JOB SEARCH BEHAVIOR AT THE END OF THE LIFE CYCLE

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CRR WP 2002-10
December 2002

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*Hugo Benitez-Silva is an Assistant Professor at SUNY-Stony Brook. The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement Research Consortium. The opinions and conclusions are solely those of the authors and should not be construed as representing the opinions or policies of SSA, the Internal Revenue Service, or any agency of the Federal Government or of the Center for Retirement Research at Boston College.

The author is grateful to John Rust, Moshe Buchinsky, Ann Huff-Stevens, George Hall, Sergi Jimnez-Martin, and Sofia Cheidvasser for their help, encouragement and comments. And to Michael Boozer, Jenny Hunt, Olivia S. Mitchell, Giorgio Pauletto, T. Paul Schultz, Anne Vellve-Torras and the participants of the 2001 North American Meeting of the Econometric Society at the University of Maryland, the CEF 2001 Meeting of the Society for Computational Economics, the Microeconomics Seminar at Universidad Carlos III de Madrid, and the Yale Summer Microeconomics Seminars for insightful comments and discussions. The author also thanks the Department of Economics at Universitat Autonoma de Barcelona, and the Economics Department at the University of Maryland for their hospitality during the Summer of 2002. Wayne-Roy Gayle and Frank Heiland provided excellent research assistance.

About the Sandell Grant Program

This paper received funding from the *Steven H. Sandell Grant Program for Junior Scholars in Retirement Research*. Established in 1999, the Sandell program's purpose is to promote research on retirement issues by junior scholars in a wide variety of disciplines, including actuarial science, demography, economics, finance, gerontology, political science, psychology, public administration, public policy, sociology, social work, and statistics. The program is funded through a grant from the Social Security Administration (SSA). Each grant awarded is up to $25,000. In addition to submitting a paper, successful applicants also present their results to SSA in Washington, DC. For more information on the Sandell program, please visit our web site at *http://www.bc.edu/crr/sandellguidelines.shtml*, send e-mail to crr@bc.edu or call Amy Chasse at (617) 552-1677.

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Abstract

This paper presents one of the first formal dynamic models of job search by older individuals. It also presents an empirical analysis of job search behavior among this population using the Health and Retirement Study. Several factors currently compound to make the topic of this research an important one in the agenda of the Economics of Aging: ongoing demographic, epidemiological, socio-economic, technological, and labor market trends indicate that older Americans are more likely to be labor force participants beyond traditional retirement ages. Increasing longevity, improving health, strong labor market conditions, increasing labor supply flexibility stemming from an increase in part-time work and self-employment and the use of technological advances to promote second careers, and increasing labor force participation, make the study of search behavior at the end of the life cycle, in a formal theoret-ical and empirical model, an important contribution. Our findings show that older Americans actively search for new jobs, both on the job and when out of work, and that previous work attachment and health limitations are key to understanding the different job search behavior of employed and non-employed individuals, as well as males and females.

Keywords: Job Search Behavior, Health and Retirement Study, Life Cycle Models, Panel Data Models.
JEL classification: J14, I28, D0

1 Introduction

This research analyzes the job search behavior of older Americans, presenting one of the first formal dynamic models of job search by older individuals, and empirical evidence of the importance of this behavior among this population using data from the Health and Retirement Study (HRS). This behavior, although mentioned in the literature for almost two decades, has been less formally modeled than for example retirement incentives and their policy implications.

Several factors currently compound to make this topic an important one in the agenda of the Economics of Aging: increasing longevity, improving health, strong labor market conditions, increasing labor supply flexibility stemming from an increase in the use of part-time work and the use of technological advances to promote second careers, and increasing labor force participation, make the study of search behavior at the end of the life cycle, in a formal theoretical and empirical model, an important contribution in order to realize what Steven H. Sandell already emphasized more than a decade and a half ago: *"If in the next century the nation is to effectively use older workers' skills and experience, the development of new retirement and employment policies must begin today."* (Sandell 1987, p.p. 245).

In Sandell (1987), and also in Borus et al. (1988), the focus was on the problems that older workers face in the labor market. The contributors to those volumes identified four aspects that would help improve the situation of older individuals in the labor force: improving economic conditions; increase in labor market flexibility; investment in training and retraining; and improving job search. A decade and a half after those remarks where made the economic conditions are quite good for both younger and older workers, and labor market flexibility has increased substantially among older workers if we consider the increasing trend towards part-time work and self-employment among older individuals. However, there has been relatively little improvement in the understanding of the processes that lead to and foster job search behavior and human capital accumulation at the end of the life cycle. In this study I propose a model of job search and I present empirical evidence that backs the assertion that this topic is interesting and worth exploring.

I present a dynamic model of job search behavior at the end of the life cycle and under uncertainty. A utility maximizing model is solved and simulated in which individuals endogenously choose how much to consume, save, work and search over their life cycle. I complement this theoretical model with an empirical analysis of job search behavior at the end of the life cycle using data from the HRS. I extend the dynamic model presented in Benítez-Silva (2002) and Rust, Buchinsky, and Benítez-Silva (2002), to account for the fact that individuals use some of their available time to search for jobs at almost any point in their lives. Searching is costly in terms of leisure and in terms of monetary resources, but it is also productive because it has a positive effect on the wage individuals expect to face in the subsequent periods. This model

represents one of the first efforts to integrate the job search decision in a utility maximizing framework where individuals are making consumption, saving, and employment decisions under uncertainty. The model proposed extends the seminal work of Seater (1977) to account for uncertainty, public pensions, and a deeper discussion of the implications for consumption, saving, and labor supply of integrating the traditional consumption/saving literature with the search literature.

The empirical analysis of search behavior at the end of the life cycle presented here represents one of the first efforts to characterize job search as an important issue to consider for older individuals. Up to now most of the research in the Economics of Aging has not paid much attention to search behavior since relatively few people returned to work after retirement or work beyond the traditional retirement ages. However, increased life expectancy and improved health, along with new technological opportunities, allow individuals to consider second careers and to search for what researchers have called *bridge jobs* or part-time jobs, as a way of phasing out of the labor force. This makes the study of the search decision of this population an interesting and novel project. Only a few research efforts, including Hutchens (1988, 1993) and the volumes by Sandell (1987) and Borus et al. (1988), deal directly with the issue of aging and search behavior. However, even those researchers only concentrate on the problems that older workers face to find jobs comparable to those of younger individuals. Turning to the search literature, the emphasis has mostly been on the empirical analysis of young and middle-aged individuals.[1] Also, theoretical search models have not investigated the implications of the searching parties' distinct characteristic of approaching or having reached retirement age.[2]

The estimation results using cross-section and panel data models show the importance of age, marital status, education, and especially previous work attachment and health limitations in the decision to search for a new job. We observe clear differences depending on whether the individual is employed or non-employed, and we also observe significant differences between males and females with respect to the importance of the driving forces behind job search decisions.

In the next section I use the HRS to highlight the importance of job search at the end of the life cycle, and present cross-section and panel data estimates of the decision to search for a job by employed and non-employed older Americans. In Section 3 I introduce the dynamic model, and Section 4 discusses the simulations of the stochastic problem and connect its results to the empirical evidence. Section 5 concludes.

[1] See for example Sandell (1980a, 1980b), Parsons (1991), and Topel and Ward (1992). Devine and Kiefer (1991) and Van den Berg (1999) provide surveys of the empirical search literature. See also Burdett and Mortensen (1998), and Van den Berg and Ridder (1998) for recent examples of the empirical equilibrium approach to search. More recently Bhattacharya, Mulligan, and Reed (2001) present a traditional model of labor market search which takes into account retirement policies that foster early retirement.

[2] In most of the literature, see for example Stigler (1962), McCall (1970), and Gronau (1971), leisure is assumed to be fixed and individuals are income maximizers. Whipple (1973) introduces utility maximization but still assumes labor to be fixed.

2 Search at the End of the Life Cycle

In this section we perform an empirical analysis of job search behavior at the end of the life cycle using all available waves of the HRS. The HRS is a nationally representative longitudinal survey of 7,700 households headed by an individual ages 51 to 61 as of the first round of interviews in 1992-93. The primary purpose of the HRS is to study the labor force transitions between work and retirement with particular emphasis on sources of retirement income and health care needs. It is a survey conducted by the Survey Research Center (SRC) at the University of Michigan and funded by the National Institute on Aging.[3] Up to now data of the first five waves of the survey are available. The last four waves of the data were conducted by phone using the computer assisted technology (CATI) which allows for much better control of the skip patterns and reduces recall errors.

Figure 1 shows the percentage of individuals by age who said they were searching for a job using the HRS.[4] The same graph also shows the responses of the employed and the non-employed. Given the nature of the HRS we only have data for individuals age 50 to approximately 75.[5] Notice the relatively large percentage of individuals in their fifties that are still actively searching for jobs, a fact that encourages us to investigate further the nature of this activity by older Americans.

Figures 2 and 3 present the information about search behavior for non-employed and employed individuals using the Health and Retirement Survey and show that job search is undertaken by a substantial proportion of individuals in our sample, and that their responses to a variety of questions regarding job search show that they are active job seekers. Figure 2 shows that 6.5% of non-employed individuals were searching for a job in the month before the interview, and that more than half of those were searching exclusively for a full-time job, and around 25% only wanted a part-time job. Both types of searchers rely quite heavily on direct contacts to try to find a job, and full-time seekers used more frequently employment agencies and more informal channels. The chart also shows that among non-searchers a sizable proportion actually wants a job, and that almost 60% of them would want a part-time job. Figure 3 presents similar results for employed workers. Employed individuals search in a higher proportion, 8.3%, and almost 2 out of 3 of them were searching for a full-time job. Both part-time and full-time searchers rely more on direct contacts and informal channels to search for their new job. Among non-searchers, more than 70% said

[3] See Juster and Suzman (1995), Gustman, Mitchell, and Steinmeier (1995), or the HRS web page.

[4] I consider employees and self-employed individuals to be searching for a job if they answered yes to the question: Are you currently looking for another job? For non-employed respondents they answered yes to the question: Have you been doing anything to find work during the last four weeks?

[5] There are a few individuals in the sample older than 75, but none of them was searching for a job. Since the HRS was supposed to be representative of the U.S. population of individuals 51 to 61 as of the first round of interviews (in the field during 1992) we do not really lose much information by ignoring those respondents.

they would not consider other jobs, mainly because of their fear to lose their pension and health insurance benefits.

Another issue supporting the enterprise of my research comes from recent work that finds that the job search indicator has behavioral meaning in a multivariate setting due to its strong impact on the labor supply decisions of older individuals. Benítez-Silva and Heiland (2000), also using the HRS, make the case for job search to be an important variable in a reduced form study of labor force transitions. This variable has a sizable effect on transitions from non-employment to employment, and also in transitions from employment to new jobs or self-employment. The first part of this result is interpreted as indicating that the distinction between unemployment and out of the labor force is behaviorally meaningful among older individuals, extending the result of Flinn and Heckman (1983) who used data on young men. The second part comes to emphasize the importance of on-the-job search among this population.

2.1 Summary Statistics

The HRS provides the researcher with a large array of socio-economic and demographic variables, health indicators, ADLs, IADLs, and even some variables that measure expectations. Table 1, in panels A and B, presents an exploratory analysis of the data. If we compare the subpopulation of those that report searching for a job with the full sample of respondents, we can observe that they are more likely to be younger and male, and less likely to be white and married. The searchers are likely to have a lower level of net worth, but a higher level of income in the previous year. They are also much less likely to be without health insurance, and also less likely to be receiving Medicare or Medicaid. Searchers are in overall better general health, and are less likely to have health limitations, but are more likely to be smokers and moderate drinkers.

It is important, however, to make a clear distinction between those searching on-the-job and non-employed searchers. Compared with those searching on-the-job, non-employed searchers are older, less likely to be male, married, and white, and substantially less likely to hold a bachelor or professional degree. They are on average less wealthy than their employed counterparts, and they are also more likely not to have any type of health insurance, and rely more on Medicare and Medicaid. Finally, non-employed searchers are in overall worse health, and with more health limitations than those searching on-the-job.

2.2 Cross-Section and Panel Data Estimates

Our objective here is to show what are the determinants of the job search decision among employed and non-employed older Americans. We will use both cross-section and panel data estimates of a binary choice model, where the dependent variable is the decision to search for a job.

