Search Costs, Outside Options, and On-the-Job Search^{*}

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Abstract

I study how beliefs about search costs, returns to search effort, and outside options relate to the job mobility decisions of employed workers. I design an online survey and administer it to a representative sample of wage and salaried workers in the US. In the survey, I directly measure employed workers' perceptions of search costs-time, money, stress—and the perceived return to their job search effort—the expected success rate of their job applications. I also elicit workers' beliefs about their opportunities outside of their current job and measure their knowledge of the wage distribution in their occupation. I document significant heterogeneity in expectations across demographic groups. Women expect higher costs and lower returns to effort. I study how expectations relate to on-the-job search behavior at the extensive and intensive margin. I find that beliefs about outside options and returns to effort are the strongest predictor of job search intentions, while expected time and monetary costs per application are not related to search intentions. Respondents who expect to spend more time looking for job openings have a lower propensity to search, consistent with the relevance of information frictions. Using two information experiments, I show that accurate information about the median wage does not shift search intentions, while positive information on the recent search experience of similar workers is more effective for groups that are more worried about search costs.

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1 Introduction

When people ponder a career move they weigh the benefits they expect to obtain from changing job against the effort they believe the job search would require and the material and psychological cost of this effort. There is growing evidence that people are imperfectly informed about their outside options. For instance, low-income workers underestimate how much they could earn at other employers (Jäger et al., 2021) and overestimate their position in the income distribution (Hvidberg et al., 2020). We know much less about workers' perceptions of the cost side of the job search equation. What are people's expectations of the cost of looking for a new job? To what extent do these perceptions, together with beliefs about returns to search effort and outside options, predict the job search behavior of employed workers?

To investigate these questions I design an online survey and administer it to a representative sample of 2,500 wage and salaried workers in the US. These survey responses present novel facts about how employed individuals perceive the job-search process. First, respondents are worried about time constraints, not so much about monetary costs. Second, there is significant heterogeneity in expected costs and returns across demographic groups. Women expect higher costs and lower returns to effort. By comparing expected and realized costs I find patterns consistent with errors in expectations. Third, beliefs about outside options, and expected returns to search effort are strong predictors of job search intentions. Expectations of the overall duration of the search, time looking for job openings and effort needed to secure a new job are negatively correlated with search intentions, while expected costs per application are not relevant. I further explore the importance of beliefs about outside options and costs in two information treatments.

To discipline these findings, I introduce a model of on-the-job search with beliefs about outside options and search costs. Standard models of the labor market with off and on-thejob search (Burdett and Mortensen, 1998; Mortensen and Pissarides, 1999; Cahuc et al., 2006; Hornstein et al., 2011) assume that workers have perfect knowledge of the wage distribution and accurately predict future job offers. Most of these models keep search effort exogenous and abstract from search costs. I show that the standard on-the-job search framework can be modified to account for expectations about search costs and returns to effort and imperfect information about outside options. I build on the "job ladder" model of on-thejob search with endogenous and costly search effort of Christensen et al. (2005) and on the belief framework in Conlon et al. (2018). I show that beliefs about outside options and expectations about costs and returns matter for the decision to search on the job and have independent effects on search behavior in this setting. In the model, workers who expect to face higher search costs and believe their returns to effort are lower are less likely to search. Workers who underestimate their outside options are also less likely to search. I test the predictions of the model using the data collected with the survey.

The first part of the survey includes a comprehensive set of qualitative and numerical questions aimed at quantifying expected search costs along many dimensions—the time and money respondents expect to spend on various phases of their job search, how stressful they expect their search to be, and other factors that respondents believe limit their ability to look for a new job. Most people consider lack of time an obstacle, while monetary constraints do not emerge as a limiting factor. Looking for job openings is perceived as the most time consuming phase of the job search process. The survey also measures respondents' expectations of the effort they would put in the job search and the perceived return to their effort—the expected success rate of their job applications. There is significant heterogeneity in expected search costs and returns to effort across demographic groups. Women, college graduates and higher-wage respondents believe it would take them more time to find a new job—more hours spent on search activities and more weeks searching. In addition, women perceive looking for a new job to be more stressful and expect a significantly lower success rate for their job applications.

With my survey I reach respondents at different stages of their job search. Most respondents are not currently looking for a new job, some have recently started a new job, and some others are currently searching. I ask respondents who started a new job in the 12 months before taking the survey about the costs experienced during their recent job search and I use their answers to benchmark the expectations of respondents who are not currently searching. On average expected costs are in line with realized costs. However, there is less heterogeneity across demographic groups in realized costs than there is in expected costs. For instance, although women expect to spend more weeks searching than men, the realized number of weeks is the same for the two groups. These results are suggestive of errors in expectations, even though they may also reflect selection into search of recent job searchers.

In the second part of the survey, I elicit workers' perceptions of the wage distribution and their beliefs about their outside options, building and expanding on the work of Jäger et al. (2021) and Conlon et al. (2018). First, I measure respondents' perceptions of the median wage for their occupation, and of their position in the wage distribution. On average, respondents slightly overestimate the median wage in their occupation, although there is significant dispersion in perceptions. Respondents tend to think that the median wage is much closer to their wage than it is the case, a result consistent with the "anchoring" documented by Jäger et al. (2021) for workers in Germany. In addition, most workers overestimate their position in the wage distribution, except for respondents in the top quartile, who underestimate their position. These patterns are consistent with the "center bias" documented by Hvidberg et al. (2020) in Denmark. Women, African American, and low-wage respondents are more likely to underestimate the median wage and overestimate their position.

Then, I measure beliefs about outside options by asking respondents how much more or less they expect to earn if they decided to change job, giving themselves a reasonable time frame (3 months) to find a new positions. Overall workers are optimistic about how much they could gain from changing jobs—the average expected wage gain is 12%. However, 40% of respondents think they would earn the same wage at the new job and 16% believe they would incur a wage loss. Respondents who underestimate the median wage or overestimate their position in the wage distribution expect a lower gain from changing job. This suggests a relationship between beliefs about outside options and perceptions of the wage distribution. I further investigate this finding in the experimental part of the paper.

To what extent are beliefs about search costs and outside options related to on-the-job search behavior? I investigate this question first by looking at correlations between beliefs and job search behavior, then experimentally, exploiting two information treatments that I embed in the survey. I consider both the extensive—the decision to search for a new job—and the intensive margin of search—how much effort to put in the search, conditional on searching. For the extensive margin, I ask respondents who are not currently searching what is the probability they will look for a new job in the next 12 months. For the intensive margin, I look at the planned search effort—number of job applications—of respondents who are currently searching.

In the correlational analysis of the extensive margin, beliefs about outside options are highly predictive of respondents' propensity to search in the future. This relationship continues to exist even after controlling for the respondent's current wage, which is usually a key predictor of search behavior (Faberman et al., 2022). The propensity to search on-thejob is also strongly correlated with expected returns to effort—respondents who expect their applications to have lower success rates are less likely to search. On the costs side, what matters for search intentions are the overall expected duration of the search, the expected time looking for job openings, and the expected effort needed to secure a new job. The average time and monetary cost per application, instead, is not related to search intentions. At the intensive margin, conditional on searching, beliefs about outside options are not correlated with planned search effort, in contrast with the extensive margin result.

In the experimental analysis, I identify the causal effect of information about search costs

and outside options on job search behavior, by randomly providing respondents with different kinds of information. In the first information treatment, a randomly selected group of respondents receive accurate information about the median wage in their occupation at the national level and in the location where they live. I call this treatment the "Median Wage Treatment." In the second treatment, which I label the "Search Costs Treatment," I provide another group of respondents with information on the search costs experienced by respondents in the same broad occupation group who recently changed their job—specifically, time and money spent on the search. The remaining respondents do not receive any information. Both treatments have a statistically significant first stage effect on the variables they are designed to target—misperception of the median wage and perceived cost of the job search process. In addition, the Median Wage Treatment has a positive effect on the expected wage gain of respondents who underestimate the median wage pre-treatment. This confirms experimentally the link between perceptions of the wage distribution and beliefs about outside options. Despite the significant first stages, neither treatment significantly changes job search intentions nor planned search effort in the overall sample. However, the Search Cost Treatment increases the propensity to search of women, suggesting that information on search costs is more effective for groups that are more worried about how costly the job search is going to be.

Overall, these findings show that expectations can influence the search behavior of employed workers. Beliefs about outside options and returns to effort are the most relevant predictor of job search at the extensive margin, they jointly explain 50% of the variation in job search intentions. Perceptions of search costs are also related to the propensity to search of employed workers. This is particularly true for women, as shown by the experimental results. Among the measures of costs, those related to information frictions—expected time to look for job openings—and those that are more directly related to how much effort it takes to find a job—number of weeks, number of applications—appear to be more relevant than the time and monetary costs per application.

These results have several important implications. First, errors in expectations about costs and returns to effort could be another barrier to job-to-job transitions, in addition to biases in beliefs about outside options. Job-to-job transitions are a crucial driver of labor market dynamism and shape workers' income trajectories and earnings growth.¹ In addition, workers' mobility and the ensuing competition between firms to retain or attract them are important sources of workers' bargaining power in the determination of their wages (Postel-

¹For instance, job switchers tend to experience greater wage growth relative to job-stayers. In June 2022, the wage growth for job switchers was 6.4% vs. 4.7% for job stayers (Wage Growth Tracker of the Federal Reserve Bank of Atlanta). See also Topel and Ward (1992) for an older reference.

Vinay and Robin, 2002). Thus, errors in expectations about costs and returns can dampen workers' welfare and increase inequality and monopsony power if they reduce mobility. Second, the experimental results show that interventions aimed at stimulating workers' mobility should target not only perceptions of the wage distribution and beliefs about outside options, but also expectations about search costs. Third, the fact that expectations about returns to effort and total applications—that are more closely related to the perceived "difficulty" to find a new job and more likely to change over the cycle—are predictive of on-the-job search behavior offer an additional mechanism explaining the cyclicality of employment-toemployment transitions (Eeckhout and Lindenlaub, 2019; Gertler et al., 2020).

1.1 Related literature

This paper contributes to a growing literature studying how expectations can inform theories of the labor market and job search. Mueller and Sinnewijn (2021) provide a comprehensive overview of this literature.² Most of the work in this area focuses on the job search behavior of unemployed workers. Spinnewijn (2015) document that job seekers overestimate how quickly they will find a new job, and, as a consequence, they do not put enough effort in their job search. Mueller et al. (2021) use job seekers' beliefs about job finding to explain heterogeneity in re-employment rates by duration of unemployment. They show that beliefs have strong predictive power for job finding but are not revised downward as job seekers remain unemployed for longer. Using panel data on employed and unemployed workers from the Survey of Consumer Expectations (SCE) of the Federal Reserve Bank of New York,³ Conlon et al. (2018) show that workers' expectations about future job offers are often far from ex-post realizations. However, they find that learning mitigates the incidence of information frictions, as individuals update their expectations in response to realized offers, albeit imperfectly. The paper closest to mine is the innovative work by Jäger et al. (2021). These authors document that employed workers in Germany wrongly anchor their beliefs about their outside options to their current wage. As a consequence, low-paid workers end up underestimating wages paid at other jobs. They also show that workers who underestimate their outside options are less likely to look for a new job in the future. I follow their framework to elicit beliefs about outside options, but expand the scope and measure expectations about search costs and returns to search effort, two other key components of the job search problem.

This paper also contributes to the (scant) literature on the job search behavior of em-

 $^{^2 {\}rm The}$ reviews by Cooper and Kuhn (2020) and Santos-Pinto and de la Rosa (2020) are also excellent references.

³https://www.newyorkfed.org/microeconomics/sce/.

ployed workers. Most of the existing knowledge of how employed workers search on the job comes from the work by Faberman et al. (2022). Using an *ad-hoc* module of the SCE, these authors document that employed workers search less—*i.e.*, apply to fewer jobs—than unemployed workers but their search is more effective—their applications are more likely to translate in an offer and they receive better job offers than the unemployed. They argue that the lower search intensity and higher search efficiency of the employed is consistent with employed workers facing higher search costs than unemployed job seekers. However they do not measure search costs directly, and do not elicit expectations and study their role on search intensions.

My work complements and expands the available evidence on search costs and search frictions which draws from field interventions targeting unemployed workers. Work by Belot et al. (2019) and Ben Dhia et al. (2022) document the relevance of information frictions for unemployed workers, but reach different conclusions on the effectiveness of targeted information interventions in the UK and France. Beam (2021) and Abebe et al. (2021) show that monetary incentives increase search effort in the context of developing countries. I contribute to this literature by measuring directly expected and realized search costs and frictions for employed workers on multiple dimensions.

Finally, this paper is related to the recent work by various teams of researchers (Bick and Blandin, 2022; Foote et al., 2021; Adams-Prassl et al., 2020) who have designed independent online surveys to collect real-time national labor market data during the Covid pandemic.

Summing up, my contributions are, first, to collect new and detailed data on beliefs about search costs, returns to effort, and outside options for employed workers in the US, and show how these vary across different demographic groups. Second, I study how these beliefs relate to on-the-job search behavior at the intensive and extensive margin, improving our understanding of employed workers' job mobility dynamics. Third, I experimentally study the effect of providing different types of information on on-the-job search intentions.

The rest of the paper is organized as follows. In Section 2 I introduce the model and show how expectation enter on-the-job search decisions at the intensive and extensive margin. I explain the data collection and survey construction in detail in Section 3. Section 4 provides an overview of the elicited beliefs about search costs, returns to effort, and outside options, and documents heterogeneity in these beliefs across demographic groups. I show how expectations about search costs and returns to effort, and beliefs about outside options correlate with on-the-job search behavior in Section 5. I present the results from the survey experiments in Section 6. The last section concludes.

2 A Model of On-the-Job Search with Beliefs about Search Costs and Outside Options

In this section I develop a partial equilibrium "job ladder" model with endogenous search effort, augmented with beliefs about search costs, returns to effort, and outside options. I build on Christensen et al. (2005), who add endogenous search effort to the Burdett and Mortensen (1998)'s job ladder model, and on subsequent versions in Hornstein et al. (2011) and Faberman et al. (2022). The framework for beliefs about outside options follows Conlon et al. (2018), who extend the Burdett and Vishwanath (1988)'s search model with learning to incorporate on-the-job search. However, unlike Conlon et al. (2018), I abstract from beliefs updating. In this section I show how beliefs enter the on-the-job search problem and derive an extensive margin and an intensive margin condition for search behavior that I will use to guide the empirical analysis in the rest of the paper.

