



What makes hiring difficult? Evidence from linked survey-administrative data[☆]

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ABSTRACT

We use a novel firm survey linked to Danish administrative data to examine the factors that shape hiring decisions. Our analysis reveals three key findings. First, search and training frictions are as influential as labor costs in discouraging hiring despite potential needs. Second, these frictions disproportionately constrain younger and smaller firms, while firms with high-wage policies are less likely to report labor costs as an obstacle. Third, employers' beliefs play a critical role: many firms prefer hiring employed rather than unemployed workers, perceiving the latter as lower ability due to negative selection or skill depreciation. Firms holding such beliefs are also more likely to report that labor market frictions impede their hiring decisions.

1. Introduction

While hiring plays a crucial role in determining employment and production levels, there is little evidence on how firms make their hiring decisions. Presumably, the decision to post a vacancy can be influenced by several factors, such as labor costs, uncertainty, or various forms of labor market friction. Which factors actually matter? And do they vary across firms? Despite the high stakes of these questions, how employers search and make their hiring decisions is far less understood than the determinants of workers' job search.

Recent literature has made progress in understanding some aspects of hiring behavior using vacancy data. For instance, it is well-documented that the job-filling rate for vacant positions varies with firm growth (e.g., [Davis et al., 2013](#) and [Bagger et al., 2022](#)). However, vacancy data are less suited to documenting how firms decide to hire, as they only record firms that have already chosen to open a vacancy.

This paper helps fill this gap by surveying Danish firms on the factors influencing their hiring decisions. Our survey collects responses from over 2000 firms, representative of the population of firms. We ask about the relevance of several hiring obstacles that may discourage firms from hiring despite potential needs. We distinguish between skill shortages, labor costs, search time,

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training time, and economic uncertainty.¹ By linking the survey to administrative datasets, we associate these factors with firm characteristics (e.g., AKM wage firm effects, size, age, productivity) and examine the role of firms' beliefs. In particular, we assess whether beliefs about hiring job seekers with different employment statuses (employed vs. unemployed) are associated with the obstacles firms report.

Our findings can be summarized as follows. First, we show that search and training frictions are as important as labor costs in shaping hiring decisions. Around 70% of firms agree that a lack of qualified workers discourages them from hiring (labeled "skill shortage"). About 40% agree that job seekers demand wages higher than what the firm can offer (labeled "labor costs"). More than one-third report that search and matching frictions, as well as training requirements, discourage hiring (labeled "search time" and "training time"). Economic uncertainty is also a concern for more than a third of respondents.

Second, we link these factors to firm characteristics while controlling for detailed firm, market, and respondent attributes. High-wage firms (measured using an [Abowd et al. \(1999\)](#) model, henceforth AKM) are less likely to consider labor costs a hiring obstacle, but they are just as likely as lower-wage firms to report skill shortages. This suggests that some labor market frictions cannot be resolved simply by raising wages. Smaller and younger firms are more affected by search and matching frictions, though they are not more constrained by labor costs than larger or older firms. These hiring frictions, which discourage young firms from expanding despite potential needs, may be particularly detrimental given their central role in job creation.

Third, we show that subjective beliefs influence hiring decisions. A quarter of employers prefer to hire employed workers, believing that skills deteriorate during unemployment. A similar share cite lower average abilities among the unemployed. Firms with such preferences are about 10 percentage points more likely to report multiple hiring obstacles, an effect comparable in size to that of wage premiums. To address concerns that differences in worker ability drive this correlation, we use an AKM model and compare worker fixed effects across employment statuses.

We find that the unemployed indeed have lower abilities on average, consistent with previous findings (e.g., [Gregory et al. \(2025\)](#)). However, controlling for these differences has little quantitative impact on the estimated effect of employers' preferences, suggesting that the status of being unemployed, in addition to the underlying employee abilities, may substantially influence hiring decisions.

We conduct several checks to validate our survey and results. First, survey responses on firm size and revenue changes align with administrative data. Second, our estimates remain robust across alternative specifications, including controls for local labor market conditions, detailed industry and region categories, and job amenity proxies.

