WHAT EFFECT DO TIME CONSTRAINTS HAVE ON THE AGE OF RETIREMENT?

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Abstract

Work affects both the time available for non-market activities and the times at which those activities are performed – and therefore work-induced constraints on time use may influence retirement decisions. We analyze these effects by combining new data from the American Time Use Survey with information on retirement in the Health and Retirement Study.

We find that the propensity to engage in three types of non-work activities – household production, leisure, and tertiary activities (eating, sleeping, grooming) – are substantially altered by work. Moreover, the ways in which the timing of these activities are distorted differ across ten different job types (industry-occupation combinations) that we examine in the ATUS. We use the resulting measures of time distortions as control variables in multinomial logit retirement models that we estimate in the HRS. Older workers in jobs with greater distortions to the quantity and timing of leisure activities have an increased propensity to leave those jobs, either for new jobs or for retirement. On the other hand, workers in jobs with greater distortions to household production have a reduced propensity to leave their jobs, and distortions to tertiary activities raise the propensity to take new jobs but reduce the propensity to retire.

I. Introduction

One potential solution to inadequate retirement saving, and a likely consequence of increasing life spans, is for workers to delay retirement. Time constraints may affect individuals' ability and willingness to extend their working lives. Work clearly affects both the amount of time available for non-market activities and the times at which those activities can be performed (Hamermesh and Donald, 2007). These constraints may be particularly severe for low-income workers who have relatively fixed work schedules and who may find it unprofitable to substitute market purchases for the non-market activity. They may also disproportionately affect women, who spend more time than men on care giving. The effect on labor force participation may be disproportionate to the time spent on the non-market activity if that activity (for example, cooking lunch for another household member) must be performed at a particular time, and is not one for which a market purchase can be readily substituted.

Yet, traditional data sets report little information on non-work time. For example, the extraordinarily rich data on income and assets in the Health and Retirement Study has facilitated the estimation of detailed retirement models that focus on financial resources. However, the HRS provides little information indicating how financial resources are converted into utility flows from either leisure or consumption. Other data sets, though they do not allow estimation of retirement models with the same level of financial detail, demonstrate that the leisure and consumption opportunities of individuals are intimately tied to both the timing of retirement and the activities of individuals during retirement (Bernheim, Skinner, and Weinberg 2001, Aguiar and Hurst 2005, 2008).

We seek to fill in this gap by combining new data from the American Time Use Survey (ATUS) with information on retirement transitions observed in the HRS. Few others have begun to use this new data, which began to be collected in 2003, to analyze retirement (Hamermesh and Donald 2007, Aguiar and Hurst 2005). The ATUS provides a snapshot showing how individuals spend their time, minute-by-minute and activity-by-activity, on a particular day. This makes it possible to compare the non-work activities – volunteering, taking classes, engaging in physical activity, cooking, cleaning, shopping, caring for family members, socializing, watching TV, and so on – of workers and retirees, and importantly, the timing of those activities.

Hamermesh and Donald emphasize that work distorts the timing of leisure, household production, and personal activities like sleep. We investigate the extent to which older workers in jobs that involve greater distortions to daily time use will retire sooner, all else given, as they will experience greater utility gains from eliminating these distortions to time use patterns. We adapt the methodology of Hamermesh and Donald to measure these distortions for typical workers in the ATUS, distinguished by industry and occupation. We then include the measures of these distortions to daily activities as controls when we estimate multinomial logits to explain job transitions for aging workers in the HRS. The multinomial logit approach recognizes the richness of retirement transitions while maintaining a parsimonious and flexible estimation approach (Friedberg, Owyang, and Webb 2008).

Thus, our method exploits the advantages of two data sets, each of which provides rich information on some aspects of work but not others. The American Time Use Survey provides rich time use data for a large cross-section of individuals, but, lacking a substantive panel, the ATUS is not well suited for analyzing the timing of retirement. For this purpose, we use the Health and Retirement Study, which provides us information about high-frequency retirement transitions observed over a long period of time but has little information about time use.[2]

In Section II, we will analyze how work alters the timing of non-work activity for prime-age workers in the ATUS, grouped by industry and occupation. In Section III, we will match these job-specific measures to the HRS sample of older workers and use them to estimate the impact of work-related time constraints on retirement.

II. MEASURING TIME CONSTRAINTS ASSOCIATED WITH WORK

As the largely cross-sectional nature of the ATUS does not allow us to follow workers into retirement, we use the ATUS to measure how work alters the time spent on and timing of non-work activities. We focus on a large sample of prime-age workers and group them by industry

[2] While the HRS has recently added both time use and expenditure information through the Consumption and Activities Mail Survey (CAMS), the CAMS has only been collected for a subset of HRS respondents via pencil and paper surveys mailed out in 2001, 2003, and 2005. Hurd and Rohwedder (2007) found that average time use patterns looked similar in the CAMS and ATUS, but the distributions of time use looked quite different. Also, the CAMS cannot be used to analyze how work alters the timing of activities, as it simply asks how many hours were spent on various activities in the last week or month.

and occupation to measure these job-related constraints. After that, we will analyze how job-related changes to non-work time use influences retirement patterns in the HRS.

A. The American Time Use Survey

The ATUS is the first large, nationally representative, repeated survey of time use by Americans. Respondents are asked by telephone to relate their time use during the previous day. This results in information on the nature of each activity, and, importantly, when the activity took place, enabling us to investigate whether the timing of non-market activities influences an individual's propensity to work.

The ATUS consists of repeated cross-sections, with data available from 2003 through 2007. The response rate in 2003 was 57%, yielding a sample of 20,720 respondents; subsequent samples were reduced by about 40% to trim costs. According to the *User's Guide* (2006, p.10), "The primary reason for non-response is that the designated persons are tired from participating in the CPS survey." Of obvious concern is that the busier respondents are, the less willing they are to take time to respond to the ATUS. Evidence that we present later suggests that this does not generate systematic bias in our results. Abraham et al (2006) found that observed characteristics correlated with busyness – like usual weekly hours of work and presence of children – had little effect on response rates.

We pool data from the five years of the ATUS, yielding a total sample size of 72,922. From this group, we exclude 895 individuals who said they were working but did not provide industry and occupation codes. Then, we eliminate individuals aged 60 and over, as people who retire late are a selected sample that is likely to have different time use patterns while working than those who retire early. These exclusions reduce the sample size to 55,318. This includes both weekdays and weekends (with each comprising roughly 50% of the sample), and we consider changes to both together, since working alters time use patterns on weekends as well as weekdays, as well as changes to weekday and weekend time use separately.

B. Methodology

Following Hamermesh and Donald (Appendix A), we group non-work activities into three categories: leisure (L), home production (H), and tertiary activities (T). Home production includes housework and care of children and others.[3] Leisure consists of talking with others, reading, watching television, participating in physical activity, etc. Tertiary activities include sleeping, eating and drinking, and personal care activities, such as bathing and grooming; these are activities that must be done for oneself and not by others, and thus cannot be purchased.

We run regressions explaining the propensity to engage in these activities throughout the day as a function of whether the individual works and average minutes of work, conditional on working. The goal is to see how the incidence and intensity of work alter the scheduling of other activities throughout the day; in Hamermesh and Donald, these are meant to capture the "fixed" and "marginal" time costs of work upon other activities. We add additional information which they do not consider by interacting both variables with the worker's industry and occupation. In this way, we aim to exploit the variation in non-work activities of workers across different industries and occupations.