Environment The setting is a standard job search framework. I focus exclusively on employed workers, given that the sample of my survey only includes workers who are currently employed. Time t is discrete and all workers have discount rate $\beta \in (0, 1)$.

While employed, workers can search for a new job exerting effort $s \in [0, 1]$. Search effort captures how intensively the worker searches for a new job. In the data, search effort may be proxied by the number of jobs the worker applies to. Each period, workers receive job offers at rate λ per unit of effort s. The offered wages are distributed according to F, which I assume to be log-normal, with mean μ and variance σ^2 . Jobs are destroyed with an exogenous probability δ . Workers whose jobs are destroyed become unemployed.

If a worker receives a job offer, she decides whether to accept the offer and leave her current employer, or remain where she is. For simplicity I assume that current employers do not compete with the outside offers received by their employees (unlike in Cahuc et al., 2006).

Search effort and search costs Searching for a job is costly. I assume that the cost, or disutility, of search effort is measured by the function

$$c(s) = k \frac{(s + \zeta^{(1+1/\gamma)} - \zeta^{(1+1/\gamma)})}{1 + 1/\gamma}$$
(1)

which is twice differentiable, increasing in search effort and convex, with c(0) = 0. This cost function features two components that capture two different types of costs. The first

component is the positive additive constant, ζ . This is a "fixed" or minimum marginal cost, which captures a baseline level of disutility associated with the job search—for instance, the psychological cost of considering yourself on the search and having to deal with the related stress. The second component is k, a shifter of the marginal cost of effort. The higher is k, the higher is the cost of an additional unit of effort. For instance, k captures the number of hours or money spent per job application submitted. The function in (1) is similar to the cost function in Christensen et al. (2005) and Hornstein et al. (2011), with the addition of the fixed marginal cost. I allow both the cost shifter k and the fixed marginal cost ζ to vary across workers. As in Christensen et al. (2005), putting more effort in searching for a new job increases the probability of receiving a job offer, but does not affect the characteristics of the potential offers. Job offers are drawn from a distribution which is independent of search effort. Workers need to put at least some effort to receive a job offer—i.e. $\lambda \cdot 0 = 0.^4$

Beliefs Workers have imperfect information about the arrival rate of offers and the offers distribution. They are also uncertain about how costly searching for a new job would be. Their beliefs about the arrival rate of offers and about the offers distribution are denoted, respectively, by $\tilde{\lambda}$ and $\tilde{F}(w)$, \tilde{w}^{min} , \tilde{w}^{max} , \tilde{w}^{median} . Their beliefs about search costs are captured by $\tilde{c}(.)$, which depends on the expectations about the cost parameters \tilde{k} and $\tilde{\zeta}$. I abstract from belief updating, *i.e.* I assume that workers do not revise their beliefs as they search.

Perceived value of employment For a worker with beliefs $\tilde{F}(.)$ and expected search costs $\tilde{c}(.)$, the perceived value of employment at wage w satisfies:

$$W(w, \tilde{F}(.), \tilde{c}(.)) = \max_{s \ge 0} [w - \tilde{c}(s) + \beta \delta U + \beta (1 - \delta) \tilde{\lambda} s \int_{w} \max \left\{ W(z - m), W(w) \right\} d\tilde{F}(z)$$
(2)
+ $\beta (1 - \delta) (1 - \tilde{\lambda} s) W(w)]$

The first term on the right-hand-side is equal to the worker's current labor income w net of the expected cost of eventual search effort. Next period, with probability δ the worker's job is destroyed, she becomes unemployed and is left with the value of unemployment U. With perceived probability $\tilde{\lambda}s$ the worker receives a job offer z from another employer. If she accepts the offer, she enjoys W(z-m), the value of the offered new job net of a "relocation"

⁴The model could be extended to allow for unsolicited offers (as in Faberman et al., 2022) and poaching, assuming a baseline arrival rate of offers $\lambda(0) = \alpha$.

cost. This relocation cost m captures the monetary and non-monetary cost of moving to a new employer—for instance, the administrative hurdle of transferring pension or health benefits, or the psychological cost of having to adapt to a new workplace and new co-workers. As for the other cost parameters, m can vary across workers. With probability $1 - \tilde{\lambda}s$ the worker does not receive any offer, and keeps her current job.

Reservation wage and job offers acceptance rule Based on Equation 2, we can define a "reservation wage" such that the worker is indifferent between accepting the offer for the new job, paying the relocation cost m, and remaining with her current employer. The reservation wage \bar{z} is defined by the following equation:

$$W(\bar{z} - m) = W(w) \tag{3}$$

Since W(w) is increasing in w, Equation 3 implies that $\bar{z} = w + m$, *i.e.* the worker's reservation wage is equal to her current wage w plus the relocation cost m. W(w) being increasing in w also implies that it is optimal for the worker to accept any offer greater or equal to her reservation wage \bar{z} . This rule is similar to the acceptance rule in Burdett and Mortensen (1998), where workers accept any offers above their current wage, which serves as their reservation wage. However, here \bar{z} is greater than w to account for the relocation cost. I can then rewrite:

$$\int_{w} \max\left\{W(z-m), W(w)\right\} d\tilde{F}(z) = W(w) + \int_{w+m}^{\tilde{w}^{max}} \left[W(z-m) - W(w)\right] d\tilde{F}(z)$$
(4)

Note that, as argued in Conlon et al. (2018) and Burdett and Vishwanath (1988), the acceptance rule would be different in the presence of a learning mechanism, where realized offers trigger a revision of beliefs over future offers and, hence, the option value of searching. In this case a reservation wage may not even exist, if workers revise very strongly their beliefs in response to realized offers. However, I abstract from learning, given that my focus is on the extensive margin of search and on search effort, rather than on how beliefs affect the propensity to accept offers. In my framework beliefs are relevant insofar they enter in the extensive margin decision to search or not and in the decision on the optimal level of search effort.

Extensive margin and intensive margin of search Substituting (4) in (2) and taking the derivative with respect to s I obtain the following first order condition for the optimal

search effort:

$$\tilde{c}'(s) = \beta(1-\delta)\tilde{\lambda} \int_{w+m}^{\tilde{w}^{max}} [W(z-m) - W(w)] d\tilde{F}(z)$$
(5)

From this expression we see immediately that search effort is decreasing in the current wage w, since c(s) is increasing and convex. Integrating the right-hand-side by parts, and using the envelope theorem to compute W'(z) we obtain:

$$\tilde{c}'(s) = \beta(1-\delta)\tilde{\lambda} \int_{w+m}^{\tilde{w}^{max}} W'(z)(1-\tilde{F}(z))dz$$

$$= \beta(1-\delta)\tilde{\lambda} \int_{w+m}^{\tilde{w}^{max}} \frac{(1-\tilde{F}(z))dz}{1-\beta(1-\delta)[\tilde{\lambda}s(1-\tilde{F}(z))+1]}$$
(6)

Finally, using the functional form for c(s) in (1) and substituting into (6) we have a functional equation for s:

$$s^*(w) = \left\{ \frac{1}{\tilde{k}_i} \int_{w+m}^{\tilde{w}^{max}} \frac{\beta(1-\delta)\tilde{\lambda}(1-\tilde{F}(z))dz}{1-\beta(1-\delta)[\tilde{\lambda}s(1-\tilde{F}(z))+1]} \right\}^{\gamma} - \tilde{\zeta}_i$$
(7)

This equation has an extensive and an intensive margin component. The first term on the right-hand side captures the expected marginal benefit of an additional unit of search effort, scaled by the expected cost parameter \tilde{k} . γ determines how elastic search effort is to the marginal benefit of searching. The second term, $\tilde{\zeta}$, is the expected fixed marginal cost. Since search effort cannot be negative, if the fixed marginal cost of search effort is greater than the marginal benefit, then s = 0 and the worker does not search at all. If the marginal benefit is greater than the fixed marginal cost, the worker sets her optimal level of effort according to (7).

I can then define the probability of searching or a "propensity" to search as the probability that $s^* > 0$, or

$$Pr(s^* > 0|\tilde{F}(.), c_i, w, m) = Pr\left(\left\{\frac{1}{\tilde{k}_i} \int_{w+m}^{\tilde{w}^{max}} \frac{\beta(1-\delta)\tilde{\lambda}(1-\tilde{F}(z))dz}{1-\beta(1-\delta)[\tilde{\lambda}s(1-\tilde{F}(z))+1]}\right\}^{\gamma} > \tilde{\zeta}_i\right)$$
(8)

This probability captures the extensive margin of search. The intensive margin of search is captured by Equation 7, provided that the marginal benefit of search effort is greater than the fixed marginal cost. Factors driving the extensive and intensive margin of search From Equations 7 and 8 we see that there are five factors entering the worker's search decision at the extensive—i.e., whether to search at all for a new job or not—and intensive margin—i.e., how much effort to put in the search:

- 1. The expected cost per unit of search effort, captured by the shifter k_i . This corresponds, for instance, to the expected average time and monetary cost per job application submitted.
- 2. The expected fixed (minimum) marginal cost $\tilde{\zeta}_i$, capturing an initial fixed cost associated with starting the job search.
- 3. The expected arrival rate of offers per unit effort, $\tilde{\lambda}$. This corresponds to the expected probability that a job application leads to a job offer.
- 4. The expected gain from changing job, equal to $E[\Delta W(w)] \equiv \int_{w+m}^{\tilde{w}^{max}} [W(z-m) W(w)] d\tilde{F}(z).$
- 5. The reservation wage $\bar{z} = w + m$.

From conditions (7) and (8) we see that both the chosen level of search effort and the probability to search are decreasing in \tilde{k} , $\tilde{\zeta}$ and \bar{z} , and increasing in $\tilde{\lambda}$ and $E[\Delta W(w)]$. Intuitively, if the expected fixed marginal cost is high, it is less likely that the expected return to search is large enough for the worker to start searching. If the perceived cost shifter is high, each unit of effort costs more (for instance, in terms of time or money). If the reservation wage is high, there is a smaller chance that the offer received will be above it and will be accepted. As a result, the expected gain from searching is also lower. Note that this result generalizes the prediction that higher wage workers are less likely to search. Indeed, the reservation wage can be high either because the current wage is high or because the relocation cost is high. Finally, If the expected gain from changing job or the expected arrival rate of offers are high, the benefit of an additional unit of search effort is larger—each application is more likely to lead to an offer, and each offer is more likely to be accepted and to generate a larger wage gain.

In the rest of the paper I construct measurable equivalents of these five factors using my survey data, and in Section 5 I test which ones matter the most in predicting on-the-job search behavior at the extensive and intensive margin.

3 Survey Design and Data

3.1 Data collection and sample

I administered the survey in the United States between September and October 2022. The final sample includes 2,462 respondents. The survey was open to full-time and part-time wage and salaried workers between 20 and 64 years of age. Self-employed were not allowed to take the survey because the concept of job search is rather different for them. I designed the survey using the online platform *Qualtrics*. The survey link was disseminated by the commercial survey company *Respondi/Bilendi*⁵ and its partner panels. I set quotas on gender, age, household income, education, race and census region of residence, to ensure that the sample is representative of the US population of employees between 20 and 64 years of age. Respondents who accepted the invitation to take the survey were first channeled through a set of screening questions, and were screened out if the quotas for their demographic characteristics were already full. Respondents were paid if they completed the survey fully. The average incentive per survey completed was \$4. The average time to complete the survey was 29 min and the median time was 21 min.⁶ Two weeks after completing the main survey, each respondent was invited to take a shorter follow-up survey.

The final sample is close to representative of the target population in the US. Table 1 shows the characteristics of the sample, in the first column, and the corresponding characteristics of the US target population of full-time and part-time wage and salaried workers between 20 and 64 years of age, in the second column. The population statistics are from the 2022 March Supplement of the Current Population Survey (2022 CPS ASEC). The sample is almost perfectly representative along the dimensions targeted by the quotas. One exception is household income: employees living in households with income above \$90,000 are slightly underrepresented in the sample. Among the non-targeted characteristics, respondents in the sample are more likely to be married or to be living with a partner, and less likely to be Hispanic or of Latino origin. Appendix Figure A-5 shows the geographic distribution of the observations in the sample by state.

Table 2 summarizes some of the labor market characteristics of respondents in the sample. Most of respondents (88%) are employed full-time. 15% work at more than one job. 69% work in person full-time, 19% work from home at least some hours per weeks, and the remaining 12% work fully remotely. In terms of job search status, 22% of respondents report to have actively searched for a job in the 4 weeks preceding the survey. An additional 4% of

⁵https://www.respondi.com/EN/.

⁶The full distribution of the time spent on the survey is shown in Appendix Figure A-4.

Supplement Male 0.51	<u>t</u>
Male 0.51 0.51	
•	
Age	
20-29 years old 0.20 0.22	
30-39 years old 0.25 0.26	
40-49 years old 0.23 0.23	
50-64 years old 0.31 0.30	
Household income	
<\$30,000 0.10 0.10	
\$30,000-\$59,999 0.22 0.21	
\$60,000-\$89,999 0.20 0.19	
\geq \$90,000 0.48 0.50	
4-year college degree or more 0.46 0.43	
High-school degree or less 0.27 0.30	
Hispanic/Latino origin 0.10 0.18	
Black/African American 0.12 0.13	
Asian/Asian American 0.06 0.07	
Married/living w. Partner 0.68 0.55	
Sample size 2462	

TABLE 1: SAMPLE CHARACTERISTICS

Notes: The table reports summary statistics for the main survey, in the first column, and corresponding statistics for the target population in the US, in the second column. Population statistics come from the 2022 March Supplement of the Current Population Survey (2022 CPS ASEC, Flood et al., 2022). Target population: full-time or part-time wage and salaried workers, between 20 and 64 years old.

respondents searched for jobs "passively," *i.e.* they only looked at job postings and did not use an active job search method. I classify respondents as "active job searchers" if they have used one of the active job search methods, as defined by the US Bureau of Labor Statistics (BLS).⁷ The BLS uses this method in the CPS to separate between unemployed individuals who are actively looking for a job and should be counted among the unemployed, and non-

⁷Active job search methods include: contacting an employer directly about a job; having a job interview; submitting a resume or application to an employer or to a job website; using a public or private employment agency, job service, placement firm, or university employment center; contacting a job recruiter or head hunter; seeking assistance from friends, relatives, or via social networks; placing or answering a job advertisement; checking union or professional registers. Source: https://www.bls.gov/cps/definitions.htm#jobsearch.