Tables 2 to 8 show the main results of our empirical analysis and have a very similar structure. The first three columns of each table show the Maximum Likelihood estimates of a Probit model with their standard errors and marginal effects. The last three columns show the Maximum Likelihood estimates of a Random Effects Probit model with standard errors and marginal effects, where we exploit the longitudinal nature of the data to control for unobserved heterogeneity.[6]

The Probit estimates are the result of fitting the following standard Probit model:

$$S_i = \beta' X_i + v_i, \tag{1}$$

where S is a dichotomous variable indicating whether the individual had searched for a job in the month preceding the interview, X is a vector of exogenous explanatory variables including a constant, β is a vector of coefficients, and v is a normally distributed disturbance with mean zero and variance σ_{vv}.

The Random Effects Probit model adds a single random effect to the equation above, and takes into account the multi-period nature of the data. For a given individual i and time period t the model can be written as follows:

$$S_{it} = \beta' X_{it} + u_i + v_{it}, \tag{2}$$

where u_i is the random individual specific effect, which is normally distributed with mean zero and variance σ_{uu}. The remaining error term, v_{it}, representing unobserved individual characteristics that vary with time, is also assumed normal with mean zero and variance σ_{vv}. We will take u_i, and v_{it} to be independent of each other and of the X_{it} explanatory variables. We will integrate out the unobservable component using Gauss-Hermite quadrature with 12 nodes, which means we would be able to integrate exactly a polynomial of degree 23. Increases in the number of nodes had basically no effect on the estimates shown below.

Table 2 presents Probit and Random Effects Probit Maximum Likelihood estimates of the decision to search for a job by the full sample of employed and non-employed individuals. First, we can see that age has the expected negative effect, something consistent with the theoretical dynamic model presented in the next section. Past attachment to the labor force represented by the `Workpre` variable, which reflects the proportion of months worked out of the last 12, has a positive and significant effect, with a large marginal effect, but currently being an employee has, other things equal, a negative, and fairly high, marginal effect on the probability of searching for a job, and so does being self-employed. As we will see in Tables 3 and 4, the positive effect of the attachment to the labor force variable is driven by non-employed respondents,

[6] Using the standard probit model with pooled data produces consistent but inefficient estimates, see Maddala (1987). However, as shown by Guilkey and Murphy (1993), in finite samples, and if the number of time periods is larger than two, the standard probit model performs quite poorly compared with the Random Effects probit model. For all the models presented below a Likelihood Ratio test comparing the pooled probit estimator and the random effects probit estimator always rejected the pooled estimator in favor of the panel characterization. The LR, tests whether the panel variance component is of relevance in the model.

which seems to indicate that those out of work for longer periods are less likely to search for (and probably eventually find) a job. This is not too surprising if we believe that some might have withdrawn from the labor force and others might be discouraged to search because of the deterioration of their human capital. This means that once we control for variables like health, age, insurance status, etc., non-employed respondents are more likely to search than employed ones.[7]

Still in Table 2, net worth has a negative and significant effect on the probability of searching, something consistent across specifications, and also consistent with the theoretical model that will show that as individuals accumulate wealth job search becomes less common. Not having access to health insurance has a large positive and significant marginal effect on the probability of searching for a job among this population, a result consistent with the large literature that emphasizes the importance of health insurance among older individuals (Currie and Madrian 1998), and having access to private health insurance also has a positive effect but not as significant. Another interesting variable that we introduce in the tradition of McCall (1970) is a proxy for the expected period of employment, the self-reported probability of living to age 85. We would expect it to be positively correlated with the likelihood of searching for a job and, the results confirm that conjecture. In our theoretical model this effect is present through the fact that individuals know that even in the best of circumstances they will die at age 85, therefore, as this age approaches search is less attractive for them. Being married has a fairly large negative and significant effect, we will later see that this is driven mainly by the effect of marriage on women's decisions. Also, those with a college degree are more likely to search for jobs than those with a lower (or higher) educational level.[8] A dummy variable indicating whether the individual has a health limitation for work, has a significant negative effect on the decision to search for a job, interestingly we will see below that this is driven by the effect of this variable on the decision of non-employed respondents, and the pooling of individuals obscures the positive effect that this variable has on the search decision of employed individuals, as we will see in Table 3. A binary indicator for self-reported psychological problems has a very large positive effect on the probability of searching for a job, which might reflect that some of these problems are likely to be work related (stress, bad working environment), or related to being out of the labor force (depression, anxiety regarding financial security). Finally, self-reported indicators of general health show that those in worse health are substantially less likely to search for new jobs, this result will be especially strong for non-employed individuals

Table 3 presents the same type of estimation results but for employed individuals.[9] In this case there are

[7] In the theoretical model almost all the search is on-the-job, therefore, an extension to introduce an stochastic shock to employment seems like a logical path for future research.

[8] The introduction of demographic variables is justified by the fact that we want to control for this type of characteristic to better assess the effect of the other variables of interest.

[9] See Black (1981) for a similar study using the PSID.

some interesting differences with the previous table; first, the health limitation indicator has now a *positive* effect on the probability of searching for a job, probably indicating that employed individuals that have a limitation to perform their work are more likely to search for another job that might accommodate better their partial disability.[10] This is also true for individuals with a psychological problem, but reverses for the self-reported indicators of general health, which have a negative effect as individuals report being in fair or poor health. However, these indicators are not significant for this sample. Another coefficient worth focusing on, is the negative and significant effect of the labor force attachment variable on the probability of searching for a job, a result that might seem counterintuitive but that can be explained by the fact that those that have worked more continuously in the last year are more likely to have a stronger attachment to their current job and have had less time to explore other options outside their current job. It is also worth noticing the negative and significant effect that an indicator for self-employment has on the search decision, this is quite reasonable, since those individuals that own their business are less likely to be searching for new jobs.

Table 4 shows the estimates of the search decision for non-employed individuals. The first difference with Table 3 is the *positive*, and very large, effect of the work attachment variable, `Workpre`, which indicates that those that worked more prior to their non-employment spell are much more likely to search for new jobs. The second difference is the *negative* effect that having a health limitation for work has on the probability of searching for a job, meaning that those with some kind of disability are less likely to try to come back to the labor force. Finally, notice the much better explanatory power of this model compared with the model for on-the-job search.

Tables 5 and 6 separately estimate the on-the-job search decision for males and females. An interesting result is the asymmetric effect of marriage for these two populations. For males, marriage has a small, positive, but insignificant effect on the decision to search for a new job, but for females, it has a large, negative, and significant effect on the decision to search for new jobs. This result might be a hint of a behavioral difference between males and females regarding their approach to on-the-job search, with females being more loyal to their employers. We can also observe that the work attachment indicator has a larger marginal effect for female respondents, but the positive marginal effect of having a work limitation is larger for males.

Finally, Tables 7 and 8, show the Probit and Random Effects Probit estimates for non-employed males and females. Again, we can observe the asymmetric effect of marriage among these two populations, from being an insignificant regressor for males, to having a fairly large negative effect for females. We can also observe the larger marginal effect among females of the work attachment indicator, and the larger marginal

[10] See Benítez-Silva et al. (2000) for a discussion of the close relationship between self-reported health limitation and disability status.

effect for males of the health limitation indicator. Notice also the different effect of the psychological problems indicators among these two populations, for males it has an insignificant effect on the probability of searching for a job, but for females it is also positive, but fairly large and statistically significant.

3 A Model of Job Search over the Life Cycle

The model presented in this section is an extension of the model introduced in Benítez-Silva (2002) and Rust, Buchinsky, and Benítez-Silva (2002), using the main insights first discussed by Seater (1977).[11]

Agents choose how much to consume and save, their leisure (or labor supply), and whether to search for a job, according to the following finite horizon utility maximizing framework,

$$\max_{c_s,l_s,se_s} E_t \left[\sum_{s=t}^{T-1} (\tau_s \, \beta^{s-t} u(c_s, l_s - se_s) + (1-\tau_s) \, K \, \beta^{s-t} u(w_s - c_s)) + \beta^T u(c_T, l_T) + K \, \beta^T u(w_T - c_T) \right] , \quad (3)$$

where β is the classic discount factor, K is a bequest factor, τ_t represents age-specific survival probabilities, c represents consumption, l represents leisure, and se is the amount of time devoted to job search. Savings, w below, accumulate at an uncertain rate of return $\tilde{r}$, that we characterize as $i.i.d.$ draws from a log-normal distribution, such that

$$w_{t+1} = \tilde{r} \, (w_t + \omega(1 - l - se) - c_t - C_{se}), \quad (4)$$

where ω represents wages, and C_{se} is the cost associated with job search. The within-period utility function is assumed to be Isoelastic and Cobb-Douglas between consumption and the leisure remaining after subtracting the time spent searching for a job, and can be written as follows,

$$u(c_t, l_t, se_t) = \frac{(c_t^{\eta}(l_t - se_t)^{1-\eta})^{1-\gamma}}{1-\gamma} , \quad (5)$$

where γ is the coefficient of *relative risk aversion* and η is the valuation of consumption versus leisure. Consumption and leisure are substitutes or complements depending on the value of γ as discussed in Heckman (1974) and Low (1998), with the cutoff approximately equal to 1. In this paper we will assume values of γ larger than 1, implicitly assuming substitutability between consumption and leisure. We solve a 61 period model for an average individual that starts working at age 25 and dies at age 85.[12]

[11] The first two set of authors extend the models of Beckmann (1959), Phelps (1962), Levhari and Srinivasan (1969), and Hakansson (1970), to account for a finite horizon, Social Security, annuities, disability, and social insurance. In endogenizing the labor supply decision in a consumption/saving framework their work and this paper extend the research of Heckman (1974), Low (1998, 1999), Flodén (1998), and French (2000).

[12] All the models solved and simulated in this paper use the same preference parameters: $\beta = 0.95$, $\gamma = 1.5$, $\eta = 0.7$, $K = 0.4$, and ρ in equation (6) is 0.9. Most of these choices are around the numbers found in the literature, when available. Benítez-Silva (2002) experiments with different values for these parameters.

We will assume that the agent has only three choices with respect to the labor/leisure decision: part-time, full-time, or out of the labor force. Within each of these choices the individuals can then choose to search for a job or not. If the person decides to search it uses some of the remaining leisure, incurs in a monetary cost, and has access to a higher expected wage in the next period. The cost in terms of leisure can change depending on the employment status, and we have assumed that it is increasing in available leisure (in level terms, but fairly stable in percentage terms). As it will be clear in the next section the parameters governing these costs and rewards are key to the performance of the model in terms of obtaining behavior that somehow relates to what we see in the data.

The model also accounts for wage uncertainty introduced through serially correlated wages, such that

$$ln\,\omega_t \;=\; (1-\rho)\,\alpha_t + \rho\,ln\,\omega_{t-1} \;+\; \varepsilon_t\;, \tag{6}$$

where α_t is a quadratic trend that mimics a concave profile of an average worker. The ε_t are $i.i.d.$ draws from a normal distribution with mean 0 and variance σ_t^2. If ρ is 0, this reduces to the case of $i.i.d.$ wages.[13]

The value functions depend on the uncertain wage realizations and wealth. We write the problem solved by the agents in the last period of their life as

$$V_T(w,\omega) = \max_{(0\le c\le w+\omega(1-l),l)} U(c,l) + K\,U(w+\omega(1-l)-c)\;, \tag{7}$$

where labor is again chosen among the three possible states. $K \in (0,1)$ is the bequest factor, representing the fact that agents in this model only care about the absolute size of their bequests, something consistent with the "egoistic" model of bequest.[14] Notice that we assume that there is no search in the last period of life since it would not be a productive use of time.

Once we obtain the decision rules numerically (no closed form solutions are available for this problem) we can write the value function in the next to last period for those that decide not to search in that period as

$$V_{T-1}(w,\omega) = \max_{(0\le c\le w+\omega(1-l),l,se=0)} U(c,l) + A + B\,, \tag{8}$$

where

$$A = (1-su_t)\;\beta\,E\,V_T(w+\omega(1-l)-c,\omega)\;, \tag{9}$$

and

$$B = su_t\;K\,U(w+\omega(1-l)-c)\;, \tag{10}$$

[13] We do not allow here for nonzero correlation between income shocks and asset returns. For a discussion of this possibility see Davis and Willen (2000).

[14] Hurd (1987, 1989), Bernheim (1991), Modigliani (1988), Wilhem (1996) and Laitner and Juster (1996) discuss the significance of bequests and altruism in the life cycle model.

where su_t represents age specific mortality probabilities taken from the U.S. Life Tables of 1997.