The regressions take the form of weighted probits of the probability that an individual engages in either L, H, or T at every 15-minute interval, defined at the midpoint of each quarter hour of the day. Sample weights are used so that the results are nationally representative. We include three types of control variables:

- *Variables representing the "fixed cost" of work.* We control for whether an individual is working, and if so in what industry and occupation. We interact four industry categories (construction/mining/ agriculture, manufacturing, professional services, non-professional services) with three occupation categories (skilled, semi-skilled, and unskilled), except that all workers in the first industry category are grouped together for reasons of sample size.[4] This results in 10 industry-occupation categories. The coefficients on these industry-occupation dummies measure the effect of any work in a particular type of job (relative to a base case of not working) on the propensity of the individual to alter their activity during each quarter hour. We further interact a work dummy with an indicator for whether household income is greater than

[3] Based on the 2003 and 2004 ATUS lexicons, activities are allocated as follows: market work (codes 0501-0599, 1705), household production (0201-0299, 0301-0499, 0701-1099, 1501-1599, 1603-1608, 1702-1704, 1707-1710, 1715), tertiary activities (0101-0199, 1101-1199, 1701, 1711, and leisure (0601-0699, 1201-1499, 1601-1602, 1706, 1712-1714). Adjustments were made to coding in later years as the lexicon changed.

[4] The HRS provides 13 industry and 17 occupation codes, derived from the 2000 Census industry and occupation codes. Based on previous literature, we group industry codes 1-2 as agriculture/construction/mining, 3-5 as manufacturing, 6-11 as professional and 12-13 as nonprofessional. We group occupation codes 1-2 (managerial, professional) as skilled, 3-4 (clerical, sales) as semiskilled, and all others as unskilled. This necessitates adapting the coding in the 2002 ATUS, which uses 1990 industry and occupation codes, to match this structure.

$50,000, as high income households may have different opportunities to substitute between the purchase and production of household services.

- *Variables representing the "marginal cost" of work*. We also control for the 10 job types described above interacted with average minutes of daily work for that job type, as observed in the same ATUS sample. This captures the effect of more or less average minutes of work on the timing of non-work activities.
- *Demographic variables*. We include other control variables to capture systematic differences in time use on the basis of gender, age and age squared, race and Hispanic ethnicity, marital status, and the presence of children of various ages (0-2, 3-5, 6-13, 14-17) in the household.

As an alternative to including gender and marital status controls, we also partitioned the sample and ran the regressions separately for each of four subsamples that are likely to experience differences in time use and in the importance of time constraints; these subsamples are married males (13,859), married females (16,600), single males (10,756) and single females (14,103). Lastly, while there are 96 15-minute intervals during each day, we only used 70 of them, from 6:00 AM until 11:30 PM. There was too little variation in activities undertaken during the middle of the night for people in different types of job to obtain useful results.

C. Results

As a result of this, we obtain probit coefficients for three activity types (L, H, T) for 70 quarter hours for 5 demographic samples (everyone, married and single men and women) for various times of the day and week (every day, weekdays, weekends). We find that the effect of work on the timing of non-work activities is jointly significantly different across the 10 job types we consider.

Our next step is to construct a measure of the "work constraint effect" for each of the job types in which we are interested. We begin with non-workers as a base case and use the probit coefficients to predict the probability of each activity in a given quarter hour; to do this, we set all demographic variables to their sample mean and all interactions involving work and job type described above to zero. Thus, we obtain results like $\hat{p}_0^{H,0600}$, the predicted probability that a non-worker engages in home production at the midpoint of the 6:00-6:15 AM interval. Then we switch the job category to, say, an unskilled worker in the manufacturing sector, using the estimated probit coefficients on both the work and work minutes interactions with the unskilled manufacturing job dummy to obtain $\hat{p}_{MFG,UN}^{H,0600}$. We take the difference between the two predicted probabilities as a measure of how being an unskilled manufacturing worker alters the probability of doing home production between 6:00-6:15 AM. Similar calculations for all 70 15-minute intervals yields the full set of differences in the probability of undertaking each type of non-work activity in each interval for each job type.

We show a few of these graphically to give a sense of the results. Figure 1 shows how working in a skilled occupation in the professional services category (as opposed to not working) alters the probability of engaging in home production during each 15-minute interval between 6:00 AM and 11:30 PM. Many of these effects are significantly different from zero – so the propensity to engage in home production is significantly changed. Specifically, work raises the probability of engaging in home production by a little less than percentage points during the first couple hours after 6:00 AM and by 5-10 percentage points from mid-afternoon through early evening. Meanwhile, the effect of the average minutes worked in this job category (shown underneath the above figure) is to reduce home production in the middle of the day, from mid-morning to early afternoon. The shift in the time pattern of home production is similar for other job types, while the particular magnitudes differ. For example, among unskilled workers in professional services, the change in the early morning and evening propensity to do home production is closer to zero, but the change in the late afternoon is greater.

Figures 2 and 3 show graphs reflecting how tertiary activities and leisure are altered among people in the same occupations. The distortions to home production are a little greater in magnitude than the distortions to leisure and to tertiary activities. Working at all (as shown in the top figures) tends to shift leisure towards the early morning and late evening intervals, while average minutes of work tend to have a greater effect in depressing leisure activities during the middle of the day. Working at all similarly raises the likelihood of engaging in tertiary activities at certain times – notably, raising the probability of eating at certain times (the middle of the day, the end of the typical work day) and reducing the likelihood of sleeping in the late hours before 11:30 PM. Greater average minutes of work also reduce the likelihood of being asleep early in the morning.

Our last step is to develop a measure that captures the overall change in non-work time during the day. To do this, we sum the absolute value of the differences in the predicted probabilities for each job type (like $\hat{p}^{H,0600}_{MFG,UN}$) to obtain $\widehat{constraint}^{H}_{MFG,UN} = \sum_{t=0600}^{2330} \hat{p}^{H,t}_{MFG,UN}$, indicating by how much the propensity to engage in home production through the day is altered by being, in this case, an unskilled manufacturing worker. We similarly compute this measure for leisure and tertiary activities to obtain a set of variables $\widehat{constraint}^{a}_{k}$ for the three activities $a = \{L, H, T\}$ and the 10 industry-occupation groups k. We also compute $\widehat{constraint}_{k}$ by adding across all three activities to arrive at a total "work constraint" measure for each industry-occupation job type.

We will use these measures of time constraints as control variables in retirement models estimated using the HRS. The resulting measures are shown in Table 1. Thus, in the row for all skilled workers in the professional services sector, the value of 5.30 indicates the sum of the change in predicted probabilities, in absolute value, of engaging in household production between 6:00 AM-11:30 PM. The average change in the predicted probabilities for any one of the 70 time intervals is thus 5.30/70 = 0.076, or 7.6 percentage points (which may be positive in some intervals and negative in others). For the same job type, this value is 2.72 for tertiary activities and 3.70 for leisure, so work in this category alters the propensity to engage in non-work activities in an average time interval by almost (5.30+2.72+3.70)/70 = 11.73/70 = 0.168, or about 16.8 percentage points. For the same job type, married men have the highest value of the job-imposed time constraint, at 14.58, while single women have the lowest value, at 12.22. Among job types, the highest value of the time constraint is 17.36, for agriculture/construction/mining, and the lowest is 7.45, for unskilled workers in nonprofessional services.