	Mean	Median	P25	P75	Obs.
Work hours per week	39.08	40.00	36.00	42.00	2462
Gross annual earnings	75025.28	58411.50	36000.00	95000.00	2462
Gross hourly earnings	38.91	27.67	17.79	45.19	2462
Tenure at current job (in yrs.)	8.96	6.00	2.17	13.25	2462
Full-time employed	0.88	1.00	1.00	1.00	2462
Working at multiple jobs	0.15	0.00	0.00	0.00	2462
Working fully in-person	0.69	1.00	0.00	1.00	2462
Working remotely some time	0.19	0.00	0.00	0.00	2462
Active job searcher	0.22	0.00	0.00	0.00	2462
Passive job searcher	0.04	0.00	0.00	0.00	2462

TABLE 2: EMPLOYMENT AND SEARCH: SUMMARY STATISTICS

employed individuals who are not actively searching and should be considered out of the labor force. Since the BLS does not provide an *ad-hoc* definition of active search status for individuals who are currently employed, I use the same classification of search activities to define active on-the-job search. 59% of the job searchers in the sample are looking for a new job to leave their current employer, while the remaining 41% are looking for a job in addition to their current one. Appendix Figures A-6 and A-7 plot the share of respondents in the sample by industry and SOC 2-digit occupation group.

3.2 The survey: an overview

The link to the survey is in Appendix A-2. Figure 1 outlines the survey flow.

Background socioeconomic questions, current employment, and current search status At the beginning of the survey, I collect information on respondents' gender, age, race and ethnicity, household income, education, zipcode of residence and current employment status. I use this information to screen out respondents and for the quotas. I ask additional demographic questions (such as the number and age of the children living in the household) at the end of the survey, to minimize the effect of potential survey fatigue on the key questions. After the screening questions, I ask respondents a comprehensive set of questions about their current job: when they started working at it, how many hours they work per week, how much they earn in a year, their occupation, the industry of their employer, whether the job is in person, remote, or hybrid, the benefits they receive, if any. I adapt the questions for respondents who hold more than one job and ask about their "main" job, defined as the job where they work the most hours per week. I measure how satisfied respondents are about their current job (in terms of pay, benefits, co-workers and work environment, flexibility in work hours, options to work from home, and opportunities for career progression), and how well they think their job fits their experience and skills. I also ask respondents if they were employed somewhere else or not-employed when they found their current job, to identify respondents who made a job-to-job transition. I then ask whether the respondent has done anything to look for a new job in the last four weeks, and provide a list of activities to select from, to classify respondents into active and passive searchers.

Sample composition: not searchers, current searchers, recent changers I classify respondents into 3 groups according to their current and past job search status. Respondents who started their current job in the 12 months before they took the survey are classified as "recent changers." Recent changers account for 15% of the sample. I define "current searchers" respondents who have been looking for a new job—either to leave their current job or in addition to it—in the four weeks before taking the survey. This group makes up for 22% of the sample. Finally, respondent who have not been looking for a new job and have been working for their current employer for more than one year are classified as "not searchers." These account for the remaining 63% of the sample. Appendix Table A-1 summarizes some of the characteristics of the respondents in the different groups.

Search costs and returns to effort The core of the survey consists of three blocks. The first block is about search costs, that I elicit using a range of qualitative and quantitative questions. I adapt the questions on search costs for the three groups of respondents. I ask recent changers about the costs of their recent job search and about the effort they put into it. Not searchers are asked about the costs they would associate with a potential job search, about the effort they would put into it, and about their expectations of the effectiveness of their job search effort. I ask current searchers about their search so far and about their expectations for the future, until they find a job that they would accept.

At the beginning of the section on search costs, I ask respondents two questions to elicit their thoughts on the main issues they faced, are facing, or expect to face when searching for a new job. Following Ferrario and Stantcheva (2022), the first question is open-ended and has the scope of capturing respondents' first reactions, without priming them on a specific direction or issue. Not searchers were asked:

"Imagine you wanted to look for a new job at a new employer now, while still working at your current employer. Are there any issues that would make looking for a new job difficult for you now? What are the first ones that come to your mind?"

The text is adapted for recent changers and current searchers. The second question is

FIGURE 1: SURVEY STRUCTURE

Screening Questions					
Employment situation, demographics					
\downarrow					
Current employment					
Occupation and industry, wage, hours, date job started, j	ob satisfaction				
\downarrow					
Current search status					
Have you done anything to look for a new job in the la	ast 4 weeks?				
\downarrow					
Search Costs	Search Costs				
<u>Not searchers</u> <u>Current Searchers</u>	Recent changers				
Expected costs Costs so far and Expected costs	Costs of recent search				
\downarrow					
Beliefs about Outside Options	Beliefs about Outside Options				
National median wage, rank in wage distribution, expected	ed wage change				
↓					
Treatments					
Median Wage T. <u>Search Costs T.</u>	Control group				
National and local median wage Experience of recent changers	No information				
\downarrow					
Post-treatment Questions					
Local median wage, "how costly" searching for a job is, expected wage at new job					
\downarrow					
Labor Market Behavior					
Prob. of looking for a new job, Pro. of asking for a raise, Reservation wage					

similar but provides some options for respondents to select, such as "not having enough time" or "having to take care of family responsibilities." Another qualitative question elicits the level of "stress" respondents associate with the job search process, measured on a Likert scale going from 1 to 7, where 1 is "not stressful at all" and 7 is "extremely stressful."

The rest of the block consists of a set of quantitative questions asking respondents about their expectations of various measures of search costs. I start by asking respondents about how many weeks in total they expect it would take them (or it took them) to find a new job—"from the moment when you would start actively looking for job openings, until the moment you accept the new job offer." I then tell them to consider the job search process split into three phases: looking for job openings, applying to jobs, preparing for and doing interviews. Although this way of breaking down a job search does not perfectly fit the experience of workers in any occupation and context, I considered it to be the best option to provide a concrete framework that could apply to the broadest set of respondents, and obtain measures as comparable as possible across workers. I ask respondents about how many hours they expect to spend (or have spent) on each of the three phases of the job search. I also ask about the number of applications they expect to submit, which I consider a measure of search effort, and about how many interviews they expect to do. Finally, I elicit their expectation of the number of job offers they would receive (but not necessarily accept). I use this number together with the expected number of applications to construct the expected applications success rate, a proxy for respondents' expected return to search effort.

At the end of the block I ask respondents about whether they expect to spend (or have spent) any money on their job search. If they answer affirmatively, I show them a "search budget," displayed in Appendix Figure A-1. On this budget I list some likely cost items, such as "new clothes for interviews," "transportation costs," or "subscriptions fees for job board websites." Respondents can write 0 or a positive amount next to each item. They also have the option to add additional items that are not already listed.

Beliefs about outside options The second main block of the survey is about perceptions of outside options. In this block, I ask respondents to "guess" the median wage for their occupation, and I elicit their beliefs about their position in the wage distribution. These questions are adapted from Jäger et al. (2021). I also ask a qualitative question measuring how "difficult" they think it is to find a new job that they would consider suitable in terms of pay, benefits, hours and workplace flexibility, work environment, and location.

The information treatments After the outside options block, respondents are randomly split in three groups. The first group of respondents receives correct information about the median wage for their occupation in the US and in the area where they live (metropolitan or micropolitan area). I call this treatment the "Median Wage Treatment." The second group of respondents receives information about the search experience of recent job changers who work in the same occupation and have recently changed job—how much money and time it took them to find a new job. I call this treatment the "Search Costs Treatment." The third (control) group sees no treatment. I provide more information on the treatments in Section 6.

Post-treatment questions and search behavior All respondents, regardless of which treatment group they belong to, are asked three post-treatment questions: i) a question about the median wage for their occupation "in the area where they live," to check for a direct first stage effect of the Median Wage Treatment; ii) a qualitative question about how "time consuming" they expect their job search to be, on a Likert scale from 1 to 7, where 1 is "not time consuming at all" and 7 is "extremely time consuming," to check for a direct first stage effect of the Search Costs Treatment; iii) a question about the wage gain (or loss) they expect to obtain if they decided change job now, giving themselves a reasonable time frame—three months—to search. This question is asked in two steps, displayed in Appendix Figure A-2.⁸

In the last main block of the survey I elicit respondents' job search intentions. Following Jäger et al. (2021), I ask respondents about the percent chance they will look for a new job in the next 12 months (if they are not currently looking for one already) and about the percent chance they will ask their current employer for a raise. I ask current searchers how many hours they plan to search in the next 7 days. Finally, I measures respondents' reservation wage using the following question from the SCE (Conlon et al., 2018) and Krueger and Mueller (2016):

"Suppose someone offered you a job today in a line of work that you would consider. What is the lowest annual pay you would accept for this job, before taxes and other deductions and including tips, commissions and bonuses?"

4 Search Costs and Perceptions of Outside Options

In this section, I describe respondents' beliefs about the costs of looking for a new job, and their expectations about the return to their job search effort, discussing some key patters. Appendix Table A-2 reports the average, median and interquartile range for all the elicited beliefs about costs and returns. I then compare these beliefs to the costs and returns to effort reported by respondents who recently searched for, found and started a new job (recent changers). I highlight heterogeneity in beliefs by demographic group. To compute all the statistics in this section, I restrict the subset of recent changers to respondents who made a job-to-job transition—i.e. those who were employed when they found their new job— I exclude recent changers who transitioned in their new job from unemployment. Since respondents' elicited beliefs refer to a potential job search "while still employed at their

 $^{^{8}}$ I start from a similar question in Jäger et al. (2021), but I change the wording slightly to adapt it to my context and framework.

current employer," this sample restriction is necessary to construct comparable benchmarks. Indeed, the employed have different schedules than the unemployed and, most likely, face different constraints in their job search. Moreover, as Faberman et al. (2022) document, the employed are more effective than the unemployed at searching—they apply to fewer jobs but their applications are more likely to be successful.

In the second part of this section, I summarize respondents' perceptions of the wage distribution in their occupation—median wage and their rank in the distribution—and I document clear patterns of misperceptions. I report the distribution of respondents' expected wage gain from changing job—a direct measure of their beliefs about their outside options—and I show how these relate to respondents' perceptions of the wage distribution.

4.1 Search Costs and Return to Search Effort

4.1.1 Main issues when looking for a new job

Before turning to the quantitative beliefs about search costs, I provide an overview of the answers to the questions about the general "issues" that would make—or that made, for recent changers—looking for a new job difficult. As explained in Section 3, the survey includes an open-ended and a multiple choice question capturing respondents' perceived or experienced issues. In Figure 2, I plot the answers to the multiple choice question for respondents who are not currently looking for a job (blue squares) and respondents who recently made a job-to-job transition (red diamonds). Appedix Figure A-9 summarizes the answers of respondents who are currently searching for a new job.

Looking at the answers of not searchers, lack of time emerges as the main obstacle to a potential job search. About 32% of these respondents complain about "not having enough free time to look for a new job," an additional 12% is worried about not being able to miss time at work if needed. Time constraints come up as a pressing issue even in the answers to the open-ended question. The world clouds in Appendix Figure A-8 display the couples of words most frequently mentioned by not searcher and current searchers, in panel A, and by recent changers, in panel B. Having to take care of family responsibilities is a constraint for 21% of not searchers. 17% of these respondents are worried that their current employed would find out about their job search. This issue is also frequently mentioned in the answers to the open-ended question. Turning to recent changers, they are more likely to say that they did not have any particular issue when they looked for their current job. Lack of time was an issue only for 18.5% of recent changers. A similar share was worried that their former employer would know about the job search. 13% of recent changers think that lack

FIGURE 2: WHAT MAKES LOOKING FOR A NEW JOB DIFFICULT?



Notes: Each symbol corresponds to the share of respondents in each group who selected the answer listed on the left. Recent changers include only respondents who made a job-to-job transition in the 12 months before taking the survey.

of qualifications was an issue in their recent job search. This share is even higher (17%) among respondents who are currently searching for a new job. In contrast, only 8% of not searchers do not feel qualified enough to look for a new position. Having to take care of family responsibilities was an issue only for 12.5% of recent changers.

Finally, only about 6% of not searchers and recent changers said that not having enough money would be an issue or was an issue for their search. This share is a bit higher among current searchers. The lack of monetary constraints for most people is coherent with the patterns in beliefs about time and monetary search costs that I present in the next subsection, and with the correlations between beliefs about costs and search behavior that I discuss in Section 5. The little relevance of monetary constraints for on-the-job search contrasts with the evidence in Schwartz (2015) and Ferraro et al. (2022) about unemployed job-seekers. These authors show that pecuniary search costs are an important limiting factor for the unemployed, who are more likely to be liquidity constrained than the employed. This additional dimension of heterogeneity between the employed and the unemployed further proves that these two groups face different search costs that need to be measured separately.

4.1.2 Time, money, returns to effort

Time and money Appendix Table A-2 summarizes the various measures of time and monetary costs that I collect in the survey—average, median, and interquartile range for the three groups of respondents (not searchers, recent changers, and current searchers). All variables are defined in Appendix Section A-1.

Starting from beliefs about time costs, respondents who are not currently searching believe it would take them 6 weeks on average to find a new job. The median number of weeks is 4. Not searchers expect to spend 35 hours on average on their job search, and expect to dedicate about 55% of these hours (19) to looking for job openings. The median for the expected total search hours is 20, and the median number of hours spent looking for job openings is 9. Looking at the average cost of effort—which I compute by dividing the total expected number of hours spent on the search by the expected number of job application, as previously explained—on average one application "costs" 6.26 hours, the median average cost is 3.5 hrs.

In terms of monetary costs, only 43% of respondents expect to incur some expenses related to their job search. Among respondents who do expect to spend some money on their search, the average total monetary cost is \$244, the median is \$150. The average dollar cost per application is \$42, the median is \$22.

Return to effort Turning to beliefs about search effort and its return in terms of job offers, the average number of applications respondents expect to submit is 9, the median is 5. The average expected success rate of these applications—my measure of expected return to effort—is 0.65, the median is 0.5. This means that on average respondents believe that one out of two applications will translate in a job offer.

