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Job Search Outcomes for the Employed and Unemployed

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This paper examines how four components of the job search process—the choice of search methods, the choice of how many firms to contact, the rate at which offers are received, and the acceptance or rejection of an offer—influence the job-finding rate. A reduced-form model of job search is estimated that takes account of the fact that users of a particular method of job search are not a random subset of all searchers. The empirical analysis focuses on differences in search behavior between the employed and unemployed. A key finding of the analysis is that the offer rate per contact is greater for employed searchers than for unemployed searchers. This may be due to differences in the effectiveness of search while employed versus unemployed or to unobserved differences in search effort. Further research on this issue is needed because many models of job search behavior are based on the assumption that job search is more effective when one is unemployed.

I. Introduction

Individuals searching for a job have a number of choices to make concerning the search process. These choices include which methods

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of search to use, how much effort to devote to each method of search, which firms to contact first, how many offers to collect before making an acceptance decision, and a criterion for deciding what constitutes an acceptable offer. Models of job search have supplied theories of many of these choices. These theories specify an objective function to be maximized, such as the expected discounted value of wealth or utility, and the constraints on the maximization, such as search costs or search technology and the budget set, and they derive rules for optimal choices from the constrained maximization problem. Search theories following this approach have been used to model the choice of acceptance criterion (e.g., Lippman and McCall 1976), search intensity and the number of offers to collect (Gal, Landsberger, and Levykson 1981; Benhabib and Bull 1983; Morgan 1983; Stern 1989), and which firms to contact first (Salop 1973). A considerable amount of empirical research has been based on such models. Some recent empirical studies have estimated the parameters of structural job search models (e.g., Flinn and Heckman 1982; Jensen and Westergård-Nielsen 1987; Wolpin 1987; Blau 1989b; Stern 1989). The most common empirical approach to job search behavior, however, is estimation of reduced-form models in which particular job search outcomes, such as the duration of search and the accepted wage, are regressed on characteristics of the searchers and the search environment.

Despite the large number of studies addressing specific aspects of the job search process, no single study has provided a consistent framework for separating out the effects of searcher characteristics on the different stages of the search process that ultimately determine the job-finding rate. In this study, we provide a consistent framework for analyzing four components of the search process: the choice of search methods, the choice of how many firms to contact given that a particular set of search methods is used, the rate at which offers are received given the contact rate, and the decision to accept an offer given the offer rate. These four components together determine the job-finding rate.

In addition to developing a consistent empirical model of these four aspects of the job search process, we address an issue that has received some attention in the recent job search literature: the relative effectiveness of employed versus unemployed search. This issue is important because the validity of the theory of search unemployment rests implicitly on the notion that unemployed search is more effective than employed search. As Clark and Summers (1979) have noted, if searching while employed is as effective as searching while unemployed, then the optimal strategy for a person seeking a new job is to accept the first offer received and to continue to search while em-
ployed. Thus an empirical examination of the relative effectiveness of employed and unemployed search should shed some light on the validity of the theory of search unemployment.

Surprisingly few empirical studies have examined the effectiveness of employed and unemployed search. One study, by Holzer (1987b), finds considerable evidence that searching while unemployed is more effective than searching while employed. Using data for youth from the 1981 panel of the National Longitudinal Survey (NLS), Holzer finds that the unemployed search more extensively (use more methods of search), search more intensively (search longer hours), collect more offers, and accept more offers. Overall, unemployed searchers are more than twice as likely to gain new employment as employed searchers. Holzer interprets his findings as providing considerable support for the theory of search unemployment.

In this paper, we follow Holzer’s approach of examining a broad range of search outcomes in order to analyze the relative effectiveness of employed and unemployed search. Our study differs from Holzer’s in several ways. First, we utilize a different data set and analyze a slightly different set of search outcomes. Second, we extend Holzer’s analysis by including adults as well as youth. Third, as indicated above, our empirical analysis provides a consistent framework for separating out the effects of observed searcher characteristics on the various components of the search process that determine the job-finding rate.

In general, we find fairly small differences in the search behavior of employed and unemployed individuals. For some dimensions of job search, we find that employed search appears more effective than unemployed search. In particular, contrary to the findings of Holzer, we find that employed searchers are significantly more likely to generate job offers and are significantly more likely to find new employment than unemployed searchers, even though they tend to use fewer methods of job search and contact fewer firms.

Our results raise some questions about the theory of search unemployment (see Lippman and McCall 1976) that need to be addressed in future studies. Is employed search really more effective than unemployed search, or is the difference accounted for by unobserved characteristics related to search effort that are correlated with employment status? If employed search is more effective than unemployed search, then why don’t unemployed searchers simply accept the first offer they receive and continue to search while employed? Our results indicate that unemployed searchers reject a sizable number of offers, and after accepting a job, most quit searching.

