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WHY WORKERS STAY:
PAY, BELIEFS, AND ATTACHMENT

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ABSTRACT

Workers often remain with their employer even when outside firms offer higher pay. This may reflect information frictions or preferences. We use a large-scale survey of full-time German workers, linked to Social Security records, to elicit pay expectations and preferences over specific outside firms. Workers believe outside pay varies across firms and direct their search toward higher-paying employers. Expected pay premia are highly correlated with administrative pay measures observed and with workers' amenity valuations. Yet most workers would not switch firms—even for substantial raises at named destination firms. Implied switching costs range from 7 to 18% of annual pay. Attachment varies across firms and is not explained by amenities or switching costs, suggesting residual firm-specific factors shape mobility.

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“...The basic difficulty is that satisfactorily employed workers are almost entirely uninterested in employment conditions in other companies. This lack of interest is an even more serious obstacle than the difficulty of compiling accurate job information.”
—Reynolds (1951)

1 Introduction

The willingness of workers to switch firms in response to changes in relative pay can affect the wages firms offer (Manning, 2011). A growing literature documents that, on average, a firm which lowers its wage by 10% can expect 30% of its workers to leave (Sokolova and Sorensen, 2018; Kline, 2025).¹ This limited response gives firms monopsony power, enabling them to set wages below the competitive level.

Workers may fail to search for—or move to— jobs that offer higher pay for different reasons. In one class of models, limited mobility stems from information frictions: workers may not switch firms if they have incomplete or incorrect knowledge of outside pay (Manning, 2003). In another class of models, fully informed workers stay because of preferences (Card et al., 2018; Berger, Herkenhoff and Mongey, 2022). These preferences may include switching costs or idiosyncratic tastes—such as for non-wage amenities or relationships with colleagues and managers.

Empirically distinguishing between information and preference-based explanations is challenging. While a large literature documents that firms differ in wage premia, existing data do not reveal whether—and to what extent—workers are aware of those differences (Card, Heining and Kline, 2013; Song et al., 2019). Workers who believe there is a single market wage for their skill may be less inclined to search than those who expect pay to vary across potential employers. Those who expect pay to vary, but do not know the pay policies of specific firms, will search differently than those who have firm-specific information on pay. If preferences are the main barrier to mobility, then accurate information or outside offers may not induce job-to-job mobility.

Understanding the sources of limited firm-to-firm mobility is important for both theory and policy. Information- and preference-based models yield different predictions for the welfare gains from increased labor market competition. In preference-based models, expanding access to outside opportunities is always beneficial to workers; in models with information frictions, more competition need not improve outcomes (Caldwell, Dube and Naidu, 2025). If information frictions dominate, transparency policies may enhance mobility (Council of Economic Advisors, 2016); if preferences dominate, such policies may be ineffective.

We provide new evidence linking workers’ beliefs about and preferences over outside firms to

¹The idea that quit rates are less than perfectly elastic goes back nearly a century (Robinson, 1933).

their search and mobility. We fielded a novel survey through the German Institute for Employment Research (IAB), and obtained responses from nearly 10,000 full-time German workers aged 25 to 50. A key innovation of this survey is that it includes questions about specific outside firms. For a set of firms named by respondents as potential destinations, and a second set of firms randomly assigned in our research protocol, we elicit (1) whether workers would apply to the firms if considering a job change, (2) what they expect the firm would pay them, and (3) how they would rank hypothetical offers from these firms relative to each other and relative to the opportunity to stay at the incumbent firm given researcher-randomized raises. We link survey responses to administrative data on the workers and to administrative and public-use data on the provided firms including firms' pay premia, median pay, and industry. This dual linkage allows us to compare workers' expectations to objective benchmarks and to compare workers' stated preferences with observed outcomes.

Our results indicate that preferences, rather than beliefs, are the key driver of limited mobility. Workers expect both pay and non-pay factors to vary across firms and perceived pay premia are positively correlated with administrative pay measures and with workers' valuations of non-wage amenities. Workers direct search toward higher-pay firms. However, when asked to rank offers from firms—including firms named as potential destinations—workers often prefer to remain at their current firm. When asked why they believe workers are reluctant to switch firms, respondents cite a general reluctance to undergo change, firm amenities, and social connections. Pay is the fourth most cited reason; lack of opportunities is not a major factor.

We frame the empirical analysis with a partial equilibrium search model in which workers have beliefs about the pay provided by outside firms and heterogeneous preferences across these firms. The model clarifies how workers' beliefs about the pay provided by outside firms shape search behavior—both on the extensive margin (whether to search) and on the intensive margin (where to apply). Pessimistic beliefs about outside options reduce search. But when workers expect pay to vary across firms, they are less likely to forgo profitable search. Preferences also affect workers' search and mobility. Workers facing high switching costs search and move less, even when outside firms offer higher pay. These switching costs may reflect tangible barriers or a general aversion to change—something highlighted by surveyed workers.

The empirical analysis proceeds in three parts. In the first part, we examine workers' firm-specific pay information. Guided by the model, we first assess whether workers expect their pay to vary across potential employers. We find that nearly one half of workers had firm-specific information on pay when they applied to their current firm. Most workers do not believe they face a uniform outside option. Only 20% say that they would earn the same pay at each of the three

firms that we randomly provided to them (researcher-provided firms). We see a similar pattern when we examine workers' pay expectations at the firms they provided as potential destinations (worker-provided firms). The within-worker variation in expected pay does not only reflect expected differences in pay across industries or regions. Instead, there appears to be a strong firm component, with workers expecting pay to vary across firms within the same industry and region.

We use a two-way fixed effects model to summarize workers' expectations at researcher-provided firms. From a list of 30 large German employers, we randomly selected three firms to provide to each worker. We identify the firm-specific effects from within-worker deviations in expected pay at these firms. Workers expect pay to vary significantly: the firm-specific estimates range from -0.25 (25 percentage points less than the base firm) to 0.05 (5 percentage points more). Workers' expected pay premia are positively correlated with objective measures of firm pay premia ($\rho = 0.42$) and of firm median ($\rho = 0.54$) and mean ($\rho = 0.56$) pay. We also find strong agreement across demographic groups in their expected pay rankings, suggesting a widely shared perception of the pay hierarchy among large German firms. Taken together, these findings indicate that workers have substantial information about firm-specific pay.

In the second part of the paper, we examine how workers' beliefs shape search. Our primary design leverages within-worker, within-firm variation in expectations, thereby controlling for both across-worker differences in general knowledge about firm pay or willingness to move and across-firm differences in non-wage amenities. A 10% increase in expected pay is associated with a 3 percentage point increase in the probability a worker will consider applying to a firm. The average application-wage elasticity is 1. Two complementary designs—which use different portions of the questionnaire—confirm that high-pay firms (both in workers' perceptions and in the administrative data) receive more overall interest. These findings suggest that workers use prior beliefs about firm pay to guide their search and view higher-pay firms as more attractive overall. The application-wage elasticity is somewhat lower for workers who are more risk averse or who report hesitancy to apply because they perceive a low probability of receiving an offer.

In the final part of the paper, we turn to the role of preferences using a set of firm-specific discrete choice experiments. We find that many workers are unwilling to switch firms—even to firms they explicitly identified as application targets—even for sizable wage increases. 39% of workers would prefer to remain in their current job over a 20% raise at a firm they indicate. The implied separation elasticity is between 2 and 4. Translating the required raise for workers to consider moving into a “switching cost”, we estimate that a typical worker faces switching costs equivalent to 7 to 18% of their annual pay. When we specify that a worker's commute would not change, we obtain only slightly lower estimates of switching costs (in the range of 6-11%)

suggesting that the switching costs are not solely driven by the costs of physically moving locations (Kennan and Walker, 2011; Koşar, Ransom and Van der Klaauw, 2022).

Workers do not prefer to stay at their firm because they believe higher pay is offset by worse amenities. A large share of workers expect higher-pay firms to offer better amenities (29%), and most (71%) believe that higher-pay firms offer at least as good amenities as lower-pay firms in the same market. When we use the choice experiments to estimate the total value workers assign to the amenity bundle at each firm, we find that amenity valuations are of similar magnitude to—and are positively correlated with—firm-specific expected pay premia (Wiswall and Zafar, 2018). There is evidence of sorting: workers who report being willing to consider a firm value it more than those who would not apply. In addition, firm insiders (incumbent workers) differ in valuations from both outsiders who are uninterested in the firm and outsiders who are interested in the firm. The latter fact is hard to rationalize with standard models of the labor market in which the utility a worker receives from working at a firm (other than a switching cost) is independent of whether a worker already works at that firm. One possibility is that ex post valuations of amenities differ because workers develop firm-specific human capital or social ties (e.g. with coworkers or managers).

Our results contribute to four distinct literatures. First, our approach was inspired by, and modeled after, an earlier ethnographic literature that used worker surveys to shed light on the labor market (Myers and Shultz, 1951; Reynolds, 1951; Rees and Shultz, 1970). We adapted many of our survey questions—such as those eliciting the names of specific outside firms—from this literature. We leverage the modern survey infrastructure of the IAB to field our survey to workers across multiple distinct labor markets, and to link workers’ responses to administrative measures.

Second, we contribute to a large literature documenting heterogeneity across firms in pay and amenities (e.g., Rosen, 1986; Abowd, Kramarz and Margolis, 1999; Card, Heining and Kline, 2013; Song et al., 2019; Sorkin, 2018). Our approach is fundamentally distinct in focusing on workers’ beliefs. However, this literature shaped both our design and our empirical strategy.² Our finding that workers believe firms differ in pay premia—and that these beliefs are correlated with administrative wage data—helps rationalize the high degree of sorting documented in prior work (e.g., Card, Heining and Kline, 2013; Song et al., 2019; Lamadon, Mogstad and Setzler, 2022). Our analysis of firm amenities is also closely related to Holzer, Katz and Krueger (1991), who found a spike in applications at the minimum wage, consistent with the idea that workers perceive such jobs as offering rents.

Third, this paper speaks to the theoretical literatures on imperfect competition and job search. Models of monopsony often explain upward-sloping labor supply curves using information fric-

²For example, we developed the wording and randomization of firm-specific pay questions to allow for estimation of two-way fixed effects models comparable to those in the wage-setting literature.

tions or preference heterogeneity (Azar and Marinescu, 2024; Caldwell, Dube and Naidu, 2025; Kline, 2025). Our results suggest that models emphasizing preferences may better capture worker behavior. Our findings that workers use firm-specific information about pay to guide search and associate higher pay with higher overall utility support central assumptions of directed search (Wright et al., 2021). Moreover, the broad agreement in perceived pay rankings—and the belief that high-wage firms receive more qualified applicants per vacancy—aligns with models in which search generates congestion externalities.³

Finally, this paper contributes to a growing literature on workers’ information and beliefs about the labor market (see summary in Cullen, 2023). This literature documents mixed effects of providing workers with pay information (e.g., Caldwell and Harmon, 2019; Jäger et al., 2024; Cullen, 2023). Several papers document that telling workers, e.g., what their coworkers make, or what other prospective applicants ask for, can improve their outcomes (Card et al., 2012; Roussille, 2024). However, other papers have shown that blanket policies of information provision do not always benefit workers (Cullen and Pakzad-Hurson, 2023).⁴ Relative to this literature, our contribution lies in documenting what workers know about specific outside firms. Our results suggest that lack of information about outside pay is not the central friction preventing mobility, echoing previous work by Fox (2010) on Swedish engineers, as well as early work by Reynolds (1951).

The rest of the paper proceeds as follows. Section 2 presents a simple partial equilibrium model that motivates our empirical analysis. Section 3 describes the survey design and data linkages. Section 4 examines workers’ firm-specific pay expectations. Section 5 analyzes how these beliefs affect search. Section 6 uses a series of discrete choice experiments to estimate amenity valuations and switching costs. Section 7 concludes.

³The reduced form evidence for directed search largely comes from settings where pay information is public (e.g., Belot, Kircher and Muller, 2022; Marinescu and Wolthoff, 2020). A notable exception is Banfi and Villena-Roldan (2019). However, it is rare in many settings for firms to provide pay information in job ads (Batra, Michaud and Mongey, 2023; Caldwell, Haegele and Heining, 2024). Further, a large share of positions are filled without a formal vacancy (Davis, Faberman and Haltiwanger, 2013).

⁴There is mixed evidence on whether workers systematically misestimate their outside options. Jäger et al. (2024) use a module embedded in the German-Socioeconomic Panel to document that a large share of workers anchor beliefs about the pay changes associated with transitions to their current wage. Appendix C describes how our elicitations—which isolate beliefs about pay separate from job arrival rates—differ from those in previous studies. This appendix also documents that workers at low-wage firms receive fewer job offers than comparable workers at high-wage firms and discusses how survey-based anchoring and question order effects could have influenced previous studies.

2 Empirical Framework

We present a simple partial equilibrium search model that motivates the empirical analysis in Sections 4-6.⁵ Appendix D provides details and proofs.

2.1 Setup

Consider a labor market populated by a unit mass of infinitely lived workers indexed by i who can work at any of J firms. Workers derive utility from pay and non-pay amenities provided by firms. Worker i 's flow utility from employment at firm k is:

$$u_{ik} = \beta w_{ik} + a_k + \epsilon_{ik}, \quad (1)$$

where $\beta > 0$ is the marginal utility of log pay, w_{ik} is the log pay of worker i at firm k , a_k is the total value of non-pay amenities provided by firm k , and ϵ_{ik} is an idiosyncratic preference shock drawn independently and identically across workers and firms from a type 1 extreme value distribution. The non-pay amenities may encompass a variety of factors, such as a firm's corporate culture, childcare policies, or health insurance policies. We denote worker i 's employer in period t by $j(i, t)$. If a worker is not employed, $j(i, t) = 0$ and they receive flow utility $u_{i0} = a_0 + \epsilon_{i0}$ where a_0 is the value of non-employment.

Beliefs. Workers hold beliefs $\tilde{w}_{ik}$ about pay at potential outside employers, which may differ from actual pay, w_{ik} . We assume that beliefs are given by:

$$\tilde{w}_{ik} = w_{ik} + b_i + \eta_{ik}, \quad \mathbb{E}[\eta_{ik} | b_i, w_{ik}] = 0,$$

where b_i captures worker i 's systematic optimism (if $b_i > 0$) or pessimism (if $b_i < 0$) relative to true pay and η_{ik} allows beliefs to vary across firms arbitrarily. Workers form beliefs based on all available information, including networks, online platforms, or past applications.⁶ Worker i learns the true pay at firm j after receiving an offer.

Dynamics, Search, and Mobility. In period t worker i receives their flow utility. They then decide on a set of firms $A \subseteq \mathcal{J} \setminus j(i, t)$ to apply to where $\mathcal{J}$ is the set of all firms. They then pay an

⁵A natural extension would embed this setup in a general equilibrium framework. In equilibrium, firms' wages and hiring selectivity would adjust endogenously to worker behavior and allowing workers' beliefs to update dynamically in response to these adjustments. We do not present this version because our empirical focus is on how workers' existing perceptions shape their individual search decisions, rather than on equilibrium wage determination.

⁶We remain agnostic about the belief formation process as we focus on elicited beliefs rather than learning.

application cost κ for each application, regardless of whether this application is successful: if they apply to $|A|$ firms, they pay $\kappa|A|$. The probability of receiving an offer from firm k is p_k .⁷

Worker i then simultaneously receives job offers and learns whether their current match will be exogenously destroyed (which occurs with probability λ). After learning about their offer set, worker i chooses the best offer in their option set. If their match was destroyed, this option set includes non-employment and any firms which made them an offer. Otherwise it also includes their current firm. If the worker moves to a new firm, they pay a one-time cost s_i . We refer to s_i as a switching cost, noting that it can encompass a broad set of frictions that reduce the attractiveness of going to a new employer, including uncertainty about new environments, disruption to established commuting patterns, and the cost of developing social ties with managers and coworkers.

Search is forward-looking and workers discount the future at rate $\delta \in (0, 1)$. Worker i applies to outside firms if the benefit of doing so exceeds the cost. We use A to denote the set of firms a worker applies to and $B(A)$ to represent the set of firms which make an offer to individual i (a subset of A). Because there is uncertainty about what firms will offer the worker employment, workers make decisions on the basis of expected utility, accounting for uncertainty in whether an application will be successful. Worker i 's perceived value of employment at firm k is:

$$\begin{aligned} \tilde{V}_{ik} = & \underbrace{\beta \tilde{w}_{ik} + a_k + \epsilon_{ik}}_{\tilde{u}_{ik}} \\ & + \max_{A \subseteq \mathcal{J} \setminus \{k\}} \left\{ -\kappa |A| + \delta \mathbb{E}_{B(A)} \left[(1 - \lambda) \max \left\{ \overbrace{\tilde{V}_{ik}}^{\text{stay}}, \overbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}^{\text{switch employers}} \right\} \right. \right. \\ & \left. \left. + \lambda \max \left\{ \underbrace{V_{i0}}_{\text{unemployed}}, \underbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}_{\text{switch employers}} \right\} \right] \right\}. \end{aligned} \quad (2)$$

where we use $\tilde{V}_{ik}$ to indicate that the value function depends on the vector of perceived wages $\tilde{\mathbf{w}}_i = (\tilde{w}_{i1}, \dots, \tilde{w}_{iJ})$, rather than the vector of actual wages. We define V_{ik} similarly, except the true wage at firm k is known.

For worker i , employed at firm j , the expected utility of not searching (not applying to any firms) is

$$V_{ij}^{\text{no search}} = u_{ij} + \delta \left[\lambda V_{i0} + (1 - \lambda) \tilde{V}_{ij} \right],$$

⁷This is firm-specific but worker-invariant. This implies that all workers face the same probability of success when they apply to firm k . Allowing p_k to vary across workers complicates the notation and does not change the predictions.

and the expected utility of applying to a non-empty set of firms, A , is

$$V_{ij}^{\text{search}}(A) = u_{ij} - \kappa|A| + \delta \mathbb{E} [\tilde{V}_i | A],$$

$$\begin{aligned} \text{where } \mathbb{E}[\tilde{V}_i | A] = & \mathbb{E}_{B(A)}[(1 - \lambda) \underbrace{\max\left\{ \underbrace{V_{ij}}_{\text{stay}}, \underbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}_{\text{switch}} \right\}}_{\text{stay}} \\ & + \lambda \underbrace{\max\left\{ \underbrace{V_{i0}}_{\text{unemployed}}, \underbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}_{\text{switch}} \right\}}_{\text{unemployed}}]. \end{aligned}$$

Definition of Directed Search. Formally, we say that search is directed if there exists at least one pair of firms (k, l) with $\tilde{w}_{ik} \neq \tilde{w}_{il}$ such that altering these beliefs, while holding aggregate distributions constant, changes the worker's applications. This behavior requires that: (1) workers believe their own pay would vary across firms ($\tilde{w}_{ik} \neq \tilde{w}_{il}$ for some $k \neq l$) and (2) workers can link their beliefs $\tilde{w}_{ik}$ and the values of amenities a_k to the identity of the firm k .

2.2 Firm-Specific Knowledge of Pay and Search

The model yields several predictions about the relationship between workers' beliefs and switching costs and their search and mobility. Formal proofs are in Appendix D.

1. The Probability of Search is Increasing in a Worker's Perceived Outside Options and Decreasing in s_i . Worker i at firm j searches in period t if there exists at least one firm for which the expected gain exceeds the cost:

$$\max_k \left\{ \delta p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \right\} > \kappa \quad (3)$$

The left side of this expression is increasing in perceived outside options ($\tilde{V}_{ik}$) and decreasing in the switching cost s_i . Perceived outside options depend on the wages other firms offer ($\mathbf{w}_i$), on worker optimism about outside pay (where $b_i > 0$ increases search), and on firm-specific bias η_{ik} . Workers may choose not to search even when they believe other firms offer better wages and amenities if they have a large switching cost s_i .

2. Mistaken Non-Search is Less Likely With Firm-Specific Pay Beliefs. We say that there is mistaken non-search whenever a worker does not search, but would if they were to base their

decision on actual wages $\mathbf{w}_i = (w_{i1}, \dots, w_{iJ})$ rather than perceived wages $\tilde{\mathbf{w}}_i = (\tilde{w}_{i1}, \dots, \tilde{w}_{iJ})$.

Consider two hypothetical scenarios in which workers believe firms vary in pay. In the first scenario, the worker can map these beliefs to firm identities (directed search). They search if there is at least one firm for which the value of applying to that firm exceeds the cost (equation 3). In the second scenario, the worker cannot map their beliefs to firm identities (non-directed search). They search if the expected benefit of a random application exceeds the cost:

$$\delta \frac{1}{J} \sum_k p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] > \kappa. \quad (4)$$

Targeting the firm with the maximum expected gain (the left side of equation 3) yields an expected value at least as high as applying randomly (the left side of equation 4) because the worker can avoid firms with low or negative expected gains. Therefore, mistaken non-search is less common if workers have firm-specific pay beliefs.

3. Directed Searchers Apply More to Firms with Higher Perceived Wages. Third, if workers direct their search, the probability that worker i applies to firm k is an increasing function of their perceived wage at that firm $\tilde{w}_{ik}$. By contrast, if workers do not perceive wage variation across firms—or if they cannot link a given wage to a specific firm—the probability worker i applies to firm k is uncorrelated with its wage.

For simplicity, suppose worker i considers whether to apply to firm k , taking the rest of their applications as given. Their decision depends on whether the gains exceeds the cost:

$$\text{Apply}_{ik} := 1\{p_k \cdot \tilde{V}_{ik} > \kappa_i\},$$

where κ_i is an individual-specific threshold which depends on the per-firm application cost κ , the worker's switching cost s_i , the worker's current employer and set of applications, the probability of job destruction, and the discount factor. Each is independent of $\tilde{w}_{ik}$. Treating the worker's application threshold κ_i as a random variable with differentiable distribution function F , we can examine how the probability the worker i applies to firm k responds to changes in perceived wages:

$$\frac{d P(\text{Apply}_{ik} = 1)}{d \tilde{w}_{ik}} = f_{\kappa_i}(p_k \tilde{V}_{ik}) \left(\underbrace{\beta p_k}_{\text{direct utility gain}} + \underbrace{p_k \frac{\partial a_k}{\partial \tilde{w}_{ik}}}_{\text{amenities}} + \underbrace{\tilde{V}_{ik} \frac{\partial p_k}{\partial \tilde{w}_{ik}}}_{\text{selectivity}} + \underbrace{p_k \frac{\partial U_k(A^*)}{\partial \tilde{w}_{ik}}}_{\text{gains from optimal applications}} \right). \quad (5)$$

There are four channels through which applications respond to $\tilde{w}_{ik}$: (1) the direct utility gain from higher pay, (2) the relationship between wages and amenities, (3) the relationship between wages and offer probabilities, and (4) the gains associated with changes to future application behavior.⁸

4. A Firm's Application-Wage Elasticity is Increasing in the Share of Directed Searchers.

Because only workers who direct their search respond to a particular firm's wage, the responsiveness of a firm's applications to changes in its own wage is increasing in the share of directed searchers. In many models, firms' markdowns are decreasing (wages are increasing) in the elasticity of applications to wages (Manning, 2003; Dal Bó, Finan and Rossi, 2013).