Stress I conclude this overview of respondents' beliefs by looking at their perception of how "stressful" a possible job search would be. This question is meant to capture the psychological costs that respondents associate with the job search process, which are in part related but also independent of expected time and monetary costs. For instance, some respondents may suffer an intrinsic psychological cost from being on the search—having to worry about applications and interviews in addition to their daily responsibilities, or having to wait to hear back from potential employers. On average, respondents expect a job search to be quite stressful. The average expected level of stress is 4.83—on a scale from 1 to 7, where 1 is "not stressful at all" and 7 is "extremely stressful." The median is 5.

Heterogeneity As reported in Appedix Table A-2, all the measured beliefs about costs, effort, and returns to effort have large standard deviations, meaning that there is a significant degree of heterogeneity across respondents. To explore and document this heterogeneity, I regress beliefs about costs, effort, and returns to effort on a set of dummies for some key demographic characteristics: gender, race, education, being married or living with a partner, having children less then 6 years old, earning a high wage.⁹ I standardize the dependent variables so they have mean 0 and standard deviation 1, to make the coefficients easier to interpret. I report the results of these regressions in Table 3.¹⁰ There are some striking patterns in beliefs across demographic groups. Women expect to spend more weeks searching—their expected search duration is 0.26 of a sd higher. They also believe that looking for a new job would be significantly more stressful—by 0.3 of a sd. They expect to send more applications, and, in particular, they expect a significantly lower success rate. All in all, they believe that looking for a new job would require more effort, would take more weeks and create more stress, and they expect a lower return to their job search effort. Younger respondents believe that their search would last fewer weeks and that they will spend fewer hours searching, but they do not expect a significantly different success rate. College graduates expect higher costs and slightly lower returns—consistent with these workers aiming at jobs that are more difficult to reach. High-wage workers also expect higher costs, but a slightly higher success rate. Finally, African American expect to spend fewer weeks and less hours searching, and associate a significantly lower level of stress to their potential job search.

4.1.3 Expected vs. realized costs

Is the heterogeneity in beliefs across demographic groups driven by systematic "errors" that respondents in certain groups make—*i.e.*, some groups systematically overestimate or underestimate search costs? Or is it due to actual differences in search costs and search efficiency across groups? To answer this question I compare expected costs and returns with the "realized" costs and returns reported by respondents who recently looked for and started a new job.¹¹ Figure 3 plots the average expected (for not searchers, blue squares) and realized costs and success rate (for recent changers, red diamonds). Strikingly, the patterns in realized costs across groups resemble the patterns in expected costs, suggesting some degree of group heterogeneity, and that respondents are aware of their search costs

⁹Defined as a wage in the top quartile of the distribution of annual wages in my sample.

¹⁰The regressions for additional variables are reported in Appendix Table A-4.

¹¹I use this strategy given that I do not observe expected and realized search costs for the same set of respondents.

TABLE 3: BELIEFS ABOUT SEARCH COSTS, SEARCH EFFORT, AND RE-TURN TO EFFORT BY DEMOGRAPHICS

	Exp. tot. time (1)	Exp. weeks (2)	Exp. stress (3)	Exp. avg. time per app. (4)	Exp. applications (5)	Exp. success rate (6)
Female	0.0377 (0.0520)	0.257^{***} (0.0509)	$\begin{array}{c} 0.317^{***} \\ (0.0512) \end{array}$	-0.112^{**} (0.0515)	0.112^{**} (0.0538)	-0.298^{***} (0.0511)
Age 20-39	-0.164^{***} (0.0517)	-0.198^{***} (0.0506)	$\begin{array}{c} 0.0330 \\ (0.0555) \end{array}$	-0.0387 (0.0538)	-0.0752 (0.0557)	0.141^{**} (0.0578)
College graduate	0.213^{***} (0.0564)	0.436^{***} (0.0550)	0.128^{**} (0.0555)	0.137^{**} (0.0564)	0.142^{**} (0.0579)	-0.130^{**} (0.0553)
Married/Living with partner	$\begin{array}{c} 0.0342 \\ (0.0562) \end{array}$	-0.0173 (0.0541)	-0.0540 (0.0586)	0.123^{**} (0.0544)	-0.108^{*} (0.0599)	0.141^{**} (0.0568)
Has children $<6yo$	-0.0989 (0.0686)	-0.143^{**} (0.0646)	-0.0210 (0.0713)	-0.131* (0.0729)	-0.00748 (0.0730)	$\begin{array}{c} 0.0785 \\ (0.0779) \end{array}$
African American	-0.200^{**} (0.0803)	-0.180^{**} (0.0743)	-0.353^{***} (0.0948)	-0.148* (0.0807)	-0.0368 (0.0884)	0.265^{***} (0.0940)
Hispanic/Latino Origin	-0.119 (0.0864)	-0.0380 (0.0800)	$\begin{array}{c} 0.00802 \\ (0.0956) \end{array}$	-0.0428 (0.0895)	-0.0882 (0.0948)	$0.102 \\ (0.0999)$
High wage	$\begin{array}{c} 0.198^{***} \\ (0.0701) \end{array}$	0.142^{**} (0.0646)	-0.0481 (0.0641)	$\begin{array}{c} 0.244^{***} \\ (0.0690) \end{array}$	-0.105 (0.0644)	0.128^{*} (0.0666)
Observations	1558	1559	1561	1522	1560	1522

Notes: All dependent variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. See Appendix Section A-1 for variables definitions. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: not searchers.

to some extent. However, the gaps in realized costs and returns between groups are often smaller and not significantly different thank zero. For instance, although women expect to spend more weeks searching than men, the realized number of weeks is the same for the two groups. The same holds for the number of hours. Women seem to be quite accurate about their applications success rate, while men tend to overestimate it. African American, Hispanic and low-wage respondents tend to overestimate the number of weeks it would take them to find a new job. Recent changers across all groups report a lower level of stress than not searchers. Interesting, women who recently found a new job think their job search was slightly more stressful than male recent changers, but the gap is much smaller than the gap in expected stress between men and women. These patterns should be interpreted with caution, given the small size of the sample of recent searchers and the likely selection of respondents into search. Appendix Table A-3 replicates the analysis in Table 3 on the sample of recent changers. Most of the differences by group are smaller and not statistically significant, coherently with the averages plotted in Figure 3.



FIGURE 3: EXPECTED AND REALIZED SEARCH COSTS

Notes: Panel A plots the average beliefs of not searchers about the number of weeks needed to find a new job (blue squares), and the average number of weeks it took recent changers took to find their job (red diamonds) for each demographic group. Groups are defined by the indicator function listed on the left. The shaded areas are 95% CI around the mean. Panel B plots the average beliefs about and realizations of the total hours spent searching. Panel C plots the average expected and realized success rate. Panel D plots the average expected and realized level of stress associated with the job search. Recent changers include only respondents who made a job-to-job transition.

4.2 Perceptions of outside options

I this section I summarize workers' beliefs about outside options. I start from the perceived national median wage for respondents' occupation. In Figure 4 I plot the distribution of the misperceptions of the national median wage, defined as perceived wage minus actual



Notes: Perceived minus actual SOC 6-digit occupation code median wage, divided by actual wage. Trimmed at the 5th and 95th percentile.

wage, divided by the actual wage. To benchmark respondents answers I use information on 2021 median wages for SOC 6-digit occupation groups from the Bureau of Labor Statistics (BLS) Occupational Employment and Wages Statistics (OEWS).¹² I classify respondents into different groups using their answers to the occupation question and the O*NET mapping from common occupation titles to SOC occupation codes.¹³ Appendix Figure A-10 plots the distribution of misperceptions of the local median wage.

On average, respondents slightly overestimate the median wage in their occupation. The median misperception is 2%, the average is 7%. Perhaps not surprisingly, respondents are slightly more accurate about the local median wage: the median misperception is 1%, the average is 6%. However, these averages masks significant heterogeneity in perceptions, as shown by the dispersion of the distribution in Figure 4. A significant share of respondents underestimate the median wage in their occupation. Respondents whose wage is actually below the median are more likely to underestimate the median wage. In Appendix Figure A-13 I show a binned scatter-plot of respondents' perceived median wage over their current wage. The slope of the fit line is 0.69 and strongly significant, while the slope of the true median wage on respondents' current median wage is 0.28. The evidence that respondents wrongly anchor their perceptions of the wage distribution to their wage is consistent with the patterns documented by Jäger et al. (2021) in Germany.

¹²https://www.bls.gov/oes/.

¹³See Appendix Section A-2.3 for more details about this question and the classification.

FIGURE 5: PERCEIVED VS. ACTUAL RANK IN OWN OCCUPATION WAGE DISTRIBUTION



Notes: This figure plots the share of respondents who believe their rank in the wage distribution is in the percentiles group listed on the x axis (in blue) and the share of respondents whose rank is actually in those percentiles group (in red).

Adding to this evidence, Figure 5 plots the distribution of respondents' perceived rank in the wage distribution in their occupation, against the distribution of their actual rank. Percentiles are binned into 6 groups (from percentiles 1-10 to percentiles above the 90th) Most respondents starkly overestimate their position in the wage distribution. This is especially true for respondents at the lower rungs of the distribution, where the gap between perceived and actual is wider. Respondents in the top quartile, instead, underestimate their position in the wage distribution. These patterns are consistent with the "center bias" documented by Hvidberg et al. (2020) in a sample of Danish respondents.

Finally, in Figure 6 I show the distribution of the expected wage change from changing job, elicited as described in Section 3. Most of respondents (42%) believe they would earn the same wage they are currently earning. Those who believe would see a wage gain are fairly optimistic. At the same time, there are some respondents who think they would earn a lower wage if they had to take a position with a new employer. The median expected wage change is 0 and the average is 11.7%. Appendix Figure A-14 plots the distribution of the expected wage change by group. Respondents who are currently searching for a new job are the most optimistic about their potential wage gain. Their average expected wage gain is 17.25%.

To what extent are respondents' perceptions of the wage distribution related to their

FIGURE 6: EXPECTED WAGE CHANGE AT NEW JOB



Notes: Sample: Only respondents who have not seen any of the treatments.

beliefs about their outside options, measured by the expected wage gain? In Table 4 I regress expectations about the wage gain from changing job on the misperception of the national median wage and of respondent's quartile in the wage distribution. Both variables capturing perceptions of the wage distribution are significantly correlated with the expected wage gain. A one sd higher misperception of the median wage—*i.e.* a larger *overestimation*—is associated with a reduction in the expected wage gain of -2.6 percentage points. Respondents who overestimate their position in the income distribution by one quartile expect a 1.9 percentage points lower wage gain.

4.2.1 Heterogeneity

Is there heterogeneity by demographic groups in perceptions of the wage distribution and beliefs about outside options? Although across all groups the average misperception of the national median wage is positive, there is significant heterogeneity in the share of respondents who underestimate the median wage, plotted in Panel A of Figure 7. Women are more likely to underestimate the median wage than men. Low-wage, younger, African American and Hispanic respondents are significantly more likely to underestimate. Low-wage, younger respondents and women also overestimate their position in the wage distribution to a greater extent, as displayed in Panel B of Figure 7.¹⁴

 $^{^{14}\}mathrm{Appendix}$ Table A-6 performs a similar analysis in regression form.

TABLE 4: PERCEPTIONS OF THE WAGE DISTRIBUTION AND EXPECTED WAGE CHANGE

	Expected Wage Change At New Job (1)
Misperception median wage (in $\%$)	-3.082^{*} (1.773)
Perceived - actual quartile	-1.899^{***} (0.594)
Observations Mean	$2416 \\ 14.23$

Notes: The regression includes demographic controls, occupation and industry fixed effects, and dummies for treatment status, not reported. Misperceptions fo the median wage are winsorized at the 5% and 95% percentile. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

FIGURE 7: HETEROGENEITY IN PERCEPTIONS OF THE WAGE DISTRIBU-TION

(A) NATIONAL MEDIAN WAGE

(B) QUARTILE IN WAGE DISTRIBUTION



Notes: Panel A plots the share of respondents who underestimate the national median wage for their occupation, by group. Panel B plots the average misperception of respondents' quartile in the wage distribution, defined as perceived minus actual quartile. The shaded areas are 95% CI around the mean.

Symbol	Description	Survey equivalent
8	Search effort	Number of job applications
k	Cost shifter	Total number of hours and dollars spent searching/
		number of applications
ζ	Fixed marginal cost	Level of stress associated with the job search
$ ilde{\lambda}$	Expected arrival rate of offers	Expected application success rate
$E[\Delta W(w)]$	Expected gain from changing job	Expected ΔW at new job
Ī	Reservation wage	Reservation wage

TABLE 5: FROM THE MODEL TO THE SURVEY DATA

5 Beliefs and Search Behavior

5.1 Search Behavior at the Extensive Margin

In this Section I show how expected search costs, expected returns to effort, and beliefs about outside options relate to search behavior at the extensive margin. I start by discussing how I connect the model to the survey data and construct measures for the five factors featured in the optimality condition for search effort at the extensive margin. I then test the predictions of the model by regressing expectations about costs and returns and beliefs about outside options on the propensity to search in the future. I further zoom in on search costs and discuss which measures of costs are more predictive of search intentions. Finally, I show how these correlations vary by demographic group.

Connecting the model and the survey data I start from the equation for optimal search effort at the extensive margin (8) and map its components into variables measured in the survey. Table 5 summarizes the key factors in this optimality condition and the corresponding variables constructed using the data from the survey. I proxy search effort, s, with the number of job applications. I measure the expected return to effort—or expected arrival rate of offers per unit of effort— λ using the expected "success rate" of applications, which I compute as the number of expected offers divided by the number of applications. I map the cost shifter k in the average time and monetary costs per effort (application), that I compute as total hours or total dollars spent on the job search divided by the number of applications. As an equivalent of the fixed marginal cost ζ I take the expected level of stress associated with the job search. I proxy $E[\Delta W]$ with the expected wage gain from changing job measured in the survey. If W(w) was just equal to w and relocation costs m were equal to 0, the expected wage change measured in the survey would correspond exactly to $E[\Delta W]$.

