University of Michigan Retirement Research Center

Working Paper

WP 2006-133

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Project #: UM06-21

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October 2006

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Acknowledgements

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

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Abstract

Many have suggested we adopt policies that explicitly encourage the elderly to work. Behind this suggestion is the assumption that if an older person desires a job, one will be found; however, little is known about the extent to which this is true, and in the Health and Retirement Study, many more respondents say they expect to work after retirement than actually undertake work. This raises an important question: To what extent can the elderly readily find suitable jobs? In the context of a theoretical job search model, we examine the decision to search for a job and the probability of transitioning to employment using a large sample of non-workers from the Health and Retirement Study. The effects of both supply-side factors (individual characteristics) and demand-side factors (local labor market conditions) are estimated with a set of reduced form econometric models. We find employment transition rates are relatively low for older searchers: only half of older searchers successfully attain jobs. We examine various explanations for this result, including variation in search intensity, reservation wages, and the possibility of intervening health shocks. We conclude that about 13% of older job searchers becomes a discouraged worker in the sense of being willing to work at the prevailing wage, but unable to find a job.

1. Introduction

Much recent discourse has centered on the idea that older workers are an underutilized economic resource, one which could be used to alleviate the economic and fiscal effects of population aging. For example, the additional payroll taxes paid by older workers could help ease financial pressures on the Social Security and Medicare systems (Diamond and Orszag 2002), and the retention of older workers in the labor force could perhaps alleviate anticipated labor shortages. In addition to potential macroeconomic benefits, there could be microeconomic benefits accruing to older workers themselves. Many apparently desire to maintain productive activity during retirement (Roper ASW 2002), and still others, while they may not necessarily wish to work, may find themselves in unexpected financial circumstances requiring them to do so. Indeed, individuals may count on their labor supply as a way to offset financial risk or recover from bad financial realizations. For those not working, this means finding a job. But how readily can an older person find a job should he or she want or need one?

Recent evidence points to potential difficulties. In a study of the age structure of hires into different occupations, Hirsch et al. (2000) conclude that employment opportunities for older workers are restricted. Older workers are least likely to be hired into occupations requiring substantial computer use or where the return to job tenure is high, and most likely to be hired into lower-wage occupations. Lahey (2004) documents evidence of statistical age discrimination against older female job applicants in an experimental study of employer hiring practices. Studies of displaced older workers have noted relatively severe displacement effects (Chan and Stevens 2001; Elder 2004). For example, Chan and Stevens report that a worker who is laid off at age 55 has a 61 percent chance of being back at work two years later if male and a 55 percent

chance if female. And furthermore, more individuals say they intend to work after retirement than actually do work (Maestas 2004).

In this paper, we study the job search and employment outcomes of older workers. We begin by documenting the presence of frictional unemployment among older workers which follows the business cycle. We then examine two-year employment transition rates, and show that only half of older job seekers successfully transition to employment. To interpret these stylized facts, we use a theoretical model of the optimal search decision that illustrates how the employment transition probability is determined by both the offer arrival rate, which depends on search effort, and the probability of receiving a wage offer yielding utility in excess of reservation utility. Using our model for guidance, we examine self-reported reservation wages, finding they appear consistent with theoretical predictions and that older jobseekers have reservation wages below prevailing wages. We then turn to several reduced form econometric specifications of the job search decision and the probability of transitioning to employment at time $t+2$ conditional upon search at time t. We analyze the effects of both labor supply and labor demand variables, the latter achieved by merging the HRS with county labor market data. Among our more striking results is the steeply declining age gradient in job attainment holding constant search effort and a rich set of covariates measuring demographics and socioeconomic status, health and cognition, retirement and unemployment benefit receipt, employment history, local labor market conditions, as well as *changes* in these same variables between t and $t+2$, and unobserved heterogeneity. Although not conclusive, this pattern is consistent with the existence of statistical age discrimination.

Finally, we conclude with an accounting exercise that attempts to identify who among the more than 50 percent of searchers who did not succeed in finding a job might be considered

"discouraged," defined as someone willing to work at the prevailing wage but unable to find a job. Accounting for alternative explanations for failing to transition to work such as exerting low search intensity, holding a very high reservation wage, or experiencing a negative health or positive budget shock, we estimate that 13% of older job searchers eventually becomes a discouraged worker. We also show that discouraged workers had realistic expectations of their chances of finding a job, suggesting that they did not necessarily choose an inefficient level of search based on incorrect expectations. We conclude with a discussion and interpretation of our findings in light of some additional data and recent findings about age discrimination and skill mismatches.

2. Unemployment

We begin by considering whether there exists notable unemployment among older workers. Using the HRS, we compute age group-specific unemployment rates for different birth cohorts at three points in time. In order to match the introduction and passage of cohorts through the HRS panel over time, we choose age bands of 51-56, 57-61, 62-67, and 68-72 and calendar years 1992, 1998 and 2004. The unemployment rate for age group *a* in each period *t* is the number of respondents in *a* who are not working and searching for work at time *t* divided by the number in *a* who are either employed or not working and searching at time *t*. All estimates are constructed using the HRS population weights. In Table 1, each row shows the time pattern in unemployment rates for a given age group. For comparison, the last row shows the unemployment rate for the civilian population aged 16 and over from the Bureau of Labor Statistics (BLS, 2006). Like the BLS estimates, the unemployment rates for older workers show clear evidence of cyclicality. In all age groups, unemployment rates were highest during the

recessionary period of 1992, lowest during the expansion in 1998, and higher during 2004 than in 1998. Although the unemployment rates for older workers are always lower than that of the general population, they are non-trivial in size—ranging between 46 and 87 percent of the general unemployment rate. Comparing rates within a column gives the cross-sectional age profile in unemployment holding time trends constant (but not cohort). Not surprisingly, the age profile is fairly flat, implying that the numerator and denominator of the unemployment rate are declining at the same rate with age, consistent with the presence of a high labor force exit rate (i.e., retirement). An exception is age group 51-56 in 2004, which has a relatively high unemployment rate (87 percent of the general unemployment rate). This group consists of the Early Baby Boomers (b. 1948-1953), who appear to have stronger labor force attachment than earlier cohorts (Maestas, 2006). The longitudinal age profile in unemployment can be seen by following the diagonals of the table. With the exception of the early Baby Boomers, the cohorts experience similar levels and cyclical changes in unemployment over time.

In sum, while frictional unemployment rates of older workers are lower than those of the general population, they are nontrivial in size, and appear to be responsive to general economic conditions. The relatively high unemployment rate of the Early Baby Boomers compared to earlier cohorts at the same age suggests that job search by older workers is an issue of growing salience.

3. Employment Transition Rates

We next examine employment transition rates of non-workers in the HRS. We exclude the AHEAD cohort (b. 1890- 1923) from our sample because non-workers were not asked about job search in the 1993 survey wave and most were also not asked in later waves for various

reasons. In addition, many other key variables that are relevant for the somewhat younger nonworkers in our sample are either missing or are simply not relevant for Ahead respondents. The loss of generality implied by this sample restriction is small since by 2002 those who are still alive are in their 80s and 90s, and hence highly unlikely to seek labor force re-entry.

We begin by constructing a panel dataset of person-wave records in which we observe respondents in at least two consecutive waves and select a subset of 32,829 records where a respondent reports not working for pay in year *t*, where $t \in \{1992, 1994, 1996, 1998, 2000, 2002\}$. We then observe whether the respondent has transitioned to employment (either full-time or part-time, wage/salary job or self-employment) by the following survey wave in year *t+2*.[1] Table 2 shows computed transition rates for all non-workers and subclasses of interest. We disaggregate the sample according to whether or not the respondent describes himself as retired[2] in order to highlight differences between self-described retired nonworkers and other nonworkers. According to labor market search theory, retired nonworkers should have higher reservation wages than non-retired, non-workers if for no other reason than they typically receive guaranteed annuity payments in the form of pension benefits. Although some of the non-retired may be drawing unemployment benefits, such benefits are not guaranteed and are time-limited. Search theory implies a negative correlation between the reservation wage and the likelihood of transitioning to employment (Mortensen, 1986). In Table 2, the two-year employment transition rate for all non-workers is 9.0 percent. Consistent with search theory, the transition rate for retired non-workers is 7.5 percent compared to 12.1 percent for non-retired, non-workers.

[1] This methodology limits our observation to spells that began between t and t+2, and which have not ended by t+2. Generally, in the HRS there is little information about employment spells that both begin and end between waves.
[2] Non-working respondents were classified as retired if they described themselves as either partially or completely retired.

We also examine employment transition rates according to whether non-working respondents said they were searching for work[3], or if not actively searching, if they said they wanted a job.[4,5] In both cases, follow-up questions were asked to determine if the respondent preferred a full-time or part-time job. Among both retired and non-retired non-workers, transition rates are highest for those engaged in job search, followed by those not searching but who want a job, and those who are neither searching nor want a job. Consistent with theory, retired searchers have lower transition probabilities than non-retired non-working searchers: 40.1 percent of retired searchers transitioned to employment compared to 52.4 percent of non-retired searchers. Interestingly, in both the retired and non-retired samples, transition rates were higher for those searching for full-time work than for those searching for part-time work. This pattern holds for wanters as well. Considering more respondents said they favored part-time work, this could be evidence of a mismatch between the desired hours of older jobseekers and the needs of employers, although it could also be that those seeking full-time work are more motivated or effective searchers on account of the higher expected return to work. The fact that those searching for either full-time or part-time employment have a higher transition rate than those searching for part-time only suggests that mismatch may play a role.

Table 2 also shows that approximately five percent of non-workers were not asked whether they were searching for (or wanted) a job due to the survey skip patterns in particular waves which skipped respondents with no recent labor force activity, those living in nursing

[3] Non-working respondents were asked, "Have you been doing anything to find work during the last four weeks?"
[4] If a non-working respondent said they were not looking for work, they were asked "Do you currently want a job, either full-time or part-time?"
[5] Some respondents volunteered the response "Cannot Work."

homes and those interviewed by proxy.[6] Not surprisingly, job transition probabilities among this group are low.

An important question raised by the patterns in Table 2 is why are success rates of older searchers so low? Two-year success rates for younger searchers (aged 20-65) are much higher—89.6 percent in the PSID and 96.8 percent in the NLSY (inferred from Table 2 in DellaVigna and Paserman (2005)). If fewer than half of older searchers (from our Table 2, ((0.401*496+0.524*876)/(496+876)=0.480) succeed in obtaining jobs, some portion of those who fail might be labeled discouraged workers. We explore this question in detail in Section 7, but first we turn to theory.