If the individual chooses to search, a cost C_{se} is to be subtracted from his or her resources. We can introduce this cost as a fixed amount or as a percentage of the available resources—we solve and simulate both types of models. Also, job search will allow the individual to have access to a higher wage in the next period, which will be taken into account in the expected value calculation performed by the individual. For the case of an individual who decides to search we can write

$$V_{T-1}(w,\omega) = \max_{(0\leq c\leq w+\omega(1-l-se)\ (y),l-se)} U(c,l-se) + A_{se} + B_{se}\ , \tag{11}$$

where

$$A_{se} = (1-su_t)\ \beta\ E\ V_T(w+\omega(1-l-se)\ (y)\ -c-C_{se},\omega)\ , \tag{12}$$

and

$$B_{se} = su_t\ K\ U(w+\omega(1-l-se)\ (y)\ -c-C_{se})\ , \tag{13}$$

In the equations above y is a parameter that determines the level of wage increase resulting from a successful search, and the costs of the search have been assumed in the equation to be a constant for ease of exposition.[15]

The functions for the earlier periods are again obtained recursively. The simplest version of the expectation term $E\ V_t(\omega(1-l)+w-c,\omega)$ appearing in the value functions for the different periods can be written as follows

$$\int_0^{\overline{r}}\int_0^{\overline{\omega}} V(\tilde{r}(w+\tilde{\omega}(1-l)-c),\tilde{\omega})\ f(\tilde{\omega})d\tilde{\omega}\ f(\tilde{r})d\tilde{r}\ . \tag{14}$$

The interpolation of the values of the next period value function has to be carried out in two dimensions. The double integrals are solved by Gauss-Legendre quadrature, but we use iterated integration since we are assuming independence of wages and interest rates.[16] Given that the value function depends on wealth and wages, we need to discretize both variables in order to approximate the integrals, we use 50 points for wealth and 50 points for wages.[17]

An extension that we also consider and that requires only a small modification of the model presented above, is the introduction of a Social Security system. We do this using a fairly simplified characterization of the current S.S. system in the United States. We analyze the behavior of an individual born in 1938, that enters the labor force at age 25 and that works for at least 35 years. We follow the formulae provided by

[15] We will assume throughout this paper that job search if undertaken always results in a wage increase, therefore $y > 1$.

[16] See Burnside (1999) for an illuminating characterization of quadrature methods.

[17] See Benítez-Silva, Hall, Hitsch, Pauletto and Rust (2000) for a detailed discussion of the methods used throughout the paper with applications to various economic problems. See also Press et al. (1992), Rust (1996), and Judd (1998) for a comprehensive treatment of numerical methods.

SSA (2000), and assume that individuals can only start receiving benefits at age 65. However, we do allow for work after that age.[18] We also tax wages at the current individual tax rate (6.2%), and add the taxes paid by the employer (also 6.2%).[19]

4 Results of the Dynamic Programming Model

In this section we present the results of solving and simulating the model(s) characterized in Section 3. Figures 4 to 17 show the paths of search, consumption, labor supply and wealth accumulation resulting from different specifications of the dynamic programming model. These graphs are averages of 10,000 simulations of a 61 period model solved and simulated using *Gauss* and *C* programming languages.[20]

The figures show the results of seven different versions of the model of Section 3, and the labelling of the curves indicates which model they refer to. The benchmark model that we present has the following properties: the cost of searching for a job in terms of leisure is of 5% of total time if the individual works full-time, 10% if he/she works part-time and 20% if non-employed.[21] The monetary cost of searching is set at 1% of available wealth, and the increase in wages due to job searching is 20%.[22]

Figure 4 presents the job searching behavior over the life cycle resulting from solving and simulating this benchmark model. We can see first the declining job search in terms of time used over most of the life with a steeper decline after age 50. This is a result consistent with Seater (1977) and a clear outcome of this life cycle dynamic model.[23] Older individuals are less interested in searching for new jobs (higher paying jobs) as they have less time to recoup the investment in terms of leisure and monetary resources. It is important to highlight that, although declining, job searching continues during the whole life span of the individuals, making the study of this behavior relevant not only when young but also as the person ages, justifying our efforts in the empirical section of this paper. Figure 4 also introduces a model with fixed costs

[18] We ignore the earnings test provision for those 65 and over, since it was in fact abolished recently. See Benítez-Silva (2002) for a discussion of the effects of the earnings test in this type of models, and Rust, Buchinsky, and Benítez-Silva (2002) for a similar model with a more realistic characterization of the Social Security system allowing for early retirement, disability award and application, and other social insurance programs. See also Friedberg (2000) for a more general discussion of the earnings test provision, and Myers (1993) for a comprehensive review of the Social Security system.

[19] We exclude the Disability Insurance withholding, and assume that the portion contributed by the employer is in fact subtracted from a higher, before all taxes, wage level.

[20] Thanks to the use of dynamic libraries written and compiled in *C*, this complex model is solved in a few minutes and the simulations are performed in less than 30 seconds.

[21] Notice that although the costs differ in levels, in terms of percentage of available time, once labor supply is accounted for, the cost of search in terms of leisure is basically the same.

[22] As mentioned in the previous section we will also experiment with a fixed cost of search. We believe that making the cost of search dependent on wealth is not unrealistic since in reality individuals might decide to dedicate the resources out of a budget allocation constraint by the wealth at the beginning of the searching period. We do not claim, however, that this is the way people behave, which is why we experiment in the model with alternative characterizations.

[23] This result was already implicit in the work by Stigler (1962) and McCall (1970).

of search (fixed at $1,000) and compares it with the benchmark model. The fixed cost model leads to a slightly lower search level when the individuals are young, and have not accumulated enough resources, but after age 60 almost exactly mimics the benchmark model.

Figure 5 shows the benchmark specification and two other curves, which represent models different from the benchmark. Both models consider that the cost of job searching in terms of leisure is twice the cost of the benchmark case for each employment status, and curve labeled high cost-2, also considers a higher monetary cost (3% of available resources) on top of the already costlier search in terms of foregone leisure. The figure clearly shows that such a parameterization of the model would deliver very little search. It is true, however, that this increase in costs has come without an increase in the reward from searching. We do this in order to isolate the effect of each change in parameters and to start characterizing a realistic set of assumptions for the model.

Figure 6 compares the benchmark model with a model that increases the monetary costs of job search to 3% of available resources leaving all the other parameters at their original levels. The result indicates a decline in job search over most of the life as expected. We can also see that a much higher cost level could easily prevent search from happening.

Figure 7 presents a small variation of the benchmark model that has a sizable effect on search behavior: a decrease in the wage boost resulting from job search to 15%. The effect is stronger for young individuals and seems to stabilize after age 50. The last figure showing simulated job search paths (Figure 8) compares the benchmark case with one that introduces the Social Security system described at the end of the previous section. We can see that due to the effect of Social Security on labor supply and the way we have defined the cost of job search in terms of leisure (as depending on your chosen employment status) we see an increase in time devoted to job search around the age of retirement (understood as the age at which the individual starts receiving benefits), but after that we observe a very steep decline to reach basically no search as the end of the life span approaches. This last property of these simulations is quite important because we have seen in Section 2 the clear effect on behavior of having access to the health insurance provided by government programs like Medicare and Medicaid.

All these figures of job search over the life cycle present a coherent picture consistent with the theory on search and investment under uncertainty. However, with the results shown so far it is still unclear how important are the effects of introducing the search decision in terms of the other relevant variables in the model, and how successful is the model in characterizing real behavior by individuals. We consider these two issues in turn, and show that the effects on the other variables are not negligible, and that the dynamic model broadly characterizes behavior by real individuals,

Figures 9 and 10 present the labor supply in the benchmark case and three other specifications, and

Figures 11 and 12 show the consumption paths for the same specifications. For labor supply, Figure 9 shows that the benchmark case delivers less amount of time dedicated to work than the specifications with less job search behavior. This means that although searchers spend some of their leisure searching for a job, the gains from this search allow them to take more time off from work and still be better off, because as Figure 11 shows they maintain a consumption path almost identical to the non-searchers. Figures 10 and 12 show the effects on labor supply and consumption of introducing Social Security in this model. As it is well documented in Benítez-Silva (2002) and Rust, Buchinsky, and Benítez-Silva (2002), the effect is substantial, highlighting the incentive effects of the social insurance programs. Labor supply drops around the time the individuals start receiving benefits, and consumption is lower because of the tax burden imposed by the social insurance system.

Finally, Figures 13 to 17 show the wealth accumulation paths of the seven model specifications solved and simulated in this paper. Figure 13 presents the wealth accumulation for the benchmark case and for the specification with fixed costs. Figure 14 shows that even though the individuals have to pay the job search cost, the wage gains allow for a higher wealth accumulation over the whole life cycle that for the case that almost no search is chosen, predicting that those that are able to search successfully will be able to maintain higher living standards. Figures 15 and 16 present very similar wealth accumulation profiles and not very different from the benchmark. Figure 17 highlights the negative effect on wealth accumulation that introducing Social Security has, a result consistent with the early work of Feldstein (1974), and Kotlikoff (1979). This result does not necessarily mean that individuals are worse off under the new regime. As a matter of fact, recent welfare calculations by Rust, Buchinsky, and Benítez-Silva (2002) suggest a "status quo" bias in favor of maintaining a Social Security system as an optimal result of a dynamic life cycle model similar to the one introduced here.

All these results regarding job search over the life cycle can have important policy implications. First, the message from our model is that job search goes on not only when individuals are young but also later in life, workers and non-workers seem to be willing to spend some of their leisure to have the chance of drawing their wages from a distribution with a higher mean. However, cost considerations are of high relevance, and that is where public policies can make it easier for older workers to be more active in the labor market and eventually work longer in an economy that will need those workers to ease the labor shortage that can ignite inflationary pressures.[24] But costs are not the whole story, individuals also care a lot about the rewards from their job search. If older workers can only expect minimal increases in wages they will not see job searching

[24] It is debatable the use of public policy in this case, but we believe there is some kind of externality in having older workers consider longer careers, second careers, or part-time jobs. This externality can come from reducing the pressures of a tight labor market as the percentage of people in the traditional working ages shrinks as the baby boomers enter retirement age.

as an interesting use of their time, and might prefer to enjoy their leisure as they grow older.

This last point introduces a different set of issues that can be considered as embedded in the models solved here, and those are mainly related to skill acquisition by older workers. The models solved here can be reinterpreted as models of human capital investment, after all, we believe that education is a productive use of time that most likely leads to sizable increases in wages (Seater 1977 also makes this point). For younger workers the theory and the empirics are well established, but for older workers it is less clear cut. If investing in human capital is very costly and will thus not be undertaken, it is less likely that older people will consider a job because they will only have access to less qualified and poorly paid positions. It is therefore worth considering if public policy should promote adult education and encourage older individuals to consider second careers.[25] These policies may also be of a redistributive nature since those endowed with less human capital tend to be poorer and with fewer career opportunities if they decide to continue working or return to work.

5 Conclusions

This paper has shown the relevance of analyzing the job search behavior of older Americans. Using the HRS and cross-section and panel data models we have characterized the decision to search for a job by employed and non-employed individuals, emphasizing the importance of age, work attachment, health insurance, and health indicators. Then, we solved a dynamic stochastic life cycle model of job search in a utility maximizing framework, allowing for individuals to endogenously choose how much to consume, save, work and search during their whole life. We have also shown that some features of the dynamic model can be reconciled with the empirical work.

This work can be considered an extension of recent research on dynamic programming models with endogenous consumption/saving and labor/leisure choices to account for the fact that individuals use some of their available leisure to search for jobs. Searching for a job is costly in terms of foregone leisure and in terms of monetary resources, but it is also productive, as the traditional search literature emphasizes, having a positive effect on the wage the individuals expect to face in the subsequent periods. The model solved also extends the seminal work of Seater (1977) to account for uncertainty, public pensions, and a deeper discussion of the implications for consumption, saving, and labor supply of using this integrated approach. We also present a framework that allows for policy experimentation, and the introduction of uncertainty, public pensions and social insurance.

[25] See Friedberg (1999) for a discussion of investment incentives in computer skills among older workers. As commented above if there is some externality argument at play this can be an interesting idea to consider.

The dynamic programming model shows that search declines over the life cycle, doing it more sharply after age 50, and that this intuitive result can be reconciled with the data from the Health and Retirement Study. We also show the effect of the cost of search in terms of leisure and monetary resources, and the effect of different wage rewards in the behavior of individuals. Furthermore, we introduce a simplified Social Security system in the model and observe that the sharp effect on job search behavior is consistent with the relevance of social insurance in the empirical model.