To see this, decompose the number of applicants to firm j , n_j , into the contributions from two groups of workers:

$$n_j = N \times \left[\underbrace{\alpha \times \mathcal{D}_j(a_j, \{\tilde{\mathbf{w}}_i\}, \{\kappa_i\})}_{\text{directed portion}} + \underbrace{(1 - \alpha) \times \mathcal{R}_j(\{\tilde{\mathbf{w}}_i\}, \{\kappa_i\})}_{\text{non-directed portion}} \right],$$

where $\alpha \in [0, 1]$ is the share of workers who direct their search, and $\mathcal{D}_j$ ($\mathcal{R}_j$) is the share of workers who direct (do not direct) their search who apply to j . The wage elasticity of applications η^j is

$$\eta^j = \frac{\partial n_j}{\partial w_j} \times \frac{w_j}{n_j} = \frac{w_j}{n_j} \times N \times \left[\alpha \frac{\partial \mathcal{D}_j}{\partial w_j} + (1 - \alpha) \underbrace{\frac{\partial \mathcal{R}_j}{\partial w_j}}_{\approx 0} \right] \approx N \times \alpha \times \frac{w_j}{n_j} \left[\underbrace{\frac{\partial \mathcal{D}_j}{\partial w_j}}_{+} \right], \quad (6)$$

where $\partial \mathcal{D}_j / \partial w_j > 0$ as long as $\partial \tilde{w}_{ij} / \partial w_j > 0$ because the probability each worker who directs their search applies is increasing in their own beliefs (prediction 3).⁹

5. The Probability of a Job Switch is Increasing in a Worker's Perceived Outside Options and Decreasing in s_i . Finally, incumbent workers' decisions to search and move are shaped both by their beliefs about outside option pay, and by their costs of switching employers. While workers learn the actual wage of an outside firm before they accept an offer from that firm, a worker can only switch jobs if they receive an offer. Workers switch jobs when they (1) apply to another job,

⁸Intuitively, after moving to a higher wage firm a worker may apply less because the gains to moving are lower. In Appendix D, we show a similar expression arises when workers can construct application portfolios. Even then, an increase in $\tilde{w}_{ik}$ raises the expected payoff of any set of applications that includes firm k . This preserves the core intuition: higher perceived wages lead to a higher probability of applying to k , all else equal.

⁹If firm j is small, $\partial \mathcal{R}_j / \partial w_j \approx 0$ because a wage change at firm j will influence workers' overall search behavior only through its influence on their beliefs about the overall wage distribution; any increase in applications will be spread across all firms.

(2) receive an offer, and (3) decide that offer is good enough to overcome the switching cost.

A worker’s probability of searching is increasing in their perceived outside options and decreasing in s_i (prediction 1). Conditional on their applications, the probability worker i receives an offer does not depend on either their beliefs or s_i . Given that worker i has an offer from outside firm k , they prefer it to the option of remaining at their incumbent firm if:

$$V_{ik} - s_i > V_{ij} \quad (7)$$

where we use V_{ik} rather than $\tilde{V}_{ik}$ as we assume that a worker learns a firm’s wages upon receiving an offer. All else equal, a worker is less likely to accept the outside offer if their switching costs are higher and more likely to accept if the firm offers them a higher wage.

2.3 Identifying the Barriers to Mobility

We use these predictions to guide our analysis of workers’ beliefs and the relationship between these beliefs—and switching costs—and workers’ search and mobility. Section 4 examines whether workers have firm-specific beliefs about pay and whether these beliefs are correlated with objective predictions. Section 5 tests prediction 3 by estimating models where the dependent variable is an indicator for worker i reports they would apply to firm k , and the key independent variable is $\tilde{w}_{ikt}$.

Our model indicates that both beliefs and preferences (including switching costs) affect observed search and mobility. Section 6 uses a series of discrete choice experiments in which we asked workers to rank offers from specific outside firms with randomized and specified pay to isolate the role of preferences. We estimate switching costs (s_i) and to examine the role of firm-specific amenities (a_k) in explaining limited mobility.¹⁰ We also consider the possibility that attachment varies across firms. We do so by considering an augmented version of the model in which workers’ valuations of non-wage attributes differ once they have joined a firm. This allows for the possibility that workers develop firm-specific attachment over time through the accumulation of match-specific capital or social ties (e.g., with managers or coworkers). This is not incorporated in standard models which assume that, even if firms vary in the utility they provide, this variation exists before a match is formed (e.g., Moen, 1997).

¹⁰As detailed in Section 3, our primary discrete choice experiments identify switching costs and valuations of firm-specific amenities by asking workers to choose between offers at named firms with specified, randomized wage increases. In a more general model in which wages grow over time and firms also differ in growth rates, workers’ preferences over the outside firm and the incumbent depend on an additional term: the discounted difference in growth rates. In most of the paper, we follow the literature in considering firm-specific amenity values as a bundle, without decomposing them into their constituent parts. However, in some of our analysis, we leverage a set of additional discrete choice experiments we conducted in which we told workers that future promotions and wage trajectories would not differ from their incumbent firm.

Throughout our empirical tests, we leverage our ability to directly measure workers’ beliefs about outside options, rather than inferring them from observed behavior, and our ability to isolate preferences from beliefs. Our approach allows us to distinguish between: (1) information frictions, where workers hold inaccurate beliefs about outside options; (2) preferences, including both switching costs and firm-specific attachment. Switching costs and firm-specific attachment provide mechanisms through which workers, who are informed and actively consider outside opportunities, may nevertheless remain with their current employer.

3 Data and Survey Design

We designed a survey to elicit workers’ information about pay, search behavior, and preferences. We fielded the survey through the German Institute for Employment Research (IAB), a group within the German Employment Agency with a statutory mandate to study the labor market. We linked workers’ responses to their Social Security records. We also developed a linkage between workers’ responses about specific firms and public and administrative data on those firms.

3.1 Survey Implementation and Descriptive Statistics

We fielded the initial wave of the survey to 134,995 full-time German workers in the fall of 2022. We selected workers for inclusion in the survey from the set of full-time employed workers between the ages of 25 and 50 who had been at their establishment for fewer than eight years. We over-sampled workers from the firms included in the firm survey conducted by Caldwell, Haegele and Heining (2024). This design allows us to produce estimates that are representative of the full-time German workforce (after re-weighting), but also gives us the ability to estimate firm-specific valuations among insiders (those currently employed at a firm) for a large set of firms. We weight responses according to this explicit dimension of over-sampling; this is considered a best practice in the survey literature (Solon, Haider and Wooldridge, 2015).

We designed the survey so that it was similar to other worker surveys fielded by the IAB. We sent invitations to the survey—which were signed by the director of the IAB—by mail; respondents completed the survey online. We received 13,680 total responses, for an effective response rate of 11.4%. Our response rate compares favorably to other IAB surveys targeting first-time respondents (Haas et al., 2021) and to other recent surveys that invited participants electronically (Caplin et al., 2023). The high completion rate (74%) and moderate median response time (9 minutes) suggest that survey fatigue and limited attention are not major concerns.¹¹ Throughout the paper, we pool

¹¹We define a response as complete if a respondent clicked through to the second to last question, which elicited

data from the initial survey wave with data from a follow-up survey we conducted in the spring of 2024. The follow-up response rate (fifty-one percent) is similar to those of other panel surveys (Haas et al., 2021). In both the initial and follow-up surveys, we randomized incentives to respond (Caldwell, Haegele and Heining, 2024).

The key innovation in our survey design is that we asked workers questions about specific firms, and linked these responses to public and administrative data on those firms. While these questions form the basis of most of our analysis, we also collected additional characteristics not observed in the Social Security records—such as collective bargaining coverage and hours worked—as well as general information on search.¹²

Table 1 describes the 9,756 employed workers who completed the initial wave of the survey and provided their consent to link their responses to the administrative records. The average individual in our sample is around 30 years of age, and 53% are male. Most are German citizens, and roughly 60% have a college degree. The majority of respondents have been at their jobs for more than two years. The average daily pay is roughly 136 euros, and half of workers are covered by a collective bargaining agreement (CBA).¹³ Because we only invited full-time workers to participate, our population earns more than the average German worker. However, our final sample includes thousands of workers at the lowest-paying firms. Appendix B.1 confirms our results are robust to weighting our sample to match the overall population of full-time workers in Germany.

3.2 Firm-Specific Questions

We designed two survey modules to elicit firm-specific information from workers. The *researcher-provided firm module* posed a series of questions about randomly drawn subsets of 30 large German employers. This approach ensures that the identity of the firms about which a given worker answers questions is not endogenous to the worker. Appendix Tables E1 and E2 confirm that the randomization was successful.

The *worker-provided firm module* first asked workers to provide the names of three firms they would consider applying to. It then posed a series of follow-up questions, analogous to those in the researcher-provided module, about these firms. The worker-provided firm module allows us to focus on firms that—by construction—are most relevant for a given worker. We were initially concerned that workers would provide the names of firms which they would like to work at, but

consent for participating in a follow-up survey. We do not require respondents to have answered every question.

¹²The survey also contained modules on workers' bargaining behavior (Caldwell, Haegele and Heining, 2024). The questionnaires and information on field logistics can be found at https://sydneec.github.io/Website/CHH_Survey_Appendix.pdf.

¹³Pay is top-coded at the Social Security maximum. We impute the upper tail of the wage distribution. To calculate daily pay, we divide the imputed total earnings by spell duration.

which were out of reach. However, workers provided a large number (more than 2,800 unique) of firms which fall throughout the pay distribution (Appendix Figure A2) and which workers from their firm have historically moved to (Appendix Figure E2). Appendix E.1.5 describes these firms.

Most of our analysis relies on the responses in the researcher-provided firm module. To avoid priming, we asked workers to complete the worker-provided firm module first. Both modules unfolded similarly, as outlined below and depicted in Figure 1.¹⁴

Search. We first asked workers where they would consider applying if they wanted to switch firms. In the researcher-provided firm module, we elicited this information by providing workers with seven potential firms and asking them:

“Suppose you planned to move to a new company in the next {one/three/six} months.
Would you consider applying to any of these firms? Please select all that apply.”

In the worker-provided firm module, we asked workers to name three firms they would consider applying to. We randomized the listed time frame. We asked about applications conditional on wanting to move so that our question would be applicable to workers without immediate job search plans. The measure we elicit is similar to the measures of interest used in many empirical studies of directed search but has the added advantage of not requiring firms to have open vacancies or to recruit via online job boards.

Pay. We then asked workers what they believed they would earn at each of three firms:

“What do you think your gross annual pay would be if you worked at these companies
in a position similar to your most recent position?”

In the researcher-provided firm module, the three firms were chosen at random from the set of seven firms included in the search question. In the worker-provided firm module, the three firms were those previously provided by the worker. To reduce the burden of the survey, we only posed this and the following question on preferences to a random 50% of workers in the researcher-provided firm module. We posed these questions to all workers in the worker-provided firm module.¹⁵

¹⁴We included the researcher-provided firm module in both the initial and follow-up surveys. However, in the follow-up survey, we did not present the worker-provided firm module to workers who completed this module in the initial survey. To avoid contamination from potential learning effects, we exclude worker-provided firm responses from the follow-up wave.

¹⁵Given that the median respondent completed the survey—which included several background questions, a module on bargaining, and both worker-provided and researcher-provided firm modules—in just 9 minutes, it is unlikely that respondents had enough time to look up the listed firms. Further, we do not see bunching in the provided salary expectations for each firm; bunching would be consistent with workers looking up this information.

The goal of this question was to elicit information on what workers thought they would make at outside firms, not what it would take to get them to move to these firms. We focused on annual pay because our sample consists of full-time workers. We told workers to assume they had the same position at each firm to ensure within-worker comparability of pay across firms. We process the raw expectations data by winsorizing workers' pay expectations at the 90% level. This processing may, if anything, lead us to slightly understate the variation in workers' expectations (and bias us against our finding that workers have firm-specific information). Appendix Section E.1.6 provides more details on the data processing and describes robustness checks which confirm our results are not driven by this choice.

Preferences. Finally, we asked workers to rank hypothetical job offers from the same three firms under researcher-randomized raises. We told workers:

“Suppose you can remain at your current company or switch to any of the companies listed below and immediately receive the raise specified below. Please rank the following job offers from 1 to 4 where 1 is the offer you are most likely to take and 4 is the offer you are least likely to take.”

We provided three hypothetical job offers with raises that ranged from 5% to 20% in the initial survey, and -5% to 15% in the follow-up survey. We chose 5% increments to simplify comparisons. We asked workers to rank these options relative to each other and to the option of remaining at their current firm at a specified raise. We specified the incumbent firm's pay to avoid the concern that some workers may anticipate the incumbent firm would renegotiate.

We use these discrete choice experiments (DCEs) to estimate switching costs and to estimate the value of firm-specific amenities. We chose to elicit workers' preferences using DCEs—rather than eliciting the pay changes that would lead a worker to leave their current firm or to join specific outside firms—because take-it-or-leave-it experiments are a more reliable way to measure preferences than contingent valuation approaches (Hausman, 2012; Mas, 2025). For instance, recent work by Rodemeier (Forthcoming) found stated willingness to pay estimates that were 1388% larger than experimental estimates from the same population. DCEs are commonly used to estimate the value of workplace amenities (Wiswall and Zafar, 2018; Mas, 2025) because they yield estimates consistent with actual job market behavior (Mas and Pallais, 2017).

3.3 Researcher-Provided Firms

A goal of our study was to shed light on workers' perceptions of outside firms and the linkage between these perceptions and their search and mobility. A key challenge in designing the survey

was selecting the set of researcher-provided firms, which needed to meet five distinct criteria.

First, for respondents' answers to be meaningful, respondents needed to be at least somewhat familiar with the provided firms. Second, for it to be reasonable to ask workers for their expected pay at each of the outside firms (conditional on holding the same position they currently hold), the included firms needed to employ workers in a wide variety of occupations. Further, for workers to find the firms reasonable, they could not be overly associated with a single occupation. Third, because we estimate firm-specific pay effects and valuations, we needed to focus on a relatively small number of firms to guarantee precision. Fourth, to ensure our findings were broadly relevant, we needed to select firms that were important in the German labor market. Lastly, to ensure relevance we also needed to include firms that represented realistic employment options for workers, rather than aspirational "dream" firms that were clearly desirable but out of reach to most respondents.

Based on these criteria, we selected 30 researcher-provided firms from a pool of the top publicly traded and top family-owned firms in Germany.¹⁶ We included 20 firms in the initial wave of the survey and all 30 firms in the follow-up wave. We focused on private sector firms, rather than including public sector employers, since our sampling frame consists of workers in Social Security-covered employment, which excludes much of the public sector in Germany. Selecting from the sets of publicly traded and family-owned firms allows us to analyze a range of well-known firms that employ a large share of the German work force, but which differ in a range of characteristics, including pay. Appendix E.1 provides more details on the selection criteria.

The final set of 30 researcher-provided firms are important employers in Germany and are relevant for our respondents. Together, they employ over 1.8 million German workers and have received more than 39.1 million page views on Germany's leading employer rating platform, Kununu. They capture six major industries in Germany and vary in characteristics such as firm age and location (Table 2; Appendix Table E3). Nearly one quarter of respondents have worked at least at one of the 30 firms in the past ten years and 47% of the researcher-provided firms were among the top 100 firms named by respondents. The fact that the firms have similar median pay and pay premia as the firms respondents currently work at (Panel A of Appendix Figure A2) weighs against the concern that these firms may be out of reach.

¹⁶An alternative approach would have been to select firms on the basis of firm-to-firm flows or networks, but this was infeasible. Although we could link survey responses to the administrative data by linking firm names we provided to establishment identifiers, we were not permitted to retrieve firm names from the establishment identifiers.

3.4 Linkages to Firm-Level Datasets

We linked workers' firm-specific responses to firm-level information. Most of this information comes from administrative data collected by the IAB. Following IAB linkage procedures, we linked the researcher-provided and the worker-provided firms to the establishment panel (BHP) and to the employment records of workers at these firms (IEB). We constructed employment-weighted averages to create firm-level characteristics from the establishment-level data. Some specifications include controls for the distance between a worker's current workplace and the indicated firm. Our baseline measure is the driving distance between a worker's current workplace and the 7-digit municipality of a firm's headquarters.¹⁷

We supplement IAB data with Orbis and hand-collected data on firm size, age, and worker ratings. Orbis provides us with firm age and financial characteristics. Most of our hand-collected data come from an employer review platform, Kununu, and from a variety of firm rankings, which we detail in Appendix Section E. We also hand-collected the number of employees in Germany.

4 Workers' Firm-Specific Pay Expectations

We begin our empirical analysis by presenting several novel facts about workers' firm-specific pay expectations, guided by the model in Section 2.

4.1 Workers Believe Firms are Heterogeneous in Pay

In the model presented in Section 2, workers can direct their search only if they expect firms to vary in pay and if they possess firm-specific information on pay. The first bar of Figure 2 shows that about half of workers had firm-specific information about pay when they applied to their current firm. Eighteen percent of workers say they knew the exact pay they would earn when they applied; a further 27% had a rough idea of what that specific firm would offer them. The remaining workers said they had no idea, or only knew pay in their region or industry.

As in the United States, it is rare for job ads in Germany to include pay information (Batra, Michaud and Mongey, 2023; Caldwell, Haegele and Heining, 2024). However, workers may obtain pay information from other sources, such as both public pay aggregators or social networks.¹⁸ Consistent with the idea that workers obtain information through informal networks, nearly 60% of workers who knew a current or former employee when they applied to their firm report that they

¹⁷In robustness checks (See Appendix Tables A3 and A4), we use an alternative measure of distance based on the distance between a worker's current workplace and the closest establishment of the outside firm.

¹⁸Pay data from Kununu, a widely used online aggregator, are positively correlated with administrative records.

had firm-specific information on pay. Less than 40% of unconnected workers had such information. Workers covered by collective bargaining agreements, which specify pay ranges for covered employees, are more likely to report that they had firm-specific information.¹⁹

Workers do not believe firms would offer them the same pay. Rather, most workers believe firms would offer them different pay for the same position. The first column of Table 3 shows the fraction of workers who report that they would earn the same pay at each of the three researcher-provided firms (first two rows) or at the firms they provided (remaining rows). The first two rows indicate that less than a third of workers expect the same pay for the three researcher-provided firms in each of the initial and follow-up surveys. Because we told workers to assume that they hold the same position at each of these firms, the within-worker variation in expected earnings does not reflect the fact that workers believe they will be engaged in different tasks at each employer. Because we focus on within-worker comparisons, the variation in expected earnings is also not driven by unobserved differences in worker ability.²⁰ The remaining rows of the table confirm that—for the firms workers themselves provided (their perceived outside option firms)—workers also perceive significant heterogeneity in pay.

The within-worker variation in expected pay could reflect a variety of firm-specific factors, including differences in amenities and hours worked. However, it does not simply reflect the fact that workers expect pay to vary across geographic regions or sectors. Rather, workers believe that pay varies across firms within a detailed labor market. Rows 3 to 6 of Table 3 show the fraction of workers who provide the same expected pay for each of the three firms in the worker-provided firm module. For a subset of these workers, we collected additional information on the specific location they had in mind when listing the worker-provided firms. We find similar results when we focus on workers who indicated that the three firms they provided were in the same state, district, or municipality (Rows 4 to 6). Further, Appendix Table A1 shows that firm fixed effects have explanatory power beyond sector fixed effects, state fixed effects, or sector-by-state fixed effects.²¹

¹⁹Because bargaining groups are not always indicated in job ads, we would not expect all covered workers to have specific information on pay when they apply (Caldwell, Haeghele and Heining, 2024).

²⁰Standard concerns with survey elicitation—such as anchoring bias—would lead us to understate the true amount of variation in workers’ expectations. As we describe in Appendix E.1.6, we winsorize workers’ firm-specific expectations to reduce the influence of outliers. If anything, this procedure biases against detecting firm-level variation.

²¹We selected the researcher-provided firms to ensure sufficient overlap to estimate these effects. Many workers provided firms in the same sector and state.

4.2 Workers' Pay Expectations are Firm-Specific

We summarize workers' firm-specific pay expectations using a two-way fixed effect model,

$$\log \tilde{w}_{ij} = \alpha_i + \psi_j + \epsilon_{it}, \quad (8)$$

where $\tilde{w}_{ij}$ is worker i 's expected pay at firm j . This specification provides us with estimates of workers' perceived pay premia, $\tilde{\psi}_j$, up to a normalization; we normalize $\tilde{\psi}_1 = 0$. For instance, we interpret $\tilde{\psi}_2$ as the average log difference in pay workers expect to receive at firm 2, relative to (the arbitrarily chosen) firm 1. If $\tilde{\psi}_2 = 0.2$, workers expect firm 2 to pay 20% more than firm 1.

This specification is similar to the two-way fixed effects models often used in the wage-setting literature (Abowd, Kramarz and Margolis, 1999). However, we identify the firm-specific pay premia using within-worker variation in expectations, rather than job-to-job mobility. Our baseline specification includes data from the researcher-provided firm module in both the initial and follow-up surveys. Because we randomly assigned workers to firms, there is no mechanical correlation between workers' characteristics and their firm-specific pay expectations (Appendix E.1.2).

To understand the stability and range of estimates, we split the sample into two random samples and plot the estimates for each sample in Figure A3. This figure shows that the estimates range from -0.2 to 0.05: the lowest-pay firm (in workers' view) in our sample pays about 25% less than the highest-pay firm in our sample. This figure also shows that the estimates do not simply reflect noise: the correlation between the estimates from two random samples is 0.88. Workers simply believe some firms pay more than others.