4. A Model of the Job Search Decision

Studies of older workers typically focus on labor force exit, not re-entry. However, Maestas (2004) finds that labor force re-entry rates by retired workers are substantial. Benitez-Silva (2002) argues that the job search decision is salient throughout the lifecycle, and offers a dynamic lifecycle model in which individuals choose consumption, leisure, and whether to search in every period. Rather than specify the unified dynamic decision program, we follow the tradition of the labor market search literature and begin with a simple model of the individual's search decision. A more realistic formulation of the search problem would be two-sided, accounting for the search problem of employers as well; however, since we lack detailed employer data, and our motivations are primarily empirical, we abstract from this consideration.

[6] In Wave 1, the questions were skipped if the respondent never worked for pay or last worked >20 years ago. In Wave 2, the questions were skipped for Ahead respondents, and in Wave 3, Ahead respondents were skipped if they had not worked since Wave 2. In Waves 2, 3, 5, and 6 proxy respondents were skipped and in Waves 4, 5, and 6 respondents living in nursing homes were skipped.

Our starting point is a model of endogenous search effort in the spirit of DellaVigna and Paserman (2005) and with foundations in Lippman and McCall (1974) and Mortensen (1986). The stationary decision problem of a non-worker is to choose search effort *s* to maximize the current value function V^U:

$$\max_s \; V^U = b - c(s\;) + \delta\left\{p(s)E_{F(w)}\left[V^E(w) \,|\, V^E(w) > V^U\right] + (1 - p(s\;))V^U\right\}, \qquad (1)$$

where *b* is the value of any benefits received while not working (e.g., unemployment or retirement benefits) and $c(s)$ is the cost of search such that $c'(s) > 0$, $c''(s) > 0$. With probability $p(s)$, the non-worker will transition to employment, in which case he receives the expected payoff from employment, $E_{F(w)}\left[V^E(w) \,|\, V^E(w) > V^U\right]$ (where the expectation is taken with respect to the distribution of wage offers *F(w)*), and with probability $(1 - p(s))$ he continues to be unemployed and receives payoff V^U. The employment transition probability $p(s)$ depends on search effort such that $p'(s) > 0$. The payoffs are discounted by an exponential discount factor $\delta = \frac{1}{1+r}$, where *r* is the discount rate. The value of employment at wage *w* is:

$$V^E(w) = \delta\left[w + qV^U + (1-q)V^E(w)\right], \qquad (2)$$

where *q* is the per-period job exit probability. Thus the value of employment is the wage plus the expected value of future utility, which depends on the likelihood that the employment relationship will end. Given that older workers have a necessarily shorter horizon of labor force participation, *q* could be quite high, and will consequently reduce the payoff from employment.

The employment transition probability $p(s)$ is a function of the offer arrival rate $a(s)$ (where $a'(s) > 0$, $a''(s) < 0$) and the probability that the wage offer will be such that the employment payoff exceeds the unemployment payoff:

$$p(s) = a(s)\Pr(V^E(w) > V^U) \quad (3)$$

This expression implies that an empirical model of the probability of job attainment should include factors that affect the job offer arrival rate, such as search effort, search effectiveness, interview skills, experience, qualifications, and local labor market conditions. Local labor market conditions will also affect $\Pr(V^E(w) > V^U)$ through their impact on the distribution of wage offers, $F(w)$.

The reservation wage $w*$ can be found by solving for the value of *w* that equates V^U and V^E:

$$w* = rV^U . \quad (4)$$

The reservation wage is the "return" to unemployment, and thus is increasing in the payoff associated with unemployment. In other words, the reservation wage will be increasing in current benefit receipt *b* and the wage offer distribution $F(w)$. As Blau (1991) notes, individuals have preferences over a set of job-specific characteristics, not just wages, and thus the reservation wage property of job search models may be too restrictive. Indeed, for many older workers, hours will be an important additional consideration. Our model is easily generalizable to a reservation utility setting.

Finally, solving for the first order condition with respect to s yields the following equation for the optimal search decision:

$$c'(s*) = \delta p'(s*)\int_{V^U}^{\infty}(V^E(w) - V^U)dF(w), \quad (5)$$

where $p'(s*) = a'(s*)\Pr(V^E(w) > V^U)$. Hence, the optimal level of search effort equates the marginal cost of search with its discounted expected marginal return. Equation (5) implies that

an increase in the reservation wage will reduce the optimal level of search effort, whereas an upward shift in the wage distribution will increase search effort.

5. Reservation Wages

One potential explanation for the relatively low success rate of job searchers is that while they report searching for work, they might have reservation wages sufficiently high that the probability of receiving a wage offer that exceeds their reservation wage is low. In the extreme, the existence of searchers with near-zero probabilities of receiving an acceptable offer can artificially inflate unemployment estimates since although they may be engaged in search, they are not willing to work at the prevailing wage. Although both criteria must be met for an individual to be correctly classified as unemployed, survey respondents are not typically asked about the second criterion. This is not the case in the HRS. All respondents who reported searching were asked to state their reservation wage, as were non-searching respondents who said they wanted a job.[7] In this section we analyze reservation wage responses to assess whether older non-workers appear willing to work at prevailing wages.

Several authors have cautioned against the use of self-reported reservation wages on the grounds that they are often inconsistent with structurally estimated reservation wages (e.g., Mohanty 2005; Hofler and Murphy 1994). Since we do not undertake structural estimation in this paper, we cannot evaluate the self-reported reservation wage data on this basis; however, as

[7] Searchers were first asked, "Are you looking for the same kind of work you did before, or something different?", followed by "If someone offered you work like that, how high would the wage or salary have to be for you to take it? Is that per hour, week, month, or year?" Wanters were asked a variant of the second question only: "If someone offered you a regular job now, how high would the wage or salary have to be for you to take it? Is that per hour, week, month, or year?" When the reported time unit was not the hour, we computed the hourly reservation wage by dividing the reported amount by the time unit, assuming 8 hours per day, 5 days per week, 4.33 weeks per month, and 52 weeks per year. In cases where the respondent said "minimum wage" or "social security limit" instead of giving an amount, we used the federal minimum wage or the social security earnings test threshold in effect during that interview year.

an alternative, we first examine whether they appear consistent with theoretical predictions. Table 3 shows reported reservation wages by search status and self-reported retirement status. Our theoretical framework shows how the reservation wage depends on the payoff from unemployment, which may include unemployment or retirement benefits. Since retirement benefits are not time-limited, we expect the value of unemployment to be higher for the retired than the non-retired. This appears to be the case. The mean reservation wage for retired individuals searching for a full-time job is $14.8 compared to $13.6 for non-retired individuals searching for a full-time job. Similarly, among those searching for a part-time job, the retired report a mean reservation wage of $11.1 compared to $8.5 for the non-retired. Reservation wages for full-time jobs are higher than those for part-time jobs, accurately reflecting the lower prevailing wages of part-time jobs. In addition, the mean reservation wages of retired wanters is higher than that of non-retired wanters. Figure 1 shows the entire distribution of reservation wages for searchers, by retired status and type of job sought. Consistent with Table 3, the distribution of reservation wages for those searching for full-time jobs has more mass in the right tail compared to the distribution for part-time jobs (whether retired or not retired), and the same is true for retired searchers versus non-retired searchers (whether searching for FT or PT).

We next compare reported reservation wages to prevailing wages. By "prevailing wages" we mean the wages of current employees, which are essentially "accepted wages." Although, the accepted wage distribution is not the same as the distribution of offered wages, which theory tells us is the relevant comparison, prevailing wages nevertheless offer a useful benchmark comparison. Figure 2 shows quite clearly that the distribution of prevailing wages for full-time jobs has substantially more mass in the right tail than the distribution of reservation wages, implying that the mean prevailing wage exceeds the mean reservation wage. The same

pattern holds for part-time prevailing and reservation wages. This pattern is consistent with the reservation wage property of job search theory: because an accepted wage is observed only if it exceeds the reservation wage, the mean of the accepted wage distribution will be greater than or equal to the wage of the reservation wage distribution.

One limitation of this comparison is that since the reservation wage is a function of the expected offered wage distribution, it will vary by desired industry and occupation even when we hold desired hours constant. However, the industry and occupational composition of the reservation wage distribution might be different from that of the offered wage distribution and its proxy, the prevailing wage distribution. We address this limitation by comparing reservation and prevailing wages by industry and occupation for a subsample of searchers for whom we know the industry and occupation of their desired job. The mean prevailing wage is calculated over all respondents working in a given industry or occupation, and the mean reservation wage is calculated over all respondents searching for a job in a given industry and occupation. Figure 3 shows the results of this exercise. In every one of five occupational categories and four industry categories the mean reservation wage is lower than the prevailing wage. In most cases, the differences are statistically significant at the 5 percent level (exceptions are Agriculture/Mining, Wholesale/Retail, and Mechanics/Crafters).

In further descriptive analyses (not shown), we found self-reported reservation wages were positively correlated with variables indicative of a higher value of leisure, such as education, household income, workforce tenure, cognition, the wage earned on one's longest tenured job, and having worked one's longest tenured job in a managerial or professional occupation. Self-reported reservation wages are also higher in counties with higher average

wage rates, appropriately reflecting geographic variation in local labor market conditions, and positively correlated with the subsequent accepted wage of successful searchers.[8]

In sum, the self-reported reservation wage data in the HRS are not inconsistent with search theory; rather we find descriptive evidence supporting a variety of theoretical predictions. Second, we find no evidence that older job seekers hold reservation wages that are so high as to render the probability of attaining an acceptable job near zero. Indeed, across a variety of comparisons, including comparisons within occupation and industry, we find mean reservation wages of job seekers are lower than mean prevailing wages. Somewhat reassuringly, Elder (2004) found a similar pattern using *structurally estimated* reservation wages instead of subjective reservation wages in the HRS.

6. Econometric Model of the Transition to Employment

6.1. Econometric Framework

We next turn to reduced form econometric models of the search decision and the probability of job attainment.

For individual *i*, job attainment at time $t+2$ ($y_{i,t+2}$), depends on search effort at time *t* (S_{it}), the reservation wage at *t* (R_{it}), individual characteristics (X_{it}) that plausibly affect the job offer arrival rate, and local labor market characteristics (Z_{it}) that plausibly affect the expected wage distribution and the job offer arrival rate. We let u_i^y be an individual random effect, and

[8] The opposite finding would not necessarily be inconsistent with search theory given the two-year time difference between reservation wage measurement and attained wage measurement. In a model where the prevailing wage distribution is not assumed to be known, Bayesian updating of the prior distribution as the search process evolves could account for a subsequent downward revision in the initially reported reservation wage. Alternatively, negative duration dependence could explain a declining reservation wage over time, whether on account of stigma (Vishwanath 1989) or simply because the reservation wage is a function of the probability of transitioning to employment, which by definition of negative duration dependence is falling over time.

