.195***	
	(0.061)		(0.042)	
Economic Variables at t				
Log Net Wage/10	-3.543***	-3.515***	-1.170***	-1.227***
	(0.452)	(0.451)	(0.271)	(0.264)
Log λ/10	-5.173***	-4.352***	-2.532***	-2.095***
	(0.753)	(0.750)	(0.472)	(0.465)
Net Worth (100,000)	-0.003	-0.004	-0.006	-0.006
	(0.004)	(0.004)	(0.003)	(0.003)
Household Non-Labor Income (100,000)	0.335***	0.332***	0.282***	0.280***
	(0.075)	(0.075)	(0.050)	(0.052)
Health Insurance at t+2 if Stop Working	0.564***	0.572***	0.518***	0.515***
	(0.067)	(0.066)	(0.046)	(0.046)
Demographics at t				
Female	0.329***	0.301***	0.207***	0.182***
	(0.101)	(0.101)	(0.062)	(0.061)
Years of Education	-0.041**	-0.052***	-0.033***	-0.040***
	(0.018)	(0.018)	(0.011)	(0.011)
Married	-0.018	-0.009	-0.077	-0.076
	(0.094)	(0.094)	(0.060)	(0.059)
Initial Conditions at Baseline Wave (W2)				
Burnout Index EX3	0.029	0.135**	-0.004	0.030
	(0.055)	(0.053)	(0.035)	(0.034)
Self-Reported Fair or Poor Health	0.250		-0.030	
	(0.143)		(0.090)	
Sum of Major Health Conditions	0.014		-0.034	
	(0.072)		(0.047)	
% of Potential Tenure Worked	0.378	0.351	0.062	0.059
	(0.214)	(0.214)	(0.131)	(0.129)
Age	0.431***	0.436***	0.203***	0.203***
	(0.015)	(0.015)	(0.010)	(0.010)
Ratio of Panel-level Variance to Total Variance (ρ)	0.557	0.560		
	(0.010)	(0.010)		
Panel-level Standard Deviation	2.032	2.048		
	(0.040)	(0.040)		
Person-Wave Observations	14797	14800	14797	14800
Log Likelihood	-7450	-7536	-11080	-11209
Pseudo R-squared	0.1908	0.1816	0.0969	0.0865

Notes: All models include a constant and indicators for race/ethnic groups, current or last job industry/occupation, and interview waves. All dollar amounts are expressed in 2002 dollars.

,*: significant on a 0.05 and 0.01 level, respectively.

Table 3. Multinomial Logit Model of Retirement Path

Retirement Path at *t+2*	(1)			(2)		
	Partial	Unretirement	Complete	Partial	Unretirement	Complete
Burnout and Health at t						
Burnout Index EX3	0.041	0.152**	0.127***	0.080	0.164**	0.249***
	(0.051)	(0.065)	(0.035)	(0.049)	(0.066)	(0.035)
Self-Reported Fair or Poor Health	0.158	0.020	0.695***			
	(0.133)	(0.186)	(0.088)			
Sum of Major Health Conditions	0.152**	0.127	0.249***			
	(0.070)	(0.124)	(0.055)			
Economic Variables at t						
Log Net Wage/10	-7.578***	-0.306	-0.736	-7.574***	-0.313	-0.753
	(0.471)	(0.786)	(0.454)	(0.470)	(0.784)	(0.445)
Log λ/10	-4.349***	-3.165***	-2.531***	-4.120***	-3.110***	-1.898***
	(0.787)	(1.178)	(0.623)	(0.782)	(1.164)	(0.618)
Net Worth (100,000)	-0.001	-0.010	-0.008	-0.001	-0.010	-0.009
	(0.003)	(0.009)	(0.006)	(0.003)	(0.009)	(0.007)
Household Non-Labor Income (100,000)	0.350***	0.145	0.403***	0.353***	0.147	0.401***
	(0.077)	(0.127)	(0.069)	(0.078)	(0.129)	(0.071)
Health Insurance at t+2 if Stop Working	0.125	0.436***	0.682***	0.133	0.439***	0.674***
	(0.081)	(0.112)	(0.060)	(0.081)	(0.111)	(0.059)
Demographics at t						
Female	-0.157	0.149	0.275***	-0.161	0.143	0.244***
	(0.106)	(0.135)	(0.082)	(0.105)	(0.135)	(0.081)
Years of Education	0.034	-0.008	-0.053***	0.034	-0.008	-0.062***
	(0.019)	(0.026)	(0.014)	(0.019)	(0.026)	(0.014)
Married	-0.027	-0.012	-0.091	-0.024	-0.014	-0.090
	(0.103)	(0.131)	(0.079)	(0.103)	(0.130)	(0.077)
Initial Conditions at Baseline Wave (W2)						
Burnout Index EX3	-0.082	0.022	-0.016	-0.071	0.022	0.034
	(0.062)	(0.079)	(0.044)	(0.061)	(0.077)	(0.043)
Self-Reported Fair or Poor Health	-0.159	-0.034	-0.019			
	(0.169)	(0.226)	(0.113)			
Sum of Major Health Conditions	-0.004	-0.108	-0.031			
	(0.080)	(0.139)	(0.062)			
% of Potential Tenure Worked	0.630***	0.536	-0.085	0.635***	0.541	-0.106
	(0.239)	(0.322)	(0.170)	(0.238)	(0.321)	(0.166)
Age	0.214***	0.221***	0.224***	0.216***	0.220***	0.223***
	(0.016)	(0.020)	(0.012)	(0.016)	(0.020)	(0.012)
Person-Wave Observations		14555			14558	
Log Likelihood		-11714			-11874	
Pseudo R-squared		0.1238			0.1120	