These results allow us to consider policy implications related to job search and human capital formation at the end of the life cycle.[26] Our model suggests that workers at all ages are responsive both to the cost of job searching (or human capital investment) and the rewards resulting from that investment of time and tangible resources. Therefore, public policies that can affect the possible costs of job search, or the rewards from it (for example policies that facilitate adult education to allow older individuals to keep up with technological change) will make it easier for older workers to be more active in the labor market and eventually work longer in an economy that will need (externality argument applies here) those workers to ease the labor shortage that can ignite inflationary pressures.

Interestingly the paper's analysis of search behavior at the end of the life cycle represents one of the few and more recent efforts we are aware of to characterize job search as an important issue to consider for older individuals. Up to now most of the research in the Economics of Aging has not paid much attention to search behavior. However, increased life expectancy, improved health, and new technological opportunities allow individuals to consider second careers and to search for part-time jobs. This makes the study of the search decision of this population an interesting and novel project that complements the more theoretical results delivered by the dynamic programming model.

There are a number of extensions of this study that are currently being considered. First, job search can be extended to be either a continuous variable or to have more than two states, allowing us to discuss not only the fact that an individual searches for a job but also the search intensity, with probably different effects in terms of wage rewards. Second, by the nature of the model we have simulated in this paper, the search behavior generated by the model has been basically on-the-job, therefore, it would be interesting to introduce a shock to employment that could lead to some workers losing their jobs, and then attaching a success probability to the search decision, making it a more realistic model and more in agreement with the data that shows that non-employed individuals are the most likely to search, others things equal. This type of model would also allow us to better distinguish job search and human capital formation that are so closely related and basically not distinguishable in our dynamic model. Finally, it is realistic to think that the

[26] Heckman (1976) presents a model that has some similarities with our discussion, and his qualitative results are in line with our findings.

framework presented here could be used for estimating some of the underlying parameters using the Health and Retirement Survey, and the fairly rich search data that it contains.

Figure 1: Search in the Health and Retirement Survey.

Figure 2: Search By Non-Employed Respondents.

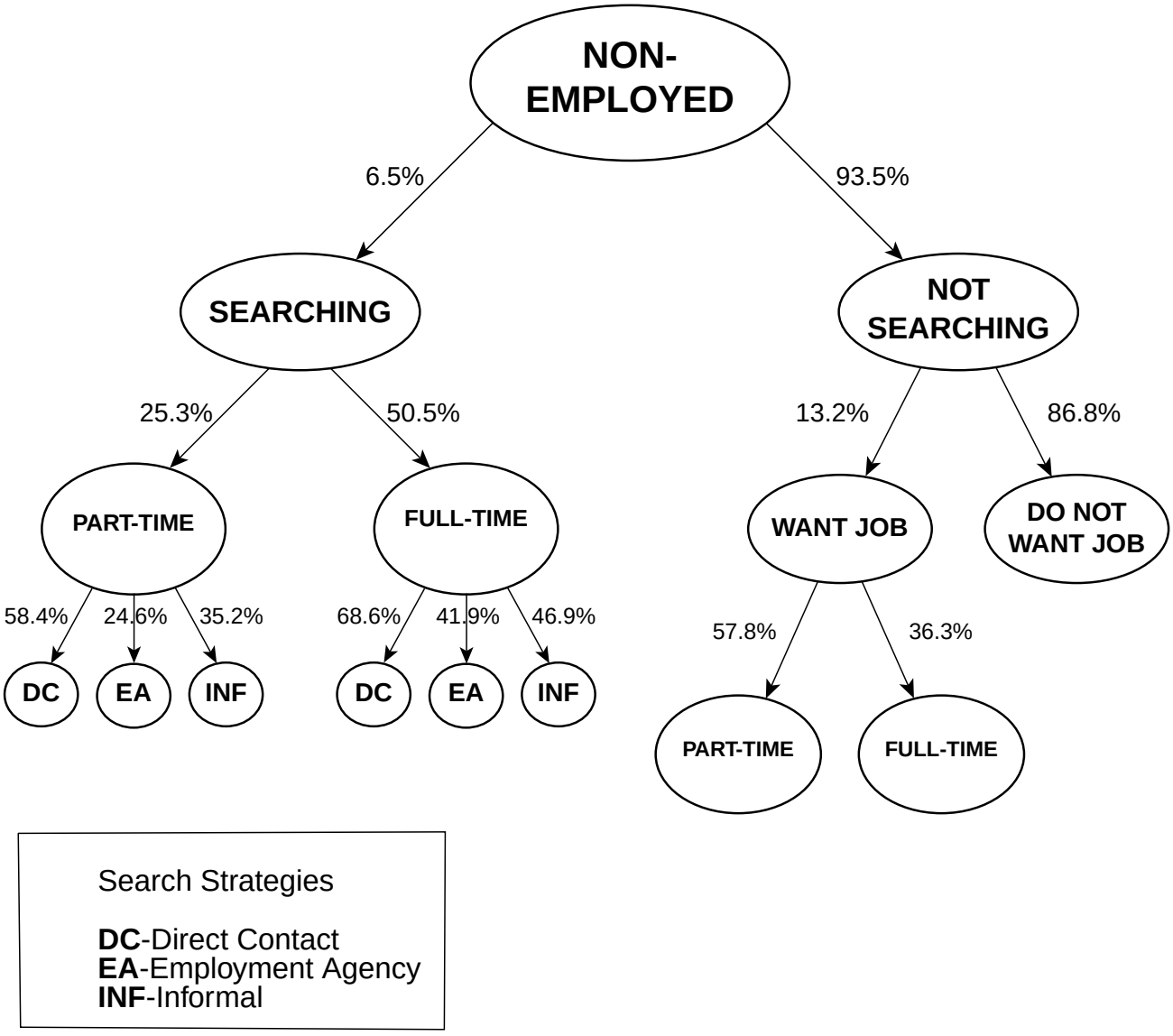


Figure 3: Search By Employed Respondents.

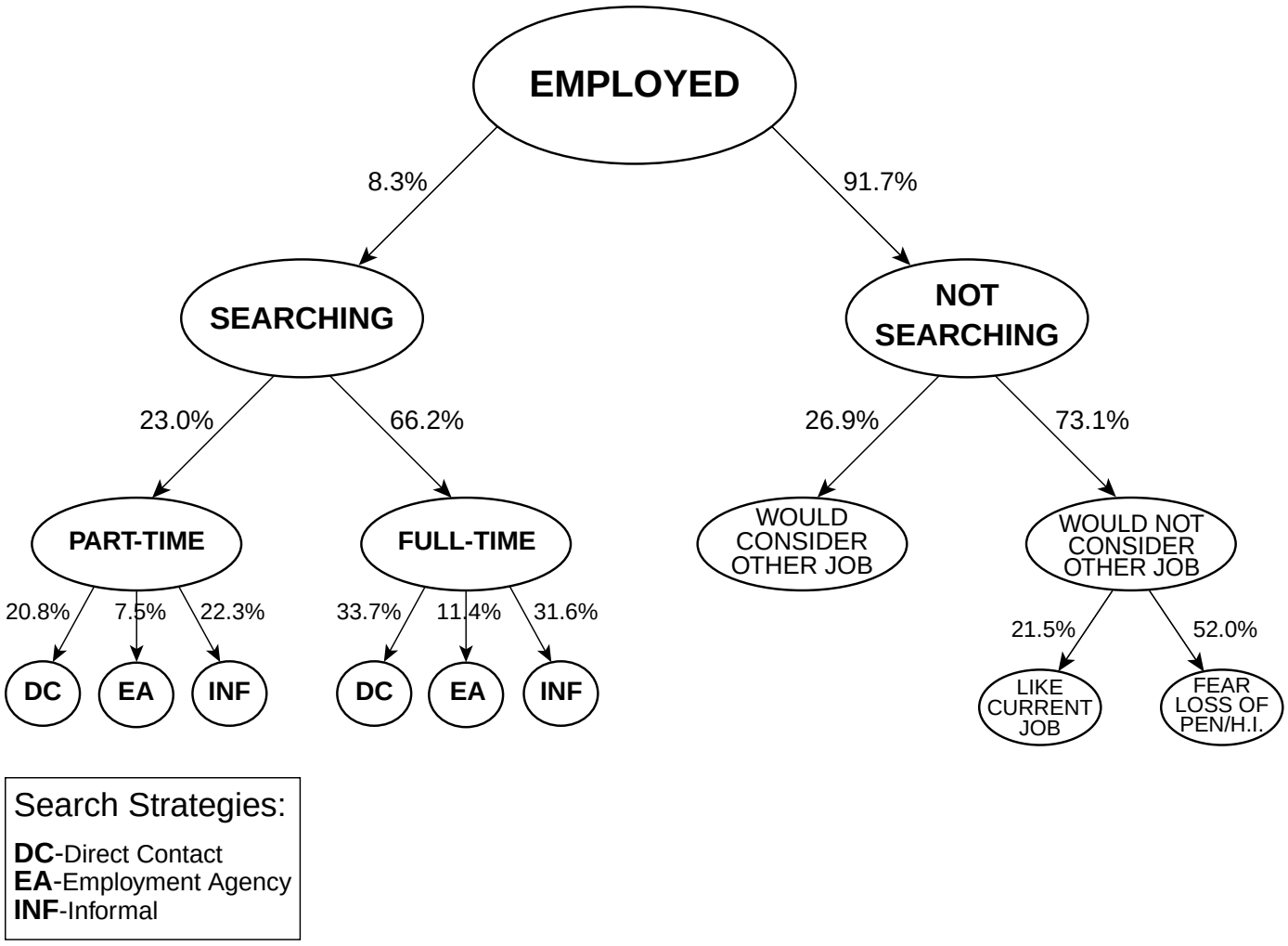


Table 1. Panel A: Means and Standard Deviations

Variable	Full Sample	Searchers Sub-Sample	Employed Searchers	Non-Employed Searchers
N	49,037	3,255	2,182	1,073
Age	59.79085	57.16221	56.65353	58.19664
	5.261594	4.285463	4.005044	4.638369
White	.7304688	.6829493	.7172319	.6132339
	.4437208	.4653989	.4504479	.4872364
Male	.467443	.5231951	.5307058	.5079217
	.498944	.4995384	.4991707	.5001704
Married	.7699288	.7130568	.7213566	.6961789
	.4208825	.4524043	.4484344	.4601208
Bachelor D.	.2084344	.2543779	.2956004	.1705499
	.4061932	.4355778	.4564168	.3762905
Professional D.	.0754328	.083871	.1044913	.0419385
	.2640912	.2772368	.3059669	.2005421
Net worth	2.372972	1.506584	1.573855	1.362206
(in $100,000)	5.356071	3.10179	3.227701	2.808744
Housing wealth	.7330686	.5760434	.5914092	.5447191
(in $100,000)	1.186714	.8211386	.7898011	.8811365
Family Inc.	50.00472	53.83516	58.09857	44.71583
(in $1,000)	162.6214	274.0054	303.4458	196.5951
Resp. Inc.	19.3242	24.55634	27.03245	19.27213
(in $1,000)	52.56738	127.0964	86.8596	185.7717
Thwkd	1132.646	1449.174	1667.331	980.4842
	1088.126	1017.862	944.9114	1011.327
% Months Worked	.596038	.7286444	.9052492	.3763242
	.4533333	.3796485	.2199182	.3858642
Searchj	.0663784	1	1	1
	.248945	0	0	0
Employee	.4483349	.5631336	.840055	0
	.4973286	.4960743	.3666391	0
Self-employed	.1102229	.1072197	.159945	0
	.3131706	.3094399	.3666391	0
Non-employed	.4414422	.3296467	0	1
	.4965642	.4701571	0	0
No Health Ins.	.0925718	.2210916	.1784729	.3077643
	.2898343	.415046	.3829984	.4617845
Gov. Health Ins.	.2968674	.1214258	.0751748	.2162485
	.4568832	.3266854	.2637501	.4119318
Employer Health Ins.	.5141016	.5213868	.6361917	.2346457
	.4998086	.4996549	.4812461	.4241112
Private Health Ins.	.2177516	.1634615	.1744563	.1411101
	.4127218	.3698436	.3795892	.3482989
Retiree Health Ins.	.8698589	.8278607	.7958478	.9097345
	.336464	.3775954	.4032203	.2868157