Table 2 shows that the time constraints are somewhat higher on weekdays. Interestingly, on weekdays they differ both during typical work hours and at other times. The time constraints also differ for workers on weekends, even though most workers are not working then.

III. ESTIMATING THE IMPACT OF TIME CONSTRAINTS ON RETIREMENT

After measuring how particular jobs constrain non-work activities in the ATUS, we can now match those measures to the jobs of aging workers in the HRS. We include the job-related measures in a retirement model while controlling for job type, so that we can test whether they influence the path of full or phased retirement.

A. The Health and Retirement Study

The HRS is a detailed longitudinal survey of over 7,600 households with a member born between 1931 and 1941. The HRS began in 1992 and surveys people every two years. We use data from the first seven waves through 2004.[5] The HRS asks about the precise timing of job transitions. It also provides enormous detail about covariates which are important in explaining retirement – like job characteristics, health, marital status, and assets. We will use industry and occupation to match individuals to information about time constraints associated with jobs.

The HRS is intended to be nationally representative, subject to oversampling of minorities and Florida residents.[6] We select our sample as follows. Beginning with 12,652 individuals in the 1992 HRS, we keep 11,314 of them who also appear in Wave 2, so we observe at least one transition for each. We drop 272 under age 50 or above age 69 in 1992, leaving 11,042. We drop a further 1,069 who lived outside a metropolitan area and 8 whose work status was unknown, leaving 9,965 whose labor force transitions were observed for periods varying from roughly two years, if they left the survey after 1994, to twelve years, if they remained until 2004.

We use the recall data on job transitions to convert person-wave observations into 86,145 person-year observations, with each individual's status measured from one birthday to the next. These person-year observations include information on whether the person was working for the same employer, working for a different employer, or not working at the start and end of the period.[7] We then exclude observations where the individual is not working at the beginning of a period, leaving 33,735 observations. Lastly, we drop observations without information on industry, occupation, or self-employment status, resulting in 33,655 observations for the overall sample. For the four subsamples, we have 13,301 married males, 12,346 married females, 1,799 single males, and 6,209 single females.

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[5] Where possible, we make use of the RAND HRS data file, a cleaned version of the original. We have not incorporated cohorts entering into the HRS in 1998 or 2004.

[6] We find that after inclusion of sample weights, the sample is indeed broadly nationally representative.

[7] In contrast to our annual approach, Gustman and Steinmeier (2001) tracked individuals by wave (over two years), which reduces precision in predicting retirement since many important milestones, such as attaining age 62 or 65, or one's normal retirement age, occur on the individual's birthday.

To give an idea of how the sample moves into transitions, we note that, between turning 55 and turning 56, 88.2% of the sample (consisting of people who are in a job at 55) stays in the same job, while 7.0% take another job, and 4.8% retire. Staying in the job occurs with almost the same frequency at age 60, 86.5%, and declines to 84.7% at age 61 and 77.7% at age 62. Exits to another job decline gradually as the sample ages, while exits to retirement rises to 8.5% at age 60, 11.7% at age 61, and 16.7% at age 62.

B. Methodology

The emphasis in the literature on the heterogeneity in retirement transitions – with some moving from full-time work to full retirement, but many others taking "bridge jobs" along the way – explains our multichotomous approach (Ruhm 1990, Gustman and Steinmeier 1986). This approach is richer than common specifications that pick a single binary definition of retirement (leaving a career job, describing oneself as retired, working zero hours, etc). Relative to the frontier of the structural retirement literature (e.g., Rust and Phelan 1997, Gustman and Steinmeier 2005, French 2005), we do not specify underlying preferences, model features of job outcomes that are not chosen, or capture the full dynamics involved in the evolution of retirement benefits. Accounting for these issues carefully would require making functional form assumptions that tend to have little clear empirical justification.

Thus, we will seek to explain the probability of observing outcome y_{ntk} *={stay in job, leave for another job, retire}* for each individual *n* in each year *t*. Ignoring for now possible correlation of the error term across observations for the same individual, we can write $y_{ntk} = y_{ik}$. The probability that a particular y_{ik} is observed, conditional on observables x_{nt}, can be expressed as

$$Pr[\, y_{ik} = j \mid x_i \,] = \frac{exp(\, x_i' \beta_j \,)}{1 + \sum_{j=1}^{K} exp(\, x_i' \beta_j \,)} \qquad (1)$$

This specification will yield coefficient estimates for each covariate x_i that are specific to each outcome *k*. As is usual in the multinomial formulation, those coefficients are identified for *K-1* of the outcomes, relative to an arbitrarily chosen outcome as a base case.

The results in these tables are presented in the form of relative risk ratios (RRR). The RRR is a transformation of the estimated logit coefficient and captures the marginal effect of the right-hand side variable on the likelihood of a particular job transition occurring relative to the likelihood of the base outcome (staying in the job) occurring. If the RRR takes a value equal to *one,* then the right-hand side variable *does not alter* the likelihood of that particular job transition occurring relative to staying in the job. If the RRR takes a value that is *smaller than one*, then the variable *reduces* the likelihood of the job transition occurring relative to staying in the job by the percentage of RRR-1, and if the RRR takes a value *greater than one*, it *raises* the likelihood relative to staying in the job. The standard errors are transformed as well to correspond to the relative risk ratios and can be compared with RRR-1 using the critical values for z-statistics; so, if, upon computing RRR-1 and dividing by the transformed standard error reported in the table, one obtains a value that is roughly two, the corresponding RRR is statistically significant at roughly the 95% confidence level.

In our estimation, we control for the work constraints we measured above from the ATUS. In some cases, we control for the three activity-specific values $constraint_k^a$, where *a* represents leisure L, home production H, and tertiary activities T, and in others for their sum $constraint_k$, as they are to some degree collinear. We also control to the extent possible for job type, so as to pick up other factors related to particular jobs or the types of people who work in particular jobs. The limitation is that we must drop not one but two of our 10 job type categories, as $constraint_k$ does not vary within job type and so is a linear combination of job type.[8] In accommodating this source of collinearity, we can identify the time-related constraints of job type, as long as these are not perfectly correlated with other unmeasured traits that vary by job type.

In order to reduce potential problems that may arise because we cannot control fully flexibly for effects of job type on retirement, we add controls for observable job characteristics reported by HRS respondents. People were asked whether there jobs required "lots of physical effort", "heavy lifting", "stooping, kneeling, or crouching", and "good eyesight". We also control for whether a job involves responsibility over "pay and promotion decisions".

[8] We must drop additional job type dummies when including the three separate measures $constraint_k^a$, for activities $a = \{L, H, T\}$.

Lastly, we include a rich set of demographic and compensation-related variables that are available in the HRS: gender, race, education (3 categories), self-reported health (5 categories), single age dummies, financial wealth by quintile (which, though potentially endogenous, influences retirement but does not alter other estimated coefficients much when included), job tenure, plant size (6 categories), union membership, and the current wage. We also include information on employer-provided pensions. We use self-reported information on pension type (defined benefit, defined contribution, both, none) and an indicator for being older than the DB full retirement age.[9]

C. Estimation Results

Column 4.1 in Table 4 shows the multinomial logit results when we do not include any measure of work-related time constraints. The column on the left shows the relative risk ratios (RRR), reflecting how each covariate alters the likelihood of leaving one's beginning-of-the-year job for another job. The column on the right shows the RRRs for the likelihood of leaving one's job and retiring.