ε_{it}^{y} is a stochastic error term. We also let *changes* in X and Z between t and $t+2$ affect job attainment by including $\Delta X_{i,t+2} = X_{i,t+2} - X_{i,t}$ and $\Delta Z_{i,t+2} = Z_{i,t+2} - Z_{i,t}$:

$$y_{i,t+2} = \alpha^{y} + \gamma^{y} S_{it} + \phi^{y} R_{it} + \beta_1^{y} X_{it} + \beta_2^{y} \Delta X_{i,t+2} + \beta_3^{y} Z_{it} + \beta_4^{y} \Delta Z_{i,t+2} + u_i^{y} + \varepsilon_{it}^{y} \quad (6)$$

Search effort at time t (S_{it}) depends on the reservation wage at t (R_{it}), X_{it}, Z_{it}, a random individual effect u_i^{s}, and a stochastic error term ε_{it}^{s}:

$$S_{it} = \alpha^{s} + \phi^{s} R_{it} + \beta_1^{s} X_{it} + \beta_3^{s} Z_{it} + u_i^{s} + \varepsilon_{it}^{s}. \quad (7)$$

The two equations highlight how S_{it} is an endogenous regressor in the job attainment equation (6). Ideally we could jointly estimate the two equations, allowing for correlation between the two unobserved heterogeneity components u_i^{y} and u_i^{s}; however, identification would require an instrumental variable for S_{it}. Our theoretical framework reveals how interconnected the two decisions are; it is difficult to find a variable that is strongly correlated with the search decision, but which is not also correlated with the residual in the job attainment equation. Consequently, our strategy is estimate (6) and (7) separately. We address the issue of endogeneity of S_{it} in (6) by modeling the unobserved heterogeneity as a random effect. Defining both $y_{i,t+2}$ and S_{it} as dichotomous variables, which amounts to measuring search effort as an all or nothing decision, calls for random-effects probit estimation.

6.2 Data and Estimation Sample

We use information from the first seven survey waves of the longitudinal HRS, which occurred every two years during the period 1992 to 2004. As noted earlier, we omit AHEAD cohort respondents because most of them were not asked about job search in various waves. The unit of observation in our sample is the person-wave. Respondents contribute one person-wave

record to our sample for every wave in which they report not working. We add to each record at time *t* the respondent's employment status at *t+2*. This effectively omits the youngest Early Baby Boomers cohort (b. 1948-1953) from our estimation sample because they first entered the HRS in the last available survey wave (2004). In order to measure the effect of local labor market conditions on job attainment, we merged the HRS with Bureau of Labor Statistics and Census Bureau measures of county-year unemployment, establishment size distribution, industry composition, average wages, and the age distribution, using the HRS restricted geographic identifiers. We also used the 2006 NCHS Urban-Rural Classification Scheme to create a variable identifying large metropolitan counties.

As noted earlier, the reservation wage survey question was asked of only a subsample of non-workers, namely those who reported searching or if not searching, then those who said they wanted a job. Thus, in principle we can only estimate (6) and (7) on the much smaller subsample of searchers and wanters, and not on the full sample of non-workers.[9] Our strategy is to estimate (6) and (7) on both samples, omitting R_{it} when we use the sample of all non-workers. If the reservation wage itself is correlated with X_{it} and Z_{it}, then the coefficients on X_{it} and Z_{it} will capture their direct effect on job attainment as well as any indirect effect operating through the omitted reservation wage.

Table 4 presents sample means for the two estimation samples. As we might expect, the samples are quite different on many dimensions. By definition, the searchers and wanters sample includes more searchers (29.7 v. 4.4 percent). The searchers and wanters are more likely

[9] An alternative would be to generate a predicted reservation wage for all non-workers, using the coefficients of a regression of the reservation wage on X_{it}, Z_{it} estimated over the searchers and wanters sample, and a term accounting for selection into the searchers and wanters sample. However, identification of the selection probability is challenging since it requires the existence of a variable affecting the decision to search or want but not the reservation wage itself.

to be non-White, single, better educated, and younger (59.4 v. 62.8). They have substantially lower non-labor income ($18,087 vs. $28,371) and non-pension wealth ($206,493 v. $315,389), which suggest working may be an important way of compensating for low wealth accumulation. Not surprisingly, the searchers and wanters are healthier on a variety of measures. They also scored slightly higher on cognition measures.[10] They are less likely to describe themselves as retired, and consequently also less likely to receive pension income or Social Security retirement benefits, and more likely to collect unemployment benefits (7.5 v. 1.8 percent). They are slightly less likely to have private health insurance coverage, but owing primarily to their younger age, they are less likely to have public health insurance (Medicare, Medicaid, Champus/VA).

The employment histories of searchers and wanters also differ. They worked fewer years at their longest tenured job (15.1 v. 17.8 years), their last job ended more recently, and they earned a substantially lower wage on their last job ($16 v. $24). Still, there are few notable differences in the occupation and industry of the longest job they held. Local labor market conditions are somewhat less favorable in the searchers and wanters sample; they face a slightly higher county unemployment rate (6.2 v. 5.8) and are more likely to live in a large metropolitan county, but other county characteristics are similar, such as the county average annual wage, industry structure, establishment size structure, and county age structure.

6.3. Estimation Results for Search Equation (7)

In Table 5, we show four specifications of the search equation (7): a simple probit model and a random effects probit model estimated over each of our two samples. With few exceptions,

[10] The Cognition Summary Score is a summation of scores from three cognition tests (word recall, serial 7, and backwards counts). The summation score is divided by 27 (the maximum possible total score) to get a value scaled between 0-1. A difficulty with the cognition variables in the HRS is that the set of tests administered and in some cases their content changed between Waves 1, 2, and the later waves. Using these three tests, we were able to construct a consistent measure for 80 percent of person-wave observations. We impute the remaining 20 percent by using the summary score from the following wave. The missing scores were mostly for respondents in Wave 1 and 2. We include an imputation indicator in all estimation models.

the probit coefficients are qualitatively similar across specifications; however, the model estimated on the searchers and wanters sample does a much better job of correctly predicting search status, so we focus our discussion on the random effects specification for that sample (4). The dependent variable and all covariates are measured as of time *t.* Consistent with our theoretical framework, the log reservation wage is negatively associated with search effort, but its coefficient is not statistically significant from zero. Search is positively associated with years of education, consistent with the prediction that search effort should increase with the expected wage, which in part determines the expected return to search. The education coefficient is statistically significant in the sample of all non-workers but not in the sample of searchers and wanters. Search effort is declining in net non-pension wealth and health[11], but is unrelated to cognition. Even holding the reservation wage constant, describing oneself as retired reduces the likelihood of search. Receipt of private pension or Social Security retirement benefits is negatively associated with the probability of search, though these coefficients are not statistically significant, probably on account of their high correlation with self-reported retirement status. Receipt of unemployment benefits is highly positively correlated with search. Holding age constant, individuals with access to public health insurance are less likely to search. Since virtually everyone over age 65 has public health insurance coverage through Medicare, this effect is essentially identified through variation in Medicaid coverage among those younger than 65, and suggests that attainment of health insurance coverage is an important motivation for job search among those as yet ineligible for Medicare.

Turning to employment history, occupation and industry on the longest tenured job are mostly unrelated to the propensity to search. However, the length of longest tenured job is

[11] Benitez-Silva (2005) also showed a negative effect of health problems on the search decision for non-employed individuals in HRS.

negatively correlated with search, and total labor force tenure is positively correlated.[12] The propensity to search declines as the length of current non-employment rises. Finally, with respect to county labor market conditions, individuals living in counties with a higher proportion of manufacturing establishments are more likely to be engaged in job search, which could be a consequence of higher layoff rates in that sector during part of our sample period (Bureau of Labor Statistics, 2002). Finally, search is more likely in counties where the proportion of population age 60 and older is higher. It is not clear what this effect reflects; perhaps peer effects, or the possibility that employers in such counties are forced to tailor job offers to the needs of older workers in order to meet staffing goals.

6.4. Estimation Results for Job Attainment Equation (6)

We next turn to the model for job attainment shown in equation (6). Tables 6 presents probit and random effects probit estimates for all non-workers, and Table 7 shows the same models estimated over the searchers and wanters subsample. Once again our model performs better in the searchers and wanters subsample, correctly predicting 47 percent of all employment transitions between *t* and *t+2*, compared to just 16 percent in the full sample. In both samples, the coefficients are fairly stable across the probit and random effects specifications.

As expected, search effort at time *t* is positively associated with job attainment at *t+2* and is highly statistically significant in both samples. Interestingly, the search coefficient is smaller in the searchers and wanters sample. One explanation for this is that wanters may be more likely than non-workers to initiate a job search *after* the time *t* interview. The age dummies reveal a pronounced age gradient in job attainment, holding constant search status. They suggest that even after controlling for a rich set of covariates dictated by equation 3, which include

[12] Benitez-Silva (2005) also showed a positive effect of previous labor force attachment on the search decision for non-employed individuals in HRS.

demographics, socioeconomic status, health and cognition, benefit receipt, employment history, and labor market conditions, as well as *changes* in these same variables and unobserved heterogeneity, the probability of successfully obtaining a job nevertheless decreases with age. One interpretation of this evidence is statistical discrimination by employers on the basis of their beliefs about the productivity of older workers.

In the searchers and wanters sample (Table 7), the log reservation wage is insignificantly different from zero since we control for many of the determinants of the reservation wage. This suggests that in the sample of all non-workers (Table 6), there is not much omitted variable bias due to the omitted reservation wage, even when we do not model the unobserved heterogeneity. An exception is the coefficient on the log wage on respondents' last job, which is negative and statistically significant when the reservation wage is omitted, but not significantly different from zero when it is included.

The other time invariant variables in the model include gender, race, socioeconomic status, self-described retirement status and employment history. The retired are less likely to transition to employment. With respect to employment history and qualifications, job attainment is decreasing in time out of the labor force, and rising in labor force attachment as measured by total years of tenure in the labor force, but largely unrelated to industry and occupation experience.