The remainder of this paper is organized as follows. Section II describes the data used to estimate the search model. Section III
presents basic search patterns for the employed and unemployed. Section IV presents the estimation results. Section V concludes the paper.

II. Data

The data used in this study are from the Employment Opportunity Pilot Projects (EOPP) baseline household survey. The EOPP survey collected data from a sample of almost 30,000 families in 20 geographically dispersed sites throughout the United States, from April through October 1980. The purpose of the survey was to provide baseline data in pilot and control sites for an evaluation of EOPP, which provided intensive job search assistance and training to low-income individuals in the pilot sites. The EOPP program was phased out in 1981, but the baseline survey provides a rich source of data for the analysis of job search behavior.

The EOPP survey collected retrospective information on a variety of job search activities for the period January 1979 to the date of the interview (April–October 1980). This paper makes use of the subsample of married men, married women, single women, and teenagers (aged 16–19) who reported experiencing at least one spell of job search (either employed or unemployed) during the period covered by the longitudinal labor market history. The sample includes both complete and incomplete spells of employment and unemployment. Only spells with known starting dates are included in the sample.

1 The EOPP survey is not a random sample of the populations in the sites. In particular, it oversampled low- and middle-income families because the pilot projects were testing a program targeted to welfare and welfare-eligible families. However, high-income families were represented in the sample so that sample truncation is not a problem. As Blau and Robins (1986b) point out, employment and unemployment rates in the EOPP sample are quite similar to aggregate rates prevailing at the time of the survey (1980–81).

2 The baseline survey was conducted during the early stages of EOPP, and it is unlikely that the individuals surveyed had yet responded to the program. Hence, for purposes of analysis, the data from families in the pilot sites may be viewed as preprogram. It should be noted that the results in this paper refer to a particular sample and time period and may not be generalizable to other samples or time periods.

3 We use the most recent job search spell to minimize problems of recall. In addition, if a given search spell overlaps with periods of both employment and unemployment, we exclude the spell from the analysis. We do this because the timing of the information on contacts, offers, etc., is not given and it is not possible to attribute the search information to the employment or unemployment part of the spell. Very few search spells overlap with periods of both employment and unemployment. For example, only about 7 percent of all unemployment search spells become employment search spells (see Blau 1989a).

4 We exclude left-censored spells from the analysis because several of the search outcomes examined are constructed using the observed length of the spell, and it is not
For each job search spell, the survey gathered information on the start and end dates of the spell (the end date is the interview date if the spell was still in progress at the time of the survey), the methods of job search used by the searcher, the number of contacts made using each method, the number of offers obtained using each method, and the acceptance or rejection of an offer using each method. The job search methods identified in the survey include the state employment service (SES), private employment agencies (PEA), friends and relatives (FRND), newspapers and other periodical advertisements (NEWS), direct employer contact (EMP), and a variety of other infrequently used methods that we have subsumed under a single heading (OTH). For each method of job search, the total reported numbers of contacts, offers received, and acceptances during the spell are divided by the length of the spell to compute the average weekly contact, offer, and acceptance rates.

III. Basic Search Patterns by the Employed and Unemployed

Table 1 reports basic statistics on the utilization rates of each method of job search by both the employed and unemployed. The utilization rates are given separately for each demographic group and for all the groups combined. Also reported are the results of tests of differences in the utilization rates between employed and unemployed searchers.

As table 1 indicates, there is a sizable number of employed search spells, although they represent only about 10 percent of all employment spells in the EOPP data base. For men, roughly one-third of the search spells occur during employment, while for women (married and single) and teenagers, about one-fifth and one-tenth, respectively, occur during employment. The number of search methods used is very similar for employed and unemployed searchers, averaging 1.9 methods for employed searchers and 2.1 methods for unemployed searchers. This difference, however, is statistically significant at the 1 percent level. In contrast, Holzer (1987b) finds a somewhat larger difference in the number of search methods used by youth. He reports that employed searchers use about 2.7 methods per month while unemployed searchers use about 3.3 methods. Our data indicate virtually no difference in the number of search methods used by cleared that the search information given in the EOPP survey applies to only the uncensored portion of the spell.