Column 4.2 adds the aggregate time constraint $constraint_k$ faced by people in industry-occupation group k. Here, we find that a higher value of this number – meaning more total distortions in daily non-work activities, compared to non-workers – raises the likelihood of switching jobs but not of retiring. Recall that the range of values that $constraint_k$ takes for the full sample is [7.45, 17.36]. Moreover, if a job altered the likelihood of engaging in non-work activities in each of the 70 time intervals we consider by 10 percentage points, then $constraint_k$ would take a value of 0.10*70 = 7. As the RRR associated with $constraint_k$ for transitions to a new job is 1.204, then a value of 7 for $constraint_k$ is associated with a (1.204-1)*7 = 143% increase in the likelihood of moving to a new job.

When we distinguish the impact of the separate measures of work-related constraints on different types of non-work activities, we find that distortions to leisure time lead to moves into both new jobs and retirement (though the latter is not statistically significant). Distortions to home production reduce the likelihood of leaving one's job. Distortions to tertiary activities lead

[9] While Gustman and Steinmeier (1999) showed that individuals report this information with substantial error, Chan and Stevens (2008) found that retirement responded more to one's beliefs about one's pension type, but also that, as people approached retirement, the accuracy of their information improved; therefore, it is reasonable to consider both measures. We have not as yet tried controlling for an individual's Social Security wealth and retirement incentives, as this involves the use of restricted data.

to more new jobs but less retirement. Table 5 shows additional results, only reported for the time constraints, when we alter the measured time constraint or the demographic sample.

This effect falls short of statistical significance for the first outcome but is significant for the second.[10] The variable $constraint_k$ has a standard deviation of 3.05, and a one-standard deviation increase in the time constraint raises the likelihood of leaving one's job for retirement by (1.0199-1)*3.05 = 6.1% – a substantial jump. For married men (the largest subsample), the effect is even larger (with a log odds ratio of 1.0373), while for other groups the effect is not statistically significant. For married women, the log odds ratio is larger still but not statistically significant. It is not surprising that time constraints matter more for married people than for singles, as time spent together is one of the chief features of marriage.[11]

Next, we analyze time constraints as they relate to particular activities – leisure, home production, and tertiary activities – though collinearity is an issue. For the sample as a whole, distortions to tertiary activities significantly raise the likelihood of leaving one's job, whether to another job or to retirement; distortions to home production significantly reduce the likelihood of exiting to a new job but raise the likelihood of retiring; and distortions to leisure significant raise the likelihood of exiting to a new job but reduce the likelihood of retiring. Most of these estimates fall short of conventional levels of statistical significance, but often not by much.

V. CONCLUSIONS

Time constraints may affect individuals' ability and willingness to extend their working lives. Work clearly affects both the amount of time available for non-market activities and the times at which those activities can be performed. Yet, traditional data sets report little information on non-work time. We seek to fill in this gap by combining new data from the American Time Use Survey with information on retirement transitions observed in the Health and Retirement Study. We measure distortions to non-work activities experienced in different types of jobs in the ATUS, and we investigate the extent to which older works in jobs that involve greater distortions to time use retire sooner.

[10] As we have relatively little variation in our time constraints variable, which are defined for ten industry-occupation categories, a lack of statistical significance is a common theme in some of our results.

[11] It is also interesting that the results are greater for married men than for married women. With the emphasis on husbands' responsiveness, this may be consistent with evidence from Coile (200y) that married men time their retirement to their wives behavior, rather than vice versa.

We find that the propensity to engage in three types of non-work activities – household production, leisure, and tertiary activities (eating, sleeping, grooming) – are substantially altered by work. Moreover, the ways in which the timing of these activities are distorted differ across ten different job types (industry-occupation combinations) that we examine in the ATUS. We use the resulting measures of time distortions as control variables in multinomial logit retirement models that we estimate in the HRS. Older workers in jobs with greater distortions to the quantity and timing of leisure activities have an increased propensity to leave those jobs, either for new jobs or for retirement. On the other hand, workers in jobs with greater distortions to household production have a reduced propensity to leave their jobs, and distortions to tertiary activities raise the propensity to take new jobs but reduce the propensity to retire.

Our research demonstrates that individuals' retirement hazard is responsive to the severity of their time use constraints. We propose extending the above analysis to consider the impact that plausible relaxations of time constraints – for example, through flexible working hours – might have on the average age of retirement.

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Figure 1(a) Impact of being skilled professional worker on predicted probability of engaging in home production activities by quarter hour time interval

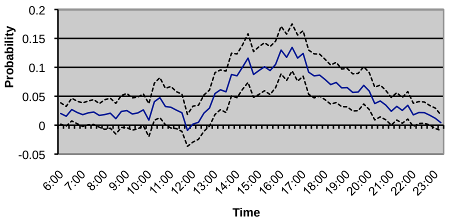


Figure 1(b) Impact of being unskilled non-professional worker on predicted probability of engaging in home production activities by quarter hour time interval

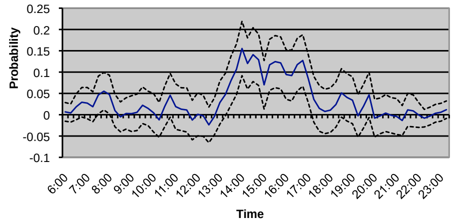


Figure 1(b') Impact of being construction/agri/mining worker on predicted probability of engaging in home production activities by quarter hour time interval

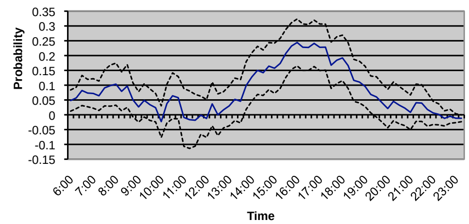


Figure 1(c) Impact of devoting one additional minute to work as a skilled professional on predicted probability of engaging in home production activities by quarter hour time interval

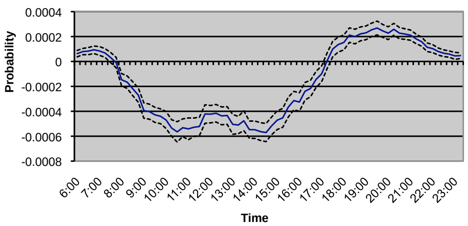


Figure 1(d)Impact of devoting one additional minute to work as a unskilled non-professional on predicted probability of engaging in home production activities by quarter hour time interval

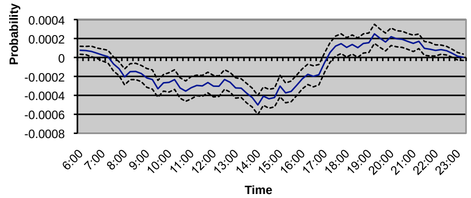
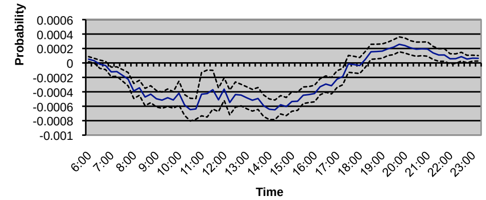


Figure 1(d') Impact of devoting one additional minute to work as a construction/agri/mining worker on predicted probability of engaging in home production activities by quarter hour time interval



Note: Figures 1(a) and (b) show the impact of working as a skilled professional or unskilled non-professional worker on the probability of engaging in household production, by quarter hour interval over the period 06:00 AM to 11:00 PM, relative to not working. Figures 1(c) and 1 (d) show the impact on the probability of participation of an additional minute devoted to work in the above occupations. The solid line shows the point estimate, and the dotted lines the 95% confidence interval.