The institutional setting, economic context, and representativeness of our survey mitigate concerns that our results are specific to Denmark during the post-pandemic recovery. Danish firms face limited hiring and firing regulations, and wages are typically set at the firm level, although sectoral minimum wage floors are common for labor market entrants in some sectors. Our survey, conducted in summer 2021, captured a labor market that was tight but not historically so, providing a valuable setting with novel data.

Contribution to the literature. Understanding the factors behind firms' hiring behavior is crucial, as most firms in the US and Europe report persistent hiring difficulties (see Figure A.1). Such frictions are known to reduce firm growth ([Signorelli and Fontaine, 2024](#); [Le Barbanchon et al., 2024](#); [Friedrich and Zator, 2024](#)), yet the demand side of the labor market (the perspective of firms) is less well understood than the supply side. While recent studies have advanced knowledge of job seekers (e.g., [Fluchtmann et al., 2024](#); [Marinescu and Skandalis, 2021](#)), much less is known about how firms perceive and navigate obstacles to hiring.

We provide the first comprehensive descriptive analysis of factors influencing firms' hiring decisions, their variation across firm characteristics, and their dependence on firms' subjective beliefs. The key methodological innovation is that, rather than relying on vacancy data as in most existing studies,² we construct a novel firm-level survey on hiring decisions and link it to rich administrative records. This combination allows us to directly analyze important aspects of firms' hiring behavior and the constraints they face.

We make three contributions. First, we show that ex-ante and ex-post matching frictions (search and training times) are key reported constraints. This complements findings from [Bergeaud et al. \(2022\)](#), who show that French manufacturing firms perceive labor shortages as more significant than labor costs. While their analysis focuses on relative perceptions of shortages versus costs, our survey elicits firm-level assessments of the importance of different search and matching frictions, allowing us to characterize their prevalence and relative salience.

Second, we uncover substantial heterogeneity in these constraints. Search and training frictions disproportionately affect younger firms, which is especially relevant given their primary role in job creation ([Sterk et al., 2021](#)). We also find that firms paying higher wages to all their employees (i.e., high-wage firms) are less likely to report labor costs as an obstacle, consistent with evidence of imperfect labor market information on the firm side (e.g., [Cullen et al. \(2025\)](#), [Friedrich and Zator \(2024\)](#) and [Bertheau and Hoeck \(2025\)](#)).

Third, we relate hiring obstacles to firms' subjective beliefs. Firms with a stronger preference for hiring employed workers are more likely to report multiple hiring constraints, even after controlling for worker characteristics. This finding complements and helps explain results in [Faberman et al. \(2022\)](#), who show that job search by the employed is substantially more effective.

¹ Employers report their perceptions using a 5-point Likert scale: strongly disagree, disagree, neutral, agree, or strongly agree. The survey also includes open-ended questions to capture additional reasons.

² See [Faberman \(2020\)](#) for a review. For US evidence, see [Davis et al. \(2013\)](#), [Mongey and Violante \(2019\)](#), and [Forsythe and Weinstein \(2021\)](#). For European evidence, see [Carrillo-Tudela et al. \(2023a\)](#), [Bagger et al. \(2022\)](#), [Mueller et al. \(2024\)](#), [Lochner et al. \(2021\)](#), [Carrillo-Tudela et al. \(2023b\)](#), and [Hochmuth et al. \(2021\)](#).

The paper is organized as follows. Section 2 describes the dataset and institutional setting. Sections 3 and 4 document factors influencing hiring decisions and their variation across firm characteristics. Section 5 analyzes how these factors vary with firms' subjective beliefs. Section 6 concludes.

2. Linked firm-level survey and administrative data

The main dataset is a large-scale survey we conducted in 2021 among private-sector firms in Denmark. We linked the survey to administrative datasets that provide detailed information on firms' financial conditions, workforce characteristics, and the labor market environments in which they operate.

2.1. Institutional setting and economic context

Hiring and layoffs in Denmark are not subject to stringent regulations. The country ranks 26th out of 36 on the OECD employment protection index, with the US ranked 36th and most Western European countries having more restrictive policies. For 80% of private-sector workers, wages are set at the firm level. For the remaining 20%, actual wages are determined by industry-level collective agreements (the *normallønssystemet*), where base wages are not adjusted at the firm level (Dahl et al., 2013). Denmark has no national minimum wage, but wage floors (defined at the occupation-industry level) apply to inexperienced workers.