Table 1. Panel B: Means and Standard Deviations

Variable	Full Sample	Searchers Sub-Sample	Employed Searchers	Non-Employed Searchers
N	49,037	3,255	2,182	1,073
Hlim	.3295879	.2614439	.2218148	.3420317
	.4700683	.4394887	.4155625	.4746114
Hlimwk	.2589065	.1840246	.1333639	.2870457
	.4380386	.3875638	.3400455	.452594
Hlimpw	.1438913	.0218126	.0013749	.0633737
	.3509831	.1460937	.0370624	.2437475
Diabetes	.1148928	.0807988	.0737855	.0950606
	.3188958	.2725677	.2614815	.2934354
Hbloodp	.36293	.3155146	.3056829	.3355079
	.4808498	.4647919	.4608017	.4723879
Heart problems	.0568346	.0402458	.0362053	.0484623
	.2315287	.1965653	.1868435	.2148411
Stroke	.0184555	.00553	.0036664	.0093197
	.1345928	.0741692	.0604532	.0961323
Cancer	.040602	.025192	.0219982	.0316869
	.1973684	.156732	.146711	.1752468
Diff. walk. mb.	.1932804	.1263516	.1081454	.1635338
	.3948751	.3322965	.3106355	.3700259
Prob. Living to 85	.4700132	.4753619	.468125	.4911003
	.3149302	.323459	.3198605	.3307781
Cognitive test	6.20325	6.353351	6.602948	5.834525
	2.969172	2.958092	2.908738	2.993721
Psych. problems	.1133226	.1324117	.1264895	.1444548
	.31699	.3389899	.3324764	.3517142
Excellent Health	.1697328	.1975422	.2131072	.16589
	.3754017	.398206	.4095967	.3721553
Very Good Health	.2940037	.296467	.3240147	.2404473
	.4555982	.4567695	.4681128	.4275544
Good Health	.2940445	.3238095	.3157654	.3401678
	.4556167	.4680002	.4649265	.4739863
Fair Health	.1625943	.1471582	.1255729	.1910531
	.3689989	.354318	.3314433	.3933141
Poor Health	.0795227	.035023	.0215399	.0624418
	.2705557	.1838663	.1452087	.242069
Smoker	.2208536	.2829493	.2699358	.3094129
	.4148263	.4505012	.444028	.4624672
Drinker	.5316394	.6129032	.6301558	.5778192
	.499003	.4871609	.482873	.4941374

Table 2: Estimates of the Search Decision for the Full Sample

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-1.311349	.0602134	—	-1.644808	.0778001	—
2	White	-.0984696	.0327922	-.0117506	-.1549152	.0420382	-.0075316
3	Male	.2107605	.0292318	.024408	.2774217	.038514	.0126629
4	Married	-.1363727	.0329894	-.0166038	-.1866515	.0423103	-.0093074
5	Bachelor D.	.2148519	.0377108	.0268939	.2814783	.0497703	.0147015
6	Prof. D.	-.0725382	.0585286	-.0079022	-.1262176	.0742282	-.0050182
7	Age 55-57	-.1351336	.0315554	-.0145149	-.1739581	.0403542	-.0069553
8	Age 58-59	-.1909904	.036111	-.0196796	-.2440921	.0457989	-.0091259
9	Age 60-61	-.3116182	.0390976	-.0300193	-.4086669	.0503864	-.0136614
10	Age 62	-.5373629	.0588992	-.0423868	-.7323967	.0771508	-.0175171
11	Age 63-64	-.7031374	.055991	-.0518949	-.9122394	.0725452	-.020652
12	Age 65+	-.7279182	.059933	-.0539297	-.995826	.0786793	-.0221795
13	Income ($1,000)	.0001986	.0003629	.0000227	.0004632	.0003413	.0000205
14	Net worth ($\$10^5$)	-.0299827	.0064433	-.0034251	-.0365316	.0057541	-.0016185
15	Thwkd (100)	.0050866	.0018599	.0005811	.0055586	.0022242	.0002463
16	Workpre	.439016	.068385	.0501515	.5428996	.0761219	.0240531
17	Employee	-.4365091	.0563165	-.0513454	-.6099319	.0586353	-.029361
18	Self-employed	-.5165238	.0677824	-.0430183	-.6990721	.0758849	-.018406
19	No Health Ins.	.5394791	.0392884	.0867489	.6368924	.0496497	.0282174
20	Priv. Health Ins.	.0722717	.0319806	.0085381	.0936053	.0407163	.0041472
21	Prob. Liv. 85	.0838273	.0416719	.0095761	.1091998	.0523734	.0048381
22	Diabetes	-.0752442	.0491847	-.0081854	-.1241283	.0616677	-.0049479
23	Diff. Walk-MB.	-.0660009	.0451498	-.0072683	-.1181526	.0542384	-.0052347
24	Psych. Prob.	.2843595	.0426251	.0389257	.3452622	.0520882	.0206444
25	Hlimwk	-.0253576	.0405455	-.0028632	-.0547475	.0487471	-.0023467
26	Fair Health	-.0863849	.0407679	-.0093914	-.1037574	.0511101	-.004597
27	Poor Health	-.4136804	.0796818	-.0351412	-.5371812	.0974483	-.0237997
	Log L/Obs./Avg. Prob.	-7125.95	30,059	0.05688	-6825.72	30,059	0.01802
	Pseudo-R^2			0.0762			0.0667

Table 3: Estimates of the Search Decision for Employed

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-.7675122	.0968853	—	-1.079887	.1298443	—
2	White	-.0558099	.0397729	-.0075266	-.0926247	.0522477	-.005106
3	Male	.2125862	.0353314	.0280867	.2729713	.047246	.0144156
4	Married	-.1295755	.0387932	-.0180318	-.1807916	.0516942	-.0105043
5	Bachelor D.	.2163493	.0434029	.0307193	.2909782	.0585054	.0175358
6	Prof. D.	-.0103438	.0640986	-.0013541	-.0311854	.0838316	-.0015891
7	Age 55-57	-.1374523	.0361216	-.017197	-.1846686	.0468926	-.0088097
8	Age 58-59	-.2456852	.0423678	-.0287049	-.3118328	.0551187	-.0133646
9	Age 60-61	-.3415421	.0469147	-.0376486	-.4605544	.0621337	-.0177066
10	Age 62	-.5220216	.0752962	-.0483261	-.7341037	.1011684	-.0206509
11	Age 63-64	-.6972037	.075099	-.0586163	-.9493397	.1000848	-.0236975
12	Age 65+	-.6874777	.0839314	-.0571908	-.9322106	.1138671	-.0228417
13	Income ($1,000)	.0000193	.0004738	2.54e-06	.0001697	.0003607	8.86e-06
14	Net worth (10^5)	-.0234306	.0068207	-.003086	-.0294808	.0066616	-.00154
15	Thwkd (100)	-.0033854	.0020582	-.0004459	-.0057885	.0025411	-.0003024
16	Workpre	-.4990382	.0827805	-.0657272	-.570332	.1096268	-.0297924
17	Self Employed	-.1268104	.0473415	-.0156988	-.1655835	.0605062	-.0077693
18	No Health Ins.	.4306629	.0504455	.073618	.5105391	.0650251	.026669
19	Priv. Health Ins.	.0838215	.0377178	.0114796	.1000474	.0498258	.0052262
20	Prob. Liv. 85	.0762857	.0503857	.0100474	.0805981	.06471	.0042102
21	Diabetes	-.0276085	.0605626	-.0035727	-.0691656	.0776839	-.0034043
22	Diff. Walk-MB	.0588005	.057278	.0080323	.0495002	.0716132	.0025857
23	Psych. Prob.	.3527808	.0542511	.0578518	.4250376	.066334	.032167
24	Hlimwk	.1373785	.0487638	.0196457	.1746249	.0645965	.0105341
25	Fair Health	-.0448644	.0499509	-.0057537	-.0261295	.0656639	-.0013649
26	Poor Health	-.1343585	.122192	-.0160436	-.1613421	.1577787	-.008428
	Log L/Obs./Avg. Prob.	-4970.87	19,085	0.06827	-4750.93	19,085	0.02187
	Pseudo-R^2			0.0513			0.04243

Table 4: Estimates of the Search Decision for Non-Employed

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-1.087999	.0969509	—	-1.408567	.1428295	—
2	White	-.2415586	.0547793	-.0180395	-.3126178	.0739918	-.0068829
3	Male	.2466042	.0519724	.0169831	.3274242	.0709756	.0063026
4	Married	-.2067273	.0595329	-.0153897	-.2832588	.0776915	-.0062707
5	Bachelor D.	.1679575	.0704948	.0122802	.2279499	.0979212	.0048622
6	Prof. D.	-.3052894	.1207783	-.0155728	-.396277	.1623902	-.0045947
7	Age 55-57	-.2342588	.0688568	-.0131951	-.2935426	.0936532	-.0040311
8	Age 58-59	-.220047	.0728693	-.0124398	-.3130835	.0989832	-.0041912
9	Age 60-61	-.4076606	.0750916	-.0207559	-.5426502	.1027131	-.0063075
10	Age 62	-.8141864	.1078912	-.0295251	-1.081908	.1445421	-.0077778
11	Age 63-64	-.9152571	.0944832	-.0353415	-1.211276	.1324816	-.0100172
12	Age 65+	-.8645099	.0935105	-.0382197	-1.180734	.135326	-.0119723
13	Income ($1,000)	.0026508	.0018663	.0001743	.0038321	.0024215	.0000673
14	Unempwc ($1,000)	.0453106	.0069416	.0029795	.0602036	.009711	.0010568
15	Net worth (10^5)	-.0446247	.0166734	-.0029344	-.0577783	.0123152	-.0010142
16	Thwkd (100)	.0319096	.0042488	.0020983	.0405085	.0059785	.0007111
17	Workpre	.4024532	.0889953	.0264643	.4618757	.1279755	.0081075
18	No Health Ins.	.5460038	.0615689	.0547488	.7051366	.0893571	.0123776
19	Priv. Health Ins.	-.0132017	.0628958	-.0008625	-.0059621	.0801411	-.0001047
20	Prob. Liv. 85	.0929281	.0753905	.0061107	.1345246	.0975807	.0023614
21	Diabetes	-.1856367	.085353	-.0106981	-.246262	.1104627	-.0034578
22	Diff. Walk-MB	-.1958279	.0724082	-.0118407	-.2692654	.090709	-.0047265
23	Psych. Prob.	.1290073	.0713157	.0092901	.1736297	.0931632	.0035914
24	Hlimwk	-.1846065	.0667545	-.0118039	-.235452	.0802331	-.0039667
25	Fair Health	-.1489603	.0741007	-.0090099	-.2127556	.0898252	-.0037346
26	Poor Health	-.5012571	.1116626	-.0231601	-.6824089	.1427005	-.0119787
	Log L/Obs./Avg. Prob.	-1885.40	10,974	0.02879	-1859.60	10,974	0.006219
	Pseudo-R^2			0.2316			0.2141

Table 5: Estimates of the Search Decision for Employed Males

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-.7818634	.1490506	—	-1.154751	.2048596	—
2	White	-.035989	.0581958	-.0051276	-.0756636	.0794199	-.0041166
3	Married	.039609	.0644283	.0054374	.0476798	.0881807	.0023887
4	Bachelor D.	.1905098	.0594592	.0281944	.2784686	.0834346	.0162349
5	Prof. D.	.0177401	.0868211	.002512	-.0400748	.1145854	-.0020192
6	Age 55-57	-.1105258	.0523114	-.0148727	-.1510066	.0696467	-.0072596
7	Age 58-59	-.1736905	.0589996	-.0224639	-.2472124	.0790842	-.0109862
8	Age 60-61	-.2745917	.064098	-.0336156	-.407213	.087696	-.0162041
9	Age 62	-.5125859	.1003169	-.0515817	-.7579335	.1390544	-.0210598
10	Age 63-64	-.637904	.0960864	-.0607406	-.8900781	.1308788	-.023615
11	Age 65+	-.6367177	.1019349	-.0603342	-.8967244	.1420633	-.0234416
12	Income ($1,000)	.0001954	.0004118	.0000274	.0004481	.0003943	.0000233
13	Net worth (10^5)	-.019448	.0079725	-.0027277	-.0256433	.0080543	-.0013316
14	Thwkd (100)	-.0036959	.0026815	-.0005184	-.0058062	.0034369	-.0003015
15	Workpre	-.4604551	.1218117	-.0645806	-.523484	.1677462	-.0271831
16	Self Employed	-.139628	.0607014	-.018523	-.1901614	.0801422	-.0089103
17	No Health Ins.	.3959523	.073229	.0701799	.4957389	.0978587	.0257424
18	Priv. Health Ins.	.0455343	.0526617	.0065194	.0555557	.072311	.0028849
19	Prob. Liv. 85	.0425957	.0738148	.0059742	.0560113	.092767	.0029085
20	Diabetes	.0214676	.0803303	.0030503	-.025014	.1039155	-.0012717
21	Diff. Walk-MB	.136927	.0843645	.020919	.1375967	.1113755	.007145
22	Psych. Prob.	.4428233	.0856905	.0816438	.5554023	.1056958	.0476253
23	Hlimwk	.1421787	.0665867	.0216435	.2387812	.0906615	.0150828
24	Fair Health	-.0561983	.067683	-.0076293	-.0592244	.0949041	-.0030754
25	Poor Health	-.1074072	.1577872	-.0139656	-.1975458	.2124041	-.010258
	Log L/Obs./Avg. Prob.	-2599.32	9,492	0.07409	-2460.98	9,492	0.02172
	Pseudo-R^2			0.0453			0.0393