Figure 2(a) Impact of being skilled professional worker on predicted probability of engaging in tertiary activities by quarter hour time interval

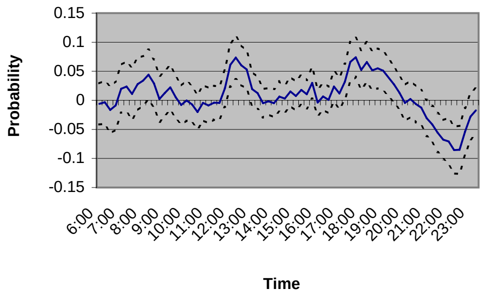


Figure 2(b) Impact of being unskilled non-professional worker on predicted probability of engaging in tertiary activities by quarter hour time interval

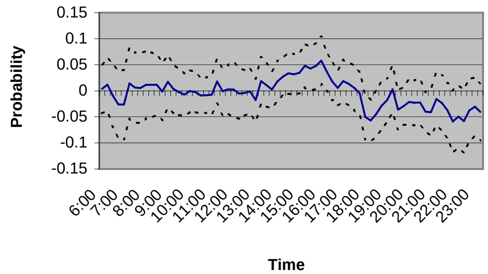


Figure 2(b') Impact of being construction/agri/mining worker on predicted probability of engaging in tertiary activities by quarter hour time interval

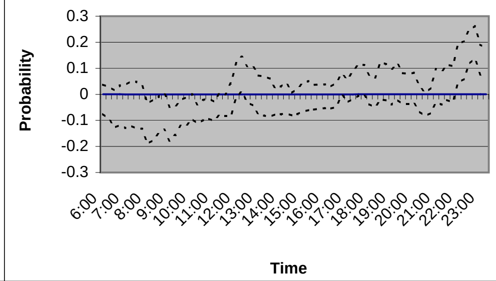


Figure 2(c) Impact of devoting one additional minute to work as a skilled professional on predicted probability of engaging in tertiary activities by quarter hour time interval

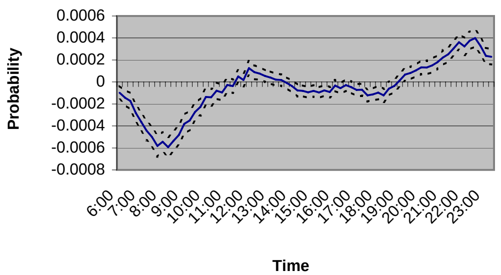


Figure 2(d) Impact of devoting one additional minute to work as a unskilled non-professional on predicted probability of engaging in tertiary activities by quarter hour time interval

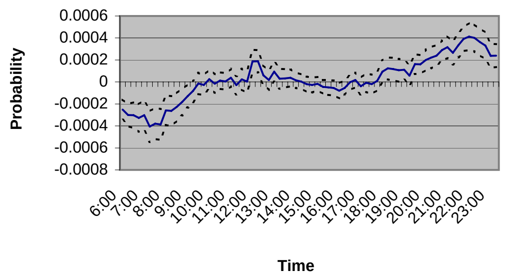


Figure 2(d') Impact of devoting one additional minute to work as a construction/agri/mining worker on predicted probability of engaging in tertiary activities by quarter hour time interval

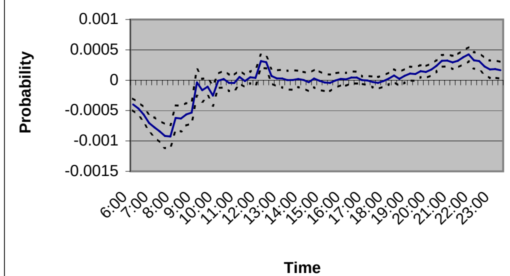


Figure 3(a) Impact of being skilled professional worker on predicted probability of engaging in leisure activities by quarter hour time interval

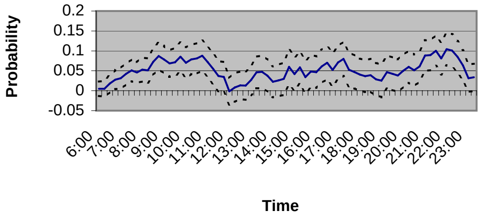


Figure 3(b) Impact of being unskilled non-professional worker on predicted probability of engaging in leisure activities by quarter hour time interval

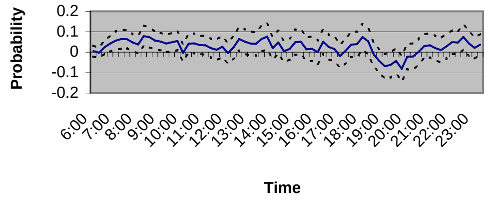


Figure 3(b') Impact of being construction/agri/mining worker on predicted probability of engaging in leisure activities by quarter hour time interval

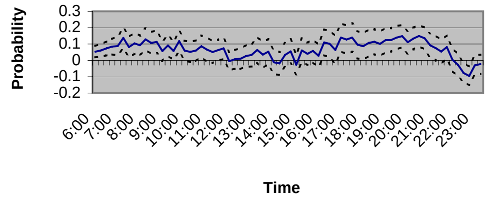


Figure 3(c) Impact of devoting one additional minute to work as a skilled professional on predicted probability of engaging in leisure activities by quarter hour time interval

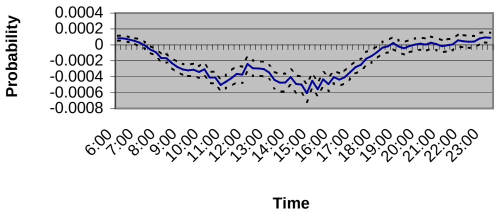


Figure 3(d) Impact of devoting one additional minute to work as a unskilled non-professional on predicted probability of engaging in leisure activities by quarter hour time interval

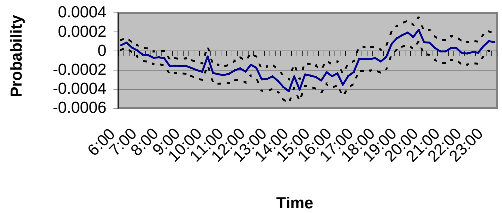


Figure 3(d') Impact of devoting one additional minute to work as a construction/agri/mining worker on predicted probability of engaging in leisure activities by quarter hour time interval

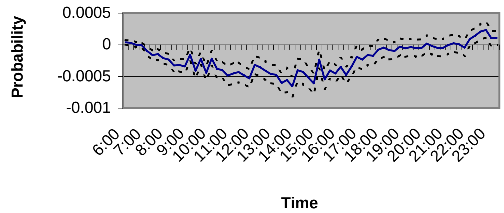


Table One: Impact of Industry and Occupation on Time Allocation - weekdays and weekends
Effect of occupation on probability of particiapting in non-work activities, averaged over all quarter-hour period