Notes: Base category in the models is continue working. For the retirement path choices, "Partial" denotes partial retirement; "Unretirement" denotes complete retirement with subsequent unretirement; and "Complete retirement" denotes complete retirement without subsequent unretirement. Observations with retirement occurring between W6 and W7 are not included in the models because we cannot tell whether there will be subsequent unretirement. Both models include a constant and indicators for race/ethnic groups, current or last job industry/occupation, and interview waves. All dollar amounts are expressed in 2002 dollars.

,*: significant on a 0.05 and 0.01 level, respectively.

Table 4. Comparison of Consumption and Time Use Between Complete Retirees and Future Unretirees

	Complete Retirees	Future Unretirees	T-Ratio
Consumption (2002 $, per Month)			
Consumption on Trips, Travel or Vacations	139.7	209.7	-2.63
Consumption on Tickets to Movies, Sports Events, and Performing Arts	14.2	26.0	-2.17
Consumption on Hobbies (Including Sports, Arts, etc.)	42.7	39.0	0.34
Whether Consumption Increased/Stayed the Same with Retirement			
Consumption on Trips, Travel or Vacations	58.0	62.4	-1.11
Consumption on Entertainment, Sports, and Hobbies	55.4	52.4	0.70
Time Use (Hours last Week)			
Watching Programs or Movies/Videos on TV	22.7	19.4	2.50
Reading Books	4.4	4.1	0.75
Participating in Sports or Other Exercise Activities	2.1	3.3	-3.47
Visiting in Person with Others	8.0	9.0	-1.09
Communicating by Telephone/Letters/Email with Others	5.2	4.8	0.90
Time Use (Hours Last Month)			
Taking Care of Finances or Investments	4.4	4.9	-0.33
Treating or Managing One's Own Existing Medical Condition	7.8	3.0	5.59
Attending Concerts/Movies/Lectures, Visiting Museums	1.4	1.2	0.60
Doing Arts and Crafts Projects	3.5	4.6	-1.11
Singing or Playing a Musical Instrument	1.1	1.3	-0.44
Doing Home Improvements	4.0	4.9	-1.11
Time Use (Days Last Year)			
Whether Days on Overnight Trips or Vacations>14	34.8	42.6	-2.10
Time Use Summary During One's Waking Hours			
Whether Often Use One's Mind	59.3	60.2	-0.26
Whether Often Use One's Body	35.9	36.6	-0.18
Person-Wave Observations During Retirement	2899	176	

Source: CAMS (Consumption and Activities Mail Survey) W1-W3. All variables tabulated are measured during retirement phase. "Complete retirees" are defined as people who reported retired and not working at either W1 or W2, and did not report working at subsequent wave. "Future unretirees" are defined as people who transitioned from "retired and not working" status to "working" status across CAMS waves.