Table 6: Estimates of the Search Decision for Employed Females

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-.5477837	.1327233	—	-.7570267	.1701363	—
2	White	-.072376	.0548961	-.0088966	-.1026739	.069117	-.0055941
3	Married	-.2484703	.0522355	-.032041	-.3278272	.0652659	-.0194395
4	Bachelor D.	.2909811	.063961	.0392392	.3639844	.0838371	.0230828
5	Prof. D.	.0112719	.0947192	.0013543	.0579459	.1259096	.0031344
6	Age 55-57	-.1701419	.0507296	-.0190342	-.2163491	.0635303	-.010054
7	Age 58-59	-.3418961	.0630738	-.0342113	-.3977446	.0781196	-.0158837
8	Age 60-61	-.449039	.0712926	-.041797	-.5516837	.090286	-.019573
9	Age 62	-.5451578	.1153327	-.0441172	-.7165955	.1495979	-.0198783
10	Age 63-64	-.8139593	.1280657	-.0555691	-1.065841	.1615252	-.0235145
11	Age 65+	-.8327763	.1631611	-.0542594	-1.063684	.2107693	-.0222271
12	Income ($1,000)	-.0073315	.0020952	-.0008745	-.0094094	.0022798	-.0004846
13	Net worth (10^5)	-.0316712	.0100013	-.0037776	-.0384185	.012351	-.0019785
14	Thwkd (100)	.0006022	.0031812	.0000718	-.0017875	.0040423	-.0000921
15	Workpre	-.5323853	.1136063	-.0635004	-.5835926	.1442383	-.0300538
16	Self Employed	-.091767	.0780836	-.0103688	-.1249818	.0939154	-.0058538
17	No Health Ins.	.4180308	.0712916	.0649916	.4724327	.0875967	.0243293
18	Priv. Health Ins.	.1287919	.054198	.016355	.1532847	.0686104	.0078938
19	Prob. Liv. 85	.1248864	.0685115	.0148958	.1255829	.0904448	.0064672
20	Diabetes	-.1156853	.0913241	-.0127529	-.1464327	.1179477	-.0066332
21	Diff. Walk-MB	-.0013825	.078852	-.0001648	-.008795	.0930862	-.0004529
22	Psych. Prob.	.2996831	.0711562	.0431496	.3510759	.0845286	.0242907
23	Hlimwk	.1149918	.0717828	.0147499	.0954661	.0925779	.0053225
24	Fair Health	-.0572125	.07354	-.0065874	-.0272848	.0911663	-.0014051
25	Poor Health	-.2205646	.1968396	-.0222162	-.1985494	.2432208	-.0102249
	Log L/Obs./Avg. Prob.	-2342.54	9,593	0.06009	-2265.036	9,593	0.02151
	Pseudo-R^2			0.0681			0.05501

Table 7: Estimates of the Search Decision for Non-Employed Males

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-.722707	.1626504	—	-.8491066	.2030333	—
2	White	-.296958	.0805966	-.0214422	-.3510425	.1030963	-.0110162
3	Married	.0718717	.0977593	.0042139	.0701553	.1182228	.0016372
4	Bachelor D.	.3574389	.096849	.0271215	.438237	.1304086	.0150056
5	Prof. D.	-.3388775	.1628051	-.0158433	-.3893089	.1989136	-.0066272
6	Age 55-57	-.3319628	.1243143	-.0159354	-.3948122	.1542977	-.0068932
7	Age 58-59	-.2152036	.123409	-.011318	-.3102771	.1558273	-.0058698
8	Age 60-61	-.4736309	.1243476	-.0212479	-.5986929	.1621218	-.0093831
9	Age 62	-.9390606	.1586357	-.0294405	-1.179092	.2054268	-.0117636
10	Age 63-64	-1.09104	.14469	-.038134	-1.367447	.1976114	-.0166149
11	Age 65+	-1.183109	.147396	-.0569656	-1.479149	.203212	-.0293675
12	Income ($1,000)	.0052161	.0021518	.000321	.0061941	.0028471	.0001531
13	Unempwc ($1,000)	.0483772	.009062	.0029767	.0596287	.0125253	.0014735
14	Net worth ($10^5)	-.0998794	.0211241	-.0061457	-.1193288	.0243759	-.0029487
15	Thwkd (100)	.0232605	.0059189	.0014312	.0279469	.0079015	.0006906
16	Workpre	.2098235	.1345921	.0129107	.2137753	.1833793	.0052825
17	No Health Ins.	.8039844	.0957032	.0940459	.9727719	.1353545	.0240379
18	Priv. Health Ins.	.000976	.0980854	.0000601	-.0096181	.1166312	-.0002377
19	Prob. Liv. 85	.0469758	.1130172	.0028905	.0745426	.1381274	.001842
20	Diabetes	-.2263304	.1228117	-.0119562	-.2527509	.1458038	-.0050979
21	Diff. Walk-MB	-.3078347	.1204926	-.0165787	-.3788997	.1359318	-.0093629
22	Psych. Prob.	.0465457	.1263505	.0029705	.0535886	.1553998	.0013941
23	Hlimwk	-.2579244	.102419	-.0155676	-.2928979	.114849	-.0070881
24	Fair Health	-.2751213	.1142457	-.014619	-.375264	.1348262	-.009273
25	Poor Health	-.5955148	.1667487	-.024445	-.7617967	.1946322	-.0188245
	Log L/Obs./Avg. Prob.	-811.83	4,548	0.02658	-805.21	4,548	0.00917
	Pseudo-R^2			0.2972			0.2801

Table 8: Estimates of the Search Decision for Non-Employed Females

No.	Variable	Probit			Random Effects Probit		
		Estimate	St.Error	Marg.Eff.	Estimate	St.Error	Marg.Eff.
1	Constant	-1.150532	.1255105	—	-1.600407	.2086076	—
2	White	-.1892943	.0758208	-.0133922	-.2577009	.1065933	-.0037057
3	Married	-.3143853	.0782844	-.0239889	-.4404084	.1092952	-.0074908
4	Bachelor D.	-.0022199	.1019329	-.0001419	.0162438	.15208	.0001946
5	Prof. D.	-.2895788	.1971941	-.0144436	-.4451764	.2676665	-.0031872
6	Age 55-57	-.2079845	.0843742	-.0117267	-.2695333	.1220836	-.0025583
7	Age 58-59	-.3004653	.0947681	-.015752	-.4069943	.1363506	-.0033837
8	Age 60-61	-.4383748	.0980104	-.0215383	-.585659	.1402053	-.004456
9	Age 62	-.7214066	.14978	-.0268761	-.991281	.2099965	-.0048698
10	Age 63-64	-.8472956	.1314316	-.0319139	-1.141228	.1876261	-.0060645
11	Age 65+	-.6166057	.1231924	-.0264642	-.9139523	.1885129	-.0054287
12	Income ($1,000)	.0028013	.0039129	.0001793	.0055162	.0051378	.0000651
13	Unempwc ($1,000)	.039989	.0103298	.0025594	.0542538	.0155927	.0006401
14	Net worth (10^5)	-.0240611	.0158469	-.00154	-.0326024	.0144371	-.0003846
15	Thwkd (100)	.0372569	.0064657	.0023846	.0489017	.0093236	.0005769
16	Workpre	.5035875	.1203167	.0322311	.6226389	.1826722	.0073456
17	No Health Ins.	.3755425	.0838748	.0320447	.4998924	.1234967	.0058975
18	Priv. Health Ins.	-.007953	.0825786	-.000507	.0206063	.1111059	.0002431
19	Prob. Liv. 85	.118616	.1029464	.0075918	.1817157	.1391748	.0021438
20	Diabetes	-.160931	.119789	-.00913	-.2807899	.1684243	-.002506
21	Diff Walk-MB	-.1400765	.092712	-.0084406	-.220018	.1246441	-.0025957
22	Psych. Prob.	.1389513	.0864288	.009751	.2019559	.120885	.0028843
23	Hlimwk	-.1611454	.0908769	-.0099788	-.2271994	.1130976	-.0025316
24	Fair Health	-.0597228	.0978897	-.0036902	-.057972	.1242422	-.0006839
25	Poor Health	-.4627141	.1534134	-.0211322	-.617396	.2090889	-.0072838
	Log L/Obs./Avg. Prob.	-1032.41	6,426	0.02787	-1014.62	6,426	0.00398
	Pseudo-R^2			0.1994			0.1823