A potential concern is that hiring difficulties in Denmark may differ systematically from those in other countries. Figure A.1 suggests that this is not the case. The figure compares hiring difficulties in Europe and the United States and shows that these difficulties are a persistent concern across the business cycle.

We fielded our survey in June 2021, a period when both the Danish and global economies were on a recovery path (IMF, 2021). Figure A.2 illustrates the evolution of labor market tightness in Denmark between 2016 and 2022. At the time of the survey, labor market tightness had returned to its pre-pandemic level.

Our survey was therefore conducted during a recovery phase following a recession, in a country with a flexible labor market. These features reduce concerns that our findings are driven by particular institutional arrangements or temporary macroeconomic conditions.

2.2. Survey overview

An international consulting firm conducted an online survey in June 2021 by sending invitation emails to firms. The target population included all private and public limited companies in Denmark (ApS, *Anpartsselskab*, and A/S, *Aktieselskab*), excluding those in the agricultural and mining sectors. The survey remained open until early August 2021, with reminder emails sent in July.

The invitation email stated that the survey was conducted on behalf of the University of Copenhagen. It was designed to encourage participation and minimize selection bias by using clear, simple language and providing only a vague description of the survey topic. The email included key details, such as the survey deadline, its mobile-friendly format, and a statement on data protection compliance. The University of Copenhagen logo was displayed to enhance credibility. Including such information is known to improve response rates (Stantcheva, 2023).

The questionnaire consisted of three parts. The first part collected background information about the respondent and the firm, including the respondent's role, knowledge of pay and employment policies, number of employees, and changes in revenue between 2019 and 2020. These questions helped confirm that respondents were knowledgeable about their firm's economic situation (see Figure A.3). This section also asked about firm characteristics unavailable in administrative datasets.

The second part focused on layoffs and wages.³ The third part, which is the primary focus of this paper, explored firms' hiring decisions (the full questionnaire is reported in Appendix B.2).⁴

2.3. Administrative data on firms and workers

We link our survey to additional datasets to obtain information on firm-specific and labor market-specific characteristics. The main features of the administrative data are described below, with further details provided in Appendix B.1.

We use the dataset FIRM (*Generel firmastatistik*), which contains annual financial statements for private-sector firms (excluding the agricultural and financial sectors) up to 2020. Nonfinancial information, such as firm age and industry codes, is also extracted from this dataset. Workforce characteristics are obtained from various administrative registers and aggregated at the firm level. We measure whether employees belong to a union, as well as their education level, age, sex, and job tenure.

In addition, we use a dataset indicating whether a wage floor applies to each occupation (1-digit level) by industry (3-digit level). Firms are classified as covered by wage floors when at least 50% of their employees are subject to such floors. We also measure the extent of non-wage job amenities using a mandatory employer survey (LONN, *Lønstatistikken*).

³ Bertheau et al. (2025) and Bertheau and Hoeck (2025) study why firms choose layoffs over wage cuts and their beliefs about wage setting.

⁴ Qualitative questions used a five-category Likert scale: "Strongly agree", "Agree", "Neutral", "Disagree", and "Strongly disagree", consistent with common practice (Dillman et al., 2014).

Table 1
Descriptive statistics across samples of firms.

	Firm population (Admin. data)	Linked Survey-Admin. (Unweighted)	Linked Survey-Admin. (Weighted)
Firm characteristics			
Number of employees	32.79	38.86	32.79
Firm age	18.05	20.70	18.05
Productivity	88.09	95.13	88.09
Wage premium	-0.01	0.00	-0.01
In manufacturing (%)	14.50	18.75	14.50
In services (%)	60.00	58.77	60.00
In other sectors (%)	25.50	22.49	25.50
In Copenhagen (%)	27.66	25.69	27.66
Covered by wage floor (%)	16.20	17.24	17.10
Employee characteristics			
Female (%)	28.63	28.39	29.06
Age	40.24	42.12	40.89
Tenure (years)	4.74	5.40	4.97
Bachelor's degree and above (%)	18.94	22.46	20.83
Unionized workers (%)	55.83	60.79	57.90
Observations	21 797	2059	2059

Note: This table compares the characteristics of firms in our sample with those in the population. Column 1 reports the mean characteristics of the population (firms with at least five full-time employees in 2019 and available financial data). Columns 2 and 3 report the means for the unweighted and weighted samples, respectively. See Section 2 for details on the variables and weighting procedure.