5 Included in the OTH category are school placement officers/teachers or professors, community action groups, urban league, welfare agencies, local CETA or WIN program, labor unions, civil service test or federal job application, and other (unspecified) methods.
## Use of Various Methods of Job Search

<table>
<thead>
<tr>
<th>Group</th>
<th>Sample Size</th>
<th>Percentage Using</th>
<th>Average Number of Methods Used</th>
<th>Average Observed Length of Spell (Weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SES</td>
<td>PEA</td>
<td>FRND</td>
</tr>
<tr>
<td>Married men:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>937</td>
<td>28</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1,983</td>
<td>46</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td></td>
<td>-9.49***</td>
<td>1.37</td>
<td>-.94</td>
</tr>
<tr>
<td>Married women:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>341</td>
<td>23</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1,413</td>
<td>36</td>
<td>8</td>
<td>26</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td></td>
<td>-4.75***</td>
<td>3.11***</td>
<td>1.12</td>
</tr>
<tr>
<td>Single women:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>422</td>
<td>27</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1,657</td>
<td>41</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td></td>
<td>-5.97***</td>
<td>2.03**</td>
<td>.95</td>
</tr>
<tr>
<td>Teenagers:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>167</td>
<td>19</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1,464</td>
<td>25</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td></td>
<td>-1.75*</td>
<td>1.01</td>
<td>-.57</td>
</tr>
<tr>
<td>All groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>combined:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>1,867</td>
<td>26</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Unemployed</td>
<td>6,517</td>
<td>38</td>
<td>8</td>
<td>29</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td></td>
<td>-9.83***</td>
<td>4.69**</td>
<td>.82</td>
</tr>
</tbody>
</table>

* Significant at the 10 percent level.
** Significant at the 5 percent level
*** Significant at the 1 percent level
employed and unemployed youth (1.8 vs. 1.9 methods). The main difference between Holzer's data (1981 NLS youth sample) and the EOPP data is that the search questions on the NLS were asked only of individuals who had searched for work in the month prior to the survey date, while the EOPP survey elicited information about search spells over a 16–22-month period prior to the survey date. It is possible that the longer period of recall in the EOPP survey caused searchers to forget about some methods they used.

According to table 1, the most frequently used method of job search is direct employer contact, although for single women and employed married women, newspapers are used slightly more often. The least-used method among those listed is private employment agencies, although many of the individual categories subsumed under OTH are used less frequently. Interestingly, SES is used much more frequently by unemployed searchers, probably reflecting provisions of the unemployment insurance program that require recipients to register with the SES (see Keeley and Robins 1985). Also, among married men and married women, unemployed searchers are more likely to contact employers directly, and among all groups, the unemployed are less likely to use private employment agencies, perhaps because of their cost.

Table 2 presents average weekly contact, offer, and acceptance rates for the combined sample (a breakdown by demographic group is available from the authors). In comparing the rates across methods, one must keep in mind that they do not adjust for differences in search intensity (hours of search). In other words, the rates reported in this table are calculated at the level of job search intensity chosen by the searcher and hence presumably reflect an optimal allocation of search intensity among the various methods.

Table 2 indicates that, on average, employed and unemployed searchers make about the same total number of contacts (between 2.1 and 2.2 per week). However, offers are received more frequently by employed searchers, averaging about 0.30 per week compared to about 0.18 per week for unemployed searchers. The significantly higher offer rate among employed searchers contrasts sharply with the findings of Holzer (1987b), where a higher offer rate is found for the unemployed. Because of the higher offer rate, table 2 indicates that the rate of gaining new employment is also higher for employed searchers, averaging 13 percent per week compared to 10 percent per

---

6 It is worth noting that the EOPP data report a considerably higher offer rate than other data (see Blau and Robins [1986a] and Blau [1989a] for a discussion). For example, Holzer (1987b) reports a monthly offer rate in the NLS data about equal to the weekly offer rate in the EOPP data.
TABLE 2

Average Weekly Contact, Offer, and Acceptance Rates by Method of Job Search (for Users of the Method)