Appendix Table A2 presents a variance decomposition of workers' pay expectations. Column 1 shows that most of the variation in workers' expectations can be explained by variation in the person effects α_i . However, both informed and uninformed workers see a role for firms in wage-setting. Columns 2 and 3 split the sample according to whether a worker knew pay when they applied to their current firm and Columns 4 and 5 split the sample according to whether the worker recently engaged in job search. Even for workers who are less informed according to these definitions, we see that there is a role for firm effects and we can reject the hypothesis that the firm effects are jointly zero. Further, the between-group gap in the standard deviation of firm effects is small. Column 6 describes the objective predictions for these firms. A comparison of Columns 1 and 6 suggests that, relative to the objective predictions, workers' perceived firm effects are about a third as variable as the firm effects observed in the data.

4.3 Workers' Pay Expectations are Correlated with Objective Predictions

Workers' firm-specific pay expectations are positively correlated with objective predictions. For each worker-firm pair in the researcher-provided firm module, we construct an objective prediction (ω_{ik}) by taking the logarithm of an individual's current total annual pay, subtracting the pay premium of her current place of work, and adding the pay premium of the specified outside firm:

$$\omega_{ik} := \underbrace{\log(w_i)}_{\text{observed earnings}} - \underbrace{\psi_{j(i)}}_{\text{current firm}} + \underbrace{\psi_k}_{\text{provided firm}} .$$

The firm premia come from Bellmann et al. (2020), who fit two-way fixed effect models to 2010–2017 population data. By exchanging the firm effects, we are able to account for the fact that pay may vary across workers for observed (e.g., education, labor market experience) and unobserved (e.g., bargaining ability, skill) reasons.²² We asked workers to assume they hold the same position in each of the outside firms so that these unobserved factors would not vary within worker.

Figure A4 shows that there is a strong positive relationship between the objective predictions (y -axis) and workers' pay expectations (x -axis). A simple regression shows that workers' firm-specific expectations explain about 20% of the variation in the objective predictions. Further, Figure 3 shows that workers' expected pay premia ($\tilde{\psi}_j$) are correlated with firms' objective pay policies: there is a correlation of 0.42 with the objective pay premia and of 0.54 (0.56) with firms' median (mean) pay.²³ Workers' expected pay premia are more positively correlated with observed firm characteristics such as age and size than the objective premia are.

Heterogeneity in Perceived Premia. A natural question is whether the perceived pay premia vary across demographic groups, and whether some groups have beliefs which are more correlated with objective firm pay policies. To answer this question, we re-estimate equation 8 for different subsamples of workers. We report the correlation between the estimates for each sample, as well as p-values from formal tests of equality in Columns 1-2 of Table 4. To assess the stability of the perceived pay ranking of firms, we use a rank-ordered logit model to fit workers' firm-specific pay expectations and report analogous results from this model in Columns 3 and 4 of Table 4.

We find that, even when groups disagree on the pay premia of these firms (when a formal

²²We use the firm pay premia from Bellmann et al. (2020) rather than estimating firm pay premia ourselves with observed pay data, because we do not have access to full population records.

²³Because there is substantial noise in our measurement of firms' objective pay premia, not all deviations can be interpreted as reflecting bias in workers' beliefs. Rather, we interpret the positive correlation with objective premia as a sign that workers have information on the pay policies offered by different firms. We refrain from taking a stand on whether workers who deviate from our prediction are overly optimistic (in the case of over-prediction) or overly pessimistic (in the case of under-prediction).

test of equality suggests the estimates are distinct), the estimates are similar in magnitude and highly correlated. For instance, we can reject the hypothesis that men and women have the same perceived pay premia at each of the 30 researcher-provided firms. However, there is a correlation of 0.73 between the pay premia men and women associate with the researcher-provided firms. We find a similar relationship when we analyze the correlation between the estimates of workers with and without a CBA or workers with and without a college degree. Column 4 of Table 4 shows that we cannot reject equality of estimates when we use the rank-based model.²⁴

4.4 Discussion

We find that many workers have information on the pay provided by outside firms.

Interpreting Survey Elicitations. A natural concern is that respondents might have looked up pay information during the survey. However, we clearly indicated respondents should provide their best guess and did not incentivize accuracy. As noted in Section 3.2, respondents spent an average of only 9 minutes on the survey, and we observe no bunching in the reported salaries—both facts weigh against such a concern. That we obtained similar results from the follow-up survey suggests workers did not use time between waves to obtain additional information. Because the survey was conducted by a government agency with an explicit mandate to understand the functioning of the labor market, respondents were likely aware of the importance of providing truthful responses.²⁵

Relationship With Other Work. The descriptive facts contrast with work in Germany which suggests workers anchor beliefs to their current wages—low-wage workers underestimate and high-wage workers overestimate outside pay (Jäger et al., 2024). In that study, 41% of workers said they would earn “the same” pay if they were forced to leave their firm; 40% said their coworkers who switched firms would earn “the same” pay (rather than “higher” or “lower” pay). Both facts are consistent with the idea workers are uninformed about their outside options and assume their outside option is identical to their inside option. However, our respondents do not uniformly report identical outside wages, as would occur if they lacked firm-specific information about their outside options. Further, we find workers at low-wage firms are more optimistic about their outside

²⁴In unreported results we find that men, younger tenured workers, and workers covered by a collective bargaining agreement have perceived premia which are somewhat more correlated with objective measures. We do not find that workers at low-wage firms have perceived premia which are less correlated with objective measures.

²⁵In a paper that analyzes the bargaining modules included in the survey, we document that workers’ answers are correlated with the policies of their current firm (Caldwell, Haegele and Heining, 2024). After we fielded the survey, the IAB received e-mails from respondents who were interested in receiving a summary of our findings, which suggests they expected others to provide truthful responses.

options than workers at high-wage firms (Appendix Figure C4), despite the fact they receive offers at lower rates, both with and without active job search (Appendix Table C1).

Appendix C reconciles these differences. We highlight that we elicited beliefs about pay, rather than beliefs about expected pay changes following voluntary or involuntary transitions. The latter depend on beliefs about pay, as well as beliefs about offer probabilities and preferences. These differences, combined with differences in questionnaire design, can reconcile differences in findings. Our results align with other recent work suggesting workers are informed about their employment and earnings risk (Guo, 2025; Caplin et al., 2023). Further, as we illustrate in Section 2, whether workers search depends on their systematic optimism or pessimism, on whether they have firm-specific information, and on their preferences. In Section 6 we show that many workers are reluctant to move even when told they could have higher pay elsewhere.

5 Firm Pay and Worker Search

Workers use their firm-specific information to direct their search to firms with higher perceived pay. Our estimates imply an average application-wage elasticity of 1. The fact that workers direct their search to firms with higher perceived pay reflects the fact that workers value pay, and the fact that workers believe higher pay firms have better non-wage amenities.

5.1 Relationship Between Pay and Consideration

The model in Section 2 suggests that a worker’s application decisions depend on perceived wages, firm-specific amenity values, and offer probabilities. Our primary design which links workers’ beliefs to their search behavior leverages the fact that, in the researcher-provided firm module, we observe both whether a worker would consider applying to the specified firm and what the worker believes they would earn at that firm.

We regress an indicator for whether worker i says they would consider applying to the randomly provided firm j on the worker’s expected pay at that firm ($\log \tilde{w}_{ij}$), on an indicator for whether the data come from the follow-up survey ($\zeta_{t(i)}$), and on worker (λ_i) and firm (γ_j) fixed effects. Some specifications include additional worker-firm covariates X_{ij} :

$$\text{Consider}_{ij} = \eta^s \log \tilde{w}_{ij} + X_{ij} + \gamma_j + \lambda_i + \zeta_{t(i)} + \epsilon_{ij}. \quad (9)$$

We cluster the standard errors at the worker level. Given the large number of fixed effects, we estimate this equation by OLS instead of using a nonlinear model.

The coefficient of interest, η^s , identifies the link between workers' pay expectations and consideration using only the deviations between workers' firm-specific expectations and what would be predicted based on invariant worker and firm characteristics. The worker fixed effects account for differences in workers' overall level of pay expectations (including systematic optimism) and for heterogeneity in workers' switching costs (s_i). The firm fixed effects account for the fact that firms vary along multiple dimensions, including amenities (a_j) and offer probabilities (p_j).²⁶

Main Estimates. The estimate in Column 1 of Table 5 suggests that a 10% increase in workers' firm-specific pay beliefs leads a worker to be 3% more likely to consider applying. Columns 2 and 3 show that this estimate is stable when we add a control for the logarithm of the driving distance between the provided firm and the worker's current place of work (Column 2), and when we additionally control for whether the provided firm is in the same sector as the worker's current firm (Column 3). The positive semi-elasticity confirms prediction 3: workers with firm-specific information on pay are more likely to apply to firms they believe pay higher wages.

We obtain the application-wage elasticity by dividing η^s by the baseline consideration rate. As reported at the bottom of Table 5 our estimates imply an application-wage elasticity of roughly 1. Of course, these models do not control for firm-worker specific offer probabilities. If workers believe higher pay is associated with lower offer probabilities (as suggested by Appendix Figure A5), their application behavior may be less responsive to pay.²⁷ Columns 4 to 7 of Table 5 split the sample according to workers' risk tolerance (Columns 4 and 5) or whether the worker says they would be reluctant to apply to a position if the probability of an offer were low (Columns 6 and 7). While we see smaller estimates and elasticities among workers who are less tolerant of risk (Column 4 relative to Column 5) or who are more sensitive to competition (Column 7 relative to Column 6), we cannot reject equality of estimates or elasticities across groups.²⁸

Robustness. Appendix Table A3 shows that our results are robust to a variety of alternative specifications and weighting schemes. We obtain similar estimates when we use a alternative specifications or measures of distance (Columns 1 to 3). Columns 4 and 5 show stability across survey waves, mitigating concerns that respondents acquired new pay information after the initial wave. Columns 6 and 7 show robustness to alternative weighting schemes.

²⁶The firm fixed effects also account for the possibility that workers may (as a group) have misperceptions about the pay of specific firms.

²⁷In many models of directed search, workers anticipate that the probability they will receive a job will be lower at high-pay firms because these firms receive more applicants per vacancy (see Wright et al., 2021, for a review of the literature). Workers trade off the probability an application is successful with the value of a successful application.

²⁸In unreported results, we analyzed demographic heterogeneity. While we found somewhat larger estimates for male workers, workers who are unmarried, and workers without children, none of the differences were significant.

5.2 Robustness to Alternative Designs

Because our primary design includes firm fixed effects it does not identify whether high-pay firms receive more overall consideration. We use two alternative designs that allow us to examine whether, within a market, high-pay firms receive more overall consideration. These designs do not hold fixed the non-wage characteristics of firms and use non-overlapping subsets of the data that differ from the data used in our main within-worker, within-firm design.²⁹

Alternative Design 1: Consideration without Pay Expectations. The first design shows that there is a positive correlation between whether a worker considers applying to a firm and the pay premia other workers associate with that firm (as well as with the firm’s observed pay premium). This design uses data on consideration for the four researcher-provided firms per worker-wave for which we elicited consideration, but not pay expectations.³⁰ We regress an indicator for whether worker i said they would consider applying to firm j if they wanted to switch firms on a measure of the firm’s pay policy (Pay_j), on worker fixed effects, on the (log) driving distance between the worker and firm j , and on the additional covariates and fixed effects listed in Appendix Table 6,

$$\text{Consider}_{ij} = \beta^{RP} \text{Pay}_j + \lambda_i + X_{ij} + \epsilon_{ij}. \quad (10)$$

Our baseline specification in Column 1 of Table 6 mimics the specification in Column 4 of Table 5, but exchanges the firm fixed effects—which would be collinear with Pay_j —with dummies for sector, along with a control for the log number of employees at the firm. The coefficient β identifies whether, within a sector, firms that have higher pay—or firms that workers believe have higher pay—receive more interest. We cluster the standard errors at the worker level.

Column 1 of Table 6 shows that there is a strong positive relationship between both the subjective pay premia (Panel A) and objective pay (Panels B) of these firms, and the probability a worker says they would consider applying to that firm. The estimate in Column 1 suggests that, relative to firms in the same sector and with the same size, workers are 1% more likely to consider applying to a firm with 10% higher pay. We obtain similar estimates after controlling for a firm’s brand recognition (Column 2) and for CBA coverage (Column 3).

Alternative Design 2: Free-Text Provision of Firm Names. The second design illustrates that the positive link between consideration and pay also emerges when we consider workers’ free-

²⁹Together with our main design, the data subsets used in each of the alternative designs span the data collected in the researcher-provided and worker-provided firm modules.

³⁰To reduce the survey burden for respondents, we elicited consideration for seven firms, but only asked for their pay expectations for three (randomly chosen) of the seven firms.

text responses. For each worker, we construct a dataset that has one observation for each of the researcher-provided firms we did not provide to them in the initial survey’s researcher-provided firm module. For each worker-firm pair, we construct an indicator for whether the worker independently provided the name of that firm.³¹ For workers who did not provide any firm names, this indicator is zero for each firm. We regress this indicator on the same measures of firm pay policies and worker-firm covariates as in our first alternative design, again clustering the standard errors at the worker level,

$$\text{List Firm}_{ij} = \beta^{WP} \text{Pay}_j + \lambda_i + X_{ij} + \epsilon_{ij}. \quad (11)$$

Columns 4 to 6 of Table 6 shows there is a strong positive relationship between the objective and subjective pay premia of these firms and the probability a worker lists the firm. The effect sizes are an order of magnitude smaller in this design, reflecting the fact that workers could name any firm they wanted in this module: on average 1.7% of the observations correspond to researcher-provided firms. However, the ratio of the effect size to the mean of the dependent variable is similar across the two designs.

Robustness. The alternative designs confirm that high-wage firms receive more overall consideration and serve as robustness checks for our main design. Because neither design controls for firm fixed effects, the estimates are not directly comparable to those from our primary design. Workers may direct their search to higher wage firms because of the pay offered by those firms or because of non-wage characteristics of those firms.³² Appendix Table B4 shows these results are robust to reweighting and to using a firm’s log mean pay, rather than pay premium.

5.3 Discussion and Implications

Our central estimate of an application-wage elasticity of 1 is similar to estimates of the application-wage elasticity from studies in which posted pay is randomized within a position. This includes estimates from observational and experimental studies of jobseekers applying on online job boards

³¹Workers completed the worker-provided firm module before the researcher-provided firm module. We only use data from the initial survey because we asked all workers to provide the names of firms in this survey. In the follow-up survey, we only asked workers to provide the names of firms if they failed to in the initial survey. Our main dataset includes one observation for each of the 17 firms we did not provide to the worker (of the 20 firms included in the initial survey). We probe the robustness of our findings by adding 10 observations, 1 for each of the 10 researcher-provided firms added in the follow-up survey.

³²Because they leverage differences in perceived pay across firms, the estimates in Panel A produce elasticities which are most comparable to our main design. Columns 1-3 suggest an implied overall application elasticity with respect to perceived wage premia on the order of 3; Columns 5-6 suggest an elasticity closer to 5. That these exceed the estimates of our preferred design suggests that workers believe high-wage firms also offer better non-wage amenities; Figure A5 confirms this.

(Marinescu and Wolthoff 2020 and Belot, Kircher and Muller 2022 obtain elasticities of 0.8) and from the public sector experiment by Dal Bó, Finan and Rossi (2013).

This similarity is surprising. Our sample consists of full-time employed workers, many of whom are not actively searching. Further, our variation comes from workers' own beliefs about firm pay, not from posted wage differences. Many firms do not provide pay in job ads; when required to do so by law, many choose to provide large ranges (Batra, Michaud and Mongey, 2023). Our estimates contribute to a literature examining the responsiveness of applications to wages (see, e.g., Belot, Kircher and Muller, 2022).³³

6 Attachment and Mobility

Workers use firm-specific pay beliefs to direct their search to higher-paying firms. Yet many do not search, even when they believe they could earn more. We use discrete choice experiments to show that most workers are unwilling to switch employers for even sizable raises. Our estimates imply separation elasticities of 2-4 and switching costs of 7–18% of annual pay. Firm attachment varies across firms and is not fully explained by amenities.

6.1 Most Workers Would Not Search or Switch Firms for Modest Pay Raises

There are many reasons workers may not search for outside employment—even when outside firms offer higher wages. Equation 3 in Section 2 shows that a worker will be less likely to search if application costs are high, if the probability an application is successful is low, or if they have high switching costs.

In the follow-up survey we asked workers how likely they would be to search for outside employment if they learned pay was 5%, 10%, or 20% higher at other firms (randomized across workers). Panel A of Figure 4 plots the average response for each level of the randomized outside pay. There is a clear positive relationship between the stated outside pay and the probability a worker would begin searching. However, the average probability of search is far from 100%, even when the specified outside pay is significantly higher than what the worker currently makes. Further, there is a plateau: at a certain level of wage change, further wage changes do not lead to

³³While we provide evidence in support of the core assumptions of directed search models—that workers have firm-specific information on pay to direct their search—we do not take a stand on whether the data are most consistent with all of the standard predictions of random or directed search models. While most directed search models feature wage posting, in previous work we documented that workers reject a substantial share of the offers they receive and that bargaining is common (Caldwell, Haegele and Heining, 2024).

more stated mobility: a sizable fraction of workers are unresponsive to outside pay. The implied market search-wage elasticity is 7.14 (Table 7).³⁴

We isolate the role of switching costs using the discrete choice experiments described in Section 3.2. These experiments reveal a similar pattern: even when offered a significant raise pay, many workers say they would prefer to stay at their incumbent firm (with no raise). Panel B of Figure 4 shows a positive relationship between the randomized outside pay and the share of workers saying they would prefer the outside job offer at one of the researcher-provided firms (navy line). However, the share selecting the outside offer is far from 100%, even for relatively large raises (20%). We see a similar pattern when we examine workers' preferences over outside firms they listed in the worker-provided firm module when we asked where they would apply if they wanted to switch firms (maroon circles) and when we focus on workers' preferences over the same firms under the assumption that their commute would not change (red diamonds) or that their future career path would not change (pink triangles).³⁵

The monopsony literature often emphasizes separation elasticities, which quantify how responsive workers are to wage changes at their current employer or outside firms. Table 7 presents results from ordinary least squares regressions of stated mobility on the randomized outside pay, and the separation elasticities implied by these models. Columns 3-5—which use data from the module in which workers rank the incumbent relative to potential destination firms—suggest separation elasticities on the order of 2-4. These estimates are strikingly similar to the typical estimate in the monopsony literature (between 3 and 5).³⁶

Because we provide pay—and indicate that this is an offer—these elasticities are not shaped by workers' beliefs about outside pay. Because we specify that the worker has an offer, these elasticities are also not shaped by workers' beliefs about the likelihood firms would make the worker an offer. Rather, our estimated separation elasticities reflect a preference on the part of workers to remain at their incumbent firm, even when attractive alternatives offer more pay. When we asked workers why they thought people might be reluctant to switch firms, the most commonly selected reasons were (in order) personal ties, a general reluctance to undergo change, and location (Figure 5). Pay ranked fourth; lack of opportunities was the least cited reason.

In our remaining analysis we use the discrete choice experiments to estimate switching costs.

³⁴In unreported results we find a similar elasticity for workers who would not be deterred by low offer probabilities suggesting that low search rates are not driven by the perception it is difficult to obtain outside offers, consistent with the results in Section 5.1.

³⁵In the initial survey, we asked a random 50% of workers to re-rank the hypothetical offers from worker-provided firms under two scenarios: (1) if their location and route to worker would not change and (2) if their career growth (future raises and promotions) would be identical across options.

³⁶In unreported subgroup analysis we find somewhat larger separation elasticities for men (relative to women), for workers at high-wage (relative to low-wage) firms, and for workers without a college degree.

We also examine whether workers are reluctant to move to higher wage employment because they perceive that higher wage firms are worse on non-wage dimensions. To accommodate the possibility that social ties—which are likely developed or deepened on the job—affect workers’ willingness to leave their firm, we finally examine whether firm-specific attachment can be predicted based on ex ante wage and non-wage factors specific to a firm.

6.2 Perceived Switching Costs are Sizable

The model in Section 2 indicates that whether worker i prefers an offer from firm k to the option of remaining at the incumbent firm j depends on (1) the gap in log wages, (2) the gap in firm-provided amenities, and (3) the switching cost. Under the standard assumption that workers’ idiosyncratic preferences are identically and independently distributed and follow a type 1 extreme value distribution we can estimate the parameters of workers’ utility functions using a rank-ordered (“exploded”) logit (Luce and Suppes, 1965).

Our discrete choice experiments generate exogenous variation in the offered log wage at the outside firm, which is, by construction, uncorrelated with worker and firm characteristics. Our initial specification therefore includes two parameters: (1) the randomized raise associated with firm k and (2) an indicator for whether firm k is the incumbent.³⁷ Because we have workers rank multiple outside firms (including their incumbent firm), our rank-ordered logit specification naturally accounts for firm-invariant worker-specific heterogeneity.

Table 8 shows that switching costs are large. The table reports the marginal effects, as well as estimates of switching costs expressed in monetary terms (s/β). The average implied cost to get a worker to move to one of the researcher-provided firms is 18% of their annual pay. By contrast, it costs 7% of their annual pay to get workers to switch to one of the firms they listed in the worker-provided module. The lower estimates for worker-provided firms likely reflect both the fact that these firms are more appealing to workers for non-wage factors (amenities) and that these firms are typically physically closer to the worker’s current workplace.

Switching costs are not simply moving costs. We augment the model in Column 1 with the log distance between the worker and firm to allow the switching cost to have both a fixed component and a cost which is proportional to distance: $s = \phi + \mu \log d_{ij}$. Column 2 shows that this shrinks the switching costs to 11%. We can also remove moving costs by using the follow-up discrete choice experiments we posed to 50% of workers in the initial survey’s worker-provided firm module. We asked these workers to re-rank the opportunities under the assumption that the location of and their

³⁷We do not multiply the randomized raise by the worker’s current wage as this does not change the comparison of utilities within a worker: $\beta \log w_{ij} - \beta \log w_{ik} = \beta \log(w_{ij}/w_{ik}) = \beta \log(1 + r_{ij}) - \beta \log(1 + r_{ik})$.

route to work would stay constant. Column 4 of Table 8 shows that we obtain results similar to those presented in Column 3 when we focus on these data (switching costs of 6%). This similarity between the overall estimates for worker-provided firms and the estimates in Column 4 arises because workers often provide firms which are close to their current location.