When relocation costs are non-zero, the survey measure is likely an upper bound for $E[\Delta W]$. Indeed although respondents should consider that they are only going to accept offers above a certain reservation wage, which should account for m, they are asked about the simple wage gain, gross of the relocation cost. Note that since $E[\Delta W]$ already depends on beliefs about the wage distribution (median wage and rank in the wage distribution), I do not need to account for these separately. Finally, I measure directly the reservation wage \bar{z} in the survey.¹⁵

Testing the model To test the predictions of the model I regress the survey equivalents of the five factors in equation (8) on the future propensity to search of respondents who are not currently searching—my measure of search intentions at the extensive margin. Table 6 reports the results of this exercise. In these regressions I control for current wage, demographic characteristics and other factors—tenure at current job, average job satisfaction, perceived fit with current job in terms of skills—that are strong predictors of search behavior and are likely to confound the estimates.¹⁶ The regressions also include industry and SOC 2-digit occupation fixed effects. To make the correlations comparable and easier to interpret, I standardize each variable by subtracting its sample mean and dividing by its standard deviation, so it becomes a z-score with mean 0 and sd equal to 1.

The expected average cost of effort does not emerge as a significant predictor of search intentions. Indeed, the expected time per application is not significantly correlated with the propensity to search in the future. The expected dollar per application is weakly positively correlated with search intentions, contrary to what the model would predict. Similarly, the level of stress associated with the job search process is not significantly related to the propensity to search. Instead, the expected return to effort—applications success rate—and the expected wage gain at the new job emerge as strong predictors of future search intentions. In the specification in column (3), where all the proxies for the five factors are included, a one sd increase in the expected applications success rate is associated with 0.07 of a sd increase in the reported probability to search for a new job in the near future. A one sd increase in the expected wage gain at the new job is associated with 0.32 of a sd increase in the propensity to search. Both correlations are in line with the predictions of the model that workers who expect a higher wage gain from changing job and face a higher arrival rate of offers are more likely to search. Finally, the reservation wage is negatively correlated with the propensity to search. A one standard deviation increase in the reservation wage decreases the probability to search in the future by 0.13 of a sd. Since in these regressions I control for respondents'

 $^{^{15}}$ See Section 3 for the exact wording of the question.

¹⁶Appendix Table A-7 reports the correlations of these variables with the propensity to search.

TABLE 6: EXPECTED SEARCH COSTS, BELIEFS ABOUT OUTSIDE OPTIONS AND SEARCH INTENTIONS

	Prob. Looking	Prob. Looking	Prob. Looking
	for New Job	for New Job	for New Job
	(1)	(2)	(3)
Exp. avg. time per application	0.00709	-0.00363	-0.0184
	(0.0277)	(0.0260)	(0.0263)
Exp. avg. money per application	0.0817***	0.0544^{*}	0.0605^{**}
	(0.0297)	(0.0288)	(0.0296)
Exp. stress	0.0234	0.0601^{**}	0.0404
	(0.0265)	(0.0264)	(0.0264)
Exp. success rate		0.0836***	0.0685***
		(0.0258)	(0.0258)
Exp. wage change in p.p.		0.293***	0.323***
		(0.0247)	(0.0249)
Reservation wage			-0.136***
			(0.0278)
Observations	1503	1494	1444
Adjusted R^2	0.158	0.248	0.260

Notes: All continuous variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. Coefficients can be interpreted as partial correlations. Each column is a separate regression, which also includes controls for current job satisfaction, skill fit with current job, demographics, occupation and industry fixed effects, dummies for treatment status. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: not searchers.

current wage, the reservation wage picks up the independent variation in relocation costs. This correlation is also in line with the prediction of the model that workers with higher relocation costs are less likely to search.

Decomposing the contribution of each variable to the explained variation in search intentions, the expected wage gain has the strongest explanatory power: it accounts for 47% of the explained variance. The reservation wage and the expected success rate follow with 4% and 3%.

Summing up, expectations about outside options appear to be the biggest predictor of search intentions at the extensive margin. Expectations on returns to effort seem to matter more than unitary time costs. I think this is interesting for two reasons. First, having to send many applications with little return is more likely to impose a psychological strain, an extra cost in addition to to the time needed to materially do the extra applications – which, in itself, is not correlated with search intentions. Second, expectations on search efficiency are more likely to be influenced by beliefs about job availability and current economic conditions compared to average search costs. Indeed, in the survey respondents who believe that finding a job is more "difficult"¹⁷ also expect a lower hit rate and expect to send more applications. The average time cost per application, instead, is not correlated with the perceived difficulty of finding a new job.

Search costs and information frictions Given that average search costs are not a significant predictor of search intentions, I look at other measures of expected costs that I elicit in the survey, to check if other cost margins are more relevant. In Table 7 I report the correlations of a broader set of measures of expected search costs with the reported probability to search for a new job in the future. Each correlation is estimated in a separate regression and variables are standardized as in Table 6. The two measures of costs that are negatively correlated with the propensity to search are the time respondents expect to spend looking for job openings, and the total number of weeks the job search would last. The expected number of applications is also negatively correlated, coherent with the results on the expected applications success rate above.

The fact that the time spent looking for job openings is the only measure of time costs significantly (negatively) related to the propensity to search suggest the relevance of information frictions. Further suggestive evidence on the relevance of information frictions is provided by another question of the survey. Before the section of the survey on search costs, I ask all respondents, regardless of search status, whether in the last four weeks they have seen any ads for jobs at other employers they would apply to (if they were looking for a new job). The majority of respondents (58%) who are not searching for a new job answered that they had not been paying attention to job ads. These respondents also expect to spend more time looking for job openings, expect a lower gain from changing jobs, and are significantly less likely to look for a job in the future. Of course, attention is likely to be endogenous to beliefs about outside options and search intentions. Hence, these correlations should be taken as purely suggestive. However, they show that the majority of employed workers are not "always searching" and sampling offers, contrary to what a model of on-the-job search with exogenous search effort would predict.

¹⁷ "How difficult do you think it is to find jobs at other employers that you would consider suitable for you in terms of pay, benefits, hours and workplace flexibility, work environment, location?"

		Prob. Looking for New Job (1)
Exp.	avg. time per application	$\begin{array}{c} 0.0312\\ (0.0269) \end{array}$
Exp.	avg. money per application	$\begin{array}{c} 0.0824^{***} \\ (0.0285) \end{array}$
Exp.	weeks searching	-0.0878^{***} (0.0258)
Exp.	time tot	-0.0384 (0.0269)
Exp.	time looking for openings	-0.0596^{**} (0.0259)
Exp.	time on applications	-0.0263 (0.0261)
Exp.	time on interviews	$0.0239 \\ (0.0261)$
Exp.	money tot.	$0.0432 \\ (0.0276)$
Exp.	applications	-0.0478^{*} (0.0248)
Exp.	stress	$0.0386 \\ (0.0263)$

TABLE 7: JOB SEARCH INTENTIONS AND EXPECTED SEARCH COSTS

Notes: All continuous variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. Coefficients can be interpreted as partial correlations. Each coefficient is estimates in a separate regression witch also includes controls for current job satisfaction, skill fit with current job, demographics, SOC 2-digit occupation and industry fixed effects, dummies for treatment status. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: not searchers.

Heterogeneity by group Are the correlations reported in Table 6 different for different demographic groups? I re-estimate the specification in column (3) of Table 6 separately on 3 sub-samples: women, college graduates, and African American respondents. As documented in Section 4, women are more pessimistic about search costs (stress) and especially returns to search effort. College graduates also expect higher costs and lower returns to effort.

TABLE 8: EXPECTED SEARCH COSTS, BELIEFS ABOUT OUTSIDE OPTIONSAND SEARCH INTENTIONS - HETEROGENEITY BY GROUP

	Women	College graduate	African American
	Prob. Looking	Prob. Looking	Prob. Looking
	for New Job	for New Job	for New Job
	(1)	(2)	(3)
Exp. avg. time per application	0.0223	-0.0262	-0.0309
	(0.0383)	(0.0370)	(0.114)
Exp. avg. money per application	0.0158	0.0805^{*}	-0.0995
	(0.0391)	(0.0421)	(0.0911)
Exp. stress	-0.00717	0.0293	0.0376
	(0.0397)	(0.0400)	(0.106)
Exp. success rate	0.0748^{*}	0.106***	0.0904
	(0.0409)	(0.0408)	(0.0993)
Exp. wage change in p.p.	0.259***	0.364***	0.190^{*}
	(0.0402)	(0.0354)	(0.102)
Reservation wage	-0.122***	-0.174***	0.129
	(0.0447)	(0.0413)	(0.0983)
Observations	665	690	126
Adjusted R^2	0.215	0.282	0.347

Notes: All continuous variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. Coefficients can be interpreted as partial correlations. Each column is a separate regression, which also includes controls for current job satisfaction, skill fit with current job, demographics, SOC 2-digit occupation and industry fixed effects, dummies for treatment status. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: not searchers.

African American are optimistic across the board. Despite the different expectations, the correlations between the five factors and job search intentions are quite similar across the three groups. For African American the correlations are weaker, but it is probably due to lack of statistical power, given the small sub-sample size.

5.2 Search Behavior at the Intensive Margin

In this Section I study how expected search costs and beliefs about outside options relate to on-the-job search behavior at the intensive margin—i.e. to the choice of optimal search effort. I follow the same structure of Section 5.1 and I focus on the planned search effort of current searchers. I regress the number of applications that current searchers plan to submit until they find a new job on the five variables discussed in Section 5.1: expected average costs per application (time and money), expected level of stress associated with the job search, expected application success rate, beliefs about expected gain at the new job, and the reservation wage. As in the previous analyses, variables are standardized and I control for demographics, current log wage, industry and occupation fixed effects. Table 9 reports the results of these regressions.

The relation between expectations and search behavior appear to be very different at the intensive and extensive margin. Expected average search costs—especially time costs are strongly negatively related to planned search effort. In column (3), one sd increase in the expected number of hours per application is associated with a reduction in the number of applications of 0.18 of a sd. This correlation is in line with the model prediction. A higher level of stress associated with the search process is predictive of more search effort. Interestingly, the expected return to effort—which was a strongly positively correlated with search intentions at the extensive margin—is negatively correlated with planned search effort. A one sd increase in the expected applications success rate is associated with a reduction in the planned number of applications of 0.34 of a sd. This result is in contrast with the model prediction. It would, instead, be consistent with a model where workers target a certain arrival rate of offers and set their effort to hit that target: if they think the return to effort is higher and effort is costly they put less of it to reach the target. Finally, the reservation wage is positively correlated with search effort, although not always significantly so. This is again in contrast with the model, and it would suggest that workers who have a higher reservation wage know that they have to search more intensively to reach their target. These correlation hold even when controlling for the number of applications that respondents have submitted so far (Column 4).

6 Information Experiments

In this Section I describe the two information treatments embedded in the survey, the Median Wage Treatment, and the Search Costs Treatment, and I report their effects on beliefs about outside options, expected search costs, and search intentions.

Median wage treatment Respondents randomized in the Median Wage Treatment group are provided with accurate information about the median wage in their occupation at the national level and in the area where they live. Panel A of Figure 8 reports the layout

TABLE 9: EXPECTED SEARCH COSTS, BELIEFS ABOUT OUTSIDE OPTIONS AND PLANNED SEARCH EFFORT

	Planned Applications (1)	Planned Applications (2)	Planned Applications (3)	Planned Applications (4)
Exp. avg. time per application	-0.232^{***} (0.0459)	-0.162^{***} (0.0445)	-0.179^{***} (0.0460)	-0.132^{***} (0.0413)
Exp. avg. money per application	-0.133^{***} (0.0326)	-0.0763^{**} (0.0311)	-0.0618^{*} (0.0334)	-0.0408 (0.0292)
Exp. stress	$\begin{array}{c} 0.173^{***} \\ (0.0499) \end{array}$	0.103^{**} (0.0472)	0.117^{**} (0.0487)	0.0769^{*} (0.0438)
Exp. success rate		-0.325^{***} (0.0370)	-0.340^{***} (0.0416)	-0.238^{***} (0.0361)
Exp. wage change in p.p.		-0.0171 (0.0457)	-0.0245 (0.0476)	-0.0516 (0.0378)
Reservation wage			0.0827^{**} (0.0411)	$0.0211 \\ (0.0323)$
Applications sent so far				$\begin{array}{c} 0.478^{***} \\ (0.0576) \end{array}$
Observations Adjusted R^2	$\begin{array}{c} 498\\ 0.170\end{array}$	$\begin{array}{c} 494 \\ 0.254 \end{array}$	$\begin{array}{c} 467 \\ 0.258 \end{array}$	467 0.459

Notes: All continuous variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1 and coefficients can be interpreted as partial correlations. Each correlation is estimated in a separate regression, controlling for current job satisfaction, skill fit with current job, demographics, SOC 2-digit occupation and industry fixed effects, dummies for treatment status. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: current searchers.

I use to present this information. This treatment is inspired by the treatment in Jäger et al. (2021), but, differently from them, I provide information on both the national and local median wage, given that in the US there is a large geographical dispersion in wages, especially for some occupations, and in an effort to give information respondents can relate to more closely. I use information on 2021 median wages from the Bureau of Labor Statistics (BLS) Occupational Employment and Wages Statistics (OEWS).¹⁸ To define occupations I use the SOC 6-digit occupation codes. I classify respondents into different groups using their answers to the occupation question and the O*NET mapping from common occupation titles to SOC occupation codes. The area where respondents live is defined by the metropolitan

¹⁸https://www.bls.gov/oes/.

or micropolitan area the zipcode where respondents reside belong to.

Search costs treatment Respondents randomized in the Search Costs Treatment group receive information on the number of weeks it took other workers in the same occupation to find a new job, on the number of hours they spent searching, and on the amount of dollars they spent on the search (if any). Panel B of Figure 8 shows how this information was presented. Since it is not possible to recover these statistics on search costs from external sources, I construct them based on the responses that I collect from recent job changers in my sample. I group respondents into broader occupation groups (condensed SOC 2-digit occupation groups, as suggested by the BLS). I compute the averages for the weeks, hours and money using a Bayesian Shrinkage estimator. I shrink the group averages to the sample averages across groups, to minimize the bias induced by the small sample size of certain groups.

First stage treatment effects Table 10 reports the "first stage" effect of the treatments on three variables measuring: *i*) the misperception of the median wage for respondents' occupation in the location where they live, defined as perceived - actual wage, in percentage of the actual wage; *ii*) how "time consuming" respondents think their job search is going to be, on a Likert scale from 1 to 7, where 1 is "not time consuming at all" and 7 is "extremely time consuming;" *iii*) the wage gain respondents expect to obtain by changing job.¹⁹ The effect of the treatments is estimated in a simple Intention to Treat (ITT) framework, controlling for demographic characteristics, occupation and industry fixed effects. Given that respondents have different baseline (pre-treatment) perceptions of the median wage, I separate between those who should revise their perception of the median wage upward following the treatment—who initially underestimate the median wage—and those who should revise their perceptions downward—who initially overestimate. Similarly, for the Search Costs Treatment I separate between respondents whose expected costs—elicited before the treatment—are above the statistics they are presented, and respondents whose expected costs are below.