<table>
<thead>
<tr>
<th>Method of Job Search</th>
<th>SES</th>
<th>PEA</th>
<th>FRND</th>
<th>NEWS</th>
<th>EMP</th>
<th>OTH</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>.60</td>
<td>1.03</td>
<td>.79</td>
<td>1.41</td>
<td>1.67</td>
<td>.90</td>
<td>2.18</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.51</td>
<td>.68</td>
<td>.67</td>
<td>1.36</td>
<td>1.53</td>
<td>.71</td>
<td>2.11</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td>.86</td>
<td>1.51</td>
<td>1.52</td>
<td>.38</td>
<td>1.20</td>
<td>1.29</td>
<td>.66</td>
</tr>
<tr>
<td><strong>Offer Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>.08</td>
<td>.19</td>
<td>.18</td>
<td>.15</td>
<td>.19</td>
<td>.13</td>
<td>.30</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.04</td>
<td>.10</td>
<td>.10</td>
<td>.09</td>
<td>.11</td>
<td>.09</td>
<td>.18</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td>2.24**</td>
<td>2.71***</td>
<td>3.66***</td>
<td>4.36***</td>
<td>5.21***</td>
<td>1.66*</td>
<td>7.24***</td>
</tr>
<tr>
<td><strong>Acceptance Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>.03</td>
<td>.07</td>
<td>.08</td>
<td>.05</td>
<td>.09</td>
<td>.06</td>
<td>.13</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.02</td>
<td>.04</td>
<td>.07</td>
<td>.04</td>
<td>.07</td>
<td>.05</td>
<td>.10</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td>.73</td>
<td>1.67*</td>
<td>1.57</td>
<td>2.33**</td>
<td>2.82***</td>
<td>.28</td>
<td>3.30**</td>
</tr>
</tbody>
</table>

* Significant at the 10 percent level.
** Significant at the 5 percent level
*** Significant at the 1 percent level

week for the unemployed. Again, by way of contrast, Holzer finds a much higher job-finding rate for unemployed searchers.

Among the individual methods of job search, EMP and NEWS generate the most contacts; PEA and EMP tend to generate the most offers, although a sizable number of offers are also generated by FRND; and FRND and EMP have the highest job-finding rates.

For every method of search, the results in table 2 indicate that employed searchers collect more offers and accept more jobs than unemployed searchers. Hence, the EOPP data suggest that employed search may be more effective than unemployed search, in contrast to the findings of Holzer (1987b), whose analysis was based on NLS data. However, it is important to note that the results in table 2 do not adjust for observed or unobserved differences in searcher characteristics that could be related to search effectiveness. At this point, it would be premature to conclude that a randomly chosen individual would be able to search more effectively while employed than while unemployed. Some evidence on this is presented below.

Another way of examining job search behavior is to calculate condi-
tional offer and acceptance rates. These are given in table 3. As this table indicates, employed searchers generate more offers and acceptances for each contact made, while unemployed searchers are somewhat less selective in accepting job offers (perhaps because of the greater costs of further search). The data also indicate that while a majority of job offers are accepted by both employed and unemployed searchers, a sizable number of offers are also rejected. Among employed searchers, close to one-half of all offers are rejected, while for unemployed searchers, about one-third of all offers are rejected.

Among the methods of job search, FRND appears to be the most effective for both the employed and unemployed. It generates the most offers per contact and the most acceptances per contact, and it has the highest acceptance rate per offer. Among unemployed searchers, three-quarters of all job offers received through FRND are accepted. The apparent effectiveness of FRND as a method of search corresponds closely with the findings of Holzer (1987a, 1988). However, it should be noted that differences in offer rates across methods do not necessarily imply differences in effectiveness. Searchers may select methods on the basis of observed and unobserved characteristics that are associated with the productivity of the method. Also, if offer rates vary with the duration of search and individuals optimally choose search methods over time, differences in average offer rates could appear in the data even if the underlying rates are the same across methods.

IV. A Reduced-Form Model of Job Search Behavior

The estimates presented above suggest that employed search is more effective than unemployed search. However, these estimates do not adjust for differences in the characteristics of employed and unemployed searchers and do not take account of the fact that the choice of search method is endogenous. In this section, we describe and present estimates of a reduced-form job search model that takes these factors into account.

The empirical analysis is based on the following relationship between the job-finding probability and four components of the job search process:

\[
P_{ij} = P(A \mid O)_i P(O \mid C)_i E(C \mid U)_i P(U)_i,
\]

where \(P_{ij}\) is the job-finding probability using method \(i\) (the probability

\footnote{These conditional rates are calculated for each individual and then averaged over the sample.}
<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>SES</th>
<th>PEA</th>
<th>FRND</th>
<th>NEWS</th>
<th>EMP</th>
<th>OTH</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>.21</td>
<td>.29</td>
<td>.31</td>
<td>.18</td>
<td>.21</td>
<td>.28</td>
<td>.24</td>
</tr>
<tr>
<td>Unemployed</td>
<td>.16</td>
<td>.22</td>
<td>.25</td>
<td>.11</td>
<td>.14</td>
<td>.28</td>
<td>.17</td>
</tr>
<tr>
<td>t-statistic for difference</td>
<td>1.84*</td>
<td>2.22*</td>
<td>3.00***</td>
<td>5.50***</td>
<td>6.20***</td>
<td>-.11</td>
<td>8.11***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acceptances per Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
</tr>
<tr>
<td>Unemployed</td>
</tr>
<tr>
<td>t-statistic for difference</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acceptances per Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
</tr>
<tr>
<td>Unemployed</td>
</tr>
<tr>
<td>t-statistic for difference</td>
</tr>
</tbody>
</table>