Turning next to the time-varying variables in the model, having a work-limiting health problem at time *t* reduces the probability of job attainment as does self-reported fair or poor health (statistically significant only in the sample of all nonworkers). In addition, *onset* of a work-limiting health problem, onset of a chronic condition, and transitioning to fair or poor self-reported health between *t* and *t+2* also reduce the probability of job attainment. The cognition

summary score at time *t* is positively correlated with job attainment, and a drop in cognition between time *t* and *t+2* lowers the probability of job attainment. Onset of receipt of social security retirement benefits is strongly associated with a reduced transition probability, whereas onset of receipt of unemployment benefits raises the transition probability. Individuals who transitioned to public health insurance coverage between *t* and *t+2* are also less likely to transition to employment. The county unemployment rate at time *t* is negatively associated with job attainment, but the change in the unemployment rate between *t* and *t+2* is not statistically different from zero in any specification. Surprisingly, the only other county labor market variable that affects job attainment is the proportion of manufacturing establishments in the county (both the level and the change), but only in the sample of all non-workers. The point estimate implies that a reduction in the proportion of manufacturing establishments in a county reduces the probability of job attainment in our sample. Again, this probably reflects the higher layoff rate in this sector during our sample period.

Finally, we also tested for evidence of skill mismatch by including interactions between the occupation and industry of respondents' longest tenured job and the county industry composition, but none of these interaction terms were statistically significant, suggesting that any skill mismatches that may exist are not necessarily industry and/or occupation specific.

7. **Discouraged Workers?**

An important question raised by our analyses is why are the success rates of older job searchers so low? In this section we explore several potential explanations, in attempt to gauge how many might be labeled discouraged workers.

7.1. Search Intensity

One possible explanation for the low success rates of older job searchers is search intensity. HRS asked all searchers to list their recent job search strategies. Responses to the question could be classified into four sets of strategies: reading/placing/answering ads or contacting employers ("direct contact"); checking public or private agencies ("agency"); asking friends or relatives ("social network"); and attending school or receiving training ("school training"). Job searchers were also asked whether they were looking for the same kind of job as they had before the current non-work spell or something different.

Table 8 illustrates a clear association between search strategy and intensity and job attainment. Compared to searchers who failed to get a job, those with successful outcomes were more likely to use a direct contact strategy and to search for the same kind of job as before. Job attainment is also positively correlated with the total number of strategies used, our measure of search intensity here. In sum, those who failed to get a job appear to have been less effective searchers to some degree, but also include some who attempted to change industries or occupations, where they may have been less competitive candidates owing to a potential lack of industry- or occupation-specific knowledge or experience.

7.2. Who among the Unsuccessful Became Discouraged?

A second important question is simply what happens to unsuccessful job seekers? Table 9 presents two-year transition probabilities between four mutually exclusive states: working, searching for a job, wanting a job, and being out of the labor force. Conditional upon searching at time *t*, 12 percent were still searching at time *t+2*.[13] Another 14 percent still wanted a job, though they were no longer searching, and 24 percent no longer wanted nor were searching for a job. Although we label the last category as "out of labor force," technically the wanters are also

[13] Of course we do not observe whether search was continuous between *t* and *t+2*. Nor can we rule out the possibility that a job was attained and left between survey waves.

not in the labor force; however, we can see that the two groups are distinct: the probability of transitioning to employment is three times as high for wanters than for those out of the labor force (22.0 v. 7.3 percent). In short, most unsuccessful job seekers left the labor force.

It is tempting to label this group discouraged workers. After all, they searched for work, they were willing to work at the prevailing wage, yet they did not find work. However, we must first rule out alternative explanations for their apparent failure to attain a job. One alternative explanation suggested by Table 8 is that some respondents might have said they were searching but in actuality exerted little effort. A second possibility discussed during our analysis of reservation wages is that some searchers may not really be willing to work at the prevailing wage, or in the kinds of jobs available. Third, something unexpected could have occurred between *t* and *t+2* which caused the searcher to discontinue his or her search process for some reason other than failing to find a job. Plausible examples include negative shocks to health or cognition, or a positive shock to wealth or income.

In Table 10, we present results of a simple accounting exercise, in which we classify the unsuccessful searchers according to whether one or more of these explanations potentially applies. Starting with all searchers at time *t*, 50 percent were working at *t+2*, 12 percent were still searching, and 21 percent (of searchers at time *t*) experienced a negative health or cognition shock, which we define as onset one of the following between *t* and *t+2*: 1) incidence of one or more additional doctor-diagnosed conditions, 2) transition to fair/poor self-reported health status, 3) onset of a work-limiting health problem, 4) decline in cognition score exceeding the 90th percentile of inter-wave changes in the full sample. About 4 percent experienced a positive budget shock, which we define as an increase in either total household non-labor income or total

non-pension wealth in excess of the 90th percentile of inter-wave changes in the full sample.[14] Another 4 percent had a high reservation wage, defined as a reservation wage in excess of the 90th percentile of the prevailing wage distribution, and 2 percent were classified as having low search intensity, defined as not using any specific search strategy to find a job. Finally 13 percent of job seekers experienced none of the above.[15] It is this group that potentially may be labeled discouraged. Our estimate of 13 percent could be an underestimate if some searchers became discouraged *before* they experienced a health or budget shock. And it does not account for the fact that some fraction of those still searching two years later will eventually become discouraged. It could be an over-estimate if we have been too restrictive in our assignment of respondents to each category. In short, it is difficult to know in which direction the error might lie, however we believe 13 percent is in the right ballpark, and on par with two-year failure rates for younger jobseekers (e.g., see DellaVigna and Paserman, 2005).

In Table 10, we also compare of the predicted probability of job attainment, computed from the estimated coefficients of the random effects probit model in Table 7, and the subjective probability of job attainment[16] in order to assess the extent to which unsuccessful searchers had realistic expectations of their chances of success. The unsuccessful were more likely to overestimate their chances of success than the successful (66 v. 55 percent); however, a comparison of the subjective and predicted probabilities reveals that this excessive optimism was confined to those who experienced an unexpected health event. There is no evidence of excessive optimism among those we label discouraged, and thus we cannot blame their failure on

[14] We are being liberal with our use of the terminology "shock" in this instance, since we cannot rule out the possibility that some large increases in income and assets were anticipated.
[15] Percents add up to more than 100 percent because some respondents qualified for categorization under multiple explanations.
[16] Searching respondents were asked the following question "You told us earlier that you were looking for a new job. On this 0 to 100 scale, what are the chances that you will find a job like the one you're looking for within the next few months?"

their having chosen an inefficient level of search based on an incorrect expectation about their chances of success.

Finally, we conduct a small simulation exercise using our estimated coefficients from Table 7 to assess how the percent of discouraged workers would change if there were no shocks. When we simulate the model assuming no budget shocks occurred between *t* and *t+2*, we predict that 16.3 percent of searchers would become discouraged. When we alternatively assume no health shocks, we predict 30.1 percent would become discouraged; and assuming neither budget nor health shocks predicts that as many as 33.6 percent of searchers could have become discouraged. Although we are unable to determine whether a given shock occurred before or after a respondent quit searching for lack of finding a job, the exercise shows how labor force exit by searchers can be thought of in a competing risks framework; if it were not for health and budget shocks, many more searchers could have become discouraged. In other words, the fraction of potentially discouraged workers is much higher than the fraction who actually become discouraged because health shocks may have caused them to discontinue their search before they otherwise would have stopped searching.

What else do we know about these discouraged workers? About 54 percent are female, 18 percent are black, their average age is 58, average years of education is 11.7, and they earned an average wage of $14 on their last job, which ended on average 3.3 years ago (long enough ago to suggest the possibility of outdated skills). About 39 percent say they have a work-limiting health problem, which suggests their set of feasible occupations may be restricted. In contrast, those who succeeded in getting a job were 54 percent female, 15 percent black, average age of 56, average education of 12.4 years, and earned an average wage of $19 on their last job, which ended only 1.5 years ago. Just 22 percent of them said they had a work limiting health problem.

A phenomenon often mentioned in the context of older workers and employment is age discrimination. In a recent labor market experiment to assess hiring conditions for older women, Lahey (2005) sent fictitious resumes to randomly selected employers posting entry-level job openings in Boston, MA and St. Petersburg, FL. All else equal, she found that a younger worker was 40 percent more likely to be offered an interview than an older worker. She interprets her findings as evidence of statistical discrimination largely on the basis of obsolete computer skills. Thus age discrimination may directly affect the job offer arrival rate.

It is difficult to directly assess how older workers may be affected by age discrimination in the HRS. The only evidence on this point comes from the subsample of wanters, who were asked why they were not currently searching, despite wanting a job. Among our discouraged workers who still said they wanted a job, only 6 percent mentioned age discrimination. While certainly not conclusive, it is unlikely that many discouraged workers *perceive* age discrimination to be a problem. Nevertheless, Lahey's (2005) interpretation of her evidence points to a mismatch, whether perceived or real, between the skills of older jobseekers and the skill needs of employers. The evidence presented in this paper supports this interpretation. In addition, the high prevalence of work limiting health conditions among discouraged workers especially, and older workers generally, suggests that the set of feasible jobs is restricted for many older workers. Employers, recognizing this, may statistically discriminate on this basis as well, although we present no evidence to prove this speculation.

8. Conclusion

Although unemployment is a classical theme in the labor economics literature, job search behavior and transitions to employment by non-working older people have not been fully

explored, probably owing to the conventional understanding of retirement as an absorbing state and older individuals as generally inactive in pursuing jobs. However, as we document, these phenomena are empirically important, and likely to become more important in the future. Using nationally representative panel data (HRS), we find that a non-trivial number of older Americans are actively looking for a job, yet half of them fail to find a job within 2 years. The question of why some older non-workers decided to search and why many of them had undesirable job search outcomes is also policy relevant, in the context of the increasing fiscal burden of the Social Security system.

Based on a theoretical model including job search effort as an endogenous choice variable, we illustrate how the reservation wage, individual characteristics, and local labor market conditions affect the decision to search and the probability of job attainment. Using our model for guidance, we estimate several reduced form econometric specifications of the decision to search and the probability of job attainment. Among our more striking results is the steeply declining age gradient in job attainment holding constant search effort and a rich set of covariates measuring demographics and socioeconomic status, health and cognition, retirement and unemployment benefit receipt, employment history, local labor market conditions, as well as *changes* in these same variables between t and $t+2$ and unobserved heterogeneity.

Finally, we undertake a detailed examination of the reasons so many older searchers failed to find jobs. Accounting for alternative explanations such as low search intensity, holding a very high reservation wage, or experiencing a negative health or positive budget shock, we estimate that about 13 percent of older jobseekers eventually becomes a discouraged worker (i.e., someone willing to work at the prevailing wage but unable to find a job) and that if it were not for intervening health and budget shocks, the percent of discouraged workers could have been as

high as 33 percent. Although not conclusive, our evidence is consistent with the presence of statistical age discrimination, skills mismatch or other unfavorable constraints in the labor market for older workers.