Robustness. Appendix Table A4 confirms we obtain similar estimates of switching costs under alternative weighting schemes (Columns 7-8). We also obtain similar results under alternative specifications of distance (Columns 2-4) and alternative samples (Columns 5-6). Appendix Section B.3 shows that the workers who did not provide firm names are somewhat less responsive to outside pay, weighing against concerns that these workers would be most responsive to information; if anything, we may understate switching costs. In unreported results we find that switching costs are somewhat larger for long-tenure workers, and for workers covered by a collective bargaining agreement. Consistent with the findings of Topel and Ward (1992), switching costs are lower for workers at the beginning of their career (with less than four years of experience) than for older workers.

6.3 Some Firms are More Attractive Than Others, Regardless of Pay

Even if workers believe outside firms offer higher pay, they may be reluctant to search for or move to this outside employment if they believe that higher wage firms are worse on non-wage dimensions. We can allow amenities to influence workers' preferences by augmenting our rank-ordered logit model to include a full set of firm dummies. Because we asked workers for their preferences over a defined set of outside firms, we start by using only data on workers' preferences over these firms, excluding their rank of the incumbent firm. For consistency with our analysis in the next section—which investigates whether firm-specific amenity values can explain why workers do not want to leave their current employers—our main analysis sample consists of data from the researcher-provided firm module for workers who work at one of the 30 researcher-provided firms. This is the set of firms for which we can plausibly estimate both insider and outsider valuations.

Estimating this model using only workers' choices across outside firms confirms that workers expect firms to vary in the overall value of amenities they provide ($a_j \neq 0$), and that they expect high-pay firms to offer better overall bundles of amenities ($\text{cov}(a_j, \tilde{\psi}_j) > 0$). Columns 1 and 2 of Table 9 show that the p-value from a test that all of the firm dummies are zero is well below 0.01. Figure 6 graphs the estimates of a_j/β (estimated using data on all workers) against the estimates of ψ_j from Section 3. We present estimates of a_j/β rather than a_j so that the estimates can be interpreted as monetary equivalents.

Figure 6 shows that the perceived variation in firm-specific amenity values is significant and that workers expect higher-pay firms to offer better bundles of amenities. The point estimates suggest a range of 0.25 percentage points, which is larger than the range in our estimates of firm pay premia. The lowest-amenity firms offer values which are 25-30% lower than that of the base firm, while the highest-amenity firms offer values that are 1-2% higher. This finding suggests that amenities are just as important—if not more important—than pay in explaining workers’ choices across firms. A 10% increase in the perceived firm pay premia is associated with an 11% increase in the amenity value. Of course, these valuations capture all non-wage characteristics which vary across firms; they do not imply that high-wage firms are better on every dimension. They also do not allow us to identify the valuation of specific amenities, such as the value of childcare facilities or remote work.³⁸ Instead they are comparable to estimates of the overall value of a firm provided in the macro-labor literature (Hall and Mueller, 2018; Sorkin, 2018; Volpe, 2024). Appendix B.5 shows that we obtain similar results when we fit a random coefficient rank-ordered model, which allows workers to have heterogeneous valuations of wages and distance.

While our estimates of non-wage amenities are specific to the set of 30 large German firms included in our researcher provided firm module, workers generally believe that higher wage firms are not worse on non-wage dimensions. In the follow-up survey asked workers whether they thought a firm paying 30% above market offered amenities that were better, the same, or worse than those offered by a firm paying 10% above market. The top two bars of Appendix Figure A5 show that the majority of workers (71%) believe that the higher-paying firm offers at least as good amenities; a large share (29%) believe that it offers strictly better amenities.³⁹

6.4 Insiders and Outsiders Differ in their Valuations of a Firm

We conclude our analysis by examining whether firms differ in how attached their workers are. Intuitively, gaps in valuations between firm insiders and outsiders could take two forms. First, insiders may value firms differently than outsiders due to simple switching or search costs. If this were the case, we would expect a level shift in firm valuations among firm insiders, captured by

³⁸A large literature has discussed how wage regressions cannot isolate amenity values; a similar logic implies that regressions of amenity valuations on firm characteristics does not yield the price of each amenity (Wiswall and Zafar, 2018). To obtain these prices a researcher would need to cross-randomize wages with each possible amenity. In the follow-up survey, we asked workers to re-rank researcher-provided firms under the assumption they would have the same training and learning opportunities. While we have less precise estimates for this subsample, we continue to reject the null that all of the firm effects are zero when we use this question (Appendix Section B.4).

³⁹Our results indicate that at most 29% of workers believe there is a negative relationship between pay and non-wage amenities. Because workers who believe that the higher-pay firm offers lower amenities may not believe that these fully offset the value of pay, this estimate is an upper bound on the percentage of workers who believe that utility is not equalized across firms.

ϕ . Alternatively, the gap between the valuations of firm insiders and outsiders may vary across firms, reflecting differences in firm-specific attachment. One way this could emerge is if some firms are more successful than others in generating the personal connections workers highlight as a key reason not to switch firms (Figure 5).

We can differentiate between these two possibilities by fitting two models, one which includes only an indicator, ι_j , for whether worker i is an incumbent at firm j , and one which additionally includes interactions between this indicator and firm dummies. The model with interactions corresponds to the model in which there is heterogeneity in firm-specific valuations; the model without interactions corresponds to the model with simple switching costs. Formally, we augment our rank-ordered logit model with a full set of firm dummies which are interacted with whether worker i currently works at the firm. This specification allows for the gap in valuations between insiders and outsiders to vary arbitrarily across firms. We then test whether these interactions (which are identified up to a constant) are heterogeneous.

Column 3 of Table 9 shows that we can reject the hypothesis that $\iota_j = 0 \forall j$, suggesting that simple switching costs cannot explain our results: the gap in valuations varies across firms. There are two leading explanations for this. First, insider and outsiders may differ in valuations because of sorting. Standard models of the labor market assume that because firms vary in the amenities they provide and workers sort into firms based on their preferences.

We do find evidence of sorting. When we re-estimate the model using data only on firm outsiders for consistency with the analysis in Section 6.3—and allow valuations to vary between workers who would and would not consider applying to each firm (as elicited in a previous question), we find that there are significant differences in valuations (Column 2 of Table 9). Appendix Figure A6 shows that outsiders who would apply to a firm have higher valuations than outsiders who are uninterested in applying to the same firm.

However, insiders and outsiders who want to move to that firm also differ in their valuations. To allow for switching costs and sorting, and for the possibility that workers' valuations change after joining a firm, we estimate a model that allows valuations to differ between three groups of workers: (1) outsiders who would not consider applying to the firm, (2) outsiders who would consider applying to the firm, and (3) insiders. Columns 4 and 5 of Table 9 show that firm-specific valuations differ not just between firm insiders and the average outsider, but between firm insiders and outsiders who say they would consider applying to the firm if they wanted to switch firms.

Because we control for a dummy for whether a worker is an incumbent, the difference in valuations between insiders and workers who would consider applying to that firm cannot be explained by a level shift (switching costs). Rather, the between-group gap in valuations is heterogeneous

across firms. One explanation for this is that firms are experience goods and that workers' valuations change dynamically after they have joined, potentially due to the development of firm-specific skills or relationships. This is consistent with the fact that personal connections are one of the most cited reasons workers highlight they believe people are reluctant to switch firms (Figure 5).

6.5 Information Frictions versus Preferences

Our results suggest that preferences better explain limited mobility than information frictions. We identify switching costs and separation elasticities from stated preferences over offers with fully specified pay. While biased beliefs could in principle affect whether a worker searches or considers an offer, they cannot explain why a worker rejects a higher-pay job at a firm they themselves named as a desirable destination, once pay is fixed. We also find similar estimates in robustness checks where we hold commute length constant or remove variation in career progression, suggesting that attachment reflects stable preferences rather than mistaken expectations about specific job attributes.

Of course, a direct implication of the fact that workers face substantial switching costs is that information provision—even when it substantially shifts workers' beliefs about outside pay—is not likely to lead to large shifts in search or mobility. Appendix B.6 uses our estimates to benchmark the potential impacts of information treatments among low-pay workers and shows that the predicted effects of providing information are small. Because our data come from Germany—where workers' health insurance membership does not change when they switch employers—switching costs likely do not reflect job lock driven by health care or health insurance considerations. In other settings, these considerations could have a significant impact on switching costs (Madrian, 1994; Garthwaite, Gross and Notowidigdo, 2014). Switching costs give firms market power over incumbent workers, as they do over consumers in the product market.

7 Conclusion

Why do many workers stay with their employer despite higher pay elsewhere? Using novel survey data from nearly 10,000 full-time German workers linked to administrative records, we examine the roles of beliefs and preferences in shaping mobility. We show that workers expect firms to vary in pay and that perceived pay premia are correlated with observed wage premia. Workers direct their search to firms they believe more (with an average application-wage elasticity of 1), and expect higher-wage firms to offer better non-wage values. For a set of large German employers, there is substantial agreement in the perceived pay rankings for different demographic groups.

Among these firms, a firm with a 10% perceived wage premium has, on average, 11% higher non-wage amenities (in money-metric terms).

Yet even when offered a raise at a firm they identified as desirable, most workers prefer to stay. Implied separation elasticities are between 2 and 4 and implied switching costs are 7–18% of annual pay. When asked why other workers might be reluctant to switch firms, respondents cite factors such as a general reluctance to undergo change, amenities, and social ties. Pay ranked fourth and lack of opportunities was not a major factor. Attachment varies across firms and is not fully explained by amenities or uniform switching costs, suggesting wage changes may differentially affect separation and recruitment.

Our analysis contributes to the literature on competition in the labor market by examining the sources of firm monopsony power. Our results suggest that worker preferences, rather than information frictions, are the primary constraint on mobility. However, our sample is limited to full-time private sector workers and does not capture beliefs about public sector jobs or the behavior of labor market entrants. Beyond extending the analysis to these samples, one potential direction for future work is to examine why attachment differs across firms. Our results suggest personal ties may play a role.

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8 Figures and Tables

Figure 1: Researcher-Provided Firm Module

Suppose you planned to move to a new company in the next {one/three/six} months. Would you consider applying to any of these? Please select all that apply.

- ☐ Company 1
- ☐ Company 2
- ☐ Company 3
- ☐ Company 4
- ☐ Company 5
- ☐ Company 6
- ☐ Company 7
- ☐ I would not apply to any of these

What do you think your gross annual pay would be if you worked at these companies in a position similar to your current one?

Company 2: [Fill in gross pay]

Company 4: [Fill in gross pay]

Company 7: [Fill in gross pay]

Suppose you can remain at your current company or switch to any of the companies listed below and immediately receive the raise specified.

Please rank the following job offers from 1 to 4 where 1 is the offer you are most likely to take and 4 is the offer you are least likely to take.

Company 2 with a X% raise _____

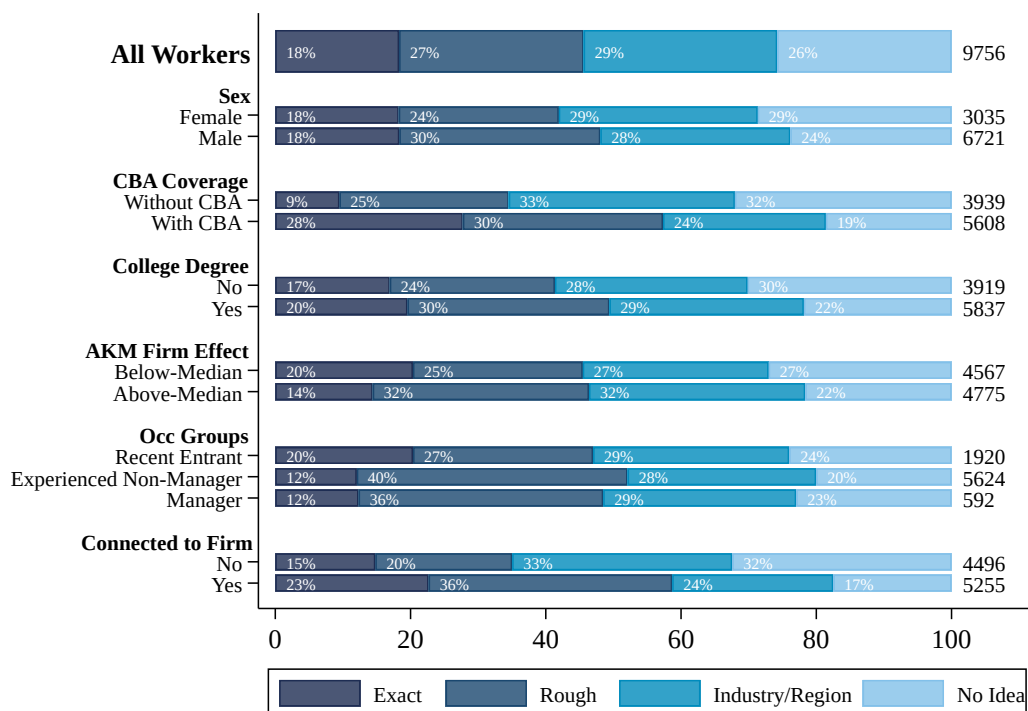
Company 4 with a Y% raise _____

Company 7 with a Z% raise _____

Remain at current firm at current pay

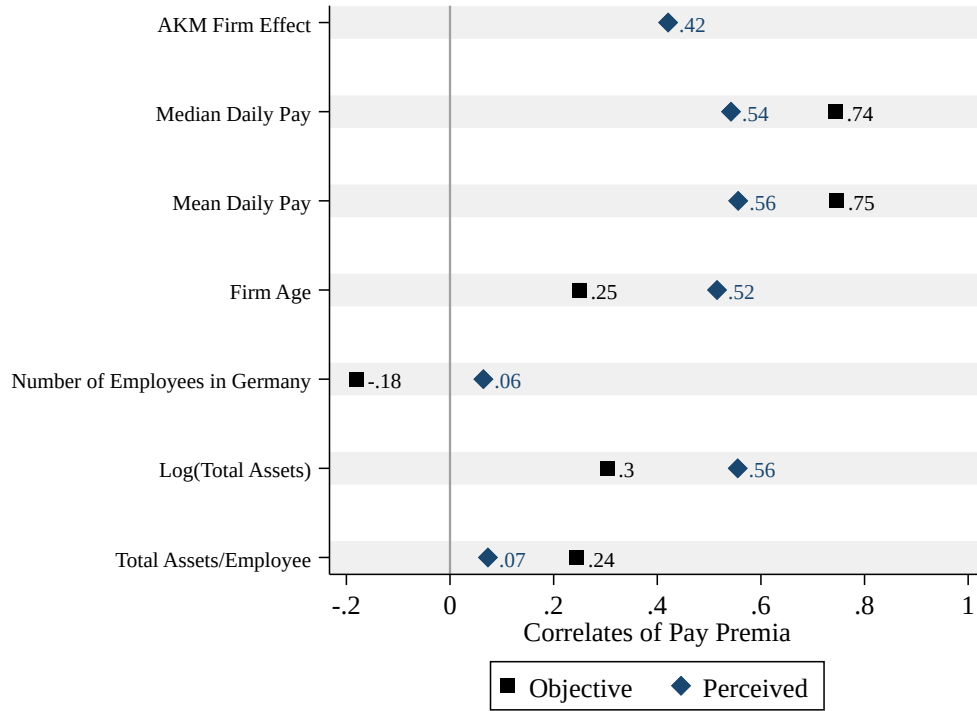
Note: This figure shows how survey respondents transitioned through the researcher-provided firm module. See Appendix Section E.1 for additional information on this module.

Figure 2: Stated Knowledge at Time Worker Applied to Current Firm



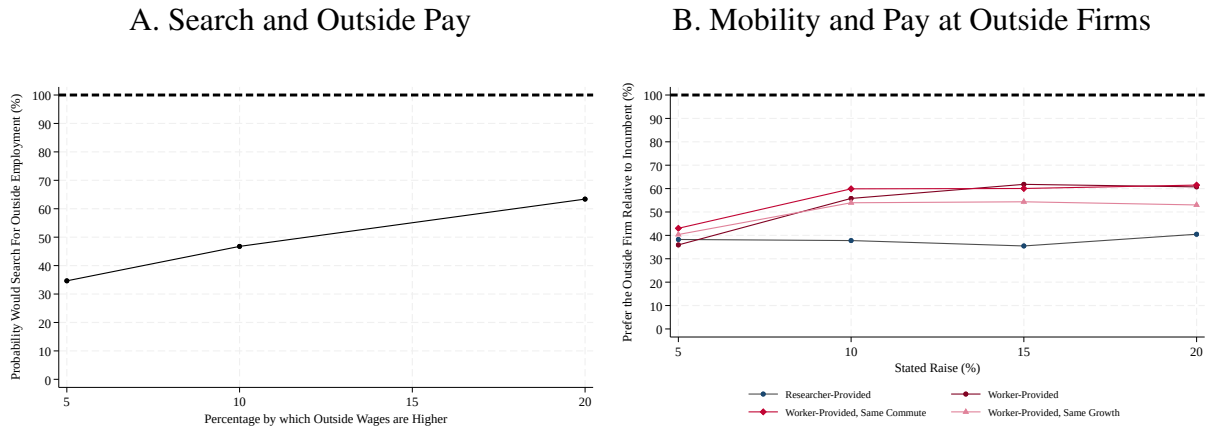
Note: Respondents could choose one of four responses: exact knowledge of how much the position pays, a rough idea of how much the position pays, a rough idea of pay in the industry/region, and no or very little idea. Results are weighted using sampling weights. Appendix Table B2 presents additional specifications. The number of observations is listed at the end of each row.

Figure 3: Correlates of Workers' Expected Pay Premia



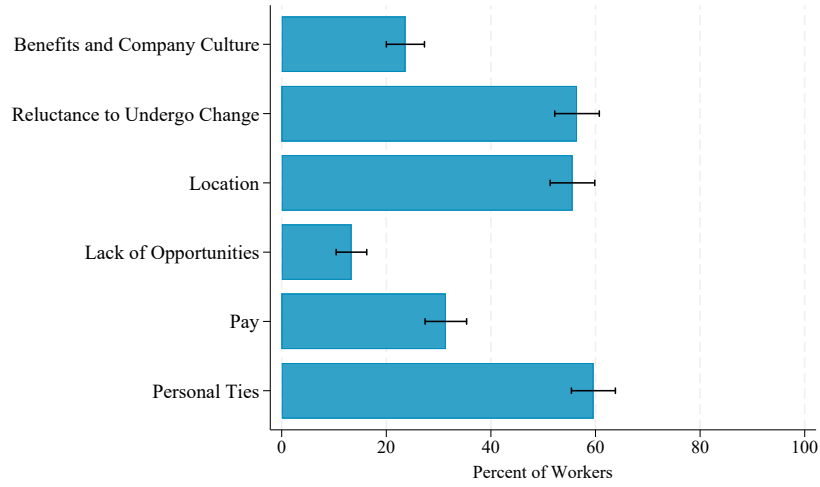
Note: This figure presents correlations between our baseline estimates of ψ_j (navy), objective measures of pay premia from Bellmann et al. (2020) (black), and different firm-specific characteristics as indicated on the y-axis. More information on the data is in Appendix E.

Figure 4: Stated Search and Mobility and Outside Pay



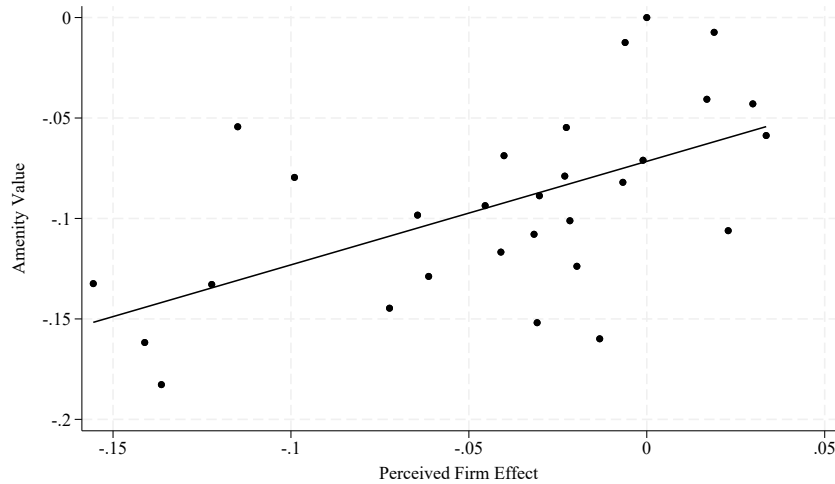
Note: This figure examines workers' propensity to search or move as a function of outside pay. Panel A shows the average probability a worker says that they would start searching for outside employment if they discovered that pay was 5%, 10%, or 20% higher in their market. Panel B shows the share of workers selecting the outside firm over the inside firm in the researcher-provided module (blue) or worker-provided module (shades of red) as a function of the randomized outside pay. Results are weighted using sampling weights.

Figure 5: Why Respondents Believe Workers are Reluctant to Switch Firms



Note: This figure shows the reasons that workers report for why people may be reluctant to switch firms. We asked respondents to select the top two reasons. This figure presents the share of respondents who selected each option. Whiskers present 95% confidence intervals. Results are weighted using sampling weights.

Figure 6: Relationship Between Perceived Firm Pay Premia and Amenity Valuations



Note: This figure compares estimates of the perceived value of firm-specific amenities and the perceived pay premia for each of the researcher-provided firms. The perceived pay premia (ψ_j) come from estimating equation 8 and controlling for whether a firm was provided in the follow-up survey. The amenity valuations come from estimating a rank-ordered logit model using workers' preferences across the researcher-provided firms. We plot estimates of a_j/β rather than a_j so that the results are directly comparable. Both models are fit using sampling weights. The line is a simple line of best fit. After accounting for the reliability in our estimates of the perceived firm effects, the slope of a regression between amenity values and perceived pay premia is 0.585 with a standard error of 0.147.

Table 1: Characteristics of Surveyed Workers

	Initial Wave		Initial and Follow-Up	
	Mean	Std. Dev.	Mean	Std. Dev.
	(1)	(2)	(3)	(4)
<u>Demographics</u>				
Female	0.40	(0.49)	0.37	(0.48)
Age	31.13	(5.18)	31.31	(5.19)
German Citizen	0.89	(0.32)	0.92	(0.28)
College Degree	0.53	(0.50)	0.61	(0.49)
Apprenticeship	0.37	(0.48)	0.31	(0.46)
<u>Employment</u>				
Daily Pay (Imputed)	143.42	(50.40)	150.77	(50.24)
Censored Pay	0.06	(0.24)	0.07	(0.25)
Hours (Survey)	149.13	(49.78)	155.96	(47.97)
CBA Covered (Survey)	0.01	(0.10)	0.01	(0.10)
Manufacturing Sector	40.36	(6.47)	40.43	(5.90)
Retail Sector	0.48	(0.50)	0.45	(0.50)
Professional Sector	0.22	(0.41)	0.23	(0.42)
Observations	9756		3575	

Note: Columns 1 and 2 include workers who completed the initial survey; Columns 3 and 4 include the subset who also completed the follow-up survey. Statistics are weighted using sampling weights.