Table 5. Random Effect Logit and Ordered Logit Model of Unretirement Hazard

	Random Effect Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
Burnout and Health at t				
Burnout Index EX3	-0.146	-0.219**	-0.128	-0.207***
	(0.094)	(0.092)	(0.066)	(0.064)
Self-Reported Fair or Poor Health	-0.413		-0.361**	
	(0.239)		(0.170)	
Sum of Major Health Conditions	-0.219		-0.207	
	(0.149)		(0.116)	
Economic Variables at t				
Log Net Wage/10	-0.699	-0.687	-0.058	-0.068
	(1.295)	(1.287)	(0.814)	(0.808)
Log λ/10	-3.343**	-4.451***	-2.080	-2.635**
	(1.642)	(1.629)	(1.150)	(1.138)
Net Worth (100,000)	-0.029	-0.027	-0.017	-0.016
	(0.018)	(0.018)	(0.014)	(0.013)
Household Non-Labor Income (100,000)	-0.253	-0.276	-0.209	-0.220
	(0.167)	(0.169)	(0.145)	(0.147)
Health Insurance at t+2 if Stop Working	-0.812***	-0.837***	-0.685***	-0.719***
	(0.206)	(0.205)	(0.134)	(0.133)
Demographics at t				
Female	-0.419**	-0.378	-0.280**	-0.258**
	(0.202)	(0.201)	(0.130)	(0.127)
Years of Education	0.090**	0.102***	0.049	0.055**
	(0.036)	(0.036)	(0.026)	(0.026)
Married	-0.176	-0.184	-0.046	-0.055
	(0.182)	(0.181)	(0.121)	(0.120)
Initial Conditions at Retirement Wave				
Burnout Index EX3	0.002	-0.178	0.042	-0.035
	(0.114)	(0.109)	(0.076)	(0.073)
Self-Reported Fair or Poor Health	-0.610**		-0.231	
	(0.281)		(0.192)	
Sum of Major Health Conditions	-0.023		0.055	
	(0.165)		(0.126)	
% of Potential Tenure Worked	1.851***	1.795***	1.013***	0.980***
	(0.468)	(0.465)	(0.320)	(0.321)
Age	-0.006	-0.001	-0.006	-0.002
	(0.026)	(0.026)	(0.018)	(0.018)
Ratio of Panel-level Variance to Total Variance (ρ)	0.629	0.632		
	(0.013)	(0.013)		
Panel-level Standard Deviation	2.360	2.374		
	(0.065)	(0.065)		
Person-Wave Observations	5411	5413	5411	5413
Log Likelihood	-1842	-1863	-2694	-2725
Pseudo R-squared	0.0590	0.0444	0.0701	0.0599

Notes: Estimation sample only includes observations from people who were completely retired at the retirement wave. All models include a constant and indicators for race/ethnic groups, current or last job industry/occupation, and interview waves. All dollar amounts are expressed in 2002 dollars.

,*: significant on a 0.05 and 0.01 level, respectively.

Table 6. Multinomial Logit Model of Unretirement Path

Unretirement Path at *t+2*	(1)		(2)	
	PT Work	FT Work	PT Work	FT Work
Burnout and Health at t				
Burnout Index EX3	-0.176**	-0.031	-0.249***	-0.128
	(0.077)	(0.108)	(0.075)	(0.110)
Self-Reported Fair or Poor Health	-0.310	-0.532		
	(0.197)	(0.292)		
Sum of Major Health Conditions	-0.225	-0.156		
	(0.138)	(0.194)		
Economic Variables at t				
Log Net Wage/10	-0.054	-0.070	-0.061	-0.185
	(0.956)	(1.409)	(0.950)	(1.404)
Log λ/10	-2.207	-1.846	-2.786**	-2.487
	(1.265)	(2.240)	(1.245)	(2.228)
Net Worth (100,000)	-0.007	-0.052	-0.006	-0.048
	(0.013)	(0.037)	(0.012)	(0.034)
Household Non-Labor Income (100,000)	-0.214	-0.146	-0.224	-0.160
	(0.123)	(0.333)	(0.124)	(0.351)
Health Insurance at t+2 if Stop Working	-0.693***	-0.696***	-0.718***	-0.745***
	(0.160)	(0.210)	(0.160)	(0.209)
Demographics at t				
Female	-0.072	-0.725***	-0.052	-0.706***
	(0.150)	(0.234)	(0.147)	(0.229)
Years of Education	0.092***	-0.030	0.098***	-0.025
	(0.028)	(0.050)	(0.027)	(0.049)
Married	-0.099	0.135	-0.109	0.116
	(0.141)	(0.211)	(0.139)	(0.209)
Initial Conditions at Retirement Wave				
Burnout Index EX3	0.112	-0.125	0.035	-0.197
	(0.087)	(0.137)	(0.084)	(0.135)
Self-Reported Fair or Poor Health	-0.333	0.054		
	(0.216)	(0.348)		
Sum of Major Health Conditions	0.114	-0.098		
	(0.147)	(0.222)		
% of Potential Tenure Worked	1.046***	0.962	1.012***	0.947
	(0.352)	(0.683)	(0.352)	(0.692)
Age	0.034	-0.083**	0.038	-0.082**
	(0.020)	(0.033)	(0.020)	(0.032)
Person-Wave Observations	5411		5413	
Log Likelihood	-2694		-2725	
Pseudo R-squared	0.0833		0.0727	