Figure 4: Simulated Search over the Life Cycle

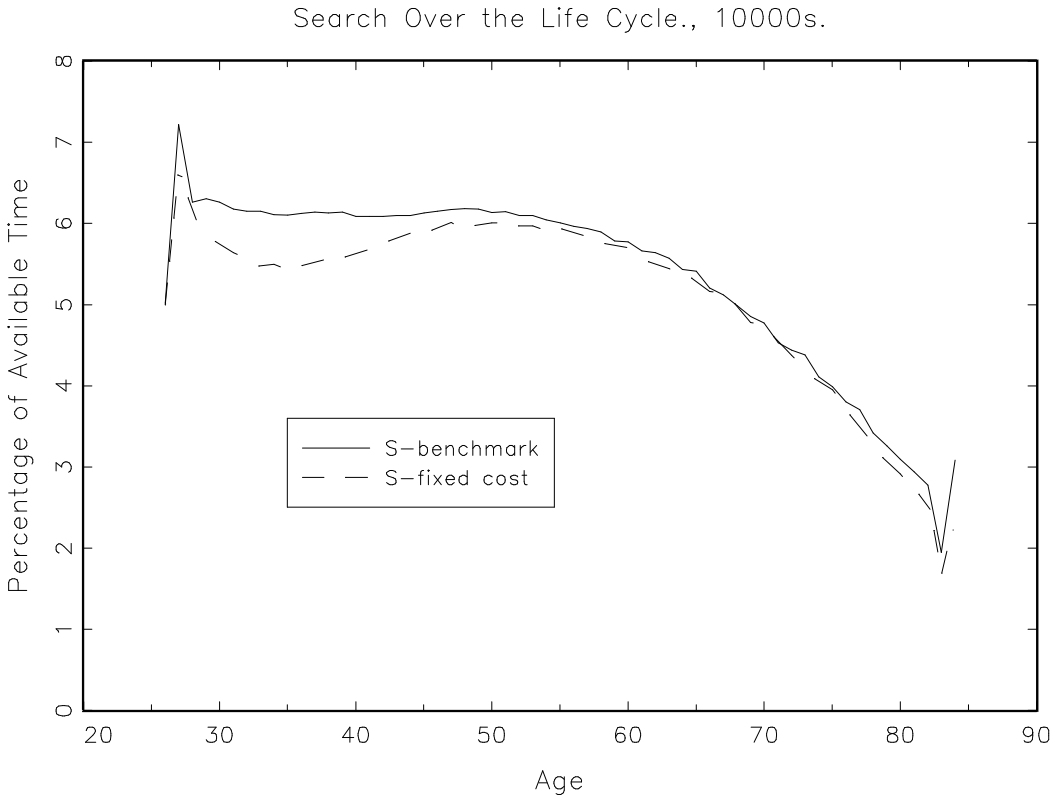


Figure 5: Simulated Search over the Life Cycle

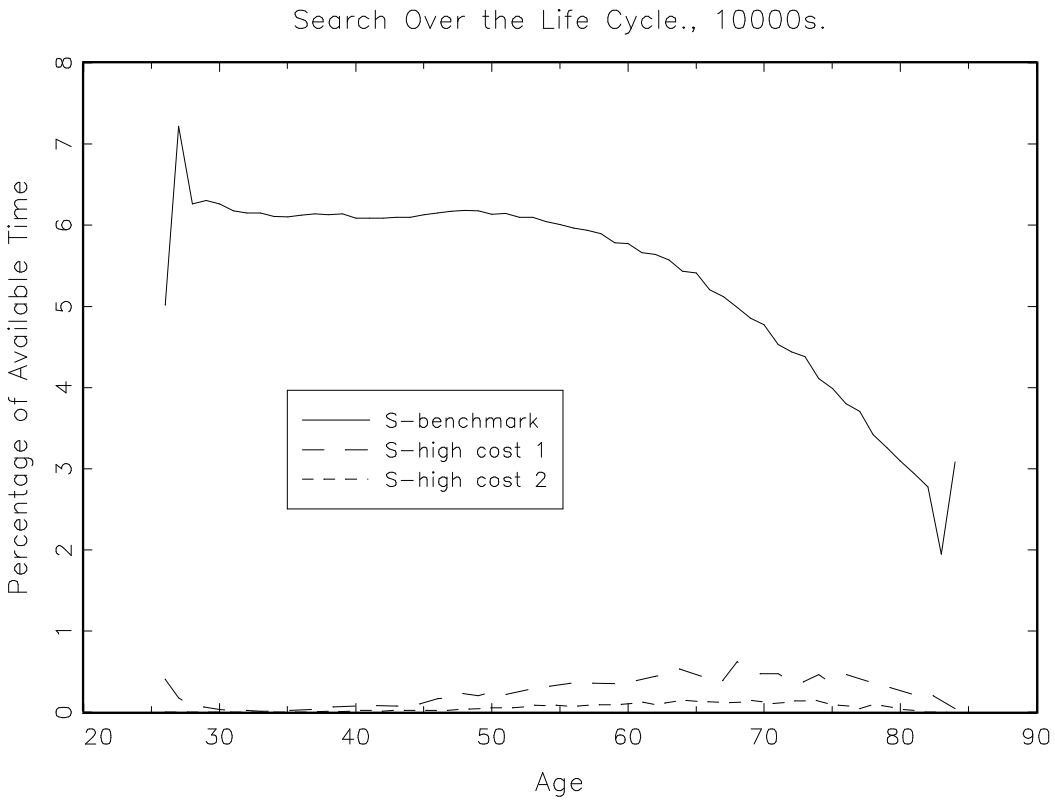


Figure 6: Simulated Search over the Life Cycle

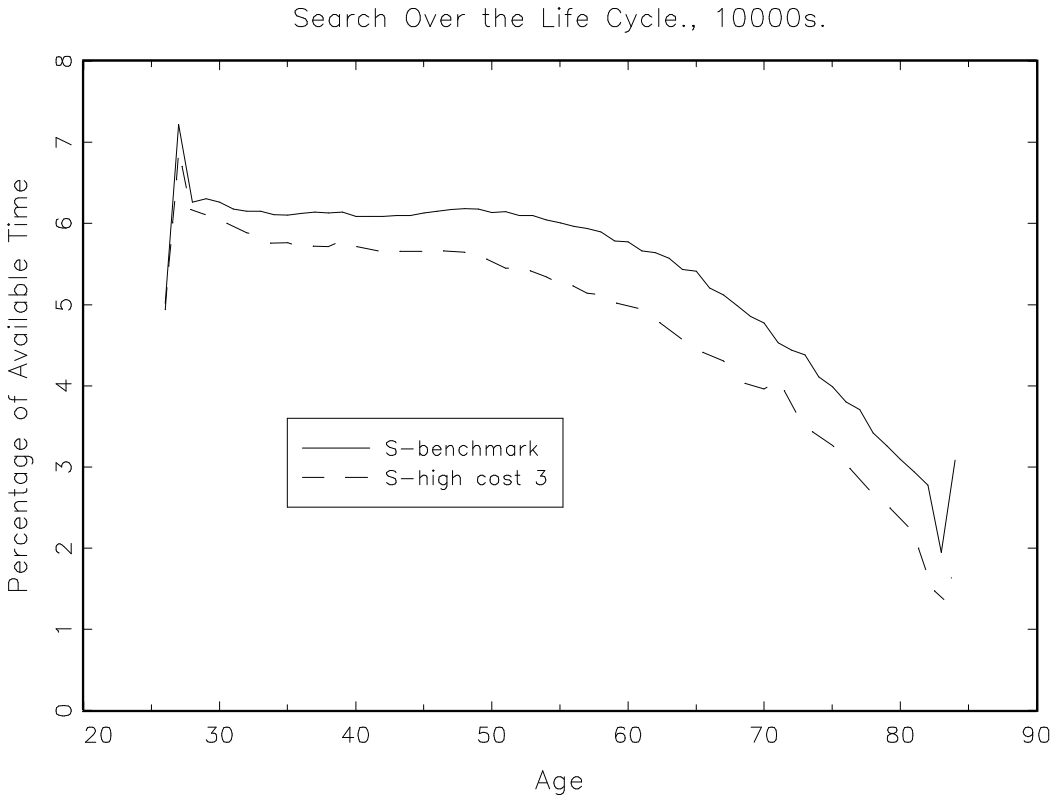


Figure 7: Simulated Search over the Life Cycle

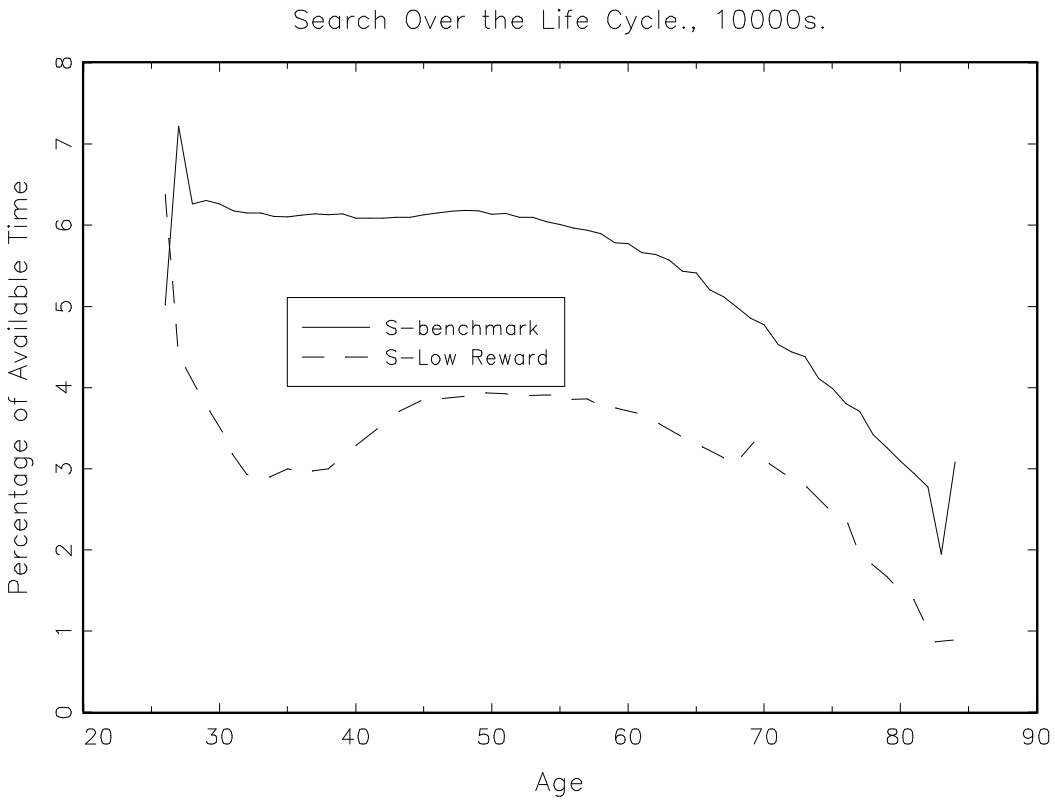


Figure 8: Simulated Search over the Life Cycle, with S.S.

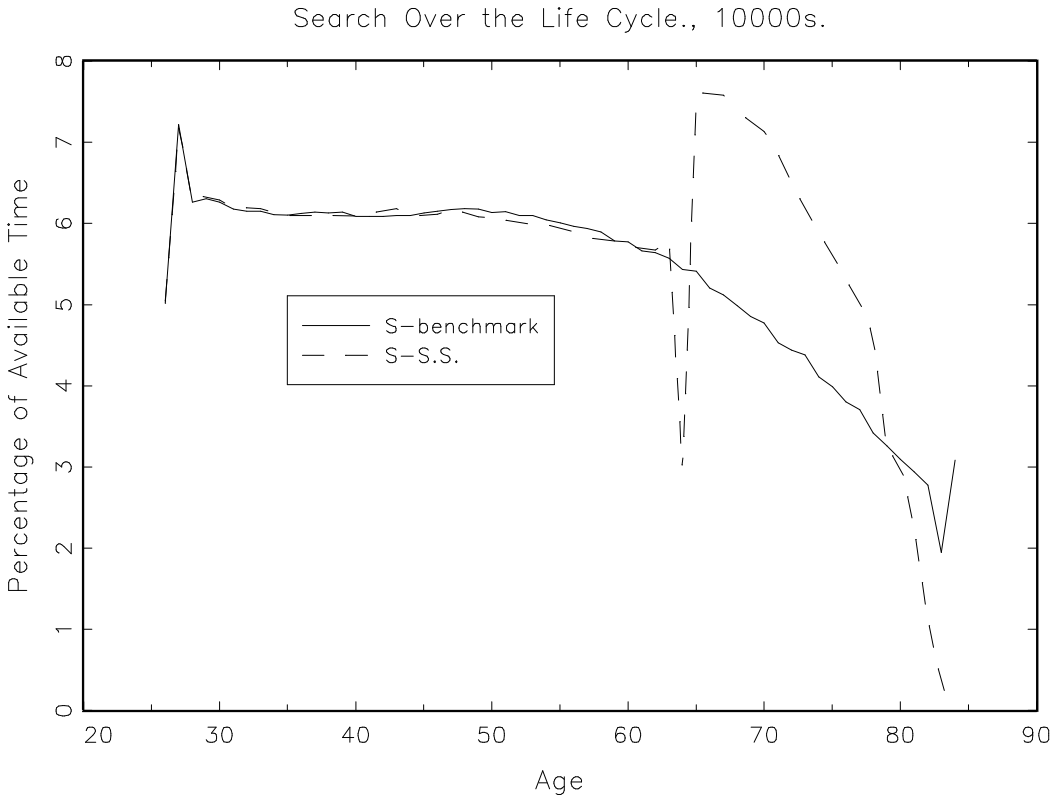


Figure 9: Simulated Labor Supply. Search Model.

Figure 10: Simulated Labor Supply. Search Model with S.S.

Figure 11: Simulated Consumption. Search Model.

Figure 12: Simulated Consumption. Search Model with S.S.

Figure 13: Simulated Wealth Accumulation. Search Model.