Table 2: Characteristics of Researcher-Provided and Worker-Provided Firms

	Researcher-Provided Firms			Worker-Provided Firms				
				Unweighted			Weighted	
	Mean	Std. Dev	N	Mean	Std. Dev	N	Mean	Std. Dev
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>Number of Employees</u>								
1-10	0.00	(0.00)	30	0.04	(0.19)	479	0.05	(0.23)
11-50	0.03	(0.18)	30	0.07	(0.25)	479	0.10	(0.30)
51-200	0.00	(0.00)	30	0.10	(0.29)	479	0.04	(0.19)
201-1000	0.00	(0.00)	30	0.22	(0.41)	479	0.12	(0.32)
1001-10000	0.03	(0.18)	30	0.34	(0.47)	479	0.18	(0.39)
10001+	0.93	(0.25)	30	0.24	(0.43)	479	0.51	(0.50)
<u>Sector</u>								
Manufacturing	0.57	(0.50)	30	0.31	(0.46)	565	0.38	(0.49)
Retail	0.07	(0.25)	30	0.12	(0.32)	565	0.10	(0.30)
Professional Services	0.10	(0.31)	30	0.13	(0.33)	565	0.15	(0.36)
Information Services	0.10	(0.31)	30	0.07	(0.26)	565	0.08	(0.27)
Finance	0.10	(0.31)	30	0.07	(0.25)	565	0.05	(0.21)
<u>Other Firm Characteristics</u>								
HQ in Eastern Germany	0.07	(0.25)	30	0.07	(0.25)	565	0.07	(0.26)
Year of Incorporation	1936	(49)	30	2008	(835)	476	1960	(337)

Note: Columns 1 to 3 (4 to 8) describe the researcher-provided (worker-provided) firms. Columns 7 and 8 weight by the number of times each firm was provided in the initial survey wave. The number of employees, sector, headquarters location, and year of incorporation come from Orbis. We include all worker-provided firms mentioned at least twice, for which we hand-collected characteristics (Appendix E.1).

Table 3: Variation in Expected Pay at Other Firms

	Fraction Identical	Std. Deviation	Max/Min	N
	(1)	(2)	(3)	(4)
<u>A. Researcher-Provided Firms</u>				
Initial Survey	0.26	5673	1.18	3715
Follow-Up Survey	0.30	5294	1.15	3163
<u>B. Worker-Provided Firms</u>				
All Workers	0.25	5863	1.19	4433
All in Same State	0.22	4869	1.18	509
All in Same District	0.26	4701	1.19	173
All in Same Municipality	0.22	5084	1.21	159

Note: Column 1 provides the share of workers that provided the same pay at each of the provided firms. Columns 2 and 3 provide the average standard deviation and range. Column 4 provides the number of workers. Panel A presents data from the researcher-provided firm module. As described in Appendix E.1.2, we asked a random 50% of surveyed workers to provide pay information in the initial wave; in the follow-up survey we asked all workers to provide pay information. Panel B presents analogous results for workers who provided the names of specific outside firms they would consider in the initial survey wave. We use workers' provided location information for sub-group analysis in Panel B; we asked a random 25% of workers to provide this information. Results are weighted using sampling weights.

Table 4: Between-Sample Agreement in Estimates of ψ_j

	Baseline Model		Rank-Ordered Logit	
	Correlation	Test of Equality (p-value)	Correlation	Test of Equality (p-value)
	(1)	(2)	(3)	(4)
Split-Sample	0.83	0.74	0.91	0.73
Sex	0.74	0.11	0.82	0.94
CBA	0.80	0.13	0.88	0.73
College Education	0.57	0.01	0.87	0.44
Current Firm AKM Effect (Split at Median)	0.72	0.03	0.87	0.43
Searched in Past 6 Mo.	0.70	0.05	0.87	0.73
Knew Wages at Application	0.73	0.23	0.90	0.67
Easy to Get a Better Job	0.76	0.47	0.92	0.98
Tenure (Split at 2 Years)	0.80	0.36	0.92	0.50

Note: This table examines the agreement in the estimates of ψ_j for different subsamples of workers. The first row uses a random, non-overlapping split of workers; the remaining splits are based on the listed characteristic. Columns 1 and 2 are based on estimating equation 8 and controlling for whether a firm was provided in the follow-up survey. Columns 3 and 4 are based on estimates from fitting a rank-ordered logit model to workers' firm-specific pay expectations. All regressions use sampling weights.

Table 5: Relationship Between Pay Expectations and Consideration

	All Workers			Risk Tolerance		Would be Reluctant to Apply if P(Success) Were Low	
				Low	High	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own Pay Expectation	0.341*** (0.050)	0.313*** (0.050)	0.309*** (0.050)	0.256*** (0.056)	0.441*** (0.103)	0.297*** (0.084)	0.240*** (0.087)
Distance Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Same-Sector Control	No	No	Yes	Yes	Yes	Yes	Yes
Observations	21272	21272	21272	14967	6305	5392	6507
Number of Workers	6440	6440	6440	4519	1921	1476	1781
Test of equality (p-value)	---	---	---	.116		.64	
Mean of Outcome	0.311	0.311	0.311	0.310	0.313	0.274	0.305
Implied Elasticity	1.097*** (0.161)	1.007*** (0.161)	0.993*** (0.161)	0.827*** (0.182)	1.406*** (0.330)	1.082*** (0.307)	0.788*** (0.286)

Note: This table presents estimates of equation 9. Each regression controls for worker and firm fixed effects, survey wave, and the listed controls. Appendix Table A3 presents alternative specifications. Regressions use sampling weights. Standard errors are clustered by worker. Elasticities are evaluated at the mean of consideration, are given at the bottom of the table. Levels of significance: * 10%, ** 5%, and *** 1%.

Table 6: Alternative Designs Linking Pay Expectations and Consideration

	Stated Consideration			Free-Text Responses		
	(1)	(2)	(3)	(4)	(5)	(6)
Mean of Dependent Variable		0.254			0.017	
A. Perceived Firm Effect (Split-Sample)						
Firm Premium (Split-Sample)	0.953*** (0.110)	1.055*** (0.127)	1.059*** (0.127)	0.089*** (0.011)	0.091*** (0.013)	0.093*** (0.013)
Observations	89742	89742	89742	224388	224388	224388
Number of Workers	9756	9756	9756	9756	9756	9756
B. Observed Firm Effect						
Firm Premium (Observed)	0.174*** (0.033)	0.165*** (0.033)	0.173*** (0.035)	0.014*** (0.005)	0.014*** (0.005)	0.014*** (0.005)
Observations	89258	89258	89258	214632	214632	214632
Number of Workers	9756	9756	9756	9756	9756	9756
Firm Characteristics						
	Size	Size, Brand	Size, Brand Recognition, CBA	Size	Size, Brand Recognition	Size, Brand Recognition, CBA
Fixed Effects	Worker, Sector	Worker, Sector	Worker, Sector	Worker, Sector	Worker, Sector	Worker, Sector

Note: Each regression controls for logarithm of driving distance, survey wave, whether the firm is in the same sector as the worker, the listed firm characteristics, and indicators for whether the listed controls are missing. Regressions use sampling weights; other specifications are in Appendix Table B4. Standard errors are clustered by worker. Levels of significance: * 10%, ** 5%, and *** 1%.

Table 7: Firm-Specific Labor Supply Elasticities

	Search	Move to a Researcher- Provided Firm	Move to a Worker-Provided Firm		
		Firm	Baseline	Same Commute	Same Growth
	(1)	(2)	(3)	(4)	(5)
Outside Pay	1.880*** (0.146)	0.391*** (0.133)	1.566*** (0.236)	1.288*** (0.364)	0.945** (0.368)
Constant	0.263*** (0.020)	0.321*** (0.018)	0.359*** (0.033)	0.425*** (0.042)	0.408*** (0.043)
Implied Elasticity	7.139*** (1.058)	1.219** (0.477)	4.364*** (1.037)	3.031*** (1.139)	2.320** (1.130)
Observations	3557	21872	12217	6264	6272

Note: This table presents OLS estimates of the relationship between stated mobility and (randomized) outside pay. Column 1 uses data from the search question. Column 2 uses the baseline discrete choice experiment in the researcher-provided firm module, Columns 3 to 5 use the experiments in the worker-provided firm module. We present the slope, intercept, and implied elasticity (slope/intercept). Standard errors are clustered at the worker level. Regressions use sampling weights. Levels of significance: * 10%, ** 5%, and *** 1%.

Table 8: Switching Costs

	Move to a Researcher- Provided Firm		Move to a Worker-Provided Firm		
	Baseline	Distance Controls	Baseline	Same Commute	Same Growth
	(1)	(2)	(3)	(4)	(5)
Log Raise	6.172*** (0.492)	6.251*** (0.495)	8.112*** (0.824)	12.323*** (1.283)	10.207*** (1.207)
Incumbent	1.132*** (0.074)	0.703*** (0.129)	0.596*** (0.106)	0.771*** (0.134)	0.774*** (0.135)
Observations	29961	29961	17539	8821	8782
Number of Workers	7735	7735	4796	2400	2385
Implied Switching Cost	0.183*** (0.009)	0.112*** (0.019)	0.074*** (0.008)	0.063*** (0.007)	0.076*** (0.008)

Note: This table presents estimates of equation 1. Columns 1 and 2 use data from the researcher-provided firm module. The model in Column 1 includes only the randomized raise, an indicator for whether the firm is the worker's current place of work, and a control for the survey wave. Column 2 adds a control for the log driving distance between the firm and the worker's current place of work. Columns 3 to 5 use data from the worker-provided firm module. Regressions use sampling weights. Appendix Table A4 presents additional specifications. Levels of significance: * 10%, ** 5%, and *** 1%.

Table 9: Firm-Specific Preferences

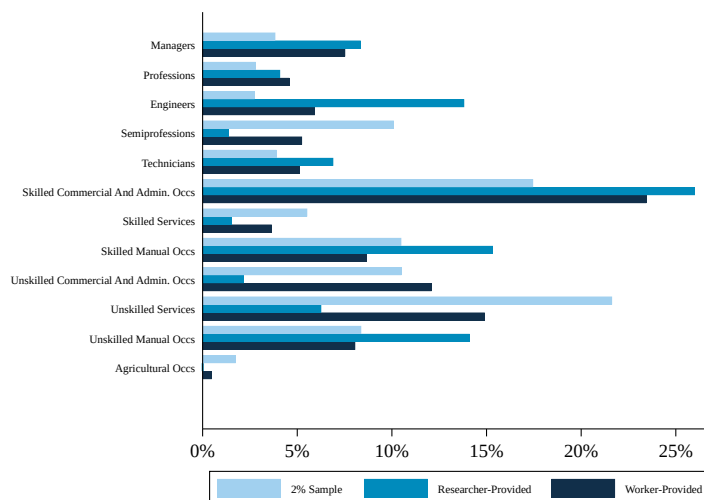
	Outside Firms Only		All Firms		Consider or Incumbent Only
	(1)	(2)	(3)	(4)	(5)
Log Raise (β)	9.723*** (3.131)	15.561*** (3.235)	7.008*** (2.461)	9.594*** (2.247)	16.260*** (4.157)
Observations	4217	4217	5671	5671	3001
Number of Workers (Clusters)	1177	1177	1200	1200	1192
<u>Test: Ex Ante Firm Effects are Zero</u>					
p-value	<.001	<.001	<.001	<.001	<.001
Chi-Squared Statistic	207.258	187.988	188.388	131.007	70.891
Degrees of Freedom	29	29	29	29	29
<u>Test: Ex Ante Effects For Those Who Would and Would Not Apply Are Equal</u>					
p-value		<.001		<.001	
Chi-Squared Statistic		164.417		209.519	
Degrees of Freedom		30		30	
<u>Test: Ex Post Effects = Ex Ante Effects</u>					
p-value			<.001	<.001	<.001
Chi-Squared Statistic			7244.552	5500.808	6557.928
Degrees of Freedom			17	17	16
<u>Test: Ex Post Effects = Ex Ante Effects For Those Who Would Apply</u>					
p-value				<.001	
Chi-Squared Statistic				51603.366	
Degrees of Freedom				80	

Note: This table presents logit coefficients (first row) and p-values (remaining rows) from fitting a rank-ordered logit model to workers' stated preferences over researcher-provided firms. Each regression controls for the randomized raise, and includes the firm fixed effects indicated in the relevant column. The baseline sample includes workers who currently work at any of the 30 researcher-provided firms. The data include workers' choices over outside firms (Columns 1 and 2) or over all firms (Columns 3 and 4). Column 5 restricts the sample to worker-firm observations in which the worker currently works at the firm or in which the worker has said he/she would consider applying to the firm if he/she wanted to switch firms. Regression use sampling weights. Standard errors are clustered at the worker level.

Online Appendix for “Why Workers Stay: Pay, Beliefs, and Attachment” (Caldwell, Haegele & Heining)

A Appendix Figures and Tables

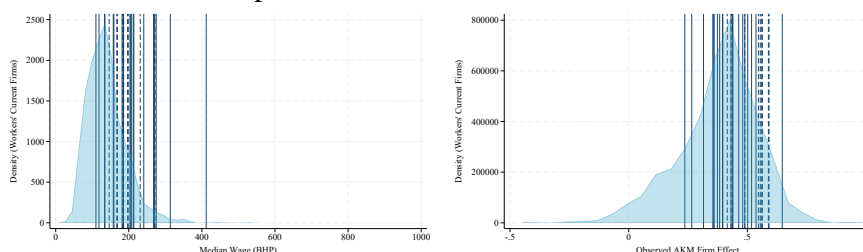
Figure A1: Occupational Distribution of Researcher-Provided Firms



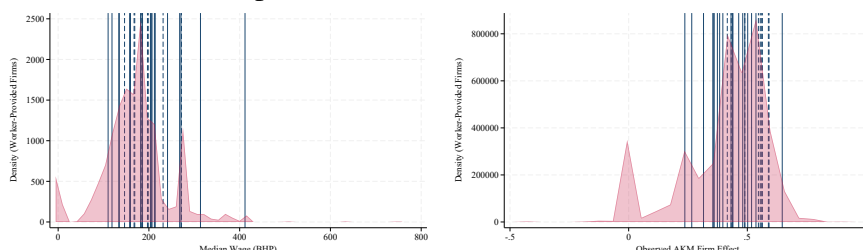
Note: This figure compares the span of major occupational groups in the overall German workforce using a 2% random sample to workers at our researcher-provided and worker-provided firms.

Figure A2: Comparison of Researcher-Provided Firms and Workers’ Firms

A. Comparison with Workers’ Current Firms

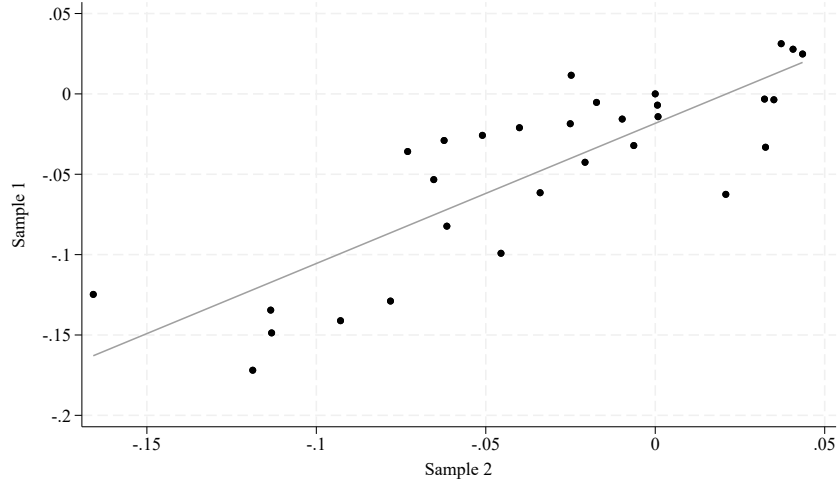


B. Comparison with Worker-Provided Firms



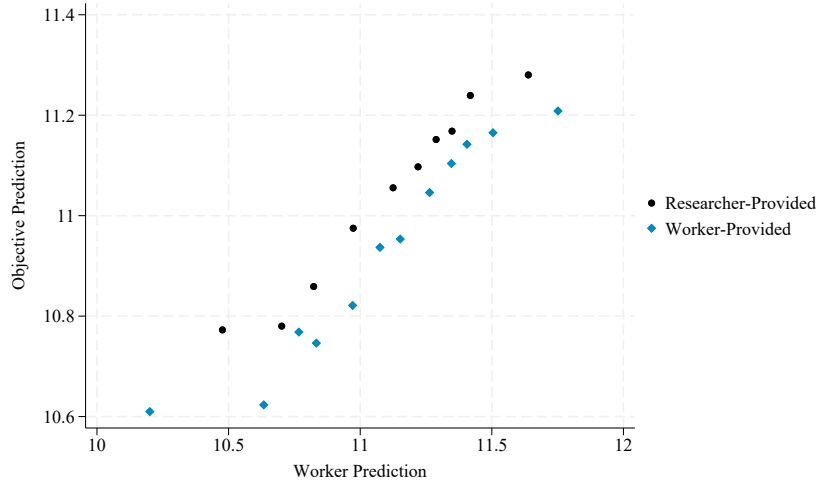
Note: This figure compares the 30 researcher-provided firms to the workers’ current firms (Panel A) and to the worker-provided firms (Panel B). The left (right) figures plot the kernel density of workers’ current or provided firms’ median pay (firm wage premium from Bellmann et al. (2020)). The vertical lines indicate the values for researcher-provided firms. Solid lines indicate firms included in the initial survey. Dashed lines indicate firms only included in the follow-up survey. Results are weighted using sampling weights.

Figure A3: Expected Firm Pay Premia: Split-Sample Evidence



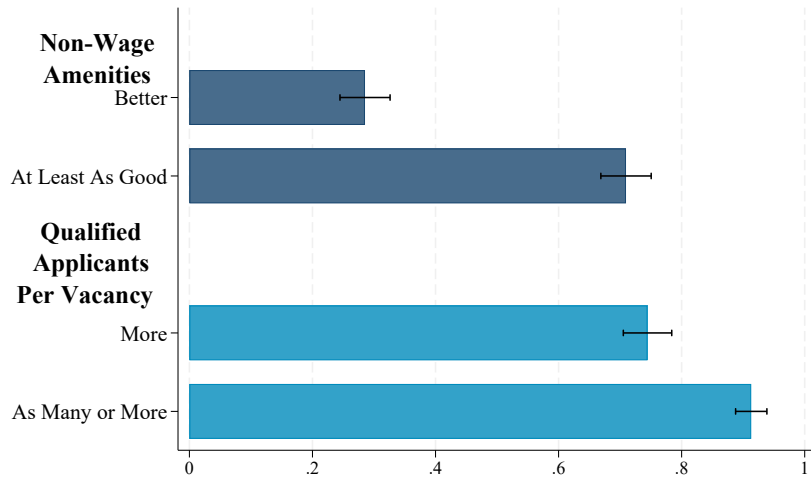
Note: This figure examines the relationship between workers' expected pay premia estimated by fitting equation 8 in two subsamples of workers in the researcher-provided firm module. We created the subsamples by randomly dividing our sample in half. Each dot represents the expected pay premium associated with one researcher-provided firm. There are 30 dots, one of which is constrained to be 0 in each sample (ψ_1). Table 4 presents tests of equality for estimates of ψ_j in different groups of workers, as well as correlations in the estimates for each sample.

Figure A4: Correlation Between Worker Expectations and Objective Pay Predictions



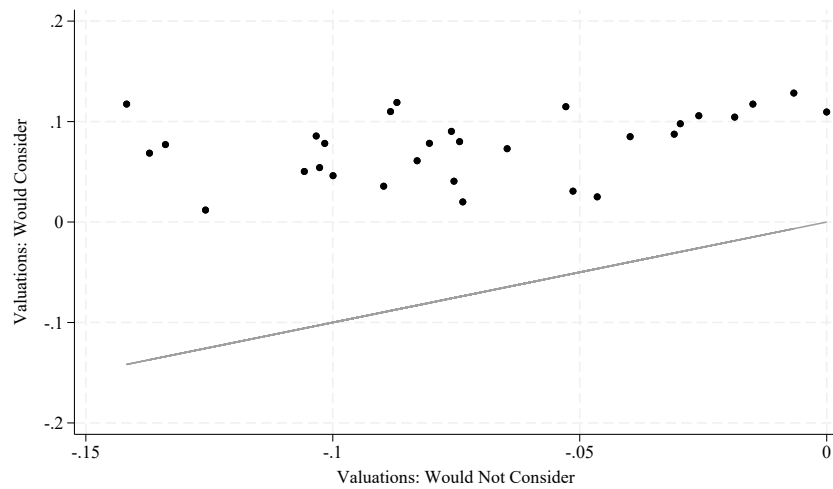
Note: This figure compares workers' expectations to the objective pay predictions. We estimate workers' expected pay premia by fitting equation 8. We construct the objective prediction by taking the logarithm of a worker's current pay, subtracting the firm pay effect of their current firm, and adding the firm pay effect of the specified firm. The black dots are based on data from the researcher-provided firm modules in both the initial and follow-up surveys. The blue diamonds are based on data from the worker-provided firm module in the initial survey. The plot is created using the package created by Cattaneo et al. (2024). Results are weighted using sampling weights.

Figure A5: Workers' Perceptions about Amenities and Application Rates



Note: In the follow-up survey, respondents compared two firms in the same labor market—one paying 10% above and one 30% above market average. They indicated which firm had better non-wage amenities and attracted more qualified applicants. The figure shows the fraction selecting the higher-paying firm as strictly better (top bar) or similar or better (bottom bar). Results use sampling weights; whiskers show 95% confidence intervals.