Notes: Estimation sample of the models only includes observations from people who completely retired at the retirement wave. Both models include a constant and indicators for race/ethnic groups, current or last job industry/occupation, and interview waves. All dollar amounts are expressed in 2002 dollars.

,*: significant on a 0.05 and 0.01 level, respectively.

Appendix Table 1. Random Effect Logit Models Including Depression Index

	Retirement Hazard		Unretirement Hazard	
	(1)	(2)	(3)	(4)
Burnout, Depression and Health at t				
Burnout Index EX3	0.108**	0.178***	-0.136	-0.198**
	(0.043)	(0.042)	(0.099)	(0.097)
Depression Index	0.045	0.066**	-0.032	-0.053
	(0.032)	(0.032)	(0.076)	(0.076)
Self-Reported Fair or Poor Health	0.510***		-0.393	
	(0.101)		(0.240)	
Sum of Major Health Conditions	0.313***		-0.225	
	(0.061)		(0.150)	
Economic Variables at t				
Log Net Wage/10	-3.552***	-3.522***	-0.670	-0.664
	(0.453)	(0.452)	(1.299)	(1.291)
Log λ/10	-5.181***	-4.373***	-3.597**	-4.752***
	(0.755)	(0.750)	(1.653)	(1.639)
Net Worth (100,000)	-0.003	-0.004	-0.029	-0.027
	(0.004)	(0.004)	(0.018)	(0.018)
Household Non-Labor Income (100,000)	0.325***	0.323***	-0.247	-0.270
	(0.076)	(0.076)	(0.169)	(0.171)
Health Insurance at t+2 if Stop Working	0.561***	0.568***	-0.801***	-0.831***
	(0.067)	(0.066)	(0.206)	(0.205)
Demographics at t				
Female	0.328***	0.299***	-0.407**	-0.365
	(0.102)	(0.101)	(0.202)	(0.201)
Years of Education	-0.037**	-0.048***	0.084**	0.095***
	(0.018)	(0.018)	(0.036)	(0.036)
Married	-0.003	0.015	-0.157	-0.187
	(0.095)	(0.095)	(0.185)	(0.184)
Initial Conditions				
Burnout Index EX3	0.026	0.118**	-0.016	-0.170
	(0.061)	(0.060)	(0.124)	(0.121)
Depression Index	0.010	0.024	0.053	0.008
	(0.045)	(0.045)	(0.093)	(0.092)
Self-Reported Fair or Poor Health	0.253		-0.634**	
	(0.144)		(0.282)	
Sum of Major Health Conditions	0.004		-0.037	
	(0.072)		(0.165)	
% of Potential Tenure Worked	0.365	0.344	1.987***	1.898***
	(0.214)	(0.215)	(0.473)	(0.469)
Age	0.430***	0.437***	-0.002	0.002
	(0.015)	(0.015)	(0.026)	(0.026)
Ratio of Panel-level Variance to Total Variance (ρ)	0.557	0.562	0.628	0.631
	(0.010)	(0.010)	(0.013)	(0.013)
Panel-level Standard Deviation	2.032	2.053	2.355	2.373
	(0.040)	(0.040)	(0.065)	(0.065)
Person-Wave Observations	14738	14741	5394	5396
Log Likelihood	-7423	-7506	-1833	-1855
Pseudo R-squared	0.1906	0.1817	0.0599	0.0487

Notes: Estimation sample for unretirement hazard are observations from people who completely retired at the retirement wave. Initial conditions are measured at W2 for retirement hazard, and retirement wave for unretirement hazard. All models include a constant and indicators for race/ethnic groups, current or last job industry/occupation, and interview waves. All dollar amounts are expressed in 2002 dollars.