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Figure 1. Reservation Wage Distribution of Searching Non-Workers

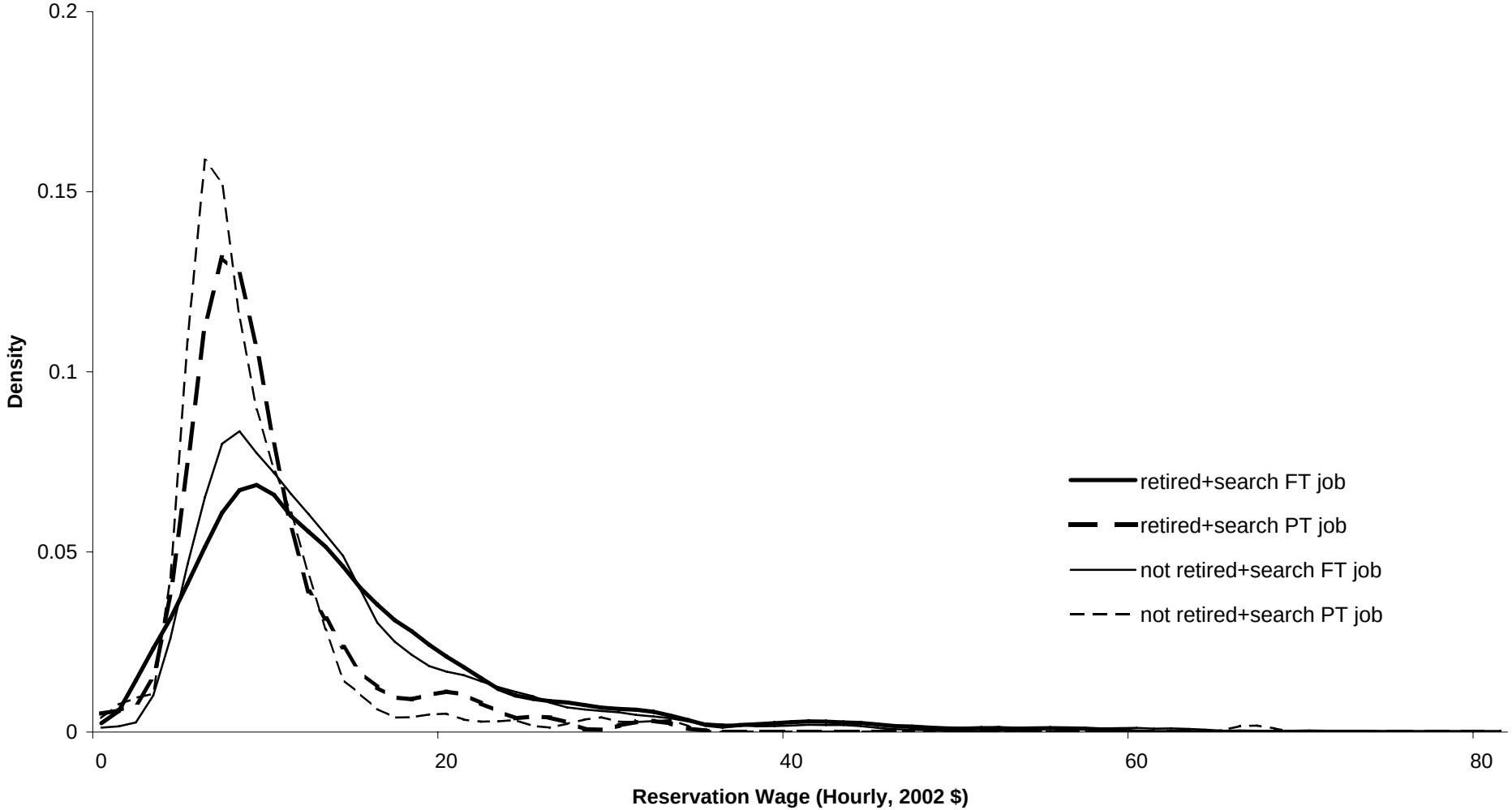


Figure 2. Comparison of Reservation Wage and Prevailing Wage

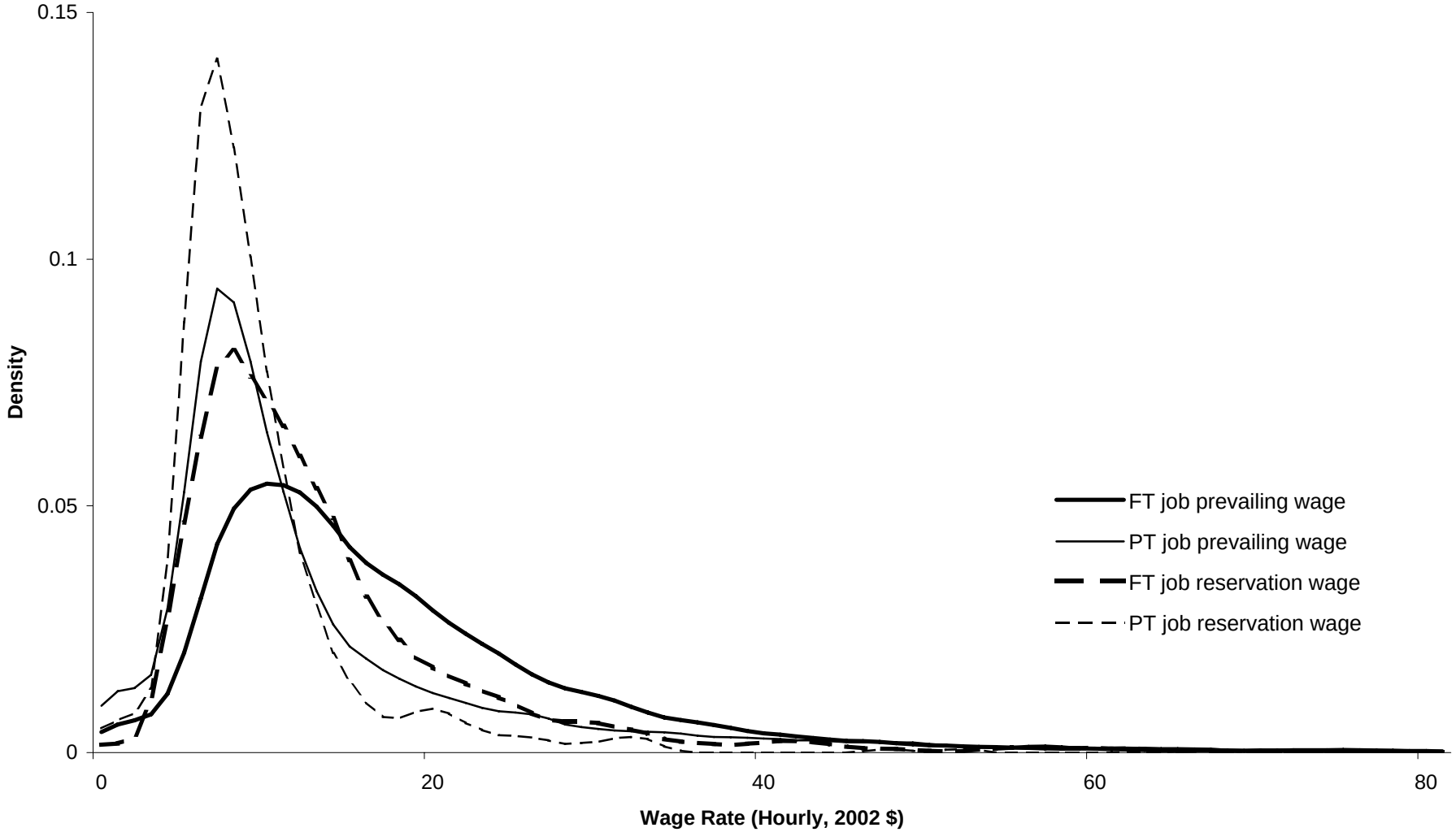
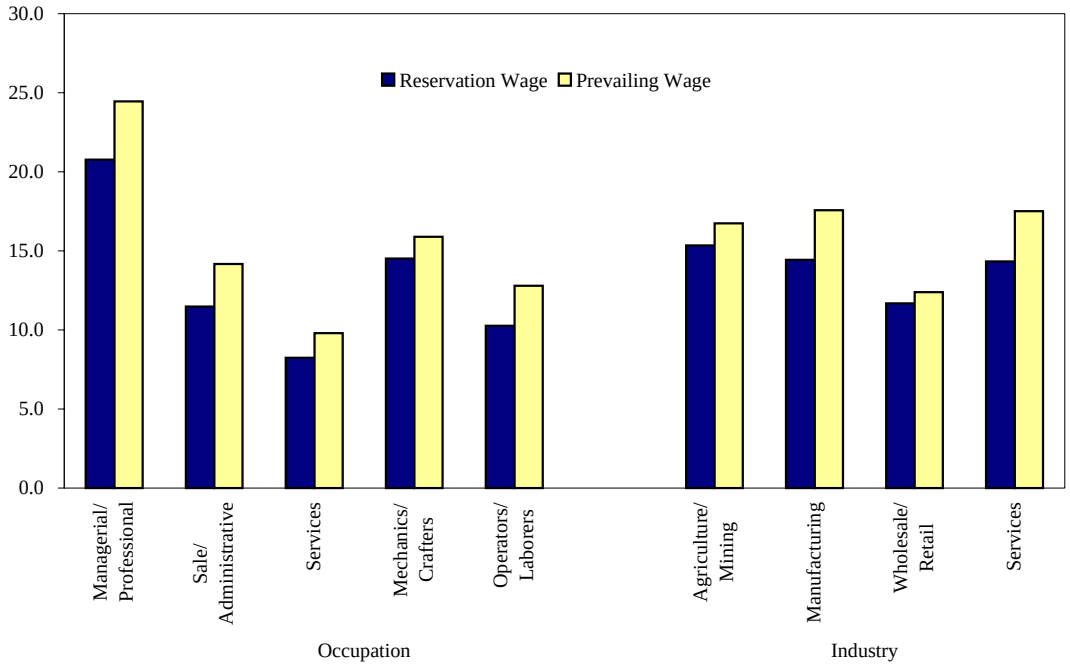


Figure 3. Comparison of Reservation Wage and Prevailing Wage by Occupation and Industry



Notes: Reservation wages were attributed to the occupation or industry of respondents' longest tenured job for the subset of respondents who said they were "looking for the same job as before" (n=614). Average prevailing wages were computed for the subsample of all working respondents (n=42066). Extreme amounts (>= $100) are excluded. All wages are in hourly 2002$.