We use a dataset containing the universe of online job vacancies, aggregated at the occupation-region level. We calculate labor market tightness relevant to each firm based on its workforce composition.⁵ We measure firm-specific tightness using 2019 data due to access constraints.

2.4. Sample characteristics

We impose the following restrictions on the sample. Firms and respondents must: (i) have employed at least five employees in 2019, (ii) operate in the private sector, (iii) have available financial information, and (iv) (for respondents) possess sufficient knowledge of the firm's human resources policies.

The objective of our study is to examine how firm characteristics relate to hiring difficulties, not the reverse. Therefore, we use administrative data from before the 2021 survey to analyze firm attributes as they existed at the time and assess how they correlate with subsequent recruitment difficulties. Additionally, we exclude respondents who answered "I only know a little about pay and employment conditions" to the question: "In the following questions, we ask about pay and employment practices. How close are you to such decisions?" The two other possible answers to this question were: "I am responsible for pay and employment conditions" and "I am not responsible, but I know about pay and employment conditions".

Table 1 reports descriptive statistics for the dataset across different samples. Column 1 shows the mean for the population of firms under study, while column 2 reports the mean for our sample. The sample slightly overrepresents larger firms (33 vs. 39 employees), older firms (18 vs. 21 years), and more productive firms (EUR 88,000 vs. EUR 95,000 value added per worker). Employee characteristics across surveyed firms are largely similar to those in the population.

To improve representativeness, we reweight our sample using the entropy-balancing method (Hainmueller and Xu, 2013), matching on firm size, firm age, industry composition, and region. Column 3 shows that in the reweighted sample, differences between the sample and the population are small. Overall, our final sample has a response rate of 9.44% (2059/21797) and is relatively representative of the population.

We validate respondents' knowledge of their firm's economic situation using two survey questions. First, we compare reported firm size (using the question: "How many employees were in the firm on May 1, 2021?") with administrative data on employees in March 2021. Figure A.3, Panel (a), shows close alignment. Second, we compare reported revenue changes from 2019 to 2020 with financial account data, classifying firms as unchanged, increased, or decreased. Figure A.3, Panel (b), confirms consistency. These validations indicate that respondents were generally well informed about their firms, and we use additional sources to verify specific questions in subsequent sections.

⁵ For firm j , tightness θ_j is computed as a weighted sum of occupation-specific tightness (θ_o) at the two-digit occupation level: $\theta_j = \sum_{o=1}^O w_{oj} \theta_o$, where $\theta_o = \frac{V_o}{U_o}$, with V_o and U_o denoting the number of vacant jobs and unemployed workers in occupation o , respectively. The weight $w_{oj} = \frac{N_{oj}}{N_j}$ is the share of workers in occupation o (N_{oj}) relative to the total number of workers in firm j in 2019 (N_j).

2.5. Regression models

We use ordered probit models to assess the relevance of several hiring obstacles. The dependent variable is the response to our main question: “What factors can discourage the firm from recruiting despite the potential need?”. It takes five ordered values: Strongly agree, Agree, Neutral, Disagree, and Strongly disagree:

$$y_i^* = \beta x_i' + \gamma_{\text{region}} + \eta_{\text{industry}} + \varepsilon_i,$$

where the latent variable y_i^* is determined by a vector of explanatory variables x_i' , regional and industry fixed effects (γ and η), and an error term ε_i . We report marginal effects (multiplied by 100) evaluated at mean covariate values, so estimates are interpreted as percentage point changes. Baseline probabilities of agreement are also reported to facilitate interpretation.