Both the Median Wage and the Search Cost Treatments have a significant effect on the variables they are designed to target. Among the respondents who underestimate the national median wage (pre-treatment), the Median Wage Treatment reduces the negative misperception of the local median wage by about 17 percentage points. This corresponds to about half of the average misperception of "underestimators." The effect is shown graphically

¹⁹Appedix Table A-9 reports the first stage effects of the treatments estimated only on not searchers.

FIGURE 8: INFORMATION TREATMENTS

(A) MEDIAN WAGE TREATMENT

You previously said that you think the typical annual earnings of a **full-time worker in your occupation** in the United States are \$30,000.

According to **official statistics** of the Bureau of Labor Statistics, the typical* annual earnings of a full-time worker in your occupation in the U.S. are \$37,880

The typical* annual earnings of a full-time worker in your occupation in the **area** where you live are \$36,850.

*By "typical annual earnings" we mean **median** annual earnings, that is the earnings of the employees in the middle of the wage distribution, such that half (50%) of all employees earn less or the same and the other half earn more.

(B) SEARCH COSTS TREATMENT

You previously said that, if you decided to look for a new job at a different employer, it would take you 8 weeks and 50 hours of active search to find a new job, and that you expect to spend \$0 on your search.

On average, **other people in the same occupation group** as you who have taken this survey and have **successfully changed job in the last 12 months** reported that their job search lasted **6 weeks**.

On average, they spent **31 hours** on their job search in total. This includes the time spent looking for job openings, preparing and submitting applications, and preparing for and doing interviews.

They did **not spend any money** on their job search.

in Panel A of Figure 9, where I plot the distributions of the misperceptions for the treatment (in blue) and the control group (in red), restricting to the respondents who underestimate the national median wage. The Median Wage Treatment is also able to increase the expected wage gain from changing job for underestimators (Column 3, Table 10). In this group, treated respondents expect a 9 percentage point higher wage gain than respondents in the control group. A graphical equivalent of this effect is shown in Panel B of Figure 9.

The Median Wage Treatment also reduces the misperception of the respondents who overestimate the national median wage. These respondents revise their perceptions down-

FIGURE 9: MEDIAN WAGE TREATMENT: EFFECT ON PERCEPTIONS OF OUTSIDE OPTIONS



Notes: Sample: Respondents who underestimate the national median wage in the control vs. median wage treatment control group.

ward and are more likely to guess a lower median wage compared to the other overestimators. However, the treatment does not move expectations of the wage gain for this group.

The Search Costs Treatment significantly reduces the perception of how 'time consuming" the job search is for respondents who expect costs above the information provided. The effect of the treatment is -0.3, about 6% of the control mean for this group. Interestingly the treatment does not have any effect on respondents who expect costs below the information provided—who should revise upward their cost estimate following the treatment. Overall, the treatment does not significantly shift the expected wage gain from changing job of either group of respondent, and it does not affect perceptions of the local median wage, which is not supposed to target. Similarly, the Median Wage Treatment does not change the perception of how costly in terms of time the search process is.

Second stage treatment effects Table 11 reports the "second stage" effect of the treatments on my measure of the propensity to search (probability to search in the future) and on the number of hours current searchers plan to spend searching in the week following the survey. The analysis follows the same ITT framework introduced in Table 10. Neither the Median Wage Treatment nor the Search Cost Treatment have a statistically significant effect on search intentions, although the estimated coefficients have sings in line with the directions I would expect.

TABLE 10: TREATMENTS: FIRST STAGE EFFECT ON EXPECTED COSTS AND BELIEFS ABOUT OUTSIDE OPTIONS

	Local Median Wage	Searching	Expectd Wage Change
	Perc. Misp. (in p.p.) (1)	(2)	(3)
Median wage treatment x Underestimate wage	16.56***	0.0394	8.753***
	(2.631)	(0.0983)	(2.016)
Median wage treatment x Overestimate wage	-27.05***	0.106	0.232
	(4.268)	(0.0909)	(1.919)
Search costs T x Underestimate costs	-0.820	-0.0846	3.097^{*}
	(4.007)	(0.0902)	(1.827)
Search costs T x Overestimate costs	6.533	-0.295**	2.342
	(5.333)	(0.121)	(2.580)
Underestimate wage	-54.60***	0.0613	-6.594***
	(3.037)	(0.0814)	(1.668)
Overestimate costs	-2.533	0.508***	-3.335**
	(2.765)	(0.0753)	(1.610)
Observations	2282	2206	2338
Control mean	11.61	4.77	12.01

Notes: All regressions include demographic controls, occupation and industry fixed effects. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Does the null effect in the overall sample mask heterogeneity in treatment effects for different demographic groups? To answer this question I re-estimate the second stage treatment effect separating between different groups, and I focus specifically on women vs. men, given that women have more pessimistic expectations of costs and tend to underestimate the median wage. Table 12 reports the results of this exercise. I look at the two treatments separately and I restrict the sample to respondents who underestimate the national median wage (Panel A), and respondents who expect costs higher than the statistics provided in the treatment (Panel B). The Median Wage Treatment does not have a significant effect on the search behavior or either men or women. The Search Costs Treatment, instead, significantly increase women's propensity to search. Treated women are 9 percentage points more likely to search for a new job in the future, corresponding to 30% of the average propensity to search in the control group. The treatment does not significantly change men's search attitudes. This result suggest that positive information on search costs is more able to move search intentions of groups that are more worried about costs, rather than simple information on the wage distribution.

Why is accurate information about the median wage unable to shift search intentions? In Appendix Table A-11, I estimate the effect of the treatments on another key variable

TABLE 11: TREATMENTS: SECOND STAGE EFFECT ON SEARCH BEHAV-IOR

	Prob. Looking for New Job	Planned search hrs
	(1)	(2)
Median wage treatment x Underestimate wage	1.385 (2.114)	$0.0974 \\ (1.407)$
Median wage treatment x Overestimate wage	$1.635 \\ (1.921)$	$1.232 \\ (1.211)$
Search costs T x Underestimate costs	$2.123 \\ (1.814)$	-1.902 (1.344)
Search costs T x Overestimate costs	4.089 (3.035)	$0.375 \ (1.597)$
Underestimate wage	-0.969 (1.733)	$1.538 \\ (0.989)$
Overestimate costs	-4.533^{***} (1.699)	$1.506 \\ (1.051)$
Observations Control mean	$1731 \\ 33.20$	613 6.87

Notes: All regressions include demographic controls, occupation and industry fixed effects. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

in the job search problem: the reservation wage. The Median Wage Treatment has the effect of raising the reservation wage of respondents who underestimate the median wage. Given that in Section 5.1 I show that the reservation wage is negatively correlated with search intentions, the positive effect of the treatment on the expected wage gain—which is positively correlated with the propensity to search—may be offset by the negative effect of the increased reservation wage.

Follow-up survey To test for persistence of the treatment effects, I invite participants to take a shorter follow-up survey two weeks after they completed the main survey.²⁰ This survey includes the same questions I use in the main survey to construct the first stage and second stage variable. I restimate the effect of the treatment in the main survey on the first-stage variables collected in the follow-up and I report the results in Appendix Table A-12. The Median Wage Treatment has a persistent effect on the perceived local median wage only on respondents who overestimate the national median wage in the main survey.

 $^{^{20}}$ The link to the follow-up survey is in Appendix A-2.

	Prob. Looking	Planned search hrs
	for New Job	(Current searchers only)
Panel A: Median Wage	e Treatment – C	Only respondents who underestimate wage
Median wage T x Female	0.423	0.0393
	(3.074)	(1.616)
Median wage T x Male	1.803	2.258
	(3.338)	(2.905)
Observations	615	235
Control mean	34.72	8.02
Panel B: Search Costs	Treatment – Or	nly respondents who overestimate costs
Search costs T x Female	9.124**	-2.146
	(4.418)	(2.178)
Search costs T x Male	-0.258	0.481
	(4.934)	(2.936)
Observations	290	195
Control mean	29.51	8.55

TABLE 12: TREATMENT EFFECTS BY GENDER

Notes: All regressions include demographic controls, occupation and industry fixed effects. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

The effect on the expected wage change is not persistent. The Search Costs Treatment seem to have a more persistent effect on how time consuming the job search is perceived to be, but with some noise across groups. Overall, neither of the two treatments has a particularly persistent first stage effect.

7 Conclusions

I collect novel data on employed workers' expectations of search costs and returns to search effort, and on their beliefs about the opportunities they have outside of their current job. I find significant heterogeneity in expectations across demographic groups. Women, college graduates and higher-wage respondents expect higher costs, African American, younger, and Hispanic respondents expect lower costs. Women perceive looking for a new job to be more stressful and expect a significantly lower success rate of their job applications. Comparing these expectations to the search experience of respondents who recently changed job, I find patterns consistent with errors in the expectations of certain groups.

Respondents are imperfectly informed about the median wage in their occupation and

overestimate their position in the wage distribution. These errors are related to workers beliefs' about their outside options—respondents who underestimate the median wage or overestimate their position in the wage distribution expect a lower gain from changing job.

Beliefs about the wage gain from changing jobs and returns to job search effort are highly predictive of the propensity to search for a new job. Among the measures of costs, those related to information frictions and those that are more directly related to how much effort it takes to find a job—number of weeks, number of applications—appear to be more relevant for job search intentions than the time and monetary costs per application. Using two information experiments embedded in the survey, I show that accurate information about the median wage does not shift search intentions, while positive information on the recent search experience of similar workers is more effective on women, who are more worried about search costs. These results further support the relevance of perceived search costs in the job search decisions of certain groups of workers.

In the future, this work could be extended in multiple directions. First, the definition of outside options that I use in this paper is conservative—limited to other jobs in the same respondent's occupation. It would be interesting to investigate workers' beliefs about their opportunities in other occupations and other sectors, and, especially, about the costs that such transitions would entail. For instance, workers may have distorted views of the skill requirements in other occupations and of the costs of re-training. This is particularly relevant for workers in lower paying occupations, that could use such transition to boost their career. Second, in this survey I mainly focus on directly measurable search costs—time and money. In the context of job search, psychological costs are likely to play a relevant role, as discussed, for instance, by Cheremukhin and Restrepo-Echavarria (2020). The survey infrastructure of this paper can be adapted to incorporate questions and methods from psychology and behavioral economics, and study the role of psychological costs and cognitive constraints on job mobility decisions.

References

- Abebe, G., A. S. Caria, and E. Ortiz-Ospina (2021). The selection of talent: Experimental and structural evidence from ethiopia. *American Economic Review* 111(6), 1757–1806.
- Adams-Prassl, A., T. Boneva, M. Golin, and C. Rauh (2020). Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *Journal of Public economics 189*, 104245.
- Beam, E. A. (2021). Search costs and the determinants of job search. *Labour Economics 69*, 101968.

- Belot, M., P. Kircher, and P. Muller (2019). Providing advice to jobseekers at low cost: An experimental study on online advice. *The review of economic studies* 86(4), 1411–1447.
- Ben Dhia, A., B. Crépon, E. Mbih, L. Paul-Delvaux, B. Picard, and V. Pons (2022). Can a website bring unemployment down? experimental evidence from france. Technical report, National Bureau of Economic Research.
- Bick, A. and A. Blandin (2022). Employer reallocation during the covid-19 pandemic: Validation and application of a do-it-yourself cps. *FRB St. Louis Working Paper* (2022-12).
- Burdett, K. and D. T. Mortensen (1998). Wage differentials, employer size, and unemployment. *International Economic Review*, 257–273.
- Burdett, K. and T. Vishwanath (1988). Declining reservation wages and learning. *The Review of Economic Studies* 55(4), 655–665.
- Cahuc, P., F. Postel-Vinay, and J.-M. Robin (2006). Wage bargaining with on-the-job search: Theory and evidence. *Econometrica* 74(2), 323–364.
- Cheremukhin, A. and P. Restrepo-Echavarria (2020). Wage setting under targeted search. FRB St. Louis Working Paper (2020-41).
- Christensen, B. J., R. Lentz, D. T. Mortensen, G. R. Neumann, and A. Werwatz (2005). On-the-job search and the wage distribution. *Journal of Labor Economics* 23(1), 31–58.
- Conlon, J. J., L. Pilossoph, M. Wiswall, and B. Zafar (2018). Labor market search with imperfect information and learning. Technical report, National Bureau of Economic Research.
- Cooper, M. and P. Kuhn (2020). Behavioral job search. Handbook of Labor, Human Resources and Population Economics, 1–22.
- Eeckhout, J. and I. Lindenlaub (2019). Unemployment cycles. American Economic Journal: Macroeconomics 11(4), 175–234.
- Faberman, R. J., A. I. Mueller, A. Şahin, and G. Topa (2022). Job search behavior among the employed and non-employed. *Econometrica* 90(4), 1743–1779.
- Ferrario, B. and S. Stantcheva (2022). Eliciting people's first-order concerns: Text analysis of open-ended survey questions. In *AEA Papers and Proceedings*, Volume 112, pp. 163–69.
- Ferraro, D., N. Jaimovich, F. Molinari, and C. Young (2022). Job hunting: A costly quest.
- Flood, S., M. King, R. Rodgers, S. Ruggles, J. R. Warren, and M. Westberry (2022). Integrated Public Use Microdata Series, Current Version 9.0 [dataset]. https://doi.org/ 10.18128/D030.V9.0. Accessed August, 2022.
- Foote, C. L., T. Hounshell, W. D. Nordhaus, D. Rivers, and P. Torola (2021). Measuring the us employment situation using online panels: The yale labor survey. *Available at SSRN* 3975943.
- Gertler, M., C. Huckfeldt, and A. Trigari (2020). Unemployment fluctuations, match quality, and the wage cyclicality of new hires. *The Review of Economic Studies* 87(4), 1876–1914.