Table 1. Unemployment Rates of Older Workers

Age Group	1992	1998	2004
51-56	3.9	2.6	4.8
57-61	4.1	2.2	2.6
62-67		2.3	2.8
68-72		3.0	3.2
16+	7.5	4.5	5.5

Source: Unemployment rates for Age 16+ come from Bureau of Labor Statistics (2006). All other rates are authors' tabulations of HRS data.

Table 2. Employment Transition Rates of Older Non-Workers

	N	Frequency	Percent Working at *t+2*
All Non-Workers at *t*	32,829	100.0	9.0
Retired	21,964	66.9	7.5
Searchers	496	2.3	40.1
Searching for FT Job	111	0.5	50.5
Searching for PT Job	283	1.3	36.0
Searching for Either	102	0.5	40.2
Wanters	2,236	10.2	16.7
Want FT Job	273	1.2	20.9
Want PT Job	1,867	8.5	16.0
Want Either	96	0.4	18.8
Not Searching, Doesn't Want	16,291	74.2	6.0
"Cannot Work"	2,270	10.3	2.2
Search/Want Question Not Asked	671	3.1	7.3
Not retired	10,865	33.1	12.1
Searchers	876	8.1	52.4
Searching for FT Job	522	4.8	57.3
Searching for PT Job	165	1.5	40.6
Searching for Either	189	1.7	49.2
Wanters	1,082	10.0	24.5
Want FT Job	336	3.1	38.4
Want PT Job	687	6.3	18.1
Want Either	59	0.5	20.3
Not Searching, Doesn't Want	5,700	52.5	7.5
"Cannot Work"	2,080	19.1	3.4
Search/Want Question Not Asked	1,127	10.4	8.1

Notes: Non-working respondents are classified as retired if they describe themselves as partly or completely retired at time *t*. "Searchers" are those non-workers who say they have been looking for work during the past four weeks. "Wanters" are non-workers who are not seaching but say they want a job. Some respondents volunteered the response that they "Cannot work." Respondents were skipped out of this sequence of questions if they resided in a nursing home, gave an interview by proxy, or had not been active in labor force for more than 20 years as of 1992.

Table 3. Reservation Wages of Older Non-Workers

	N	Mean
All Non-Working Searchers/Wanters	4,195	11.8
Retired	2,411	12.4
Searchers	442	13.0
Searching for FT Job	104	14.8
Searching for PT Job	244	11.1
Searching for Either	94	16.1
Wanters	1,969	12.2
Want FT Job	247	15.3
Want PT Job	1,641	11.8
Want Either	81	11.6
Not Retired	1,784	11.0
Searchers	806	12.2
Searching FT	487	13.6
Searching PT	149	8.5
Searching Either	170	11.4
Wanters	978	10.0
Want FT Job	318	12.9
Want PT Job	611	8.6
Want Either	49	9.5

Notes: "Searchers" are those non-workers who say they have been looking for work during the past four weeks and report valid reservation wages. "Wanters" are non-workers who are not searching but say they want a job and report valid reservation wage. Non-working respondents are classified as retired if they describe themselves as partly or completely retired at time t. Reservation wages are self-reported, see text for details. All dollar amounts are expressed in 2002 dollars.

Table 4. Descriptive Statistics of Sample

	All Non-Workers	Searchers and Wanters	T-Ratio
Searching	4.4	29.7	-35.40
Demographics			
Female	60.3	60.2	0.06
Age	62.8	59.4	28.37
Black Non-Hispanic	15.4	20.7	-7.95
Hispanic	10.0	12.3	-4.43
Asian/Other	2.1	3.2	-3.84
Married	71.8	65.8	7.70
Socioeconomic Status			
Years of Education	11.6	11.8	-3.11
Total Household Non-Labor Income	$ 28,371	$ 18,087	18.73
Total Net Non-Pension Wealth	$ 315,389	$ 206,297	8.96
Health and Cognition			
Sum of Major Health Conditions	1.8	1.5	13.48
Fair or Poor Health	35.1	29.5	7.48
Work Limiting Health Problem	42.5	37.0	6.91
Cognition Summary Score (0-1)	0.59	0.60	-4.12
Retirement Status and Benefit Receipt			
Describes Self as Retired	66.9	57.5	11.70
Receives Pension Income	30.9	22.8	11.64
Receives Social Security Retirement Benefits	49.2	31.0	23.88
Receives Unemployment Benefits	1.8	7.5	-13.91
Covered by Private Health Insurance	47.3	44.6	3.27
Covered by Public Health Insurance	58.1	38.2	24.90
Employment History			
Years of Tenure at Longest Job	17.8	15.1	14.92
Years of Tenure in Labor Force	27.6	29.3	-7.21
Years Since Last Job Ended	8.1	4.1	38.97
Wage on Last Job (Hourly)	$ 24	$ 16	3.56
Longest Job Occupation: Managerial/Professional	25.4	23.6	2.45
Longest Job Occupation: Sales/Administrative	25.1	26.6	-1.98
Longest Job Occupation: Services	15.6	17.6	-3.02
Longest Job Occupation: Operators/Laborers	19.3	19.8	-0.69
Longest Job Industry: Manufacturing	31.3	30.7	0.70
Longest Job Industry: Wholesale/Retail	15.8	18.0	-3.21
Longest Job Industry: Services	43.9	42.6	1.49
County Labor Market Conditions			
Large Metropolitan County	45.1	51.2	-7.41
Proportion of Population 20-39 Years Old	29.1	29.7	-9.27
Proportion of Population 60+ Years Old	17.3	17.2	2.30
County Unemployment Rate	5.8	6.2	-9.09
County Average Annual Wage	$ 32,100	$ 32,577	-3.75
Proportion of Manufacturing Establishments	5.5	5.5	-1.62
Proportion of Services Establishments	79.5	79.9	-3.98
Proportion of Small Establishments (Employees<100)	97.7	97.7	0.10
Proportion of Large Establishments (Employees>=500)	0.3	0.3	3.10
N	32,829	4195	

Notes: "All Non-workers" sample includes respondents who were not working for pay at time *t*. "Searchers and Wanters" sample is the subset who said they were currently looking for or wanted a job and had valid reservation wages. The reservation wage question was asked only of the Searchers and Wanters sample. All dollar amounts are expressed in 2002 dollars. County-year labor market data from the Bureau of Labor Statistics and the Census Bureau was merged to the HRS using restricted geographic identifiers. We used the 2006 NCHS Urban-Rural Classification Scheme to identify large metropolitan counties.

Table 5. Probit Model of Job Search

	All Non-Workers		Searchers and Wanters	
Covariates Measured at Time *t*	(1)	(2)	(3)	(4)
Log Reservation Wage			-0.017	-0.023
			(0.040)	(0.039)
Demographics				
Female	-0.355***	-0.403***	-0.356***	-0.397***
	(0.044)	(0.051)	(0.063)	(0.072)
Age group [51, 56]	-0.076	-0.082	-0.014	-0.014
	(0.062)	(0.070)	(0.088)	(0.096)
Age group [57, 61]	-0.243***	-0.286***	-0.056	-0.064
	(0.066)	(0.073)	(0.092)	(0.101)
Age group [62, 67]	-0.517***	-0.608***	-0.380***	-0.430***
	(0.079)	(0.089)	(0.115)	(0.127)
Age group [68, 72]	-0.519***	-0.624***	-0.385**	-0.432**
	(0.109)	(0.121)	(0.156)	(0.173)
Age group [73+]	-0.350***	-0.422***	-0.271	-0.308
	(0.125)	(0.141)	(0.199)	(0.219)
Black Non-Hispanic	0.048	0.050	-0.029	-0.033
	(0.053)	(0.058)	(0.069)	(0.077)
Hispanic	0.167**	0.180**	0.164*	0.162*
	(0.067)	(0.071)	(0.090)	(0.097)
Asian	0.342***	0.384***	0.243*	0.264*
	(0.091)	(0.109)	(0.125)	(0.145)
Married	-0.196***	-0.226***	-0.091	-0.099
	(0.041)	(0.045)	(0.056)	(0.062)
Socioeconomic Status				
Years of Education	0.018**	0.022***	0.009	0.009
	(0.007)	(0.008)	(0.010)	(0.011)
Total Household Non-Labor Income (10,000)	-0.016**	-0.017**	-0.003	-0.003
	(0.008)	(0.007)	(0.010)	(0.010)
Total Net Non-Pension Wealth (10,000)	-0.003***	-0.003***	-0.002*	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Health and Cognition				
Sum of Major Health Conditions	-0.038**	-0.048***	-0.021	-0.024
	(0.015)	(0.017)	(0.022)	(0.024)
Fair or Poor Health	-0.188***	-0.227***	-0.132**	-0.156**
	(0.047)	(0.050)	(0.061)	(0.068)
Work Limiting Health Problem	-0.311***	-0.348***	-0.236***	-0.248***
	(0.045)	(0.047)	(0.056)	(0.063)
Cognition Summary Score (0-1)	0.188	0.232*	0.125	0.165
	(0.127)	(0.139)	(0.175)	(0.192)
Retirement Status and Benefit Receipt				
Describes Self as Retired	-0.568***	-0.643***	-0.546***	-0.594***
	(0.043)	(0.046)	(0.059)	(0.066)
Receives Pension Income	-0.148***	-0.176***	-0.071	-0.089
	(0.047)	(0.054)	(0.067)	(0.078)
Receives Social Security Retirement Benefits	-0.136**	-0.168***	-0.144	-0.170*
	(0.056)	(0.064)	(0.088)	(0.096)
Receives Unemployment Benefits	0.759***	0.838***	0.514***	0.557***
	(0.063)	(0.072)	(0.082)	(0.092)
Covered by Private Health Insurance	-0.168***	-0.182***	-0.056	-0.058
	(0.039)	(0.044)	(0.055)	(0.061)
Covered by Public Health Insurance	-0.301***	-0.345***	-0.173***	-0.210***
	(0.045)	(0.050)	(0.066)	(0.072)
Employment History				
Years of Tenure at Longest Job	-0.015***	-0.018***	-0.014***	-0.015***
	(0.002)	(0.002)	(0.003)	(0.003)
Years of Tenure in Labor Force	0.011***	0.013***	0.009***	0.010***
	(0.002)	(0.002)	(0.003)	(0.003)
Years Since Last Job Ended	-0.070***	-0.078***	-0.054***	-0.059***
	(0.007)	(0.005)	(0.007)	(0.007)