,*: significant on a 0.05 and 0.01 level, respectively.

Appendix Table 2. Multinomial Logit Model of Retirement Path with Decomposed Net Wage

Retirement Path at *t+2*	(1)			(2)		
	Partial	Unretirement	Complete	Partial	Unretirement	Complete
Burnout and Health at t						
Burnout Index EX3	0.037	0.158**	0.134***	0.077	0.166**	0.253***
	(0.051)	(0.065)	(0.036)	(0.049)	(0.066)	(0.035)
Self-Reported Fair or Poor Health	0.163	0.016	0.684***			
	(0.132)	(0.186)	(0.089)			
Sum of Major Health Conditions	0.176**	0.062	0.232***			
	(0.069)	(0.122)	(0.054)			
Economic Variables at t						
Log Potential Earnings/10	-6.994***	-0.876	0.227	-7.003***	-0.887	0.171
	(0.441)	(0.869)	(0.488)	(0.442)	(0.868)	(0.481)
ASINH Potentially Forgone Benefits/10	0.413***	0.527***	0.626***	0.420***	0.526***	0.647***
	(0.100)	(0.141)	(0.071)	(0.100)	(0.140)	(0.070)
ASINH Pension Accrual/10	-0.471***	-0.235	-0.478***	-0.468***	-0.230	-0.484***
	(0.099)	(0.167)	(0.075)	(0.098)	(0.166)	(0.073)
Log λ/10	-4.099***	-2.886**	-1.923***	-3.864***	-2.855**	-1.304**
	(0.786)	(1.192)	(0.625)	(0.781)	(1.178)	(0.618)
Net Worth (100,000)	-0.000	-0.009	-0.008	-0.001	-0.009	-0.009
	(0.003)	(0.008)	(0.006)	(0.003)	(0.008)	(0.007)
Household Non-Labor Income (100,000)	0.358***	0.155	0.409***	0.361***	0.157	0.409***
	(0.079)	(0.126)	(0.069)	(0.080)	(0.129)	(0.071)
Health Insurance at t+2 if Stop Working	0.116	0.341***	0.602***	0.125	0.345***	0.595***
	(0.080)	(0.113)	(0.060)	(0.080)	(0.112)	(0.059)
Demographics at t						
Female	-0.181	0.140	0.313***	-0.187	0.135	0.283***
	(0.106)	(0.136)	(0.082)	(0.105)	(0.136)	(0.081)
Years of Education	0.035	-0.010	-0.057***	0.036	-0.010	-0.067***
	(0.019)	(0.026)	(0.014)	(0.019)	(0.026)	(0.014)
Married	0.002	0.009	-0.068	0.007	0.004	-0.065
	(0.103)	(0.130)	(0.079)	(0.103)	(0.130)	(0.077)
Initial Conditions at Baseline Wave (W2)						
Burnout Index EX3	-0.082	0.027	-0.013	-0.074	0.027	0.037
	(0.062)	(0.080)	(0.045)	(0.061)	(0.077)	(0.043)
Self-Reported Fair or Poor Health	-0.185	-0.037	-0.011			
	(0.170)	(0.227)	(0.114)			
Sum of Major Health Conditions	-0.031	-0.045	-0.015			
	(0.079)	(0.137)	(0.061)			
% of Potential Tenure Worked	0.682***	0.543	-0.107	0.687***	0.547	-0.132
	(0.242)	(0.323)	(0.172)	(0.241)	(0.322)	(0.169)
Age	0.196***	0.197***	0.195***	0.197***	0.197***	0.193***
	(0.016)	(0.021)	(0.013)	(0.016)	(0.021)	(0.013)
Person-Wave Observations		14598			14601	
Log Likelihood		-11725			-11880	
Pseudo R-squared		0.1278			0.1165	

Notes: Base category in the models is continue working. For the retirement path choices, "Partial" denotes partial retirement; "Unretirement" denotes complete retirement with subsequent unretirement; and "Complete retirement" denotes complete retirement without subsequent unretirement. Observations with retirement occurring between W6 and W7 are not included in the models because we cannot tell whether there will be subsequent unretirement. For potentially forgone benefits and the pension accrual, we use the inverse hyperbolic sine transformation (denoted by ASINH) rather than the log transformation to account for valid zero and negative values. Both models include a constant and indicators for race/ethnic groups, current or last job industry/occupation, and interview waves. All dollar amounts are expressed in 2002 dollars.