To estimate firm and worker fixed effects, we use a standard AKM model (Abowd et al., 1999):

$$Y_{it} = X_{it}'\beta + \alpha_i + \psi_{j(i,t)} + \varepsilon_{it},$$

where Y_{it} is the log hourly wage of worker i in period t , X_{it} are exogenous covariates, α_i is the worker fixed effect, $j(i,t)$ is the employing firm, $\psi_{j(i,t)}$ is the firm fixed effect, and ε_{it} is an idiosyncratic error. X_{it} includes year dummies and quadratic and cubic age terms fully interacted with education. The model is estimated using data from 2008–2019. The firm-specific wage premium $\psi_{j(i,t)}$ (reported in Table 1) measures the proportional wage premium or discount paid by firm j , typically interpreted as reflecting rent-sharing, efficiency wages, or strategic wage posting. The worker effect α_i is interpreted as a combination of skills and other factors rewarded equally across firms.

3. The determinants of the hiring decision

The decision to post a job vacancy can be influenced by labor costs, uncertainty, and various labor market frictions. This section documents the obstacles that discourage firms from hiring despite having labor needs.

The survey question on hiring decisions is: “What factors can discourage the firm from recruiting despite the potential need?”. The questionnaire explicitly asks respondents to report perceptions for their own firm, not firms in general. Respondents evaluate five predefined factors, with an additional open-ended category for “other” factors. The categories are: The lack of qualified candidates; Job seekers want a higher wage than the firm can offer; Finding and choosing the right employee is too time-consuming; Training employees in firm-specific skills is too time-consuming; The uncertainty of economic activity.⁶ Throughout the paper, we use the term “hiring” to refer to labor-side costs of creating and filling a position, such as recruiting, screening, onboarding, and firm-specific training, rather than the full costs of firm expansion, which may also include capital or workspace adjustments not covered by our survey.⁷

This question directly relates to the canonical Diamond–Mortensen–Pissarides (DMP) model of the labor market. When the value of recruiting exceeds a threshold, firms search for workers. As Pissarides (2011) notes: “A job is an asset owned by the firm: if it is vacant it has some value because it can expect to recruit a worker and yield some profit in the future; if it is filled it is producing for profit. Vacant jobs are like nascent investment projects that have not started yielding a return yet. If their net value is positive, the firm can create them for profit; if it is negative, it is losing money from them, so it makes sense to close them down”.⁸

3.1. The relative importance of different hiring obstacles

Fig. 1 reports responses to the survey question. The most prevalent hiring obstacle is the lack of qualified candidates, cited by over 70% of firms, almost twice as many as the second most common obstacle. Other factors are also reported as significant barriers. About 40% of firms agree that job seekers’ wage expectations are too high. Around 37% report that searching for the right employee is too time-consuming, and 34% agree that training employees in firm-specific skills discourages hiring. Additionally, 37% state that uncertainty about economic activity is a deterrent. These obstacles are relevant across all sectors (see Figure A.4).

Fig. 1 shows that training time for new employees is a key concern for firms. To better understand its role, we asked two additional questions. First, we asked: “When recruiting an employee, which part of the hiring process is most costly in time or money?” Firms could choose between “Search for candidates, conducting interviews” and “Training of new employees (by their manager or colleagues)”. Sixty percent reported that training is more costly than search. Second, for firms that hired in 2020, we asked: “When will the newly hired employee achieve the same productivity as an average employee in a similar position? Please indicate the estimate in months”. Respondents could choose from zero to eighteen months. About 35% believe productivity is reached within three months, while 25% think it takes at least one year (results not shown).

This additional evidence supports the finding in Fig. 1 that search and training frictions significantly affect firms’ hiring decisions.

⁶ Most of the “other” factors reported are similar to, or variants of, the five provided categories. Note that the item related to job seekers’ wage expectations refers to cases where the firm perceives a wage demand that is higher than it is willing or able to offer. This can be due, for instance, to either a lack of productivity, financial frictions, or the firm’s misperceptions.

⁷ Our survey does not distinguish between external hires and recalls. If recalls are quantitatively important, measured hiring difficulties may understate frictions in the external labor market.

⁸ However, empirical evidence about a firm’s decision to open a vacancy is rare, even though vacancy creation is key to explaining labor market fluctuations (e.g., Mercan and Schoefer (2020) and Qiu (2023)).