Log Wage on Last Job (Hourly)	-0.017	-0.023	0.030	0.031
	(0.022)	(0.026)	(0.033)	(0.038)
Longest Job Occupation: Managerial/Professional	0.092	0.105	0.086	0.093
	(0.066)	(0.079)	(0.096)	(0.111)
Longest Job Occupation: Sales/Administrative	-0.009	-0.021	-0.032	-0.040
	(0.068)	(0.080)	(0.095)	(0.110)
Longest Job Occupation: Services	-0.095	-0.112	-0.128	-0.153
	(0.075)	(0.089)	(0.107)	(0.123)
Longest Job Occupation: Operators/Laborers	-0.008	-0.020	0.020	0.018
	(0.064)	(0.075)	(0.091)	(0.106)
Longest Job Industry: Manufacturing	-0.058	-0.073	-0.119	-0.128
	(0.069)	(0.080)	(0.101)	(0.114)
Longest Job Industry: Wholesale/Retail	-0.061	-0.074	-0.039	-0.039
	(0.078)	(0.090)	(0.113)	(0.127)
Longest Job Industry: Services	-0.029	-0.040	0.029	0.032
	(0.072)	(0.085)	(0.108)	(0.121)
County Labor Market Conditions				
Large Metropolitan County	-0.021	-0.025	-0.048	-0.051
	(0.043)	(0.049)	(0.061)	(0.069)
Proportion of Population 20-39 Years Old	0.819	0.727	2.061	2.078
	(0.853)	(0.954)	(1.260)	(1.354)
Proportion of Population 60+ Years Old	0.754	0.699	1.916**	1.952**
	(0.575)	(0.652)	(0.818)	(0.907)
County Unemployment Rate	0.488	0.563	-0.064	-0.081
	(0.654)	(0.773)	(0.933)	(1.082)
County Average Annual Wage (10,000)	0.082***	0.097***	0.063	0.077
	(0.030)	(0.037)	(0.045)	(0.052)
Proportion of Manufacturing Establishments	2.669***	3.054***	3.454***	3.789**
	(0.921)	(1.063)	(1.277)	(1.485)
Proportion of Services Establishments	0.947***	1.163***	0.006	0.112
	(0.326)	(0.391)	(0.489)	(0.566)
Proportion of Small Establishments (Employees<100)	3.834	3.744	4.213	4.865
	(3.644)	(4.119)	(5.016)	(5.739)
Proportion of Large Establishments (Employees>=500)	-22.731	-28.141	-8.466	-10.854
	(15.134)	(17.378)	(22.174)	(24.874)
Ratio of Panel-level Variance to Total Variance (ρ)		0.250		0.195
		(0.014)		(0.042)
Person-Wave Observations	32302	32302	4150	4150
Log Likelihood	-3948	-3884	-2054	-2047
Pseudo R-Squared	0.298	0.277	0.187	0.178
Percentage of Correctly Predicted Success	11.4%	11.0%	43.8%	43.5%
Percentage of Correctly Predicted Failure	99.8%	99.8%	90.8%	90.8%
Individual Random Effects	No	Yes	No	Yes

Notes: "All Non-workers" sample includes respondents who were not working for pay. "Searchers and Wanters" sample is the subset who said they were currently looking for or wanted a job and had valid reservation wages. The reservation wage question was asked only of the Searchers and Wanters sample. All dollar amounts are expressed in 2002 dollars. Cognition summary score is a [0-1] measure of respondents' cognitive abilities based on their responses to three cognitive tests (word recall, serial 7's and backward counts. For longest job occupation, the reference group is precision production, craft, and repair. For longest job industry, the reference group is agriculture, forestry, mining, and construction. All models include a constant and dummies for interview wave. We also include missing value dummies for covariates with considerable proportions of missing values. We don't include such dummies for covariates with relatively small proportions of missing values, so the number of observations in the estimation sample is slightly lower than that reported in Table 4.

*,**,***: significant on a 10, 5, and 1 percent level, respectively.

Table 6. Probit Model of Job Attainment (All Non-Workers)

	Probit		Random Effects Probit	
	Coefficient	Standard Error	Coefficient	Standard Error
Covariates Measured at Time t				
Search	0.852***	(0.043)	0.917***	(0.048)
Demographics				
Female	-0.053	(0.033)	-0.065*	(0.038)
Age group [51, 56]	-0.268***	(0.051)	-0.302***	(0.058)
Age group [57, 61]	-0.591***	(0.053)	-0.668***	(0.061)
Age group [62, 67]	-0.536***	(0.062)	-0.626***	(0.074)
Age group [68, 72]	-0.784***	(0.076)	-0.932***	(0.089)
Age group [73+]	-0.938***	(0.090)	-1.131***	(0.105)
Black Non-Hispanic	0.069*	(0.039)	0.080*	(0.045)
Hispanic	0.016	(0.050)	0.033	(0.059)
Asian/Other	0.010	(0.087)	0.019	(0.098)
Married	-0.061**	(0.031)	-0.075**	(0.035)
Socioeconomic Status				
Years of Education	0.009*	(0.005)	0.010*	(0.006)
Total Household Non-Labor Income (10,000)	-0.010**	(0.004)	-0.011**	(0.004)
Total Net Non-Pension Wealth (10,000)	0.000*	(0.000)	-0.001*	(0.000)
Health and Cognition				
Sum of Major Health Conditions	-0.018*	(0.011)	-0.025*	(0.013)
Fair or Poor Health	-0.233***	(0.042)	-0.276***	(0.047)
Work Limiting Health Problem	-0.445***	(0.037)	-0.530***	(0.042)
Cognition Summary Score (0-1)	0.451***	(0.099)	0.529***	(0.115)
Retirement Status and Benefit Receipt				
Describes Self as Retired	-0.130***	(0.032)	-0.147***	(0.037)
Receives Pension Income	-0.148***	(0.036)	-0.188***	(0.041)
Receives Social Security Retirement Benefits	-0.095**	(0.045)	-0.107**	(0.054)
Receives Unemployment Benefits	0.699***	(0.106)	0.751***	(0.118)
Covered by Private Health Insurance	-0.109***	(0.031)	-0.119***	(0.036)
Covered by Public Health Insurance	-0.396***	(0.038)	-0.456***	(0.045)
Employment History				
Years of Tenure at Longest Job	-0.007***	(0.001)	-0.009***	(0.002)
Years of Tenure in Labor Force	0.024***	(0.001)	0.028***	(0.002)
Years Since Last Job Ended	-0.020***	(0.003)	-0.019***	(0.003)
Log Wage on Last Job (Hourly)	-0.051***	(0.016)	-0.053***	(0.018)
Longest Job Occupation: Managerial/Professional	0.042	(0.050)	0.057	(0.058)
Longest Job Occupation: Sales/Administrative	0.059	(0.051)	0.071	(0.059)
Longest Job Occupation: Services	0.063	(0.057)	0.072	(0.066)
Longest Job Occupation: Operators/Laborers	0.007	(0.049)	0.011	(0.057)
Longest Job Industry: Manufacturing	-0.083	(0.053)	-0.109*	(0.060)
Longest Job Industry: Wholesale/Retail	-0.046	(0.060)	-0.064	(0.068)
Longest Job Industry: Services	-0.102*	(0.055)	-0.136**	(0.063)
Time-Varying County Labor Market Conditions				
Large Metropolitan County	-0.039	(0.031)	-0.045	(0.037)
Proportion of Population 20-39 Years Old	-0.085	(0.622)	-0.168	(0.692)
Proportion of Population 60+ Years Old	-0.468	(0.431)	-0.574	(0.502)
County Unemployment Rate	-1.247**	(0.600)	-1.617**	(0.666)
County Average Annual Wage (10,000)	-0.012	(0.026)	-0.009	(0.029)
Proportion of Manufacturing Establishments	1.252*	(0.706)	1.614**	(0.807)
Proportion of Services Establishments	-0.316	(0.257)	-0.363	(0.298)
Proportion of Small Establishments (Employees<100)	1.184	(2.636)	1.452	(3.065)
Proportion of Large Establishments (Employees>=500)	7.585	(10.245)	8.848	(11.768)
Difference of Covariates between Time t+2 and t				
Demographics and Scocioeconomic Status				
Married	-0.100*	(0.059)	-0.122*	(0.067)
Total Household Non-Labor Income (10,000)	-0.003	(0.003)	-0.003	(0.003)
Total Net Non-Pension Wealth (10,000)	0.000	(0.000)	0.000	(0.000)

Health and Cognition				
Sum of Major Health Conditions	-0.069***	(0.024)	-0.080***	(0.028)
Fair or Poor Health	-0.213***	(0.037)	-0.245***	(0.040)
Work Limiting Health Problem	-0.555***	(0.038)	-0.626***	(0.039)
Cognition Summary Score (0-1)	0.318***	(0.117)	0.350***	(0.130)
Retirement Status and Benefit Receipt				
Receives Pension Income	-0.075**	(0.038)	-0.103**	(0.042)
Receives Social Security Retirement Benefits	-0.114***	(0.036)	-0.139***	(0.043)
Receives Unemployment Benefits	0.495***	(0.090)	0.539***	(0.099)
Covered by Private Health Insurance	0.025	(0.037)	0.031	(0.038)
Covered by Public Health Insurance	-0.356***	(0.038)	-0.404***	(0.046)
Time-Varying County Labor Market Conditions				
Proportion of Population 20-39 Years Old	0.043	(1.154)	0.095	(1.258)
Proportion of Population 60+ Years Old	-0.431	(0.934)	-0.341	(1.005)
County Unemployment Rate	-0.038	(1.009)	-0.047	(1.214)
County Average Annual Wage (10,000)	-0.055	(0.057)	-0.066	(0.064)
Proportion of Manufacturing Establishments	3.603**	(1.808)	4.090**	(1.897)
Proportion of Services Establishments	0.215	(0.402)	0.292	(0.447)
Proportion of Small Establishments (Employees<100)	-5.580	(3.914)	-6.046	(4.383)
Proportion of Large Establishments (Employees>=500)	-16.207	(16.187)	-16.938	(18.315)
Ratio of Panel-level Variance to Total Variance (ρ)			0.232	(0.015)
Person-Wave Observations	31952		31952	
Log Likelihood	-7521		-7462	
Pseudo R-Squared	0.225		0.197	
Percent of Successes Correctly Predicted	16.1%		16.6%	
Percent of Failures Correctly Predicted	99.2%		99.1%	

Notes: "All Non-workers" sample includes respondents who were not working for pay. "Searchers and Wanters" sample is the subset who said they were currently looking for or wanted a job and had valid reservation wages. The reservation wage question was asked only of the Searchers and Wanters sample. All dollar amounts are expressed in 2002 dollars. Cognition summary score is a [0-1] measure of respondents' cognitive abilities based on their responses to three cognitive tests (word recall, serial 7's and backward counts. For longest job occupation, the reference group is precision production, craft, and repair. For longest job industry, the reference group is agriculture, forestry, mining, and construction. All models include a constant and dummies for interview wave. We also include missing value dummies for covariates with considerable proportions of missing values. We don't include such dummies for covariates with relatively small proportions of missing values, so the number of observations in the estimation sample is slightly lower than that reported in Table 4.