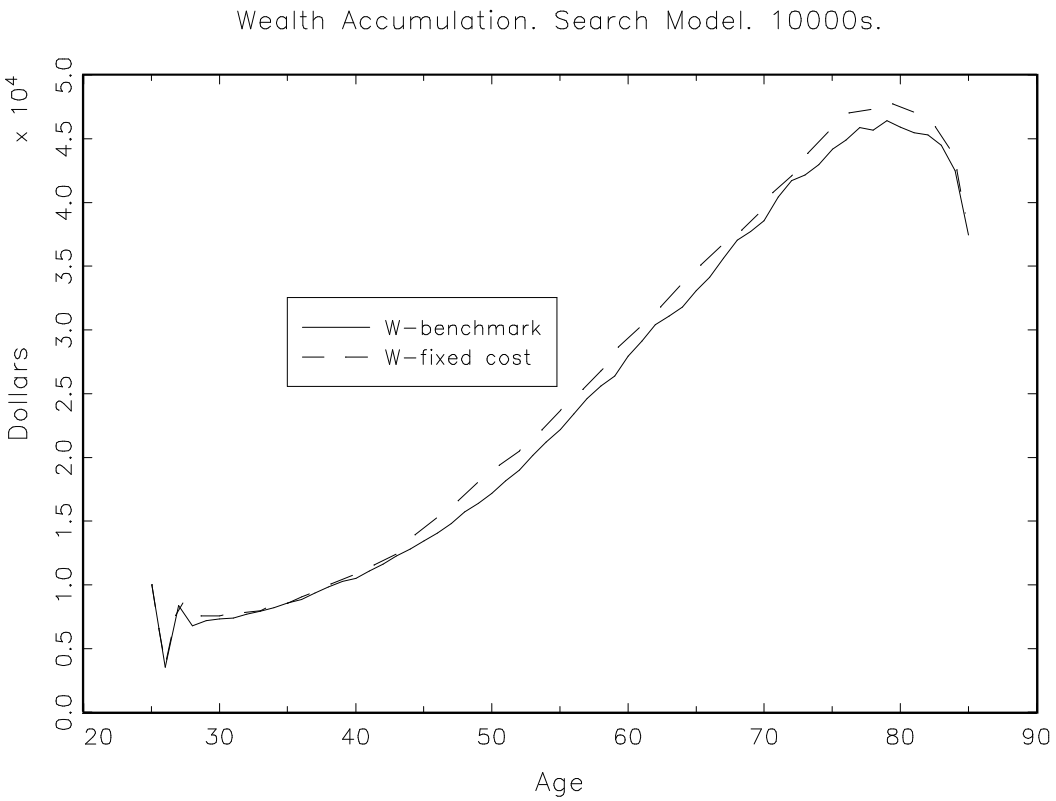


Figure 14: Simulated Wealth Accumulation. Search Model.

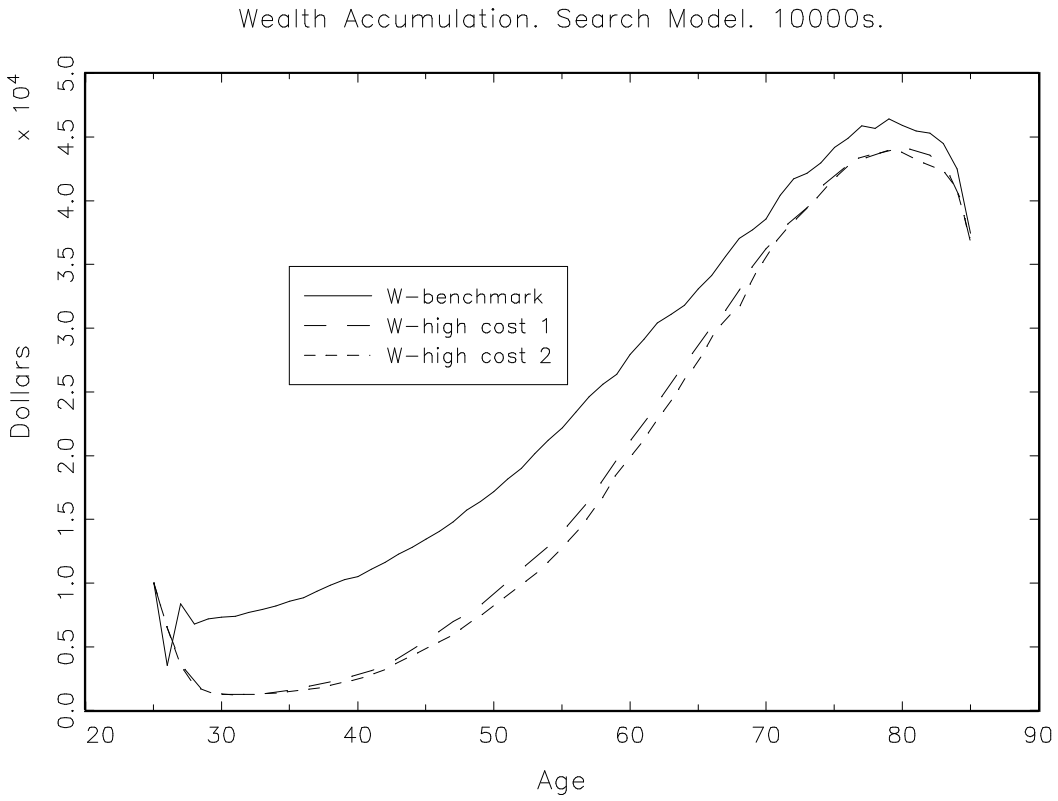


Figure 15: Simulated Wealth Accumulation. Search Model.

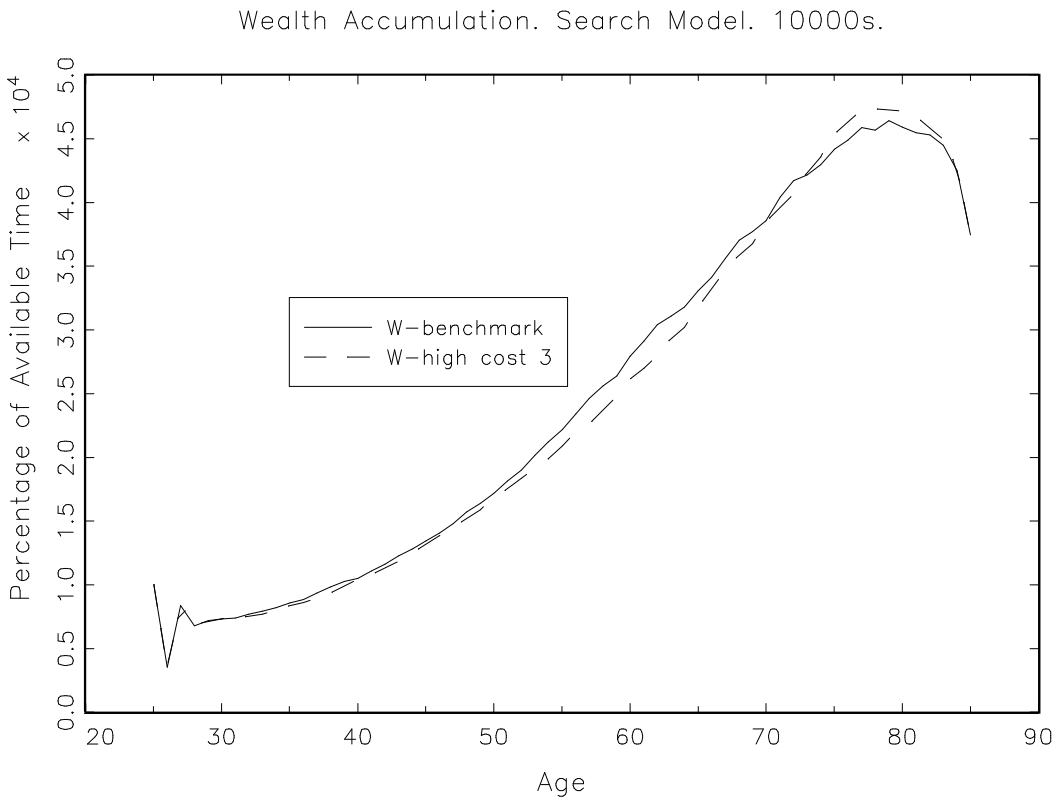


Figure 16: Simulated Wealth Accumulation. Search Model.

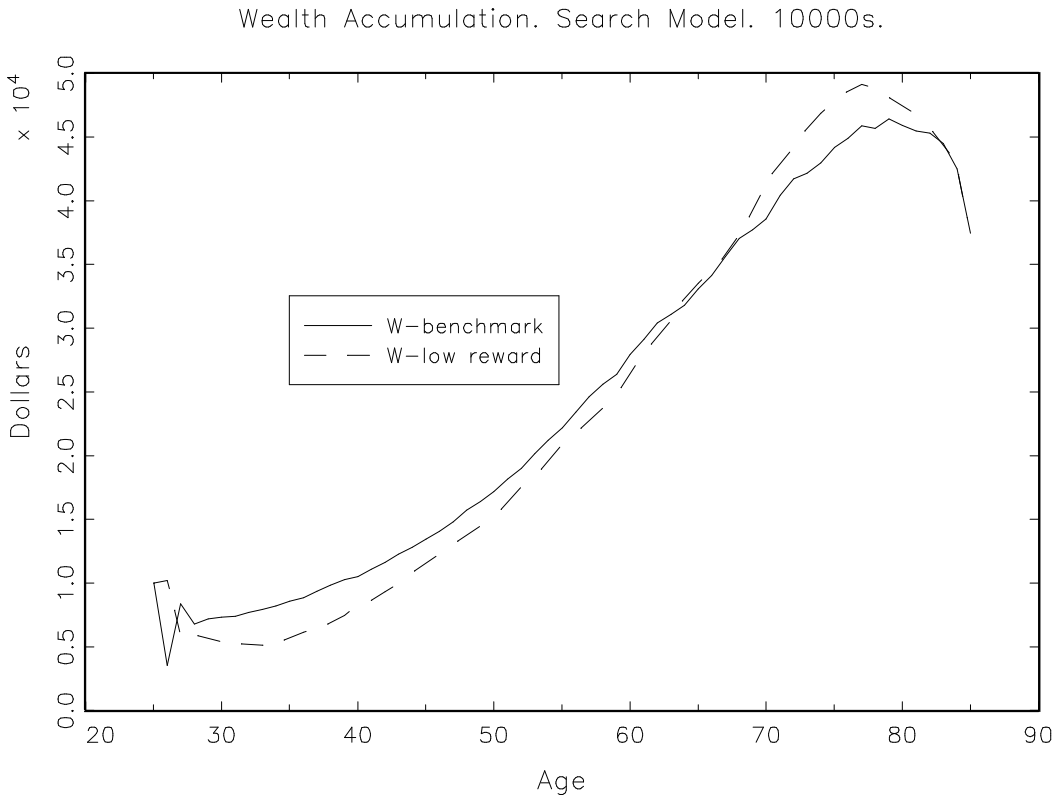
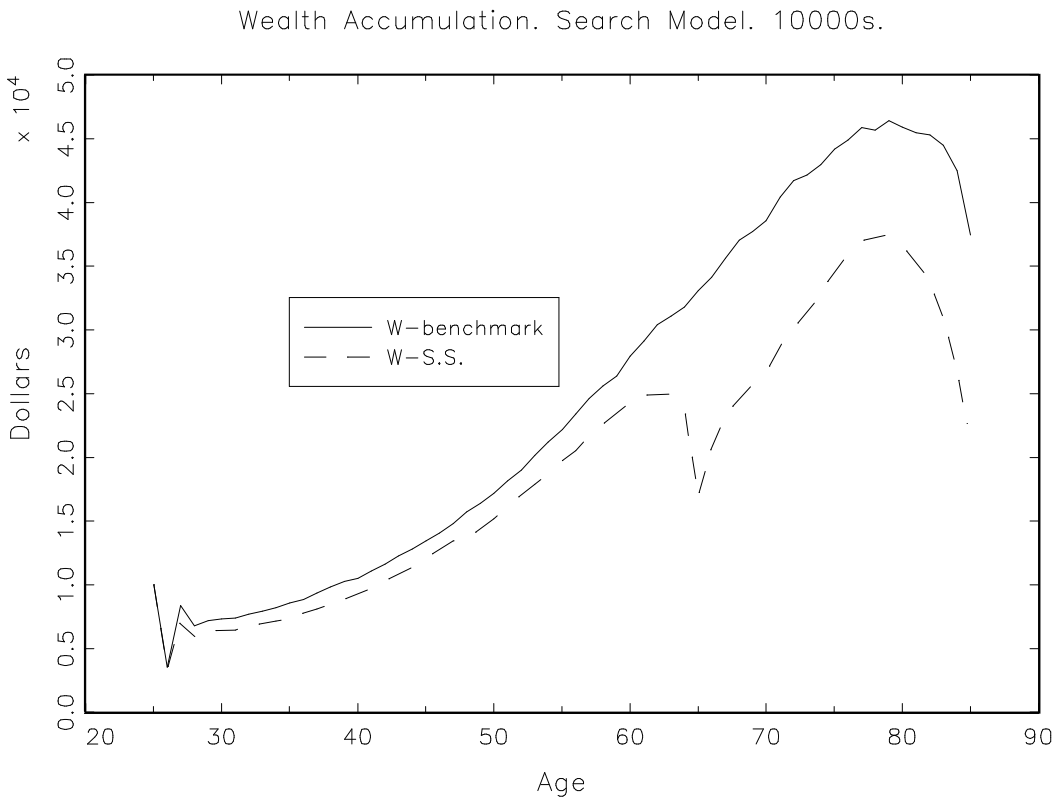


Figure 17: Simulated Wealth Accumulation. Search Model with S.S.



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