Figure A6: Valuations by Consideration



Note: This figure shows the valuations for each of the 30 researcher-provided firms for those who say they would (y-axis) and would not (x-axis) consider applying to the firm if they wanted to switch firms. Each dot presents the estimate from a separate firm; the estimate of a_1 for those who would not consider applying to the firm is constrained to be zero. We estimate valuations using a rank-ordered logit model applied to the discrete choice experiments in the researcher-provided firm module. The model includes a control for the (randomized) wage offer, the order in which the firm was listed, and a full set of firm dummies, interacted with worker-firm specific consideration. We convert valuations to monetary equivalents by dividing by the coefficient on the randomized wage offer.

Table A1: Firm Effects Have Explanatory Power Beyond Sector and Location

	Sector Fixed Effects		Sector and State Fixed Effects		Sector-State Fixed Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Researcher-Provided Firms						
Adjusted R-Squared	0.858	0.866	0.862	0.866	---	---
Observations	19734	19734	19734	19734	---	---
Parameters Tested	24		17		---	---
F-Statistic	7		5		---	---
p-value	<.01		<.01		---	---
B. Worker-Provided Firms						
Adjusted R-Squared	0.888	0.907	0.868	0.885	0.871	0.881
Observations	10733	10733	8527	8527	8138	8138
Parameters Tested	535		387		334	
F-Statistic	17370894		392000000000		18485608	
p-value	<.01		<.01		<.01	

Note: This table reports the adjusted R-squared from regressions of log expected earnings at researcher-provided (Panel A) or worker-provided (Panel B) firms. Columns 1, 3, and 5 include worker fixed effects, and the fixed effects indicated in the column. Columns 2, 4, and 6 add firm fixed effects. The F-statistic tests whether firm dummies are jointly zero. Standard errors are clustered at the worker level. Regressions use sampling weights. We exclude results with limited within-sector/state firm pairs.

Table A2: Decomposition of Workers' Firm-Specific Pay Expectations

	Worker Expectations					
	All	Informed at Application		Recent Search Activity		Objective Predictions
	Workers	Yes	No	Yes	No	
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Number of Parameters</u>						
Person Effects	5305	2643	2662	3971	1334	1103
Firm Effects	30	30	30	30	30	29
<u>Summary of Parameter Estimates</u>						
Std. Dev. Person Effects	0.365	0.386	0.344	0.358	0.386	0.516
Std. Dev. Firm Effects	0.051	0.055	0.049	0.051	0.053	0.091
RMSE	0.105	0.108	0.102	0.105	0.106	0.315
<u>Addendum</u>						
Std. Dev. Log(Salary)	0.378	0.401	0.357	0.371	0.401	0.254
Variance Log(Salary)	0.143	0.160	0.127	0.138	0.160	0.064
Observations	19431	9692	9739	14580	4851	3879

Note: This table describes the results of estimating equation 8 using data from the researcher-provided firm module and controlling for survey wave. Column 1 presents the baseline results. Columns 2 and 3 present results for workers who did and did not know pay at time of application to their current firm. Columns 4 and 5 present results for workers who did and did not engage in job search in the previous six months. Column 6 presents analogous statistics for our objective predictions, which use firm effects from Bellmann et al. (2020). Regressions use sampling weights.

Table A3: Relationship Between Pay Expectations and Consideration: Additional Specifications

	Alternative Specifications of Distance			Alternative Samples		Alternative Weighting Schemes	
	Quadratic in Distance	Direct Distance	Closest Establishment	Initial Survey Only	Follow-Up Only	Unweighted	Population Weights
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own-Pay Expectation	0.312*** (0.050)	0.309*** (0.050)	0.331*** (0.050)	0.427*** (0.122)	0.249 (0.174)	0.225*** (0.026)	0.255*** (0.085)
Observations	21272	21272	21272	15095	5980	21272	21236
Number of Workers (Clusters)	6440	6440	6440	0.396	0.309	0.330	0.335
Mean of Outcome	0.31	0.31	0.31	0.35	0.24	0.33	0.32
Implied Elasticity	1.004*** (0.162)	0.996*** (0.161)	1.067*** (0.161)	1.214*** (0.347)	1.052 (0.736)	0.677*** (0.079)	0.788*** (0.261)

Note: Each regression uses data from the researcher-provided firm module and controls for worker and firm fixed effects, for whether the firm and worker are in the same sector, for the log driving distance between the worker and indicated firm, for the survey wave, and for indicators for whether the respective controls are missing. Columns 1–3 replace log driving distance with quadratic driving distance (1), log point-to-point distance (2), or log distance to the firm’s closest establishment (3). Columns 4–5 restrict the sample to initial and follow-up survey waves, respectively. Columns 1–5 use sampling weights; Column 6 is unweighted; Column 7 is reweighted to match the German full-time population. Standard errors are clustered at the worker level. Elasticities of consideration with respect to pay expectation (evaluated at the mean) are provided at the bottom. Levels of significance: * 10%, ** 5%, and *** 1%.

Table A4: Robustness of Switching Costs

	Alternative Specifications of Distance				Alternative Samples		Alternative Weighting	
	Log Distance	Quadratic in Distance	Direct Distance	Closest Establishment	Initial Survey Only	Follow-Up Only	Unweighted	Population Weights
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Researcher-Provided Firms								
Implied Switching Cost	0.112*** (0.019)	0.123*** (0.011)	0.113*** (0.019)	0.167*** (0.011)	0.142*** (0.025)	0.083*** (0.023)	0.127*** (0.007)	0.094*** (0.022)
Observations	29961	29961	29961	29961	16594	13367	29961	29961
Number of Workers	7735	7735	7735	7735	4322	2351	7735	7735
B. Worker-Provided Firms								
Implied Switching Cost	0.079*** (0.010)	0.078*** (0.008)	0.066*** (0.009)	0.072*** (0.008)	---	---	0.099*** (0.005)	0.059*** (0.010)
Observations	15259	15259	17539	17539			15259	15259
Number of Workers	4784	4784	4796	4796			4784	4784

Note: This table describes the results of estimating a rank-ordered logit model model fit to workers’ preferences over outside firms specified in the researcher-provided firm module (Panel A) or the worker-provided firm module (Panel B). The model includes controls for the randomized raise of the outside firm, an indicator for whether the worker currently works at that firm, and the log driving distance between that firm and the worker’s current place of work. Columns 2 to 4 use alternative distance metrics: quadratic driving distance (2), log point-to-point distance (3), and log distance to the closest firm establishment (4). Columns 5 and 6 restrict the sample to initial and follow-up survey waves, respectively. Columns 1 to 6 use sampling weights; Column 7 is unweighted; Column 8 re-weights to match the German full-time population. Levels of significance: * 10%, ** 5%, and *** 1%.

B Additional Results and Robustness Checks

B.1 Robustness to Alternative Weighting Schemes

Our main analysis uses survey weights to account for the fact that we over-sampled workers from firms that participated in a firm survey studied in Caldwell, Haegele and Heining (2024). However, our results are robust re-weighting the sample to match the overall population of regular full-time workers in Germany. We use the following variables to match our sample: female, labor market experience, federal state, German citizenship, occupational group (i.e., labor market entrant, experienced non-manager, manager), industry (i.e., manufacturing, retail, professional), and pay.

Results in Section 3. Appendix Table B1 shows how reweighting changes sample composition.

Table B1: Characteristics of Surveyed Workers: Reweighted

	Unweighted			Sampling Weights		Population Weights	
	Mean	Std. Dev.	N	Mean	Std. Dev.	Mean	Std. Dev.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Demographics</u>							
Female	0.31	(0.46)	9756	0.40	(0.49)	0.38	(0.49)
Age	33.35	(6.23)	9756	31.13	(5.18)	34.98	(7.31)
German Citizen	0.92	(0.27)	9756	0.89	(0.32)	0.97	(0.16)
College Degree	0.60	(0.49)	9756	0.53	(0.50)	0.37	(0.48)
Apprenticeship	0.33	(0.47)	9756	0.37	(0.48)	0.55	(0.50)
<u>Employment</u>							
Daily Pay (Allocated)	170.80	(57.50)	9756	136.06	(47.81)	126.27	(63.66)
Censored Pay	0.22	(0.41)	9756	0.06	(0.24)	0.11	(0.31)
Hours (Survey)	40.27	(5.99)	9756	40.36	(6.47)	39.54	(7.44)
CBA Covered (Survey)	0.59	(0.49)	9547	0.48	(0.50)	0.49	(0.50)
Manufacturing Sector	0.47	(0.50)	9756	0.22	(0.41)	0.29	(0.45)
Retail Sector	0.09	(0.28)	9756	0.09	(0.29)	0.11	(0.31)
Professional Sector	0.13	(0.34)	9756	0.15	(0.36)	0.04	(0.20)
Observations	9756						

Note: This table describes the individuals in our sample under different weighting schemes, indicated in each column.

Results in Section 4. Appendix Table B2 shows that our finding that many workers were informed about pay at the time they applied to their current firm is robust to re-weighting: our main specification says 45% said firm-specific information, we obtain 44% using population weights. Appendix Table B3 shows that, after re-weighting, we still find that workers perceive a heterogeneous (in pay) outside option.

Table B3: Variation in Expected Pay at Other Firms: Robustness to Reweighting

	Fraction Identical			N
	Baseline	Unweighted	Population	
			Weights	
	(1)	(2)	(3)	(4)
<u>A. Researcher-Provided Firms</u>				
Initial Survey	0.26	0.23	0.25	3518
Follow-Up Survey	0.30	0.26	0.37	3057
<u>B. Worker-Provided Firms</u>				
All Workers	0.25	0.26	0.28	4305
All in Same State	0.22	0.27	0.34	507
All in Same District	0.26	0.33	0.43	172
All in Same Municipality	0.22	0.34	0.43	158

Note: This table presents re-weighted results analogous to those in Table 3. Column 1 presents our baseline specification. Columns 2 and 3 present unweighted and population-weighted results, respectively.

Table B2: Stated Knowledge at Time of Application: Robustness to Reweighting

	Knew Pay in Position at This Company		Rough Idea of Pay in Industry or Little or No Region Idea		Obs
	Exactly	Rough Idea	Region	Idea	
	(1)	(2)	(3)	(4)	(5)
Baseline	18%	27%	29%	26%	9756
Unweighted	14%	36%	29%	22%	9756
Population Weights	13%	31%	26%	30%	9756

Note: The first row is the baseline specification (Figure 2). Rows 2 and 3 present unweighted and population-weighted results, respectively.

Results in Section 5. Appendix Table A3 documents that our results on search in Section 5.1 of the main text are robust to re-weighting. Appendix Table B4 below confirms that the results from the two alternative designs (Section 5.2) are also robust.

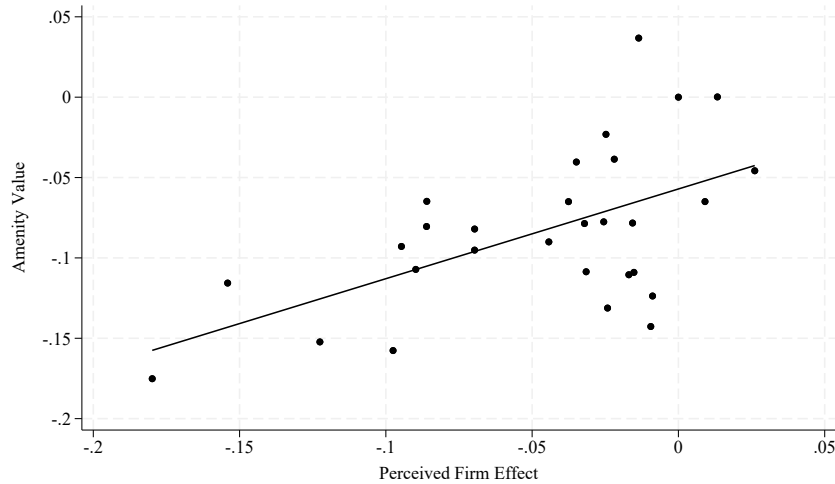
Results in Section 6. Appendix Table A4 shows that our main estimates of switching costs are robust reweighting. Appendix Figure B1 and Appendix Table B5 show other core results are robust to population weighting.

Table B4: Alternative Designs Linking Pay Expectations and Consideration: Robustness

Mean of Dependent Variable	Stated Consideration			Free-Text Responses		
	Sample	Population		Sample	Population	
	Weights	Unweighted	Weights	Weights	Unweighted	Weights
	(1)	(2)	(3)	(4)	(5)	(6)
A. Perceived Firm Effect (Split-Sample)						
Firm Premium (Split-Sample)	0.986*** (0.127)	1.309*** (0.127)	0.457*** (0.127)	0.101*** (0.013)	0.161*** (0.013)	0.034*** (0.013)
Observations	89742	89742	89742	224388	224388	224388
Number of Workers	9756	9756	9756	9756	9756	9756
B. Observed Firm Effect						
Firm Premium (Observed)	0.173*** (0.035)	0.245*** (0.021)	0.087 (0.061)	0.014*** (0.005)	0.012*** (0.004)	0.011** (0.005)
Observations	89258	89258	89258	214632	214632	214632
Number of Workers	9756	9756	9756	9756	9756	9756
C. Observed Log(Mean Daily Pay)						
Firm Mean Daily Pay	0.093*** (0.011)	0.149*** (0.007)	0.088*** (0.020)	0.008*** (0.002)	0.010*** (0.001)	0.006*** (0.002)
Observations	89258	89258	89258	214632	214632	214632
Number of Workers	9756	9756	9756	9756	9756	9756

Note: This table probes the robustness of results in Table 6, which uses sampling weights, to no weighting (Columns 2 and 5) and population weights (Columns 3 and 6). Estimation details are in Section 5.2. Standard errors are clustered at the worker level. Levels of significance: * 10%, ** 5%, and *** 1%.

Figure B1: Perceived Pay Premia and Amenity Valuations: Robustness to Population Weighting



Note: This figure compares estimates of the perceived value of firm-specific amenities ($\frac{a_j}{\beta}$) and the perceived pay premia (ψ_j) for each of the researcher-provided firms. The methodology is described in Figure 6, but we replace sample weights with population weights. The line is a simple line of best fit. After accounting for their estimates' reliability, the slope of the regression is 0.602 with a standard error of 0.191.

Table B5: Firm-Specific Preferences: Robustness to Population Weighting

	Outside Firms Only		All Firms		Consider or Incumbent Only
	(1)	(2)	(3)	(4)	(5)
Log Raise (β)	9.723*** (3.131)	15.561*** (3.235)	7.008*** (2.461)	9.594*** (2.247)	16.260*** (4.157)
Observations	4217	4217	5671	5671	3001
Number of Workers (Clusters)	1177	1177	1200	1200	1192
<u>Test: Ex Ante Firm Effects are Zero</u>					
p-value	<.001	<.001	<.001	<.001	<.001
Chi-Squared Statistic	207.258	187.988	188.388	131.007	70.891
Degrees of Freedom	29	29	29	29	29
<u>Test: Ex Ante Effects For Those Who Would and Would Not Apply Are Equal</u>					
p-value		<.001		<.001	
Chi-Squared Statistic		164.417		209.519	
Degrees of Freedom		30		30	
<u>Test: Ex Post Effects = Ex Ante Effects</u>					
p-value			<.001	<.001	<.001
Chi-Squared Statistic			7244.552	5500.808	6557.928
Degrees of Freedom			17	17	16
<u>Test: Ex Post Effects = Ex Ante Effects For Those Who Would Apply</u>					
p-value				<.001	
Chi-Squared Statistic				51603.366	
Degrees of Freedom				80	

Note: This table presents results analogous to Table 9, in which the regressions are weighted to match the overall population of full-time German workers. We provide more details on estimation in Section 6. Standard errors are clustered at the worker level.

B.2 Robustness to Alternative Winsorization Schemes

Our preferred specifications winsorize workers' pay expectations at the 90% level. For most of our analysis this represents a conservative assumption. Our decision to winsorize expectations, for instance, leads us to underestimate the amount of within-worker variation in pay; this biases us against our finding that workers believe in a heterogeneous outside option.

The main piece of analysis which could be influenced by this decision is our analysis of the agreement in the firm pay premia between different demographic groups (Table 4). Intuitively, by reducing the variation in workers' expectations, winsorization could lead us to over-state the amount of agreement. Appendix Table B6 shows that we continue to find agreement in the perceived pay premia across demographic groups when using the raw elicitations (Column 1), winsorizing at the 98% level (Column 2), or trimming at the 98% level (Column 4).⁴⁰

⁴⁰In unreported results we have probed the robustness of other findings to these decisions.

Table B6: Correlation in Perceived Pay Premia: Robustness to Data Cleaning

	Raw	98% Winsor	90% Winsor	98% Trim	90% Trim
	(1)	(2)	(3)	(4)	(5)
Split-Sample	0.67	0.67	0.98	0.92	0.99
Sex	0.43	0.44	0.93	0.91	0.96
CBA	0.48	0.51	0.96	0.94	0.98
College Education	0.52	0.53	0.97	0.96	0.98
Current Firm AKM Effect (Split at Median)	0.65	0.63	0.95	0.91	0.98
Searched in Past 6 Mo.	0.49	0.49	0.96	0.95	0.99
Knew Wages at Application	0.61	0.64	0.97	0.96	0.99
Easy to Get a Better Job	0.60	0.59	0.98	0.95	0.98
Tenure (Split at 2 Years)	0.31	0.34	0.96	0.96	0.99

Note: This table looks at the correlation in the estimates of ψ_j as estimated by fitting equation 8 for different samples of workers (indicated in each row) under different data cleaning procedures (indicated in each column). Column 1 uses workers' raw pay expectations. Columns 2 and 3 (our baseline) use winsorized pay expectations. Columns 4 and 5 use trimmed pay expectations.

B.3 Provision of Worker-Provided Firms and Pay Responsiveness

Most of our analysis relies on the researcher-provided firm module. However, we also present several specifications which rely on data from the worker-provided firm module of the initial survey. Appendix Table B7 shows that, if anything, workers who do not provide firm names are less responsive to changes in outside pay, suggesting that, if anything, analysis based on this module may understate the extent to which workers are infra-marginal to their firm. Column 1 presents search elasticities; Columns 2 and 3 show separation elasticities based on the researcher-provided firm module.

Table B7: Stated Mobility Preferences and Provision of Firms

	Search	Researcher-Provided Firm Module	
		Baseline	Same Commute
	(1)	(2)	(3)
Provided Specific Firm Names	0.08 ***	1.61 **	1.94 ***
	0.01	0.68	0.72
	1986	11898	5715
Did Not Provide Specific Firm Names	0.08	0.83	1.69 **
	0.01	0.66	0.75
	1571	9974	4202

Note: This table presents search (Column 1) and separation (Columns 2 and 3) elasticities for workers who did (Row 1) and did not (Row 2) provide names of specific firms in the worker-provided firm module. Column 1 uses data from the search question in the follow-up survey. Columns 2 and 3 use data from the discrete choice experiments including researcher-provided firms. Standard errors are computed using the delta method. Levels of significance: * 10%, ** 5%, and *** 1%.

B.4 Workers Believe Firms Vary in Amenities: Robustness

Section 6.3 documents that workers believe firms vary in pay and non-pay characteristics. In the follow-up survey, we embedded additional discrete choice experiments, which allow us to confirm that this workers' believe this is true even when the training and learning opportunities would be the same at each of the outside firms.⁴¹ We fit our baseline rank-ordered logit model to workers' preferences—as elicited in these experiments—using only the rankings on outside firms (i.e. excluding the incumbent). Appendix Table B8 shows that, across all models, we can reject the null that there are no unobserved firm-specific factors such as amenities which drive workers' preferences (beyond those we specified would remain the same).

Table B8: Workers Have Firm-Specific Preferences: Robustness

	Follow-Up Survey		
	Baseline	Same Growth	Same Training and Learning Opportunities
	(1)	(2)	(3)
Log Raise (β)	8.395*** (0.800)	8.941*** (0.815)	8.290*** (0.763)
Observations	10012	9971	10001
Number of Workers (Clusters)	3375	3352	3363
<u>Test: Ex Ante Firm Effects are Zero</u>			
p-value	<.001	<.001	<.001
Chi-Squared Statistic	279.112	324.183	300.252
Degrees of Freedom	27	27	27

Note: This table presents logit coefficients (first row) and p-values and test statistics (remaining rows) from fitting a rank-ordered logit model to workers' stated preferences in the discrete choice experiments in the follow-up survey that include researcher-provided firms. The data include workers' choices over outside firms in the baseline scenario (Column 1), if the firms provided equal the training and learning opportunities (Column 2) or if their work would stay constant (Column 3). Regressions use sampling weights.

B.5 Robustness to Allowing for Preference Heterogeneity

To allow for preference heterogeneity, we estimated a random coefficient model allowing variation in workers' wage and commute preferences. Table B9 shows there is substantial variation in preferences. However, the valuations are similar to those of our baseline model ($\rho = 0.91$) and we continue to see a positive correlation between perceived premia and amenity valuations.

⁴¹We included similar discrete choice experiments in the initial survey, but only for the worker-provided firms.

Table B9: Random Coefficient Model Estimates

	Estimate (1)	Standard Error (2)
Model Estimates		
<u>Mean</u>		
Log(Wages)	15.71	0.81
Log(Distance)	-0.32	0.03
<u>Variance</u>		
Log(Wages)	353.99	1.54
Log(Distance)	0.05	0.04
Correlations		
With Baseline Amenity Values		0.91
With Baseline Perceived Premia		0.73
Comparison Values		
Correlation Between Baseline Amenities and Premia		0.58

Note: This table presents the estimates and standard errors from fitting a random coefficient rank-ordered model to workers' stated preferences over outside researcher-provided firms. The model includes the randomized raise, for the log distance between the worker and the firm, for the order in which the firm was presented, and for firm fixed effects. We allow preferences on distance and wages to be heterogeneous.

B.6 Expected Impacts of Information Treatments

We calculate the potential impacts of information treatments under alternative definitions of whether a worker is informed. We fit OLS regression models to workers' stated search and stated mobility choices, as elicited in the worker-provided firm module (preferred firm) or researcher-provided firm module (random firm). We assume that informed workers do not change their behavior; uninformed workers increase their search or mobility by the amount predicted by the regression model (i.e. the slope, multiplied by the information treatment).⁴²

Appendix Table B10 shows that, if no workers are informed, telling workers they could increase their pay by an amount equal to the gap between the median pay premium firm and their current firm ($\psi^{\text{med}} - \psi_{j(i)}$) would increase search by 19 percentage points. This shrinks to 5 to 6 percentage points if workers who knew pay when they applied to their current firm (Column 2) or who believe it would be easy to find a better job (Column 3) are informed. This further shrinks to less than 2 percentage points if workers who believe in a heterogeneous outside option are informed (Column 4). Search may not translate into mobility: under realistic assumptions on information, the increase in mobility is closer to 1 to 3 percentage points for workers' preferred firms.⁴³

⁴²Our predicted impacts on search and mobility likely overstate the impact of information treatments for two reasons. First, we implicitly assume that all workers can obtain jobs with the pay raises that we assign. Second, we ignore the role that firm-specific beliefs play; as outlined in Section 2, workers may search if they have optimistic beliefs about a single firm.