- Hornstein, A., P. Krusell, and G. L. Violante (2011). Frictional wage dispersion in search models: A quantitative assessment. *American Economic Review* 101(7), 2873–98.
- Hvidberg, K. B., C. Kreiner, and S. Stantcheva (2020). Social positions and fairness views on inequality. Technical report, National Bureau of Economic Research.
- Jäger, S., C. Roth, N. Roussille, and B. Schoefer (2021). Worker beliefs about outside options. Technical report, National Bureau of Economic Research.
- Krueger, A. B. and A. I. Mueller (2016). A contribution to the empirics of reservation wages. American Economic Journal: Economic Policy 8(1), 142–79.
- Mortensen, D. T. and C. A. Pissarides (1999). New developments in models of search in the labor market. *Handbook of labor economics 3*, 2567–2627.
- Mueller, A. and J. Sinnewijn (2021). Expectations data, labor market and job search. Technical report, Prepared for the Handbook of Economic Expectations.
- Mueller, A. I., J. Spinnewijn, and G. Topa (2021). Job seekers' perceptions and employment prospects: Heterogeneity, duration dependence, and bias. *American Economic Re*view 111(1), 324–63.
- Postel-Vinay, F. and J.-M. Robin (2002). Equilibrium wage dispersion with worker and employer heterogeneity. *Econometrica* 70(6), 2295–2350.
- Santos-Pinto, L. and L. E. de la Rosa (2020). Overconfidence in labor markets. Handbook of Labor, Human Resources and Population Economics, 1–42.
- Schwartz, J. (2015). Optimal unemployment insurance: When search takes effort and money. Labour Economics 36, 1–17.
- Spinnewijn, J. (2015). Unemployed but optimistic: Optimal insurance design with biased beliefs. Journal of the European Economic Association 13(1), 130–167.
- Topel, R. H. and M. P. Ward (1992). Job mobility and the careers of young men. *The Quarterly Journal of Economics* 107(2), 439–479.

Appendix

A-1 Variables Definitions

Groups:

Not searchers: respondents who are not currently looking for a new job and have been working at their current job for at least 12 months before taking the survey.

Recent changers: respondents who have started their current job in the 12 months before taking the survey

Current searchers: respondents who are currently looking for a new job and have been working at their current job for at least 12 months before taking the survey.

Core Respondents' Characteristics:

Each variable is defined as a dummy equal to one if:

Male: respondent is male.

Female: respondent is female.

Age 20-39: respondent's age is between 20 and 39.

Age 40-64: respondent's age is between 40 and 64.

College: respondent has a college degree.

No College: respondent does not have a college degree.

Married/Living with partner: respondent lives with spouse or partner.

Has children < 6yo: One or more children younger than 6 years old live in respondents' household.

African American: respondent is African American.

Hispanic/Latino Origin: respondent is Hispanic or of Latino Origin.

High wage: respondent's annual wage is in the top quartile of wages in the sample.

Low wage: respondent's annual wage is not in the top quartile of wages in the sample.

Search costs:

Realized costs

Tot. time: total hours spent on the job search, constructed by summing the number of hours spent looking for job openings, submitting applications, and preparing for and doing interviews.

Tot. Money: total dollars spent on the job search, corresponding to the total in Figure A-1. *Time looking for openings:* hours spent looking for job openings.

Time on applications: hours spent preparing and submitting applications

Time on interviews: hours spent preparing for and doing interviews.

Weeks: total duration of the job search in weeks.

Stress: level of stress associated with the job search, on a scale from 1 to 7, where 1 is "not

stressful at all" and 8 is "extremely stressful." Average time per application: total hours spent on the job search divided by total number of applications submitted. Average money per application: total dollars spent on the job search divided by total number of applications submitted. Expected costs

Defined in the same way as realized search costs but in expectations.

Search effort and return to effort:

Realized

Applications: number of jobs respondent applied to.

Success rate: number of job offers received divided by number of jobs respondent applied to. Expected

Defined in the same way as realized but in expectations.

Perceptions of wage distribution and outside options:

Misperception about national median wage: perceived national median wage minus actual median wage for respondent's SOC 6-digit occupation, divided by actual

Misperception about local median wage: perceived local median wage minus actual median wage for respondent's SOC 6-digit occupation in respondent's metropolitan or micropolitan area, divided by actual.

Perceived rank: perceived rank in wage distribution for respondent's occupation.

Perceived - actual quartile: respondents' perceived quartile in wage distribution for their occupation minus their actual quartile.

Expected wage change in p.p.: expected annual wage gain or loss at a new job found in 3 months (see Figure A-2), in percentage points.

Labor market behaviors

Prob. looking new job: probability to look for a new job in the next 12 months.

Reservation wage: minimum annual wage respondent require to accept a new job, in percentage points of current wage.

Planned search hours: number of hours respondents plan on spending looking for a new job in the 7 days after taking the survey.

Treatments:

Underestimate wage: dummy equal to 1 if respondent underestimate the median wage in her occupation.

Overestimate wage: dummy equal to 1 if respondent overestimate the median wage in her occupation.

Overestimate costs: dummy equal to 1 if respondents' expected search costs are above real-

ized costs for recent-changers in the same broad occupation group. More precisely, it is equal to 1 if hours expected > hours realized, and expected weeks \geq realized weeks, or expected \geq hours realized, and expected weeks > realized weeks. In both cases expected dollars \geq realized dollars.

A-2 Additional Information on the Surveys

A-2.1 Links to Surveys

- Main survey: https://harvard.az1.qualtrics.com/jfe/form/SV_9NPBDiEwnmQziw6
- Follow-up survey: https://harvard.az1.qualtrics.com/jfe/form/SV_ekuzgZ1gmroGCyi

A-2.2 Selected Survey Questions

The full text of the survey is available at https://scholar.harvard.edu/files/amiano/files/main_survey.pdf.

FIGURE A-1: JOB SEARCH "BUDGET"

Please tell us how much **you think you would spend** on each of the following items if you were to look for a new job. Write 0 if you do not expect to spend anything.

If you expect to spend money on other items that you would consider related to your job-search but do not find them listed below, please report the amount in the field for "Other expenses" and tell us in a few words what these items are by writing in the box below.

Subscription fees for job board websites				
Fees for employment agencies, head-hunters, or career services	\$			
Mailing fees and/or transportation costs to submit applications				
New clothes for interviews (for instance, a new suit)				
Material and/or courses to prepare for interviews				
Transportation to and from locations of interviews				
Other expenses related to the job search (please specify)				
	\$			
Total	\$	0		

FIGURE A-2: ASKING ABOUT WAGE CHANGE AT NEW JOB

In the graph below, the grey bar represents your current annual pay in dollars. The yellow bar represents the annual pay that you would earn at that new job. **How much higher (in percent)** do you think your annual pay would be at the new job compared to your current annual pay?

Move the slider to select a percentage. As you move the slider the yellow bar will adjust to reflect your response.

Imagine that **you decided to leave your current job** and gave yourself **3 MONTHS to find a new job suitable for you** at another employer in the same occupation.

Do you think you would find a job that would offer you a lower, higher or the same annual pay, compared to what you currently earn at your job?

Higher pay	
Same pay	
Lower pay	



A-2.3 Asking About Occupation

Prote

FIGURE A-3: QUESTION ABOUT OCCUPATION AT CURRENT JOB

What is your **occupation** at your current job? Some examples of occupation titles include electrical engineer, stock clerk, waiter/waitress, typist...

Please type your occupation in the box below and select one of the suggested options. Try to be specific. For instance, write "preschool teacher" or "high school teacher" rather than just "teacher".

If none of the options correspond to your occupation, try adding more detail or rephrasing.

	high school teacher		1
	High School Teacher		-
	Junior High School Teacher		
	SED High School Teacher (Serious Emotional Disability High School Teacher)		
	Severe Emotional Disorders High School Teacher		
cted by r		Powerea b	y Qualtrics (

A-3 Sample and Response Quality

A-3.1 Distribution of Time Spent on the Survey

FIGURE A-4: DISTRIBUTION OF TIME SPENT ON THE SURVEY



Notes: The figure shows the distribution of the time respondents spent on the survey (truncated at 200 minutes). The mean duration is 29 minutes, the median 21, and the 25th and 75th percentiles are 16 and 30.

A-3.2 Sample Composition and Representatives

FIGURE A-5: GEOGRAPHIC DISTRIBUTION OF RESPONDENTS IN SAMPLE



Notes:



FIGURE A-6: SHARE OF RESPONDENTS BY INDUSTRY

Notes: Two-digit NAICS sectors.

	Not searchers	Cur	rent sea	rchers	Re	cent cha	anger
	Mean	Mean	Diff	P-value	Mean	Diff	P-value
Male	0.53	0.52	-0.02	0.479	0.40	-0.14	0.000
Age 20-39	0.36	0.60	0.24	0.000	0.66	0.30	0.000
High income	0.19	0.16	-0.03	0.134	0.11	-0.08	0.000
4-year college degree or more	0.46	0.53	0.06	0.014	0.35	-0.12	0.000
High-school degree or less	0.26	0.20	-0.06	0.006	0.38	0.12	0.000
Hispanic/Latino origin	0.08	0.15	0.07	0.000	0.10	0.03	0.129
Black/African American	0.10	0.15	0.05	0.004	0.16	0.06	0.001
Married/living w. Partner	0.70	0.68	-0.02	0.400	0.58	-0.12	0.000
Sample size	1549	536			377		

TABLE A-1: GROUP CHARACTERISTICS

FIGURE A-7: SHARE OF RESPONDENTS BY OCCUPATION



Notes: Two-digit SOC code occupation groups.

A-4 Search Costs: Additional Tables and Figures

	Mean	SD	Median	P25	P75	Obs.
Not searchers						
Search weeks	5.57	7.26	4.00	2.00	6.00	1547
Tot. search hours	35.36	55.64	20.00	10.00	40.00	1544
Search hours – looking for openings	18.66	35.52	9.00	4.00	20.00	1546
Search hours – applications	10.47	26.42	5.00	2.00	10.00	1547
Search hours – interviews	6.47	10.40	4.00	2.00	7.00	1546
Spent money on search	0.43	0.49	0.00	0.00	1.00	1533
Tot. search money	92.19	178.19	0.00	0.00	120.00	1533
Avg. hours per application	6.26	12.12	3.50	2.00	6.50	1509
Avg. dollars per application	18.39	43.93	0.00	0.00	17.50	1495
Stress	4.83	1.65	5.00	4.00	6.00	1549
N applications	9.36	19.21	5.00	3.00	10.00	1546
Applications success rate	0.65	1.00	0.50	0.20	0.80	1509
Recent changers - E to E						
Search weeks	5.54	7.84	3.00	1.00	7.00	168
Tot. search hours	35.26	63.99	13.00	5.50	35.00	168
Search hours – looking for openings	21.75	45.60	6.00	3.00	20.00	168
Search hours – applications	9.80	20.10	3.00	1.00	9.50	168
Search hours – interviews	3.71	5.19	2.00	1.00	4.00	168
Spent money on search	0.14	0.34	0.00	0.00	0.00	168
Tot. search money	18.17	71.61	0.00	0.00	0.00	168
Avg. hours per application	5.91	6.23	3.50	2.00	7.00	165
Avg. dollars per application	7.73	43.85	0.00	0.00	0.00	165
Stress	4.02	1.97	4.00	2.00	6.00	168
N applications	8.34	13.54	4.00	1.00	10.00	168
Applications success rate	0.56	0.49	0.50	0.17	1.00	165
Becent changers - U to E						
Search weeks	4 86	7 86	3.00	1.50	5.00	208
Tot search hours	40.14	108.52	14 00	6.00	35.00	208
Search hours - looking for openings	24.13	73 17	7 50	3.00	20.00	208
Search hours – applications	15 33	64 16	4.00	2.00	20.00	200
Search hours – interviews	10.00	15 74	2.00	1.00	3.00	203
Sport money on search	4.05	0.30	2.00	0.00	0.00	209
Tot soarch monoy	34 77	122 76	0.00	0.00	0.00	209
Avg hours per application	6.07	11 19	3.00	1.20	5.25	203
Avg. dollars per application	8 44	45 79	0.00	0.00	0.20	201
Stress	4 27	1.06	5.00	2.00	6.00	202
N applications	19.92	25.20	5.00	2.00	12.00	209
Applications success rate	0.54	0.86	0.33	0.13	12.00	208 198
Current conchere						
Complete Searchers	16 59	10.48	10.00	6.00	16.00	E 90
Jearch weeks	10.58	19.48	10.00	0.00	10.00	529
10t. search hours	(0.40	159.13	37.00	18.00	88.00	530
Search hours – looking for openings	40.86	05.40	10.00	8.00	49.00	531
Search nours – applications	20.16	35.46	10.00	4.00	21.00	530
Search hours – interviews	11.45	22.11	5.00	2.00	12.00	535
Spent money on search	0.44	0.50	0.00	0.00	1.00	529
Tot. search money	147.24	322.01	0.00	0.00	150.00	529
Avg. hours per application	6.84	11.29	4.00	2.40	7.37	512
Avg. dollars per application	17.83	42.20	0.00	0.00	17.50	509
Stress	4.90	1.55	5.00	4.00	6.00	536
N applications	20.33	41.73	8.00	5.00	16.00	533
Applications success rate	0.33	0.40	0.22	0.08	0.50	514

TABLE A-2: SEARCH COSTS – SUMMARY

FIGURE A-8: WORD CLOUD: WHAT MAKES LOOKING FOR A NEW JOB DIFFICULT?

(A) NOT SEARCHERS VS. CURRENT SEARCHERS

(B) RECENT CHANGERS

Current searcher



pore benefit direct tink degre several of the experiments process indeed interview ackients process want interview ackients process want interview ackients process time pay high also process

Not searcher

Figure A-9: What Makes Looking for a New Job Difficult? – Current Searchers



Notes: Each symbol corresponds to the share of current searchers who selected the answer listed on the left.