Occupation	All non-work activities	Household production	Tertiary activities	Leisure
everybody				
construction/agric/mining	17.36	5.97	6.62	4.76
skilled manufacturing	13.26	5.96	3.23	4.07
semiskilled manufacturin	13.37	5.82	4.87	2.68
unskilled manufacturing	15.34	4.99	6.93	3.42
skilled professional	11.73	5.30	2.72	3.70
semiskilled professional	14.91	5.83	3.49	5.58
unskilled professional	13.11	5.37	4.58	3.15
skilled nonprof	11.28	4.55	1.96	4.77
semiskilled nonprof	7.75	3.43	1.14	3.18
unskilled nonprof	7.45	3.13	2.09	2.23
married male				
construction/agric/mining	21.24	7.42	7.94	5.88
skilled manufacturing	16.95	7.10	4.21	5.64
semiskilled manufacturin	17.73	6.05	5.99	5.69
unskilled manufacturing	17.08	5.98	6.99	4.12
skilled professional	14.58	6.28	3.23	5.06
semiskilled professional	20.90	7.66	5.04	8.20
unskilled professional	15.63	4.98	6.58	4.08
skilled nonprof	15.24	5.93	2.68	6.63
semiskilled nonprof	13.10	5.37	3.05	4.68
unskilled nonprof	14.88	5.69	4.03	5.17
married female				
construction/agric/mining	14.06	5.81	4.37	3.88
skilled manufacturing	15.48	8.39	3.77	3.32
semiskilled manufacturin	16.90	7.62	5.09	4.18
unskilled manufacturing	14.11	4.58	5.95	3.58
skilled professional	12.32	7.12	2.62	2.58
semiskilled professional	16.23	9.33	3.33	3.57
unskilled professional	15.35	7.82	4.57	2.96
skilled nonprof	12.41	6.69	2.79	2.93
semiskilled nonprof	11.14	6.04	1.74	3.36
unskilled nonprof	10.29	4.62	3.09	2.58
single male				
construction/agric/mining	17.89	4.04	7.77	6.07
skilled manufacturing	13.63	4.44	3.89	5.31
semiskilled manufacturin	14.29	4.89	5.05	4.36
unskilled manufacturing	17.42	3.22	10.16	4.04
skilled professional	12.54	3.32	3.53	5.70
semiskilled professional	16.61	2.62	4.95	9.04
unskilled professional	12.66	3.15	4.16	5.34
skilled nonprof	10.90	2.92	3.29	4.70
semiskilled nonprof	9.46	1.86	2.35	5.25
unskilled nonprof	8.42	1.92	3.20	3.29
single female				
construction/agric/mining	16.97	5.25	6.39	5.34
skilled manufacturing	15.28	5.09	4.39	5.80
semiskilled manufacturin	18.72	7.47	5.58	5.66
unskilled manufacturing	18.98	4.96	8.78	5.25
skilled professional	12.22	4.88	2.90	4.43
semiskilled professional	15.34	4.11	4.54	6.69
unskilled professional	13.80	4.89	4.60	4.31
skilled nonprof	10.48	2.91	1.76	5.81
semiskilled nonprof	7.45	2.04	1.81	3.61
unskilled nonprof	6.29	2.18	1.80	2.31

Notes: We first calculate the impact of occupation on the predicted probability of participating in the activity in question, controlling for socio-economic characteristics and hours worked. We then sum the absolute values over the 70 quarter hour periods for which we estimate our model.

Table One: Impact of Industry and Occupation on Time Allocation - weekdays and weekends
Effect of occupation on probability of particiapting in non-work activities, averaged over all quarter-hour periods

Occupation	All non-work activities	Household production	Tertiary activities	Leisure
everybody				
construction/agric/mining	24.8%	8.5%	9.5%	6.8%
skilled manufacturing	18.9%	8.5%	4.6%	5.8%
semiskilled manufacturing	19.1%	8.3%	7.0%	3.8%
unskilled manufacturing	21.9%	7.1%	9.9%	4.9%
skilled professional	16.8%	7.6%	3.9%	5.3%
semiskilled professional	21.3%	8.3%	5.0%	8.0%
unskilled professional	18.7%	7.7%	6.5%	4.5%
skilled nonprof	16.1%	6.5%	2.8%	6.8%
semiskilled nonprof	11.1%	4.9%	1.6%	4.5%
unskilled nonprof	10.6%	4.5%	3.0%	3.2%
married male				
construction/agric/mining	30.3%	10.6%	11.3%	8.4%
skilled manufacturing	24.2%	10.1%	6.0%	8.1%
semiskilled manufacturing	25.3%	8.6%	8.6%	8.1%
unskilled manufacturing	24.4%	8.5%	10.0%	5.9%
skilled professional	20.8%	9.0%	4.6%	7.2%
semiskilled professional	29.9%	10.9%	7.2%	11.7%
unskilled professional	22.3%	7.1%	9.4%	5.8%
skilled nonprof	21.8%	8.5%	3.8%	9.5%
semiskilled nonprof	18.7%	7.7%	4.4%	6.7%
unskilled nonprof	21.3%	8.1%	5.8%	7.4%
married female				
construction/agric/mining	20.1%	8.3%	6.2%	5.5%
skilled manufacturing	22.1%	12.0%	5.4%	4.7%
semiskilled manufacturing	24.1%	10.9%	7.3%	6.0%
unskilled manufacturing	20.2%	6.5%	8.5%	5.1%
skilled professional	17.6%	10.2%	3.7%	3.7%
semiskilled professional	23.2%	13.3%	4.8%	5.1%
unskilled professional	21.9%	11.2%	6.5%	4.2%
skilled nonprof	17.7%	9.6%	4.0%	4.2%
semiskilled nonprof	15.9%	8.6%	2.5%	4.8%
unskilled nonprof	14.7%	6.6%	4.4%	3.7%
single male				
construction/agric/mining	25.6%	5.8%	11.1%	8.7%
skilled manufacturing	19.5%	6.3%	5.6%	7.6%
semiskilled manufacturing	20.4%	7.0%	7.2%	6.2%
unskilled manufacturing	24.9%	4.6%	14.5%	5.8%
skilled professional	17.9%	4.7%	5.0%	8.1%
semiskilled professional	23.7%	3.7%	7.1%	12.9%
unskilled professional	18.1%	4.5%	5.9%	7.6%
skilled nonprof	15.6%	4.2%	4.7%	6.7%
semiskilled nonprof	13.5%	2.7%	3.4%	7.5%
unskilled nonprof	12.0%	2.7%	4.6%	4.7%
single female				
construction/agric/mining	24.2%	7.5%	9.1%	7.6%
skilled manufacturing	21.8%	7.3%	6.3%	8.3%
semiskilled manufacturing	26.7%	10.7%	8.0%	8.1%
unskilled manufacturing	27.1%	7.1%	12.5%	7.5%
skilled professional	17.5%	7.0%	4.1%	6.3%
semiskilled professional	21.9%	5.9%	6.5%	9.6%
unskilled professional	19.7%	7.0%	6.6%	6.2%
skilled nonprof	15.0%	4.2%	2.5%	8.3%
semiskilled nonprof	10.6%	2.9%	2.6%	5.2%
unskilled nonprof	9.0%	3.1%	2.6%	3.3%

Notes: We first calculate the impact of occupation on the predicted probability of participating in the activity in question, controlling for socio-economic characteristics and hours worked. We then sum the absolute values and average over the 70 quarter hour periods for which we estimate our model.