⁴³For the worker-provided firm module, we can only estimate this model for workers who provided the names of specific firms. Because—as we document in a separate section—workers who did not provide the names of specific firms are more attached to their firm—this means that we will overstate the impacts of providing information to all workers when we extrapolate from this sample.

Table B10: Changes in Search or Mobility and Information Provision

	All Workers Are Uninformed	Did Not Know Pay at Application	Difficult to Get a Better Job	Provide Uniform Pay
	(1)	(2)	(3)	(4)
Percent Informed	0	49.826***	44.107***	77.288***
	---	(0.854)	(0.897)	(1.131)
P(Search)	17.606***	4.867***	4.356***	2.048***
	(2.504)	(0.761)	(0.758)	(0.472)
P(Move to a Preferred Firm)	11.837***	2.784***	2.579***	1.486***
	(2.904)	(0.789)	(0.675)	(0.453)
P(Move to a Random Firm)	1.127	0.837*	0.963**	0.741**
	(1.761)	(0.475)	(0.454)	(0.294)

Note: The first row shows the percent of informed workers across different definitions. The remaining rows present the predicted impact on search or mobility. The sample includes workers who work at firms with below-median pay premia. Coefficients and standard errors are estimated via 200 bootstrap replications. Levels of significance: * 10%, ** 5%, and *** 1%.

C Relationship with Findings in Jäger et al. (2024)

A natural question arises as to why our results—demonstrating that workers possess detailed, firm-specific information about outside wages—differ from Jäger et al. (2024) (JRRS), who report that workers often have limited or inaccurate information about outside options. Our findings align with Guo (2025), who also documents accurate worker perceptions of external wage offers.

In this section, we explain the differences in the studies. We focus on two key elements. First, JRRS elicited a measure which combines beliefs about pay with beliefs about offer rates and preferences. By contrast, we elicited a measure of beliefs about pay. We provide a speculative reconciliation of the findings by noting that workers at low-wage firms receive offers at lower rates than similar workers at high-wage firms; this is true both among searchers and non-searchers. Our findings echo those from the literature (Faberman et al., 2022; Faberman, Mueller and Şahin, 2025) which has shown that heterogeneity in the intensity and productivity of search can resolve several puzzles in the literature. Second, we note it is difficult to separate survey anchoring (due to priming or question order effects) from true anchoring in beliefs.

C.1 Similarity of Empirical Settings

JRRS use two samples for their analysis: (1) a sample of 1,068 German job-seekers surveyed in the German Socio-Economic Panel (GSEOP) and (2) a sample of German workers recruited via internet panels. JRRS use the first dataset to describe workers’ beliefs about outside options; they use the second to present experimental evidence on the relationship between biased beliefs and search and to replicate their findings on anchoring. Our sample (13,680 workers surveyed by the Institute for Employment Research) is similar to the first dataset.

C.2 Differences in What and How Beliefs are Elicited

A key result in JRRS is that “workers wrongly anchor their beliefs about outside options on their current wage” (abstract). Specifically, they report that a large share of workers (41%) believe they would earn the “same pay” at their outside option. In the GSOEP module, they first asked workers whether workers who switch jobs (to or from their employer) receive the “same pay” or “higher pay” or “lower pay” (with follow-up questions if they did not indicate the worker would receive the same pay); they then asked a similar question about whether the worker themselves would earn the “same pay” at another employer if forced to switch firms. In the internet panel, they first asked what a worker currently made and then (immediately afterwards) asked what they thought they would make if forced to switch firms (Appendix Section C.5).

Differences in Approach. We differ both in what we elicit and in methodology. First, because we were interested in beliefs about pay (and how these varied across outside firms), we directly asked workers how much they believed they would earn if employed at each of three specific outside firms. These questions did not require assumptions about offer probabilities or other workers’ preferences. By contrast, to form a belief about the expected wage following a forced job-to-job transition, workers must consider both the wages at outside firms and the probability they receive an offer from those firms. To form a belief about the wage changes of movers, workers must consider both these factors, as well as what factors lead workers to switch jobs and what factors workers consider when weighing outside offers.⁴⁴

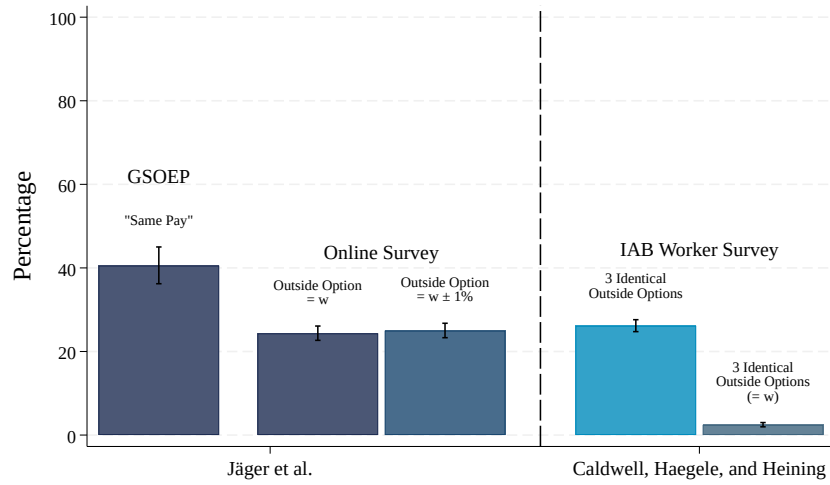
Second, because we could link all responses to administrative records, we did not ask respondents for their current salary. Research demonstrates that survey respondents anchor responses to previously provided or elicited numbers, even if those numbers are arbitrary or irrelevant (Tversky and Kahneman, 1974). Standard textbooks on survey methodology caution that priming effects can significantly affect responses (Schwarz, 1999; Dillman, Smyth and Christian, 2014). This suggests that eliciting a worker’s current wage before eliciting their expectation about outside wages—as was done in the Internet panel used to provide a causal link between beliefs and search—would lead respondents to anchor to this number.

Comparison of Results. Appendix Figure C1 compares the extent of anchoring across the two studies. The first bar shows that 41% of workers in the GSOEP panel selected the “same pay” option. Their internet panel exhibits much lower anchoring, with fewer respondents exactly matching their outside wage expectations to their current pay (second and third bars). Differences observed between the GSOEP and internet panel samples may arise from several factors, including population differences or the precise interpretation respondents gave to the phrase “same pay”—whether respondents understood this literally or interpreted it more loosely, as within a monetary range. In our data, the share of respondents reporting identical wage expectations across different outside firms (fourth bar) is similar to the internet panel from JRRS.

Survey-induced anchoring occurs when respondents provide answers which are more similar (or, the same) to responses they have previously provided. Because JRRS asked internet respondents (the sample used for their experiment) for their current wage immediately before asking for

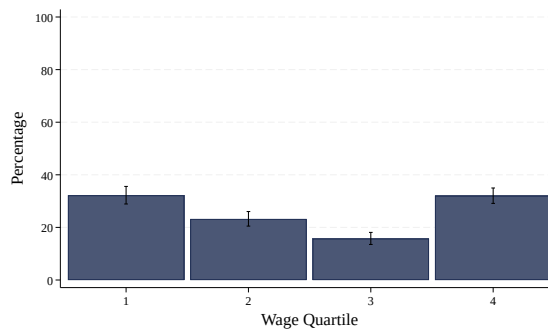
⁴⁴We did collect a summary measure—the perceived ease with which workers could find a more preferred job elsewhere—which aligns somewhat more closely with that in JRRS, which we discuss below.

Figure C1: Comparison of Anchoring Behavior



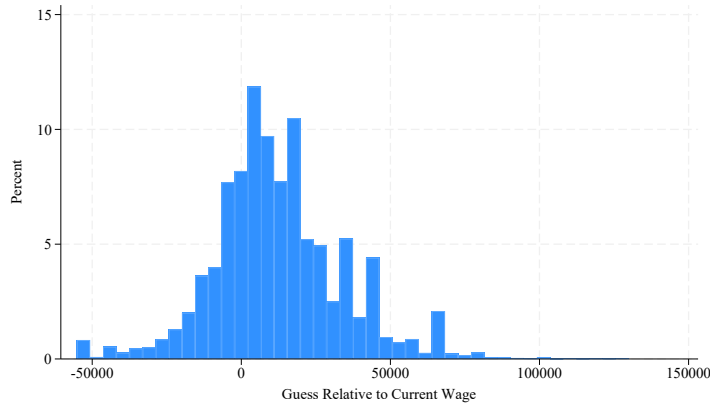
Note: This figure compares our estimates (right of the dashed line) of the prevalence of anchoring (measured as indicated above each bar) to those in Jäger et al. (2024) (left of the dashed line).

Figure C2: Share of Workers Reporting Identical Salaries: Heterogeneity by Wage



Note: This figure presents our estimates of the prevalence of anchoring (measured as the share of respondents indicating the same expected wage at all three outside options) by wage quartile.

Figure C3: Anchoring in Beliefs at Workers' Current Salary



Note: This figure plots the difference between workers' expected pay at outside firms, relative to their pay at their current firm.

their outside option pay, it is natural to think that any survey-induced anchoring will lead respondents to provide beliefs which are anchored to this number. Because we asked respondents for the wage they expect at each of three outside firms, it is natural to expect respondents may anchor beliefs to the first number they provide.⁴⁵ A comparison of the third and fourth bar indicates that workers who provide the same three numbers do not typically provide their wage (not elicited in this survey). Appendix Figure C2 reveals minimal heterogeneity in the proportion of respondents reporting identical salaries across different wage groups. Appendix Figure C3 illustrates the distribution of the difference between workers' firm-specific wage expectations and their current salaries; this figure shows we do not see a spike in pay expectations precisely at respondents' current wage. Although the distribution is centered around zero, it is smoothly bell-shaped, displaying no substantial clustering at zero.

C.3 Economic Explanation for Differences in Findings

Setting aside potential issues with survey anchoring, there is a coherent economic story—the combination of Bayesian updating about wages with heterogeneity in offer probabilities—which can plausibly reconcile the descriptive results in both studies.

JRRS (Section IV.C) suggest Bayesian updating as a potential explanation: workers rationally incorporate their own wage experience and skill into their beliefs about outside pay. This would explain why workers provide more accurate estimates about their own potential wages (as elicited directly in our study) compared to the realized pay changes of other workers or their own pay given a forced transition (as elicited in their study). As discussed in JRRS, aside from the finding that workers in low-wage jobs disproportionately underestimate outside pay, Bayesian updating accounts for the empirical patterns.

Rational pessimism about offer probabilities—heterogeneous by firm wage premium—could

⁴⁵Any survey-induced anchoring in our survey would reduce the variance in perceived wage premia and thus bias our analysis against detecting that workers perceive systematic firm wage premia and actively direct their search based on expected pay differences—central results we robustly document.

Table C1: Search Productivity by Firm Wage Premium

	All			Recent Search	
	(1)	(2)	(3)	No	Yes
	(1)	(2)	(3)	(4)	(5)
A. Received Job Information					
Current Firm Wage Effect	0.377*** (0.055)	0.182*** (0.057)	0.179** (0.069)	0.212* (0.118)	0.231*** (0.081)
Person Wage Effect			0.048* (0.028)	0.155** (0.064)	0.030 (0.030)
Observations	9319	9319	7506	2065	5441
B. Received Information or Offer					
Current Firm Wage Effect	0.295*** (0.052)	0.133** (0.055)	0.104 (0.071)	0.062 (0.145)	0.196** (0.079)
Person Wage Effect			0.015 (0.026)	0.179*** (0.065)	-0.014 (0.027)
Observations	9319	9319	7506	2065	5441

Note: This table examines the relationship between the wage premium of a worker's firm and whether they received information on outside jobs in the previous six months (Panel A) or whether they either received such information or a job offer (Panel B). Column 1 presents results from a bivariate regression; Columns 2-5 include controls for experience and for education and occupation dummies. Columns 3-5 control for the person effect from an AKM wage regression. Columns 4-5 split by whether a worker has searched for employment in the previous six months. Regressions use sampling weights. Levels of significance: * 10%, ** 5%, and *** 1%.

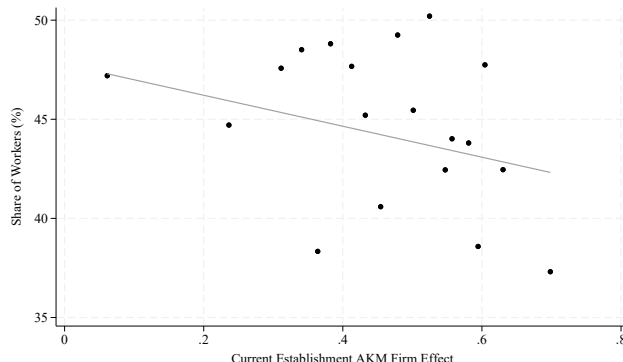
reconcile the results of the two studies. Appendix Table C1 shows that, conditional on education, occupation, and experience, workers at low-wage firms receive significantly fewer job offers and less job-related information than similar workers at higher-wage firms (Column 2). This pattern is robust to controlling for unobserved differences in worker skill by controlling for the AKM worker effects (Column 3) and to focusing on workers who are not actively searching (Column 4).⁴⁶ This explanation is also consistent with the finding by Miano (2023) that information treatments on search difficulty affect behavior, while information treatments on wages do not.

C.4 Additional Result: Summary Measure of Outside Options

We also elicited a summary measure: how easy a worker believed it would be to get a better job. Caldwell, Haegele and Heining (2024) show this correlates with objective measures of outside options (Online Appendix Table A8) and predicts pay renegotiation (Table 5). Appendix Figure C4 shows that workers at lower-wage firms are generically more optimistic about the ease with which they could find a preferred job than workers at higher-wage firms.

⁴⁶This pattern echoes findings in a large literature which has documented differences in the productivity of search (typically higher among employed than unemployed workers) and showed that these differences explain several other puzzles in the literature (Faberman et al., 2022; Faberman, Mueller and Şahin, 2025; Cederlöf et al., 2025).

Figure C4: Share of Workers Who Believe it Would be “Easy” To Get a Better Job



Note: This is a binned scatterplot of whether a worker said it would be “easy” to find a job they would prefer to their current position against their current AKM firm effect.

C.5 Jäger et al. (2024) Belief Elicitations

In the GSOEP JRRS elicited beliefs as follows:

3. **Beliefs About Firm Pay** Think of the typical employee with work experience that switches from another employer to your employer. Would this employee receive a lower, higher or the same pay compared to his previous employer?

- Higher pay
- Same pay
- Lower pay

[Asked only if previous answer is not “Same pay”] How much lower/higher would the monthly pay before taxes of this employee be (in percent) after the switch compared to his/her prior employer?

- Between 0% and 2%
- Between 2% and 5%
- ⋮
- Between 50% and 75%
- More than 75% (in data normalized to 87.5%)

Think of the typical employee with work experience that switches from your current employer to another employer. Would this employee receive a lower, higher or the same pay compared to his previous employer?

- Higher pay
- Same pay
- Lower pay

[Asked only if previous answer is not “Same pay”] How much lower/higher would the monthly pay before taxes of this employee be (in percent) after the switch compared to his/her prior employer?

- Between 0% and 2%
- Between 2% and 5%
- ⋮
- Between 50% and 75%
- More than 75% (in data normalized to 87.5%)

11. **Posterior About Outside Option: Point Belief** Imagine that you were forced to leave your current job and that you had 3 months to find a job at another employer in the same occupation. Do you think that you would find a job that would offer you a higher overall pay, the same pay or a lower pay?

- Higher pay
- Same pay
- Lower pay

[Asked only if previous answer is not “Same pay”] What do you think: how much more/less would you earn in that new job?

- Between 0 and 50 EUR
- Between 50 and 100 EUR
- $\vdots$
- Between 2000 and 3000 EUR
- More than 3000 EUR (in data normalized to 3500 EUR)

In the online survey, they elicited beliefs in a single step, immediately after eliciting current wages:

4. **Wage Income** How high is your current monthly gross income from work in EUR before taxes?

__EUR

5. **Beliefs About Personal Outside Option** Imagine that you were forced to leave your current job and that you had 3 months to find a job at another employer. In the job with another employer, how much would you receive per month as gross employment income in EUR?

__EUR

D Theoretical Appendix

Define

$$\tilde{V}_{ik} = \tilde{u}_{ik} \tag{12}$$

$$+ \max_{A \subseteq \mathcal{T} \setminus \{k\}} \left\{ -\kappa|A| + \delta \mathbb{E}_{B(A)} \left[(1 - \lambda) \max\{\tilde{V}_{ik}, \max_{m \in B(A)} (\tilde{V}_{im} - s_i)\} \right. \right. \tag{13}$$

$$\left. \left. + \lambda \max\{V_{i0,t+1}, \max_{m \in B(A)} (\tilde{V}_{im} - s_i)\} \right] \right\}. \tag{14}$$

Lemma. Contraction Mapping

The operator $\mathcal{T}$ that maps a bounded function V to the right-hand side of the above Bellman equation is a contraction on $(\mathcal{X}, \|\cdot\|_\infty)$ with modulus δ . Hence a unique bounded fixed point $\tilde{V}$ exists.

Proof. Let $V, V' \in \mathcal{X}$. For any state s , the difference $|(\mathcal{T}V)(s) - (\mathcal{T}V')(s)| \leq \delta \mathbb{E}[\|(V - V')(s')\|_\infty] \leq \delta \|V - V'\|_\infty$. Taking sup over s yields $\|\mathcal{T}V - \mathcal{T}V'\|_\infty \leq \delta \|V - V'\|_\infty$. Because $\delta < 1$, Banach’s fixed-point theorem applies. $\square$

Prediction 1: Probability of Searching Increases with Increased Perceived Outside Options and Decreased Switching Costs *If any $\tilde{V}_{ik}$ increases, the probability that worker i chooses a non-empty application set $A \neq \emptyset$ weakly increases. Equivalently, a worker's incentive to search is (weakly) increasing in her perceived outside options.*

Proof Sketch.

1. *Define search vs. no-search.* Let $\Phi(\{\tilde{V}_{ij}\})$ be the *maximum* expected payoff over all $A \subseteq \mathcal{J} \setminus \{j\}$, net of application costs. That is,

$$\begin{aligned} \Phi(\{V_{ij}\}) = \max_{A \subseteq \mathcal{J} \setminus \{j\}} & \left\{ -\kappa |A| + \delta \mathbb{E}_{B(A)} \left[(1 - \lambda) \max \left\{ \overbrace{V_{ik}}^{\text{stay}}, \overbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}^{\text{switch employers}} \right\} \right. \right. \\ & \left. \left. + \lambda \max \left\{ \underbrace{V_{i0}}_{\text{unemployed}}, \underbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}_{\text{switch employers}} \right\} \right] \right\}. \end{aligned}$$

If the worker ends up choosing $A = \emptyset$, it means:

$$\begin{aligned} \emptyset \in \operatorname{argmax}_{A \subseteq \mathcal{J} \setminus \{j\}} & \left\{ -\kappa |A| + \delta \mathbb{E}_{B(A)} \left[(1 - \lambda) \max \left\{ \overbrace{V_{ik}}^{\text{stay}}, \overbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}^{\text{switch employers}} \right\} \right. \right. \\ & \left. \left. + \lambda \max \left\{ \underbrace{V_{i0}}_{\text{unemployed}}, \underbrace{\max_{m \in B(A)} (\tilde{V}_{im} - s_i)}_{\text{switch employers}} \right\} \right] \right\}. \end{aligned}$$

2. *Increase some $\tilde{V}_{ik}$.* Suppose $\tilde{V}_{ik}$ rises. The payoff from any set A that includes k increases, since with probability $p_k > 0$ the worker may receive the offer. The payoff from any set that does not include k is unchanged. Thus the *optimal* objective, Φ weakly increases.
3. *Hence, search is at least as likely.* If the worker did not find any profitable $A \neq \emptyset$ before, a rise in $\tilde{V}_{ik}$ may make some A' profitable.
4. Notice that the same argument works when s_i is reduced.

Prediction 2: Fewer Mistaken Non-Search Outcomes Under Directed Search *When workers have firm-specific beliefs $\{\tilde{V}_{ik}\}$, they are less likely to fail to search when at least one firm is potentially profitable. By contrast, if they cannot match beliefs to firm identities, they may not search even when a single high-value firm would justify searching.*

Proof Sketch.

1. Consider two otherwise identical workers who differ in whether or not they can match beliefs to firm identities. The worker who cannot assign beliefs to firms searches when the expected payoff exceeds the cost, κ :

$$\delta \frac{1}{J} \sum_k p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] > \kappa. \quad (15)$$

The worker who can assign beliefs to firm identities searches when

$$\max_k \left\{ \delta p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \right\} > \kappa \quad (16)$$

2. Define mistaken non-search as a case where the worker fails to search (the corresponding inequality above fails), but the search is worthwhile under full information. Suppose the directed searcher (the second worker) fails to search. Then

$$l \in \operatorname{argmax}_k \left\{ \delta p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \right\} \quad (17)$$

$$\delta p_l [(1 - \lambda) \max(\tilde{V}_{il} - s_i - V_{ij,t+1}, 0) + \lambda \max(\tilde{V}_{il} - s_i - V_{i0}, 0)] \leq \kappa \quad (18)$$

This implies the non-directed searcher also fails to search because:

$$\begin{aligned} & \delta \frac{1}{J} \sum_k p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \\ & \leq \delta \frac{1}{J} \sum_k p_l [(1 - \lambda) \max(\tilde{V}_{il} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{il} - s_i - V_{i0}, 0)] \\ & = \delta p_l [(1 - \lambda) \max(\tilde{V}_{il} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{il} - s_i - V_{i0}, 0)] \end{aligned} \quad (19)$$

3. Now consider the case where the non-directed searcher fails to search:

$$\delta \frac{1}{J} \sum_k p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \leq \kappa. \quad (20)$$

Suppose

$$l \in \operatorname{argmax}_k \left\{ \delta p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \right\} \quad (21)$$

and that l is not a member of the set containing the corresponding argmin . Then, the expected value of applying to firm l is strictly greater than a random application. There is some level of κ such that the directed searcher searches:

$$\begin{aligned} & \delta \frac{1}{J} \sum_k p_k [(1 - \lambda) \max(\tilde{V}_{ik} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{ik} - s_i - V_{i0}, 0)] \\ & \leq \kappa < \delta p_l [(1 - \lambda) \max(\tilde{V}_{il} - s_i - V_{ij}, 0) + \lambda \max(\tilde{V}_{il} - s_i - V_{i0}, 0)]. \end{aligned} \quad (22)$$

Prediction 3: Directed Search Implies Higher Application Rates for Higher-Wage Firms, All Else Equal *If the worker engages in directed search, then—holding amenities a_k and offer probabilities p_k constant—the probability of applying to firm k increases with $\tilde{w}_{ik}$. Conversely, if the worker believes all firms pay the same wage, then the probability of applying to a specific firm is uncorrelated with w_{ik} .*

Proof Sketch.