* Significant at the 10 percent level.
** Significant at the 5 percent level
*** Significant at the 1 percent level.
that person $j$ accepts an offer generated by using method $i$ during a given week), $P(A|O)_{ij}$ is the acceptance probability (the probability that person $j$ accepts an offer, given that an offer has been received using method $i$), $P(O|C)_{ij}$ is the offer probability (the probability that person $j$ receives an offer, given that an employer has been contacted using method $i$), $E(C|U)_{ij}$ is the contact rate (the expected number of contacts per week for person $j$ using method $i$), and $P(U)_{ij}$ is the probability that person $j$ uses method $i$.

Equation (1) defines the weekly rate of finding a job using a given search method as the product of the conditional acceptance, offer, and contact rates and the probability of using the method. The term $P_{ij}$ can be interpreted as the expected job-finding rate using method $i$ of a random member of a homogeneous population. If there were no economies or diseconomies of using multiple search methods, then the overall job-finding rate for person $j$ would be $P_{ij} = \Sigma_i P_{ij}$. We specify reduced-form equations for each of the four terms on the right-hand side of equation (1). Let $y_{1ij} = A_{ij}/O_{ij}$, where $A_{ij}$ equals one if individual $j$ accepts a job using method $i$ and zero otherwise, and $O_{ij}$ is the number of offers received by individual $j$ using method $i$. Let $y_{2ij} = O_{ij}/C_{ij}$, where $C_{ij}$ is the average number of contacts made per week by individual $j$ using method $i$. Let $y_{3ij} = C_{ij}$, and let $y_{4ij}$ equal one if individual $j$ uses method $i$ and zero otherwise. The variables $y_{kij}$, $k = 1, \ldots, 4$, are the observed realizations of the terms on the right-hand side of equation (1). Our statistical model for these observed variables is specified as

$$y^*_{1ij} = X_j \beta_1 + \epsilon_{1ij},$$ (2)

$$y_{1ij} = \begin{cases} 1 & \text{if } y^*_{1ij} \geq 1 \\ y^*_{1ij} & \text{if } 1 > y^*_{1ij} > 0 \\ 0 & \text{if } 0 \geq y^*_{1ij}; \end{cases}$$

$$y^*_{2ij} = X_j \beta_2 + \epsilon_{2ij},$$ (3)

$$y_{2ij} = \begin{cases} 1 & \text{if } y^*_{2ij} \geq 1 \\ y^*_{2ij} & \text{if } 1 > y^*_{2ij} > 0 \\ 0 & \text{if } 0 \geq y^*_{2ij}; \end{cases}$$

8 Note that, strictly speaking, $P_{ij}$ can be interpreted as a probability only if the expected number of contacts per week is less than or equal to one. The length of a period can always be defined so that $E(C|U)$ is less than or equal to one. As indicated in table 2, the weekly contact rate exceeds one for several methods, but $P_{ij}$ is always considerably less than one.

9 Blau and Stern (1989) show that there are apparently diseconomies involved in using multiple search methods.
\[
    y_{3ij}^* = \mathbf{X}_j \beta_3 + \epsilon_{3ij},
    \]
\[
    y_{3ij} = \begin{cases} 
    y_{3ij}^* & \text{if } y_{3ij}^* > 0 \\
    0 & \text{if } y_{3ij}^* \leq 0;
    \end{cases} 
    \tag{4}
\]
\[
    y_{4ij}^* = \mathbf{X}_j \beta_4 + \epsilon_{4ij},
    \]
\[
    y_{4ij} = \begin{cases} 
    1 & \text{if } y_{4ij}^* > 0 \\
    0 & \text{if } y_{4ij}^* \leq 0.
    \end{cases} 
    \tag{5}
\]

In each of the four models above, \( y_{kj}^* \) is a latent index, \( \beta_k \) is a parameter vector, \( \mathbf{X}_j \) is a vector of explanatory variables, and \( \epsilon_{kj} \) is a disturbance. Our model is reduced form in nature, so the same set of variables appears in each equation.\(^{10}\)