Table Two: Impact of Industry and Occupation on Time Allocation - weekdays and weekends

Occupation	activities, averaged over all quarter-hour periods			
	All non-work activities	Household production	Tertiary activities	Leisure
everybody - weekdays				
construction/agric/mining	19.66	6.93	6.92	5.82
skilled manufacturing	16.75	7.35	3.55	5.85
semiskilled manufacturing	15.81	6.96	4.84	4.00
unskilled manufacturing	16.01	5.67	6.62	3.72
skilled professional	14.81	6.64	2.75	5.41
semiskilled professional	16.63	6.90	3.27	6.46
unskilled professional	13.22	5.74	4.04	3.44
skilled nonprof	13.59	5.71	2.22	5.66
semiskilled nonprof	9.40	4.32	1.14	3.94
unskilled nonprof	8.80	3.68	2.15	2.96
everybody - weekdays 9:5				
construction/agric/mining	7.90	3.68	1.56	2.66
skilled manufacturing	7.38	3.44	1.25	2.69
semiskilled manufacturing	6.04	3.23	1.18	1.64
unskilled manufacturing	6.24	2.89	1.84	1.51
skilled professional	7.06	3.24	1.10	2.72
semiskilled professional	8.00	3.52	1.51	2.97
unskilled professional	5.27	2.72	0.88	1.67
skilled nonprof	6.66	2.67	1.20	2.79
semiskilled nonprof	4.62	2.12	0.48	2.02
unskilled nonprof	4.06	1.96	0.52	1.58
everybody - weekends				
construction/agric/mining	8.77	2.70	3.59	2.48
skilled manufacturing	7.52	3.06	2.08	2.38
semiskilled manufacturing	9.30	2.59	2.80	3.91
unskilled manufacturing	12.15	3.17	5.75	3.24
skilled professional	6.07	1.95	2.02	2.09
semiskilled professional	9.32	2.71	2.42	4.19
unskilled professional	10.02	3.40	4.15	2.46
skilled nonprof	6.59	2.32	1.79	2.48
semiskilled nonprof	5.10	1.70	1.47	1.94
unskilled nonprof	5.97	2.46	1.54	1.97

Notes: See table One. Results for weekdays 9-5 are summed over 32 quarters.

Table Two: Impact of Industry and Occupation on Time Allocation - weekdays and weekends

Occupation	work activities, averaged over all quarter-hour periods			
	All non-work activities	Household production	Tertiary activities	Leisure
everybody - weekdays				
construction/agric/mining	28.1%	9.9%	9.9%	8.3%
skilled manufacturing	23.9%	10.5%	5.1%	8.4%
semiskilled manufacturing	22.6%	9.9%	6.9%	5.7%
unskilled manufacturing	22.9%	8.1%	9.5%	5.3%
skilled professional	21.2%	9.5%	3.9%	7.7%
semiskilled professional	23.8%	9.9%	4.7%	9.2%
unskilled professional	18.9%	8.2%	5.8%	4.9%
skilled nonprof	19.4%	8.2%	3.2%	8.1%
semiskilled nonprof	13.4%	6.2%	1.6%	5.6%
unskilled nonprof	12.6%	5.3%	3.1%	4.2%
everybody - weekdays 9:5				
construction/agric/mining	24.7%	11.5%	4.9%	8.3%
skilled manufacturing	23.1%	10.8%	3.9%	8.4%
semiskilled manufacturing	18.9%	10.1%	3.7%	5.1%
unskilled manufacturing	19.5%	9.0%	5.7%	4.7%
skilled professional	22.1%	10.1%	3.4%	8.5%
semiskilled professional	25.0%	11.0%	4.7%	9.3%
unskilled professional	16.5%	8.5%	2.7%	5.2%
skilled nonprof	20.8%	8.3%	3.8%	8.7%
semiskilled nonprof	14.4%	6.6%	1.5%	6.3%
unskilled nonprof	12.7%	6.1%	1.6%	4.9%
everybody - weekends				
construction/agric/mining	12.5%	3.9%	5.1%	3.5%
skilled manufacturing	10.7%	4.4%	3.0%	3.4%
semiskilled manufacturing	13.3%	3.7%	4.0%	5.6%
unskilled manufacturing	17.4%	4.5%	8.2%	4.6%
skilled professional	8.7%	2.8%	2.9%	3.0%
semiskilled professional	13.3%	3.9%	3.5%	6.0%
unskilled professional	14.3%	4.9%	5.9%	3.5%
skilled nonprof	9.4%	3.3%	2.6%	3.5%
semiskilled nonprof	7.3%	2.4%	2.1%	2.8%
unskilled nonprof	8.5%	3.5%	2.2%	2.8%

Notes: See table One. Results for weekdays 9-5 are averaged over 32 quarters.