*,**,***: significant on a 10, 5, and 1 percent level, respectively.

Table 7. Probit Model of Job Attainment (Searchers and Wanters)

	Probit		Random Effects Probit	
	Coefficient	Standard Error	Coefficient	Standard Error
Covariates Measured at Time t				
Search	0.499***	(0.052)	0.535***	(0.060)
Log Reservation Wage	0.063	(0.040)	0.067	(0.043)
Demographics				
Female	0.042	(0.066)	0.032	(0.073)
Age group [51, 56]	-0.163*	(0.089)	-0.179*	(0.099)
Age group [57, 61]	-0.391***	(0.096)	-0.427***	(0.107)
Age group [62, 67]	-0.351***	(0.127)	-0.397***	(0.142)
Age group [68, 72]	-0.547***	(0.165)	-0.614***	(0.185)
Age group [73+]	-0.570**	(0.223)	-0.667***	(0.237)
Black Non-Hispanic	-0.100	(0.074)	-0.106	(0.079)
Hispanic	-0.096	(0.090)	-0.091	(0.103)
Asian/Other	-0.133	(0.137)	-0.135	(0.156)
Married	-0.071	(0.061)	-0.084	(0.065)
Socioeconomic Status				
Years of Education	0.012	(0.010)	0.014	(0.012)
Total Household Non-Labor Income (10,000)	-0.010	(0.012)	-0.011	(0.012)
Total Net Non-Pension Wealth (10,000)	-0.001*	(0.001)	-0.001*	(0.001)
Health and Cognition				
Sum of Major Health Conditions	-0.034	(0.024)	-0.038	(0.025)
Fair or Poor Health	-0.044	(0.079)	-0.059	(0.086)
Work Limiting Health Problem	-0.521***	(0.073)	-0.577***	(0.081)
Cognition Summary Score (0-1)	0.628***	(0.203)	0.679***	(0.219)
Retirement Status and Benefit Receipt				
Describes Self as Retired	-0.133**	(0.063)	-0.147**	(0.069)
Receives Pension Income	-0.092	(0.078)	-0.111	(0.085)
Receives Social Security Retirement Benefits	-0.076	(0.105)	-0.075	(0.115)
Receives Unemployment Benefits	0.446***	(0.141)	0.484***	(0.152)
Covered by Private Health Insurance	-0.040	(0.065)	-0.044	(0.071)
Covered by Public Health Insurance	-0.301***	(0.080)	-0.343***	(0.089)
Employment History				
Years of Tenure at Longest Job	-0.001	(0.003)	-0.002	(0.003)
Years of Tenure in Labor Force	0.016***	(0.003)	0.018***	(0.003)
Years Since Last Job Ended	-0.042***	(0.007)	-0.043***	(0.007)
Log Wage on Last Job (Hourly)	-0.004	(0.034)	-0.001	(0.037)
Longest Job Occupation: Managerial/Professional	0.047	(0.101)	0.063	(0.112)
Longest Job Occupation: Sales/Administrative	-0.026	(0.098)	-0.022	(0.111)
Longest Job Occupation: Services	0.087	(0.112)	0.103	(0.124)
Longest Job Occupation: Operators/Laborers	0.040	(0.096)	0.044	(0.107)
Longest Job Industry: Manufacturing	-0.127	(0.104)	-0.131	(0.115)
Longest Job Industry: Wholesale/Retail	-0.122	(0.115)	-0.135	(0.129)
Longest Job Industry: Services	-0.137	(0.112)	-0.150	(0.123)
Time-Varying County Labor Market Conditions				
Large Metropolitan County	-0.062	(0.064)	-0.065	(0.070)
Proportion of Population 20-39 Years Old	-1.464	(1.464)	-1.796	(1.409)
Proportion of Population 60+ Years Old	-0.432	(0.900)	-0.500	(0.952)
County Unemployment Rate	-2.448**	(1.151)	-2.691**	(1.242)
County Average Annual Wage (10,000)	0.022	(0.052)	0.029	(0.055)
Proportion of Manufacturing Establishments	1.933	(1.454)	2.035	(1.580)
Proportion of Services Establishments	-0.013	(0.556)	-0.024	(0.611)
Proportion of Small Establishments (Employees<100)	9.522*	(5.576)	9.622	(6.074)
Proportion of Large Establishments (Employees>=500)	25.295	(24.364)	24.637	(26.312)
Difference of Covariates between Time t+2 and t				
Demographics and Scocioeconomic Status				
Married	-0.101	(0.115)	-0.125	(0.133)
Total Household Non-Labor Income (10,000)	-0.006	(0.008)	-0.007	(0.009)
Total Net Non-Pension Wealth (10,000)	0.000	(0.001)	0.000	(0.001)

Health and Cognition				
Sum of Major Health Conditions	-0.138***	(0.050)	-0.152***	(0.056)
Fair or Poor Health	-0.204***	(0.069)	-0.223***	(0.076)
Work Limiting Health Problem	-0.711***	(0.068)	-0.776***	(0.078)
Cognition Summary Score (0-1)	0.375	(0.232)	0.400	(0.260)
Retirement Status and Benefit Receipt				
Receives Pension Income	0.002	(0.082)	0.000	(0.089)
Receives Social Security Retirement Benefits	-0.295***	(0.078)	-0.322***	(0.090)
Receives Unemployment Benefits	0.342***	(0.114)	0.378***	(0.125)
Covered by Private Health Insurance	0.081	(0.069)	0.087	(0.075)
Covered by Public Health Insurance	-0.380***	(0.082)	-0.415***	(0.091)
Time-Varying County Labor Market Conditions				
Proportion of Population 20-39 Years Old	-2.175	(2.476)	-2.177	(2.484)
Proportion of Population 60+ Years Old	-3.159	(1.968)	-3.143	(2.008)
County Unemployment Rate	2.016	(2.158)	2.426	(2.417)
County Average Annual Wage (10,000)	0.019	(0.120)	0.027	(0.125)
Proportion of Manufacturing Establishments	1.109	(3.240)	1.288	(3.724)
Proportion of Services Establishments	-0.153	(0.803)	-0.184	(0.902)
Proportion of Small Establishments (Employees<100)	-15.541*	(8.432)	-17.047*	(9.237)
Proportion of Large Establishments (Employees>=500)	-10.213	(35.836)	-12.863	(42.765)
Ratio of Panel-level Variance to Total Variance (ρ)			0.168	(0.058)
Person-Wave Observations	4107		4107	
Log Likelihood	-1916		-1912	
Pseudo R-Squared	0.219		0.212	
Percent of Successes Correctly Predicted	45.5%		47.0%	
Percent of Failures Correctly Predicted	91.3%		91.0%	

Notes: "All Non-workers" sample includes respondents who were not working for pay. "Searchers and Wanters" sample is the subset who said they were currently looking for or wanted a job and had valid reservation wages. The reservation wage question was asked only of the Searchers and Wanters sample. All dollar amounts are expressed in 2002 dollars. Cognition summary score is a [0-1] measure of respondents' cognitive abilities based on their responses to three cognitive tests (word recall, serial 7's and backward counts. For longest job occupation, the reference group is precision production, craft, and repair. For longest job industry, the reference group is agriculture, forestry, mining, and construction. All models include a constant and dummies for interview wave. We also include missing value dummies for covariates with considerable proportions of missing values. We don't include such dummies for covariates with relatively small proportions of missing values, so the number of observations in the estimation sample is slightly lower than that reported in Table 4.

*,**,***: significant on a 10, 5, and 1 percent level, respectively.

Table 8. Search Strategies and Intensity

	Failure	Success	T-Ratio
Direct Contact	79.4	84.8	-2.60
Agency	30.1	35.3	-2.05
Social Network	29.7	33.6	-1.57
School/Training	2.5	4.0	-1.52
Number of Above Methods Used	1.4	1.6	-3.72
Whether Searching for Same Kind of Work as Before			
Same	35.4	42.9	-2.84
Different	29.8	28.0	0.74
Either Same or Different	34.7	29.1	2.25
N	714	658	

Notes: The "Failure" group includes those "searchers" at time t who were not working at time t+2. The "Success" group includes those "searchers" at time t who were working at time t+2.

Table 9. Four-State Two-Year Transition Matrix

		t+2				
		Working	Searching	Wanting	Out of Labor Force	N
t	Working	82.8%	1.9%	2.8%	12.5%	38,690
	Searching	49.9%	11.8%	14.0%	24.4%	1,319
	Wanting	22.0%	4.5%	23.8%	49.7%	2,909
	Out of Labor Force	7.3%	0.7%	4.9%	87.1%	20,874

Notes: The sample is all non-AHEAD HRS respondents for whom we can observe their working/not working status and whether searching/wanting job (if not working) at both time t and time t+2.

Table 10. Evidence of Potentially Discouraged Workers

	N	Percentage	Self-Reported Probability of Finding a Job	Predicted Probability of Finding a Job	Proportion with Optimistic Expectation
Searching at time t	1,315	100.0	56.5	49.3	60.8
Working at t+2	657	50.0	61.1	60.8	55.2
Not Working at t+2	658	50.0	52.1	38.4	66.1
Still Searching at t+2	154	11.7	60.2	48.6	65.4
Not Searching at t+2	504	38.3	50.6	36.5	66.7
Negative Health or Cognition Shock by t+2	271	20.6	50.8	29.6	72.7
Positive Budget Shock by t+2	53	4.0	--	--	--
High Reservation Wage at t	55	4.2	--	--	--
Low Search Intensity at t	35	2.7	--	--	--
None of the Above	175	13.3	50.7	44.3	62.0

Notes: Sub-categories of Not Working and Not Searching at t+2 add up to more than total because some respondents are present in more than one sub-category. Negative health or cognition shock is defined as experience of at least one of the following between t and t+2: 1) incidence of one or more additional doctor-diagnosed conditions, 2) transition to fair/poor self-reported health status, 3) onset of a work-limiting health problem, 4) decline in cognition score exceeding the 90th percentile of inter-wave changes in the full sample. Positive budget shock is an increase in either total household non-labor income or total non-pension wealth in excess of the 90th percentile of inter-wave changes in the full sample. High reservation wage is defined as a reservation wage in excess of the 90th percentile of the *prevailing* wage distribution. Low search intensity is assigned to searchers who said they did not use any specific search strategy or did nothing specific to find a job. An optimistic expectation is defined as self-reported probability of finding a job being larger than predicted probability of finding a job. We do not report figures in the last three columns when the sample size is below 100.