We assume that \( E(\epsilon_{kj} \epsilon_{kj}) = \sigma_{kj} \).\(^{11}\) The normality assumption means that equations (2) and (3) are two-limit tobit models, equation (4) is a single-limit tobit model, and equation (5) is a probit model. The two-limit tobit models are used to account for cases with multiple contacts or offers, recognizing that at most one offer can be accepted and at most one offer can result from a contact. Note that equation (2) for the acceptance rate per offer using method \( i \) can be estimated only on the sample of people who have received at least one offer using method \( i \), that is, only for cases with \( y_{2ij} > 0 \). Similarly, equation (3) for offers per contact can be estimated only on the sample for which the number of contacts from method \( i \) is positive \( (y_{3ij} > 0) \), and equation (4) for contacts can be estimated only on the sample that uses method \( i \) \( (y_{4ij}^* = 1) \). Thus if the disturbances are in fact correlated across equations, then the use of standard estimation methods for equations (2)–(4) would result in inconsistent estimates because of sample selection.

An important point to note about the specification in equations (2)–(5) is the absence of duration dependence. The EOPP survey, as noted above, reports the total number of acceptances, offers, and contacts generated from each method used for each search spell but not the timing of these events. In the absence of data on the timing of the contacts and offers, disentangling the effects of true duration dependence from spurious duration dependence induced by unobserved heterogeneity is difficult and is not attempted here.

\(^{10}\) Holzer (1987b) estimates equations explaining the choice of search methods and includes as an explanatory variable the predicted number of offers based on a first-stage regression. Hence, his model is not a reduced form and is based on (apparently) arbitrary exclusion restrictions.

\(^{11}\) Note that \( \sigma_{44} \) is normalized to unity since it is not identified.
Estimation of equations (2)-(5) was accomplished as follows. Consistent estimates of the \( \beta \)'s and the covariance matrix of the disturbances were obtained by performing bivariate maximum likelihood separately on each pair of equations. The resulting estimates of the \( \beta \)'s were very similar to those obtained from single-equation estimates, but the estimated standard errors were substantially smaller. Of course, full-information maximum likelihood would have been still more efficient but cumbersome and costly because of the four-variate integration required.

Equations (2)-(5) were estimated for each of the six different search methods and for all methods combined. In the combined methods sample, equation (5) was replaced by an ordinary least squares equation explaining the number of methods used (rather than the probability of using a given method). Computational feasibility precluded joint estimation across methods. Each equation was estimated separately for employed and unemployed searchers, thus allowing all coefficients to differ between the two groups. The equations were also estimated on the combined sample of employed and unemployed searchers with an employment status dummy variable \( (1 = \text{employed}) \) included on the right-hand side of the equation. By including employment status of the searcher as an explanatory variable, we assume that it is exogenous to the choice of search method and outcomes.

The explanatory variables included in each equation are dummy variables for demographic groups (married women, single women, and youth aged 16–19, with married men the omitted category), race (black and Hispanic, with white the omitted category), location (living in a standard metropolitan statistical area), receipt of unemployment insurance (unemployed searchers only), receipt of welfare (Aid to Families with Dependent Children or food stamps), years of work experience, years of education, average monthly nonwage income during the search spell, the local unemployment rate at the time of the spell, and the hourly wage at the end of the most recent previous job held (for unemployed search spells) or at the beginning of the current job (for employed search spells), if available.

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12 Blau and Stern (1989) use the method of moments approach to estimate search method choice and outcomes jointly for all the methods.

13 The employment status of a job searcher could be related to the perceived productivity of searching while employed vs. unemployed. If there is heterogeneity in unobserved components of search productivity, then employment status while searching should be treated as an endogenous variable. Our conclusions regarding the relative effectiveness of employed vs. unemployed search should be interpreted with this caveat in mind.

14 If the previous wage is unavailable, then a dummy variable is set to one and the wage variable is set to zero.
The results for all search methods combined are presented in table 4 (the results for each search method are in an appendix available from the authors). The table also reports the estimated standard deviations of the error terms ($\sigma_{kk}$) and the estimated correlation coefficients of the error terms across equations ($\rho_{kl}$).

According to the results in table 4, with other characteristics held constant, married men use the most methods of search and make the most contacts, but they receive and accept the fewest offers. Blacks use more methods of search than whites but make fewer contacts, receive fewer offers, and accept fewer offers. Overall, the results imply that the main source of the lower job-finding rate for blacks is a lower contact rate. Although, in contrast to blacks, Hispanics use fewer methods of search than whites, like blacks they make fewer contacts and accept fewer offers.15

Searchers receiving unemployment insurance benefits use more methods of search (probably reflecting the search provisions of the unemployment insurance program) but make fewer contacts and receive fewer offers. The same pattern is observed for welfare recipients. As a consequence of the lower contact and offer rates, unemployment insurance and welfare recipients have a lower probability of finding a job. Numerous studies have found that receiving transfer benefits is associated with a lower escape rate from unemployment. Our results confirm this finding but provide additional evidence on the source of the lower job-finding rate. In the detailed results by search method available from the authors, it is found that both unemployment insurance and welfare recipients use more methods of search because of a much higher probability of using the SES. Most of them are required to register with the SES in order to receive benefits. Note that the acceptance rate per offer of these recipients is not significantly different from that of nonrecipients, suggesting either that reservation wages do not differ on average between recipients and nonrecipients or that regulations imposed by program officials effectively prevent recipients from turning down too many offers.