1. *Worker's objective over sets A.* For each set $A \subseteq \mathcal{J} \setminus \{j\}$, define

$$U_j(A) = -\kappa |A| + \delta \mathbb{E}_{B(A)} \left[(1-\lambda) \max \left\{ \max_{m \in B(A)} (\tilde{V}_{im} - s_i), V_{ij} \right\} + \lambda \max \left\{ \max_{m \in B(A)} \{(\tilde{V}_{im} - s_i)\}, V_{i0} \right\} \right].$$

The worker picks A^* to maximize $U_j(A)$ given the probability distribution of offer sets B from each application set A .

2. *Incremental value of adding k .* Let $\Delta_{k;j,A} = U_j(A \cup \{k\}) - U_j(A)$. As $\tilde{w}_{ik}$ (and thus $\tilde{V}_{ik}$) increases, any state in which firm k extends an offer becomes more valuable. Hence $\Delta_{k;j,A}$ weakly increases.
3. *Probability of including k in A^* .* The event “ $\text{Apply}_{ik} = 1$ ” means $k \in A^*$. Since A^* is chosen to maximize $U_j(\cdot)$, if $\Delta_{k;j,A^*}$ becomes positive after an increase in $\tilde{w}_{ik}$, the worker is more likely to include k . Hence Apply_{ikt} is weakly increasing in $\tilde{w}_{ik}$.
4. *No perceived variation.* If $\tilde{w}_{ik} = \bar{w}_i$ for all k , then workers do not base application decisions on the wages of individual firms at all, so the choice of A is uncorrelated with w_{ik} .

E Survey and Administrative Data

This appendix describes the survey modules designed for this paper, as well as the additional data sources. An additional survey appendix, available here, describes the logistics of inviting workers to the survey and response rates. Much of that material is included in the main text and appendix of Caldwell, Haegele and Heining (2024). The full text of the initial and follow-up surveys are available on the authors' websites.

E.1 Researcher-Provided and Worker-Provided Firm Modules

Two separate survey modules elicit firm-specific information from respondents. Appendix Figure E1 provides an overview of the survey flow. We randomized the provision of many of the follow-up questions to keep the length of the survey manageable. After workers provided the names of firms they would consider, we randomized them into three groups (with probability 50%, 25%, and 25%) and presented them with additional questions accordingly.

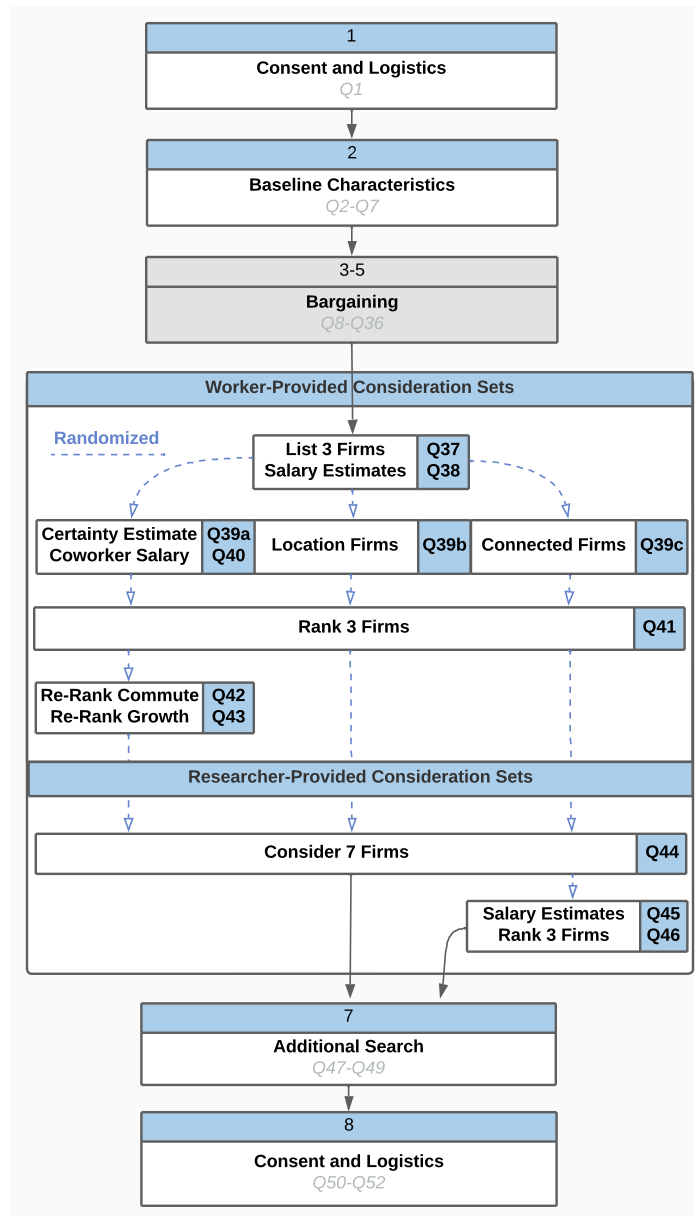
In the researcher-provided firm module we asked a random 50% of workers to provide their expected pay at and rankings over three researcher-provided firms. We selected these firms at random from the seven researcher-provided firms we provided in the question on consideration; whether a firm was selected was unrelated to whether a worker said they would consider applying.

The follow-up survey proceeded similarly. However, we only posed the worker-provided firm module to workers who declined to complete it in the initial wave. We posed researcher-provided firm questions on pay expectations and preferences to all workers in this wave.

E.1.1 Selecting Researcher-Provided Firms

We had to select a subset of German firms to ask workers about in the researcher-provided firm module. Due to IAB's strong confidentiality requirements, we could not select firms on the basis

Figure E1: Flow of the Initial Survey



Note: This figure provides an overview over the modules in the worker survey. The main questions used for our analysis are posed in the worker-provided and researcher-provided modules.

of firm-to-firm flows or networks.⁴⁷ Further, these requirements do not allow us to export the list of firms included in our final list from the IAB. We instead describe the systematic process through which we selected firms for inclusion in the survey.

Selection Process. To balance the criteria described in Section 3.3, we focused on 30 well-known German firms. We included 20 of these in the initial survey, and 30 in the follow-up survey. For the initial survey, we used two publicly-available lists of German firms to select our 20 firms: the top 40 publicly listed firms and the top 100 family-owned firms in Germany. While the first list contains large, well-known firms, the second list also includes somewhat smaller firms.

To select firms from these lists, we first grouped them by their industry. We prioritized firms that were in the six major industries covered by our worker sample.⁴⁸ Because manufacturing is by far the most important industry in our sample (69%), we included multiple manufacturing firms in our list. Second, we excluded firms with poor name recognition (e.g., those not known under their official name) or with ambiguous names. Third, within each industry, we prioritized firms that participated in our firm-survey on wage-setting (Caldwell, Haegele and Heining, 2024).⁴⁹ All of the 20 firms included in the initial wave of the survey can be linked to the Social Security records.

Initial Set of Firms. We verified that the final set of 20 firms included in the initial survey met the criteria listed above in two ways. First, we compared the firms to those provided by the 518 respondents to an IAB pilot conducted in February 2022. In that pilot, we asked respondents to name five firms that they would consider applying to if they were interested in switching firms. Ten of the 20 firms we selected were listed at least once. This test allows us to verify both that the firms we identified as well-known (from the publicly listed set) were likely to be self-reported by respondents and that the firms we believed to be lesser-known (from the family-owned set) were less likely to be listed. Second, to ensure familiarity with the chosen firms, we surveyed 50 German Prolific users in June 2022. This pilot confirmed that the firms on our final list are generally well-known to respondents (though there was substantial variation), and that the firms that are less well-known are those drawn from the second list.

Expanded Set of Firms. For the follow-up survey, we selected 10 additional firms. We again focused on firms that are reasonably well-known in Germany. In selecting these firms, we made sure that we have firms in the same industry across different regions. We also made sure to have variation in how large and popular the new firms were to avoid only including the most desirable German employers. All 10 additional firms were named by respondents in the initial survey.

E.1.2 Researcher-Provided Firm Module: Randomization Assessment

In the researcher-provided firm module, we performed several randomizations within the survey code. We posed the initial question in researcher-provided firm module—which asked respondents

⁴⁷While we link survey respondents' answers about specific firms to the administrative data, we were not allowed to *export* firm names from the administrative data for inclusion in the survey.

⁴⁸The gap in frequency between the sixth and seventh most frequent industry was large.

⁴⁹For privacy reasons, we are not allowed to release the list of firms that participated in that survey; 9 of the 20 firms included in the initial wave of the survey participated in this survey.

Table E1: Randomization Assessment: Assignment of Workers to Provided Firms

	Initial Survey			Follow-Up		
	Firm Group	Firm	Firm Quality	Firm Group	Firm	Firm Quality
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Demographics</u>						
Female	0.375	0.576	0.570	0.094	0.064	0.570
Age	0.094	0.332	0.817	0.886	0.783	0.817
German Citizen	0.334	0.374	0.195	0.591	0.697	0.195
<u>Education</u>						
College	0.526	0.643	0.947	0.005	0.014	0.947
Apprenticeship	0.496	0.714	0.607	0.069	0.146	0.607
<u>Employment and Earnings</u>						
Daily Earnings	0.227	0.189	0.552	0.941	0.971	0.552
Earnings are Censored	0.391	0.764	0.893	0.682	0.822	0.893
Weekly Hours (Survey)	0.085	0.128	0.106	0.451	0.639	0.106
Covered by a CBA (Survey)	0.351	0.785	0.736	0.882	0.965	0.736
<u>Sector</u>						
Manufacturing	0.998	0.999	0.941	0.481	0.704	0.941
Retail	0.628	0.945	0.297	0.813	0.818	0.297
Professional	0.730	0.980	0.785	0.399	0.360	0.785

Note: Firm group is an indicator for the set of firms a worker is assigned to, firm is an indicator for the firm a worker is assigned to, and firm quality is the objective pay premium (Bellmann et al., 2020). We perform separate regressions of each covariate (indicated in the row) on the characteristics indicated in the column. Each entry provides the p-value from an F-test that all of the included regressor(s) (other than the constant) are equal to zero. P-values are calculated using standard errors clustered at the worker level. We assigned each worker to one of 18 groups, which defined the set of firms they would see.

whether they would consider applying to each of these firms—to all survey respondents. In the initial survey we randomized each respondent into one of three lists of seven firms, each of which contained one of two randomly chosen focal firms: there were six randomization groups. We asked respondents whether they considered each of seven (rather than 20) firms to reduce the burden of the survey. We performed a similar randomization for the follow-up Appendix Table E1 shows that the randomization of workers to firms in the initial survey (Columns 1 to 3) and follow-up survey (Columns 4 to 6) was successful. Appendix Table E2 shows analogous results for the randomization of pay raises; as before, there is no evidence that the randomization failed.

E.1.3 Cleaning Worker-Provided Firms

To use data from the worker-provided firm module, we had to clean the firm names that workers provided. In the initial survey, respondents (overall, including those dropped from our main analysis sample) provided 5,828 unique strings. Of these, we could assign 5,016 (86%) to uniquely identifiable firms. We performed this assignment manually through online searches to ensure that the strings matched a unique firm.

Of the 812 strings that could not be uniquely identified, the majority are unspecific firm types (e.g., “City government”, “police”); a small share (10%) represent non-response (e.g., “I do not want to answer”) or unidentifiable content (e.g., “XXX”). Our manual assignment procedure,

Table E2: Randomization Assessment: Assignment of Pay Offers to Firms

	Initial Survey	Follow-Up
	(1)	(1)
Number of Employees	0.39	0.31
<u>Sector</u>		
Manufacturing	0.64	0.64
Retail	0.44	0.09
Professional Services	0.71	0.15
Information Services	0.33	0.92
Transportation	0.21	0.34
Finance	0.74	0.27
<u>Other Firm Characteristics</u>		
HQ in Eastern Germany	0.78	0.59
Year of Incorporation	0.79	0.20
<u>Financial Characteristics</u>		
Total Assets per Employee	0.94	0.36
Fixed Assets per Employee	0.85	0.30

Note: We regress each covariate (indicated in the row) on the randomly assigned pay offer, controlling for the position of the firm (whether listed first, second, or third), and clustering standard errors at the worker level. Each entry is the p-value from a test that the coefficient on the pay offer is zero.

which corrects for differences in spelling and pools subdivisions of the same firm, assigns the 5,016 identifiable strings to 3,018 unique firms. Of these 3,018 firms, 2,013 can be matched to establishments in the IAB records. Among the firms that we cannot link to the IAB, 29% are foreign entities and 37% are in the public sector; these firms may not have any workers in Social Security-covered employment in Germany. We link 79% of the firms that were at least named twice—for which we also collect additional firm characteristics (Appendix Section E.1.4)—to the IAB records. We obtained the municipality of firms’ headquarters for 99% of linked firms.

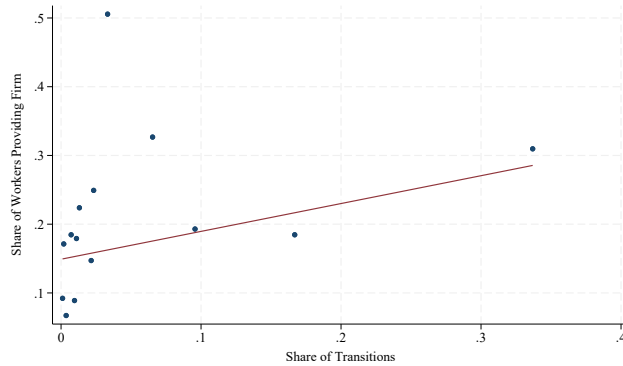
E.1.4 Measuring Firm Characteristics Using the IAB Social Security Records

We follow standard linkage approaches at the IAB to match the firms to the IAB data. We assign each firm the employment-weighted average for all matched establishments. For each establishment, we collect the following information: number of full-time employees, average pay, share of women, share of college educated workers, and the AKM establishment effect. We use the AKM establishment effects as estimated by Bellmann et al. (2020).

To examine the geographic coverage of our firms, we use information on the location of all firm establishments. Based on the headquarter addresses of the researcher-provided and worker-provided firms, we assigned each firm a 7-digit municipality code (“Gemeindeschlüssel”) that represents the finest geographical distinction in the IAB records. We have this code for over 99% of linked firms. Based on the municipality code, we can aggregate to the district (“Kreis”) and state (“Bundesland”).

We measure distance as the driving distance between a worker’s workplace and the headquarters of the indicated firm. In some specifications, we use an alternative measure of distance, based on the driving distance between a worker’s current place of work and the closest establishment of the provided firm (rather than the largest). We have verified our results are robust to using this

Figure E2: Relationship Between Stated and Revealed Destinations



Note: For each origin-destination pair we calculate the share of workers at the origin firm who move to a given destination firm between 2019-2019. We then calculate the share of workers at this firm who name each destination firm as a place they would apply if they wanted to switch firms. This is a binned scatterplot of the former share (x-axis) against the latter (y-axis).

alternative measure; many of these specifications are in the appendix.

E.1.5 Additional Characteristics of Researcher-Provided and Worker-Provided Firms

Appendix Table 2 shows that both the researcher-provided firms and the worker-provided firms span a broad range of the German labor market.⁵⁰ While the most common industry is manufacturing—covering 75% of researcher-provided firms and 31% of worker-provided firms—our sample also captures other major sectors, such as retail, professional services, information services, and finance. Appendix Table E3 shows that, when including non-headquarters establishments, the firms operate in all German states. The researcher-provided firms capture a large span of the major occupational groups in the labor market, with the exception of agriculture (Appendix Figure A1).

These firms represent important employers in the German labor market. The researcher-provided firms employ over 1.8 million German workers (4% of the workforce). 63% are on lists of the largest German employers (Deutsche Wirtschaft, 2022) and 53% are rated among the most popular employers in Germany (Statista 2023). In total, the 30 researcher-provided firms received over 70,000 reviews on Kununu, almost 3% of total reviews. Nine are in the top 20 by number of reviews. The firms also received more than 39.1 million page views, almost 3% of total page views. Seven are in the top 20 by page views. In the past 10 years, 23% of respondents have worked at least at one of the 30 researcher-provided firms, highlighting the relevance of these firms for the German workforce.

The worker-provided firms listed at least twice collectively employ over 6.2 million German workers. They have received over 295,000 reviews and over 190 million page views. Figure E2 shows workers' provided firms are firms which workers from their firm have historically moved to.

⁵⁰Our current dataset captures worker-provided firms that were named at least twice as well as a randomly drawn set of 200 worker-provided firms that were named only once.

Table E3: Coverage of the Worker- and Researcher-Provided Firms

	German Labor Market	Researcher- Provided Firms	Worker-Provided Firms	
	(1)	(2)	Unweighted	Weighted
<u>Region</u>			(3)	(4)
Baden-Württemberg	0.14	0.13	0.13	0.35
Bavaria	0.19	0.33	0.25	0.45
Berlin	0.05	0.07	0.05	0.24
Brandenburg	0.03	0.00	0.00	0.00
Bremen	0.01	0.00	0.00	0.00
Hamburg	0.03	0.07	0.08	0.32
Hesse	0.08	0.10	0.11	0.28
Lower Saxony	0.09	0.07	0.05	0.35
Mecklenburg Western Pomerania	0.02	0.00	0.00	0.00
Northrhine-Westphalia	0.20	0.17	0.05	0.29
Rhineland Palatinate	0.05	0.07	0.02	0.07
Saarland	0.01	0.00	0.00	0.00
Saxony	0.04	0.00	0.00	0.00
Saxony-Anhalt	0.02	0.00	0.00	0.00
Schleswig Holstein	0.04	0.00	0.00	0.00
Thuringia	0.02	0.00	0.00	0.00
<u>Sector</u>				
Information and Communication	0.05	0.10	0.07	0.27
Manufacturing	0.08	0.57	0.31	0.49
Professional Services	0.19	0.10	0.13	0.35
Retail	0.22	0.07	0.12	0.30
<u>Number of Employees</u>				
1-49	0.97	0.00	0.01	0.08
50-249	0.03	0.00	0.04	0.07
250+	0.01	1.00	0.95	0.11

Note: This table compares firm characteristics for the universe of all German firms (Column 1) to our sample of researcher-provided (Column 2) and worker-provided firms (Columns 3 and 4). Column 4 re-weights the worker-provided firms by the number of times they were listed by survey respondents. Information on all German firms stems from Hiersemenzel, Sauer and Wohlrabe (2022). The sample of worker-provided firms contains only those that were named at least twice and for which we collected this data.

E.1.6 Cleaning Workers' Expected Pay

In both firm-specific modules, we elicited what workers believe they would earn at specific outside firms. The questionnaire included free-form text entries. The survey tool required responses to be numeric or missing to proceed to the subsequent question. Workers responses are high quality. Less than 3% of workers who provide at least one pay estimate, do not provide all three requested estimates. The vast majority of pay estimates are within a reasonable range. Only 5% of workers report numbers that are below the annual pay that a full-time worker would receive if they earned the minimum wage. Less than 0.1% of provided pay estimates are above 1,000,000 Euros. There are no numbers reported that can be classified as gibberish (e.g., "999999").

We clean these free-form text responses in several ways. First, we scale up pay which was input in thousands. Second, to deal with outlier observations we winsorize workers' expected pay at the 90% level. As we document in Appendix B.2, we have implemented alternative winsorization schemes (e.g., at the 98% level) or trimming schemes and obtained similar results. To generate Figure A4, we scale the researcher predictions (from 2022) by the CPI when comparing our predictions to the workers' predictions in the follow-up survey (conducted in 2024).

E.2 Additional Data Sources

IEB Social Security Records We used the German Social Security records, which are assembled by the Institute for Employment Research (IAB) into the Integrated Employment Biographies (IEB) database, to select the sample of workers to whom we fielded the survey. These data capture all private-sector and public-sector employees with Social Security contributions. They contain information on employee demographics (e.g., gender, age, and education), employer information (e.g., sector and location), and job-spell-based information (e.g., full-time status, daily pay, and occupation). We impute daily pay for individuals whose pay is top-coded.

Orbis We collected information on firms' assets, year of incorporation, sector based on the 4-digit NACE industry code, the headquarters zip-code, and the number of employees from Orbis.⁵¹ For each variable from Orbis, we select the last year that the data is available; we CPI-adjust monetary values. We match firms based on firm name and address. We match 100% of the researcher-provided and 79% of worker-provided firms named at least twice in the initial survey.

Kununu We collected firm-level information from Kununu, the leading employer review platform in Germany. Kununu is similar to the review platform Glassdoor but has a stronger presence in Germany. We linked firms in the Kununu data to our data based on firm name. Among the researcher-provided firms, 100% of firms appear on Kununu. Among the worker-provided firms that were named at least twice in the initial survey, this is true for 88% of firms. As of February 2023 (when we collected the Kununu data), Kununu contained reviews for almost 200,000 German firms. In total, these firms received over 2.5 million ratings and had around 1.5 billion page views.

⁵¹Since Orbis draws on firms' balance sheet information, the number of employees may include employees outside of Germany. We hand-collected the number of employees firms have in Germany from the firms' websites.

Employer Ratings We hand-collected information on firms’ reputations from three established employer rankings; we use data from 2022. First, we identify whether a firm is listed as one of the largest German employers (Deutsche Wirtschaft, 2022). Second, we identify whether a firm is listed as one of the most popular employers in Germany based on a rating of worker reviews (Statista, 2023). Third, we obtain information about the importance of the firm’s brand, which may affect workers’ familiarity with the firm (Kantar, 2023).

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