A-4.1 Heterogeneity

TABLE A-3: REALIZED SEARCH COSTS, SEARCH EFFORT, AND RETURN TO EFFORT BY DEMOGRAPHICS

	Tot. Hours (1)	Weeks (2)	Stress (3)	Avg. time per app. (4)	Applications (5)	Success rate (6)
Female	-0.106 (0.155)	$0.105 \\ (0.157)$	$\begin{array}{c} 0.0408 \\ (0.158) \end{array}$	-0.219 (0.160)	$0.120 \\ (0.165)$	-0.176 (0.161)
Age 20-39	-0.241 (0.169)	-0.357^{*} (0.186)	0.300^{*} (0.172)	-0.225 (0.172)	-0.115 (0.194)	$0.137 \\ (0.177)$
College graduate	$\begin{array}{c} 0.235 \\ (0.155) \end{array}$	0.505^{***} (0.150)	0.335^{**} (0.160)	-0.00664 (0.158)	$0.282 \\ (0.173)$	-0.381^{**} (0.168)
Married/Living with partner	$\begin{array}{c} 0.121 \\ (0.168) \end{array}$	-0.0639 (0.181)	$\begin{array}{c} 0.0360 \\ (0.181) \end{array}$	$0.0505 \\ (0.176)$	$0.203 \\ (0.156)$	$0.200 \\ (0.165)$
Has children $<6yo$	$0.0859 \\ (0.185)$	-0.272^{*} (0.143)	-0.232 (0.210)	0.160 (0.225)	-0.184 (0.139)	-0.0614 (0.209)
African American	-0.128 (0.184)	-0.247^{*} (0.137)	$0.168 \\ (0.243)$	-0.226 (0.203)	-0.0223 (0.124)	-0.107 (0.204)
Hispanic/Latino Origin	-0.158 (0.211)	-0.279 (0.225)	-0.257 (0.297)	-0.0175 (0.244)	-0.280^{**} (0.136)	$0.329 \\ (0.235)$
High wage	$\begin{array}{c} 0.105 \\ (0.255) \end{array}$	$\begin{array}{c} 0.231 \\ (0.236) \end{array}$	-0.100 (0.192)	0.257 (0.268)	-0.0846 (0.235)	-0.0494 (0.209)
Observations	170	170	170	167	170	167

Notes: All dependent variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: recent changers who made a job-to-job transition.

TABLE A-4: BELIEFS ABOUT SEARCH COSTS BY DEMOGRAPHICS: ADDI-TIONAL VARIABLES

	Hours Looking (1)	Hours App. (2)	Hours Int. (3)	Spend any money (4)	Tot. Money (5)
Female	0.00884 (0.0512)	0.0913^{*} (0.0537)	-0.00996 (0.0521)	-0.134^{**} (0.0526)	-0.130** (0.0510)
Age 20-39	-0.202^{***} (0.0518)	-0.111^{**} (0.0534)	-0.123^{**} (0.0544)	$0.0158 \\ (0.0568)$	-0.0430 (0.0537)
College graduate	0.193^{***} (0.0548)	$\begin{array}{c} 0.193^{***} \\ (0.0579) \end{array}$	0.177^{***} (0.0557)	0.108^{*} (0.0564)	$\begin{array}{c} 0.238^{***} \\ (0.0560) \end{array}$
Married/Living with partner	0.0217 (0.0569)	$\begin{array}{c} 0.0600\\ (0.0541) \end{array}$	$0.0709 \\ (0.0560)$	$0.0159 \\ (0.0584)$	$0.0260 \\ (0.0556)$
Has children $<6yo$	-0.101 (0.0684)	-0.0866 (0.0695)	-0.0524 (0.0744)	-0.0565 (0.0753)	$0.0306 \\ (0.0760)$
African American	-0.164^{**} (0.0820)	-0.242^{***} (0.0733)	-0.0929 (0.0851)	-0.164^{*} (0.0849)	-0.132^{*} (0.0705)
Hispanic/Latino Origin	-0.0905 (0.0881)	-0.128 (0.0777)	-0.124 (0.0764)	$0.128 \\ (0.0942)$	$0.103 \\ (0.0910)$
High wage	$\begin{array}{c} 0.221^{***} \\ (0.0687) \end{array}$	$\begin{array}{c} 0.0389 \\ (0.0676) \end{array}$	$\begin{array}{c} 0.0840 \\ (0.0658) \end{array}$	$0.0930 \\ (0.0650)$	$\begin{array}{c} 0.214^{***} \\ (0.0727) \end{array}$
Observations	1560	1560	1558	1561	1561

Notes: Dependent variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. All regressions include occupation and industry fixed effects. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: not searchers.

TABLE A-5: REALIZED SEARCH COSTS BY DEMOGRAPHICS: ADDITIONAL VARIABLES

	Hours Looking	Hours App.	Hours Int.	Spend any money	Tot. Money
	(1)	(2)	(3)	(4)	(5)
Female	-0.143	-0.0497	0.0420	-0.113	-0.0524
	(0.151)	(0.170)	(0.172)	(0.160)	(0.162)
Age 20-39	-0.196	-0.267	-0.198	-0.170	0.0149
	(0.168)	(0.179)	(0.184)	(0.172)	(0.164)
College graduate	0.243	0.183	0.263	0.0726	0.0586
	(0.159)	(0.151)	(0.162)	(0.176)	(0.188)
Married/Living with partner	0.135	0.141	-0.0856	-0.0486	-0.00944
	(0.166)	(0.162)	(0.172)	(0.167)	(0.166)
Has children $<6yo$	0.0506	-0.0450	0.200	0.458^{*}	0.316
	(0.186)	(0.141)	(0.214)	(0.244)	(0.230)
African American	-0.132	-0.132	0.0349	0.240	0.252
	(0.195)	(0.139)	(0.214)	(0.243)	(0.274)
Hispanic/Latino Origin	-0.132	-0.239	-0.144	0.0745	-0.161
	(0.219)	(0.146)	(0.220)	(0.292)	(0.189)
High wage	0.101	0.0675	0.0957	-0.00628	0.0591
	(0.256)	(0.261)	(0.246)	(0.222)	(0.255)
Observations	170	170	170	170	170

Notes: All dependent variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: recent changers who made a job-to-job transition.

A-5 Perceptions of Outside Options: Additional Tables and Figures

FIGURE A-10: MISPERCEPTIONS: LOCAL MEDIAN WAGE



Notes: Perceived minus actual local SOC 6-digit occupation code median wage, divided by local actual wage. Trimmed at the 5th and 95th percentile. Sample: respondents who have not seen the Median Wage Treatment.

FIGURE A-11: MISPERCEPTIONS BY GROUP: NATIONAL MEDIAN WAGE



Notes: Perceived minus actual SOC 6-digit occupation code median wage, by group.





Notes: Sample: only respondents who have not seen any treatment.

FIGURE A-13: ANCHORING: PERCEIVED NATIONAL MEDIAN WAGE AND OWN WAGE



Notes: Binned scatterplot residualized on the actual national median wage for respondent's SOC 6-digit occupation. 45 degree line in red. Sample: respondents earning no more than \$300,000 per year.



FIGURE A-14: EXPECTED WAGE CHANGE AT NEW JOB BY GROUP

Notes: Sample: Only respondents who have not received any of the treatments.

A-5.1 Heterogeneity

TABLE A-6: PERCEPTIONS OF OUTSIDE OPTIONS AND DEMOGRAPHICS

	National Median Wage	Local Median Wage	Expected Wage Change	Perceived - Actual
	(p.p. misp.)	(p.p. mip.)	At New Job	Quartile
	(1)	(2)	(3)	(4)
Female	-0.0226	-0.0441^{*}	-2.519	-0.0541
	(0.0206)	(0.0242)	(1.669)	(0.0574)
Age 20-39	-0.0712^{***}	-0.0520^{**}	10.35^{***}	0.196^{***}
	(0.0205)	(0.0247)	(1.716)	(0.0572)
College graduate	0.0727^{***}	0.0207	3.809^{**}	-0.115^{*}
	(0.0219)	(0.0269)	(1.895)	(0.0623)
Married/Living with partner	0.0710^{***}	0.103^{***}	1.031	-0.134**
	(0.0207)	(0.0249)	(1.684)	(0.0602)
Has children ${<}6\mathrm{yo}$	-0.00698 (0.0267)	-0.0357 (0.0319)	4.575^{**} (2.279)	$0.0588 \\ (0.0765)$
African American	-0.0635^{**} (0.0307)	$0.0105 \\ (0.0391)$	4.858^{*} (2.518)	0.00846 (0.0885)
Hispanic/Latino Origin	-0.00672	0.0705^{*}	1.234	-0.0409
	(0.0332)	(0.0427)	(2.537)	(0.0925)
High wage	0.452^{***}	0.402^{***}	-0.0869	-1.147^{***}
	(0.0262)	(0.0299)	(2.057)	(0.0613)
Observations Mean	$\begin{array}{c} 2430\\ 0.07\end{array}$	$\begin{array}{c} 1507 \\ 0.06 \end{array}$	$1549 \\ 13.25$	2443 0.43

Notes: The sample in columns 2 and 3 only includes respondents who have not seen the Median Wage Treatment. Additional controls include industry and SOC two-digit code occupation fixed effects.

A-6 Search Costs, Outside Options and Job Search: Additional Tables and Figures

TABLE A-7: SEARCH INTENTIONS AND DEMOGRAPHICS

	Prob. Looking for New Job (1)
Median wage T.	-0.00726 (0.0271)
Search costs T.	$0.00458 \\ (0.0267)$
Current job satisfaction	-0.0141 (0.0283)
Skills fit with current job	-0.0984^{***} (0.0269)
Tenure at current job (in yrs.)	-0.0998^{***} (0.0261)
Female	-0.122^{***} (0.0272)
Age 20-39	0.200^{***} (0.0293)
College graduate	0.0582^{*} (0.0310)
Married/Living with partner	$0.0119 \\ (0.0254)$
Has children <6yo	$0.0133 \\ (0.0255)$
African American	$\begin{array}{c} 0.0817^{***} \\ (0.0246) \end{array}$
Hispanic/Latino Origin	0.0495^{**} (0.0241)
High Income	-0.0711^{**} (0.0282)
Log current wage	-0.0126 (0.0351)
Observations Adjusted R^2	$\begin{array}{c} 1540 \\ 0.151 \end{array}$

Notes: The regression also includes occupation and industry fixed effects, not reported. Sample: not searchers.

	Planned Applications
	(1)
Median wage T.	-0.00850 (0.0505)
Search costs T.	0.0497 (0.0512)
Current job satisfaction	-0.0122 (0.0582)
Skills fit with current job	-0.164^{***} (0.0578)
Tenure at current job (in yrs.)	-0.0816^{*} (0.0466)
Female	$0.0411 \\ (0.0514)$
Age 20-39	-0.0900 (0.0598)
College graduate	$0.0859 \\ (0.0592)$
Married/Living with partner	-0.0958^{*} (0.0530)
Has children $<6yo$	-0.0308 (0.0455)
African American	-0.0373 (0.0464)
Hispanic/Latino Origin	-0.132^{***} (0.0296)
High Income	-0.000208 (0.0523)
Log current wage	$0.0589 \\ (0.0551)$
Observations Adjusted R^2	$533 \\ 0.071$

TABLE A-8: PLANNED SEARCH EFFORT AND DEMOGRAPHICS

Notes: All continuous variables are winsorized at the 5th and 95th percentile and standardized so they have mean equal to zero and sd equal to 1 and coefficients can be interpreted as partial correlations. Each correlation is estimated in a separate regression, controlling for current job satisfaction, skill fit with current job, demographics, occupation and industry fixed effects. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Sample: not searchers.

A-6.1 Treatment effects

TABLE A-9: TREATMENTS: FIRST STAGE - NOT SEARCHERS

	Local Median Wage	Searching	Expectd Wage Change
	Perc. Misp.	Time Consumimg	New Job (in p.p.)
Median wage treatment x Underestimate wage	16.65^{***}	-0.00434	9.849^{***}
Median wage treatment x Overestimate wage	(2.803)	(0.123)	(2.014)
	-23.91***	0.0706	2.957
	(4.565)	(0.108)	(2.427)
Search costs T x Underestimate costs	0.559	-0.174^{*}	3.020
	(3.998)	(0.0993)	(2.061)
Search costs T x Overestimate costs	1.181	-0.402***	5.032^{*}
	(5.283)	(0.148)	(3.018)
Underestimate wage	-52.03^{***}	0.0349	-4.721^{**}
	(3.607)	(0.0964)	(1.938)
Overestimate costs	-0.841	0.585^{***}	-9.245^{***}
	(3.663)	(0.0989)	(2.112)
Observations Control mean	$\begin{array}{c} 1451 \\ 9.50 \end{array}$	$\begin{array}{c} 1489 \\ 4.81 \end{array}$	$\begin{array}{c} 1482\\ 9.00\end{array}$

TABLE A-10: TREATMENTS: SECOND STAGE - NOT SEARCHERS

	Prob. Looking for New Job
Median wage treatment x Underestimate wage	-0.0992
	(2.335)
Median wage treatment x Overestimate wage	0.881
	(2.127)
Search costs T x Underestimate costs	0.241
	(1.895)
Search costs T x Overestimate costs	3.772
	(3.126)
Underestimate wage	-0.493
	(1.860)
Overestimate costs	-5.991***
	(1.875)
Observations	1483
Control mean	33.89

TABLE A-11: TREATMENT EFFECTS ON RESERVATION WAGE

	Reservation wage in p.p. of current wage (1)
Median wage treatment x Underestimate wage	6.826*** (1.877)
Median wage treatment x Overestimate wage	-3.651^{**} (1.585)
Search costs T x Underestimate costs	-1.433 (1.599)
Search costs T x Overestimate costs	-1.767 (2.082)
Underestimate wage	-7.690^{***} (1.429)
Overestimate costs	2.664^{*} (1.385)
Observations Control mean	$2272 \\ 102.45$

Notes: The regression includes demographic controls, occupation and industry fixed effects. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

A-6.2 Follow-up Survey: Persistence of Treatment Effects

	Local Median Wage	Searching	Expectd Wage Change
	Perc. Misp.	Time Consuming	New Job (in p.p.)
Median wage treatment x Underestimate wage	-2.914	0.0765	-0.861
0	(5.213)	(0.139)	(2.874)
Median wage treatment x Overestimate wage	-11.40**	0.0813	1.801
	(4.526)	(0.130)	(2.495)
Search costs T x Underestimate costs	-2.618	-0.296**	-3.011
	(4.808)	(0.142)	(3.016)
Search costs T x Overestimate costs	-0.483	-0.178	2.630
	(6.522)	(0.182)	(3.335)
Underestimate wage	-35.80***	0.0160	0.656
-	(3.999)	(0.118)	(2.509)
Overestimate costs	3.581	0.554***	-5.374**
	(4.071)	(0.109)	(2.120)
Observations	980	987	997
Control mean		4.58	8.16

TABLE A-12: TREATMENTS: FIRST STAGE FOLLOW-UP