A more detailed breakdown of black-white differences is possible using the estimation results separately by method (available from the authors). These results indicate that the main source of the lower job-finding rate for unemployed blacks is a lower frequency of contacting employers directly and substantially fewer offers per contact via newspaper advertisements. However, the lower job-finding rate of unemployed blacks is also due in part to lower acceptance rates per offer for four of the six methods. Blacks have a higher acceptance rate per offer only via the OTH method, which includes a variety of government programs aimed at the disadvantaged. These results are similar in some respects to Holzer’s (1987a), but our results indicate that use of friends is at least as productive for unemployed blacks as for whites. Holzer found that for men aged 16–23 a lower offer rate via friends accounts for a substantial share of the lower overall job-finding rate of blacks. In the case of employed searchers, we do find that blacks have significantly fewer contacts, offers, and acceptances via friends.
<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS on Number of Methods Used (1)</th>
<th>Single-Limit Tobit on Contacts per Week (2)</th>
<th>Two-Limit Tobit on Offers per Contact (3)</th>
<th>Two-Limit Tobit on Acceptances per Offer (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.72*** (.05)</td>
<td>3.13*** (.20)</td>
<td>.19*** (.01)</td>
<td>.39*** (.02)</td>
</tr>
<tr>
<td>1 = married woman</td>
<td>-.23*** (.02)</td>
<td>-.73*** (.08)</td>
<td>.04*** (.01)</td>
<td>.01* (.007)</td>
</tr>
<tr>
<td>1 = single woman</td>
<td>-.12*** (.02)</td>
<td>-.45*** (.08)</td>
<td>.04*** (.01)</td>
<td>.01** (.007)</td>
</tr>
<tr>
<td>1 = teenager</td>
<td>-.29*** (.02)</td>
<td>-.63*** (.09)</td>
<td>.03*** (.01)</td>
<td>.02** (.01)</td>
</tr>
<tr>
<td>1 = black</td>
<td>.04** (.02)</td>
<td>-.55*** (.07)</td>
<td>-.02*** (.01)</td>
<td>-.03*** (.01)</td>
</tr>
<tr>
<td>1 = Hispanic</td>
<td>-.21*** (.02)</td>
<td>-.29*** (.09)</td>
<td>.004 (.006)</td>
<td>-.02* (.01)</td>
</tr>
<tr>
<td>1 = receives unemployment insurance</td>
<td>.24*** (.02)</td>
<td>-.06 (.08)</td>
<td>-.05*** (.005)</td>
<td>.006 (.007)</td>
</tr>
<tr>
<td>1 = receives welfare</td>
<td>.10** (.02)</td>
<td>-.31*** (.06)</td>
<td>-.02*** (.004)</td>
<td>.01 (.01)</td>
</tr>
<tr>
<td>1 = lives in SMSA</td>
<td>-.01 (.01)</td>
<td>-.23*** (.05)</td>
<td>.01** (.004)</td>
<td>-.01 (.01)</td>
</tr>
<tr>
<td>Hourly wage rate</td>
<td>-.05*** (.004)</td>
<td>-.17*** (.02)</td>
<td>.01*** (.001)</td>
<td>-.002 (.002)</td>
</tr>
<tr>
<td>1 = wage missing</td>
<td>-.25*** (.02)</td>
<td>-.16*** (.09)</td>
<td>.03*** (.006)</td>
<td>-.01 (.01)</td>
</tr>
<tr>
<td>Nonwage income</td>
<td>.02 (.01)</td>
<td>.13*** (.05)</td>
<td>-.002 (.003)</td>
<td>-.004 (.005)</td>
</tr>
<tr>
<td>Years of work experience</td>
<td>.0004 (.001)</td>
<td>-.01*** (.004)</td>
<td>.0002 (.0003)</td>
<td>-.0001** (.0003)</td>
</tr>
<tr>
<td>Years of education</td>
<td>.05*** (.003)</td>
<td>.07*** (.01)</td>
<td>.002*** (.001)</td>
<td>-.002*** (.001)</td>
</tr>
<tr>
<td>Local unemployment rate</td>
<td>.01** (.005)</td>
<td>-.01 (.02)</td>
<td>-.004*** (.001)</td>
<td>.01*** (.002)</td>
</tr>
<tr>
<td>1 = employed</td>
<td>-.19*** (.02)</td>
<td>-.21*** (.07)</td>
<td>.04*** (.005)</td>
<td>-.01 (.01)</td>
</tr>
<tr>
<td>$\sigma_{kk}$</td>
<td>1.07*** (.005)</td>
<td>3.84*** (.02)</td>
<td>.17*** (.001)</td>
<td>.13*** (.002)</td>
</tr>
<tr>
<td>$\rho_{11}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\rho_{21}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\rho_{34}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Log likelihood = -95,265. Standard errors are in parentheses.