Table 3: Impact of time use constraint on job change and retirement hazard

		3.1				3.2				3.3			
		No time use constraints				Total time use constraints				Three time use constraints			
		Change job		Retire		Change job		Retire		Change job		Retire	
Time use variables		rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.
All						1.204	0.087	0.966	0.059				
Hosuehold production										0.784	0.088	0.804	0.804
Tertiary activities										0.950	0.046	1.094	1.094
Leisure										**1.563**	0.211	1.136	1.136
Occupation variables													
construction/agric/mining													
Manufacturing	skilled	**0.617**	0.113	0.936	0.154	1.319	0.349	0.811	0.171	0.703	0.166	1.381	1.381
	semi-skilled	**0.573**	0.108	1.251	0.188	1.199	0.317	1.088	0.205	1.275	0.305	**1.845**	1.845
	unskilled	0.688	0.101	1.073	0.133								
Prof services	skilled	**0.545**	0.084	**0.698**	0.095	1.548	0.530	0.573	0.156	**0.607**	0.115	0.980	0.980
	semi-skilled	**0.577**	0.105	0.764	0.114	0.909	0.163	**0.702**	0.090	**0.329**	0.110	0.884	0.884
	unskilled	**0.626**	0.097	0.773	0.106	1.378	0.354	0.666	0.131				
Non-prof services	skilled	0.786	0.124	1.008	0.153	2.429	0.933	0.815	0.253	**0.434**	0.134	1.119	1.119
	semi-skilled	0.772	0.109	0.878	0.117	4.589	2.857	0.627	0.319	0.636	0.120	1.008	1.008
	unskilled	0.815	0.112	0.898	0.113	5.124	3.319	0.635	0.335				
Socio-Economic Variables													
Male		0.973	0.074	1.099	0.070	**1.341**	0.095	**0.818**	0.051	**1.341**	0.095	**0.818**	0.818
Married		**1.341**	0.095	**0.818**	0.051	0.973	0.074	1.099	0.070	0.973	0.074	1.099	1.099
Black		0.930	0.084	1.061	0.077	0.930	0.084	1.061	0.077	0.930	0.084	1.061	1.061
Education	Less than high school	**0.746**	0.067	1.131	0.083	**0.746**	0.067	1.131	0.083	**0.746**	0.067	1.131	1.131
	Some college	1.129	0.085	0.969	0.062	1.129	0.085	0.969	0.062	1.129	0.085	0.969	0.969
Self-reported health	Excellent	1.015	0.088	**0.706**	0.056	1.015	0.088	**0.706**	0.056	1.015	0.088	**0.706**	0.706
	Very good	0.940	0.069	0.908	0.056	0.940	0.069	0.908	0.056	0.940	0.069	0.908	0.908
	Fair	1.040	0.103	**1.525**	0.119	1.040	0.103	**1.525**	0.119	1.040	0.103	**1.525**	1.525
	Poor	0.567	0.173	**2.138**	0.358	0.567	0.173	**2.138**	0.358	0.567	0.173	**2.138**	2.138
Plant size	less than 5 employees	1.013	0.220	1.090	0.202	1.013	0.220	1.090	0.202	1.013	0.220	1.090	1.090
	5-14	1.271	0.159	0.977	0.119	1.271	0.159	0.977	0.119	1.271	0.159	0.977	0.977
	15-24	1.128	0.142	1.101	0.123	1.128	0.142	1.101	0.123	1.128	0.142	1.101	1.101
	25-99	0.982	0.077	0.959	0.064	0.982	0.077	0.959	0.064	0.982	0.077	0.959	0.959
	100-499	1.043	0.074	1.003	0.062	1.043	0.074	1.003	0.062	1.043	0.074	1.003	1.003
Union member		1.012	0.022	1.008	0.016	1.012	0.022	1.008	0.016	1.012	0.022	1.008	1.008
Has pay and promotion responsibility		0.975	0.020	**1.069**	0.021	0.975	0.020	**1.069**	0.021	0.975	0.020	**1.069**	1.069
Self reported pension type	Defined contribution	**0.627**	0.049	**0.626**	0.048	**0.627**	0.049	**0.626**	0.048	**0.627**	0.049	**0.626**	0.626
	Defined benefit	**0.469**	0.045	1.022	0.077	**0.469**	0.045	1.022	0.077	**0.469**	0.045	1.022	1.022
	Both	**0.476**	0.053	1.193	0.097	**0.476**	0.053	1.193	0.097	**0.476**	0.053	1.193	1.193
Job provides health insurance		0.937	0.055	1.059	0.054	0.937	0.055	1.059	0.054	0.937	0.055	1.059	1.059
At or over defined benefit pension ful retirement age		1.195	0.253	1.212	0.152	1.195	0.253	1.212	0.152	1.195	0.253	1.212	1.212
Years tenure in current job		**0.966**	0.004	1.006	0.003	**0.966**	0.004	1.006	0.003	**0.966**	0.004	1.006	1.006
Hourly wage		1.000	0.000	0.998	0.002	1.000	0.000	0.998	0.002	1.000	0.000	0.998	0.998
Financial wealth	81th-100th percentile	1.010	0.090	0.820	0.066	1.010	0.090	0.820	0.066	1.010	0.090	0.820	0.820
	61th-80th percentile	1.205	0.106	0.837	0.067	1.205	0.106	0.837	0.067	1.205	0.106	0.837	0.837
	21st-40th percentile	1.023	0.092	1.142	0.084	1.023	0.092	1.142	0.084	1.023	0.092	1.142	1.142
	1st-20th percentile	0.901	0.092	1.198	0.095	0.901	0.092	1.198	0.095	0.901	0.092	1.198	1.198
Homeowner		0.926	0.076	0.991	0.077	0.926	0.076	0.991	0.077	0.926	0.076	0.991	0.991
Job requires	lots of physical effort	1.034	0.039	0.974	0.030	1.034	0.039	0.974	0.030	1.034	0.039	0.974	0.974
	lifting heavy loads	0.980	0.044	0.969	0.037	0.980	0.044	0.969	0.037	0.980	0.044	0.969	0.969
	stooping, kneeling, or crouchi	1.024	0.039	1.002	0.033	1.024	0.039	1.002	0.033	1.024	0.039	1.002	1.002
	good eyesight	0.944	0.037	0.999	0.033	0.944	0.037	0.999	0.033	0.944	0.037	0.999	0.999
Job involves lots of stress		**0.899**	0.034	0.941	0.031	**0.899**	0.034	0.941	0.031	**0.899**	0.034	0.941	0.941

Notes: The above table reports the efefcts of the covariates on the likelihood of changing job or retiring, relative to a base case of staying in the existing job. If the relative risk ratio is less than one, the covariate reduces the likelihood of the transition, and conversely, if the value is greater than one, it increases the liklihood. Dark shading and bolded text indicates 1% statistical significance; dark shading indicates 5% significance, light shading indicates 10% significance.

Table 4: Impact of time use constraint on job change and retirement hazard - additional specifications

		4.1				4.2				4.3			
		Weekdays				Weekdays 9 to 5				Weekends			
		Change job		Retire		Change job		Retire		Change job		Retire	
Time use variables		rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.	rrr	robust s.e.
Hosuehold production		0.824	0.086	0.825	0.069	0.611	0.146	0.682	0.131	**0.311**	0.131	0.673	0.261
Tertiary activities		0.998	0.052	**1.121**	0.043	1.325	0.239	**1.487**	0.209	1.817	0.541	1.047	0.283
Leisure		**1.343**	0.120	1.067	0.082	**1.943**	0.434	1.358	0.253	0.230	0.181	1.234	0.863
Occupation variables													
Manufacturing	skilled	0.658	0.187	1.490	0.353	**0.580**	0.110	0.966	0.163	2.001	0.893	1.179	0.474
	semi-skilled	0.981	0.216	**1.799**	0.303	1.160	0.281	**1.807**	0.335	6.581	8.115	0.919	0.995
Prof services	skilled	0.575	0.143	1.094	0.218	**0.465**	0.083	0.695	0.107	**0.331**	0.093	0.605	0.153
	semi-skilled	**0.471**	0.138	1.107	0.260	**0.414**	0.101	0.648	0.133	14.629	23.456	0.566	0.806
Non-prof services	skilled	0.646	0.160	1.381	0.293	**0.430**	0.139	0.708	0.196	1.470	0.493	0.943	0.275
	semi-skilled	0.801	0.132	1.167	0.161	0.736	0.111	0.913	0.122	**0.384**	0.127	0.729	0.223

		4.4				4.5				4.6			
		Married male - weekdays and weekends				Married female - weekdays and weekends				Single - weekdays and weekends			
Time use variables													
Hosuehold production		0.797	0.197	0.969	0.191	0.858	0.060	0.907	0.050	1.002	0.151	0.803	0.098
Tertiary activities		1.081	0.093	1.059	0.077	1.142	0.230	1.087	0.145	1.105	0.055	**1.182**	0.045
Leisure		1.674	0.375	1.117	0.193	0.813	0.416	0.918	0.293	0.780	0.111	0.941	0.101
Occupation variables													
Manufacturing	skilled	0.710	0.243	0.983	0.277	1.845	1.040	1.900	0.783	1.587	0.614	1.666	0.579
	semi-skilled	0.512	0.146	1.292	0.299	1.288	0.765	1.565	0.573	1.024	0.489	2.691	1.045
Prof services	skilled	0.798	0.260	0.783	0.211	1.328	0.404	1.071	0.244	1.050	0.298	1.413	0.335
	semi-skilled	0.382	0.197	0.657	0.356	2.260	1.442	1.459	0.595	1.056	0.495	1.023	0.380
Non-prof services	skilled	0.468	0.151	1.120	0.304	1.750	0.635	1.482	0.421	2.609	1.193	1.432	0.540
	semi-skilled	1.418	0.316	1.067	0.237	1.628	1.140	1.270	0.573	1.317	0.373	1.144	0.288

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