* Significant at the 10 percent level.

** Significant at the 5 percent level.

*** Significant at the 1 percent level.
This could rationalize the apparent search strategy of generating fewer offers per contact if the goal is to remain unemployed longer.

The human capital variables have mixed effects. Higher-wage individuals use fewer methods of search and make fewer contacts, but they are able to generate more offers. However, higher-wage individuals are no more likely to accept an offer than lower-wage individuals. Education is positively related to the number of methods used, the number of contacts made, and the number of offers received, but it is negatively related to the conditional acceptance rate. Work experience has a negligible effect on all the outcome measures.

The state of the local economy also affects search decisions. When the local unemployment rate rises, individuals tend to search more extensively (use more methods), but they generate fewer contacts and offers. A higher unemployment rate also induces searchers to reject fewer job offers.

After we adjust for the effects of observed variables and sample selection, the results indicate that the employed search less extensively, generate fewer contacts, receive more offers, and have a conditional acceptance rate similar to that of the unemployed. Recall that the unadjusted results indicate less extensive search by the employed, a similar contact rate, a higher offer rate, and a lower conditional acceptance rate.

There is weak but significant correlation among the error terms in the four equations. Unobserved characteristics that lead to more methods being used also lead to more contacts, but fewer offers and acceptances are generated. Apparently the more extensive the search, the less likely the searcher is to achieve positive search outcomes. Successful search, therefore, seems to be more likely when fewer methods are used.

Table 5 gives predicted employed-unemployed differences in the various search outcomes for each method of job search, derived from separate estimates by method available from the authors, and for all methods combined. The derived effect on the unconditional job-finding probability is also given. The net effect of the four components of the search process is a slightly higher job-finding rate among employed searchers. This higher job-finding rate is fully attributable to a higher offer rate.

There are some differences in search behavior across the various methods. Unemployed searchers are much more likely to use the SES than employed searchers and are somewhat more likely to use NEWS and EMP. Employed searchers are more likely to make contacts using PEA, but as noted earlier, few searchers use this method. In general, employed searchers tend to make contacts using PEA and FRND,
while unemployed searchers tend to make contacts using SES, NEWS, and EMP.

V. Summary and Conclusions

In this paper, we have examined how individual components of the job search process influence the probability of reemployment. A reduced-form model of job search is estimated that takes account of the fact that users of a particular method of job search are not a random subset of all searchers. The empirical model produces estimates of the parameters governing the choice of search method, the contact rate per method, the process by which job offers are generated, and the acceptance or rejection of offers. Particular attention is paid to the role of observed characteristics in explaining differences in search behavior between the employed and unemployed.

The results of this paper show that individuals who search for a new job while working are, on average, more successful at finding a job than otherwise similar unemployed searchers. As was indicated above, there are two possible explanations for this finding. One is that employed search is more effective than unemployed search, perhaps because of better search technology (e.g., access to internal career ladders and better contacts) or the stigma associated with unemployment. If this explanation is correct, then a typical unemployed job seeker would have a better chance of finding a desirable job by accepting the first offer received and continuing to search while employed.
However, such behavior may not be optimal for the individual if there are important differences in search costs between the employed and unemployed.

The other explanation is based on unobserved heterogeneity: employed searchers may simply search harder or may be better searchers than the unemployed in ways that are not captured by observed variables. In other words, employment status may be correlated with (or serves as a signal of) search ability or effort. In this case, there is no presumption that employed search is more effective than unemployed search for any particular individual; unobserved differences across individuals are responsible for the higher job-finding rate.

This study has identified an important phenomenon in the labor market that warrants an explanation. In future work, it would be useful to attempt to determine which of the two alternative explanations is empirically most important.

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