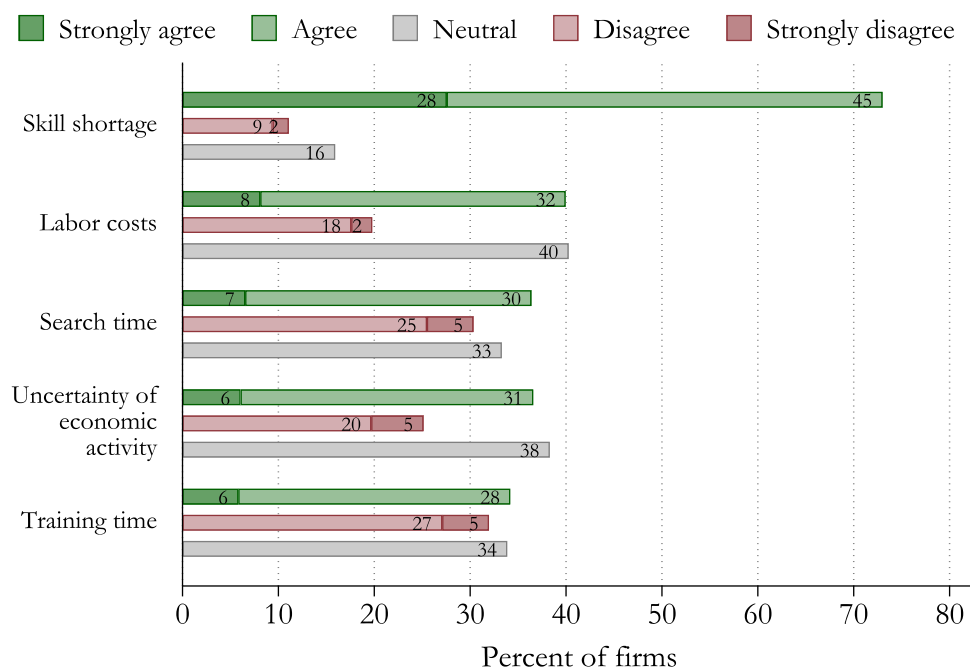


Fig. 1. Factors altering firms hiring decisions.

Note: The figure reports responses to the question: “What factors can discourage the firm from recruiting despite the potential need?” The hiring obstacles are: The lack of qualified candidates (Skill shortage); Job seekers want a higher wage than the firm can offer (Labor costs); Finding and choosing the right employee is too time-consuming (Search time); Training employees in firm-specific skills is too time-consuming (Training time); The uncertainty of economic activity.

Table 2

Association between hiring obstacles.

Hiring obstacles	Skill shortage	Labor costs	Search	Training	Uncertainty
Skill shortage	1.00				
Labor costs	0.29	1.00			
Search	0.19	0.27	1.00		
Training	0.14	0.23	0.59	1.00	
Uncertainty	-0.03	0.16	0.20	0.26	1.00

Note: This table reports the correlation matrix of hiring difficulties. Hiring difficulties are the responses to the question “What factors can discourage the firm from recruiting despite the potential need?” Fig. 1 shows the distribution of each response.

Table 2 reports the Spearman correlations between responses to the different hiring obstacles. The strongest correlation is between search time and training time (0.59), suggesting that these two non-wage labor costs often jointly influence hiring decisions. Most other obstacles are only weakly correlated. For example, the correlation between labor costs and search or training time ranges from 0.23 to 0.27, while other correlations vary between 0.14 and 0.29.

Economic uncertainty stands out as the least related to other factors, showing no correlation with skill shortages (-0.03). Overall, Table 2 indicates that firms distinguish among the different components of hiring difficulties, and the survey responses are unlikely to be driven by a single underlying factor.

We next compare survey responses with *aggregate* measures of hiring difficulties. We consider two indicators: labor market tightness (defined in Section 2.5) and the percentage of unfilled vacancies (“unfilled vacancies”).⁹

Table 3 reports results from univariate regressions of our hiring obstacle measures on aggregate labor market conditions. Aggregate conditions are measured at the occupational level using administrative data and linked to the survey through firms’ occupational employment shares. All estimates are positive, though their magnitudes differ across factors. As expected, the skill shortage estimate is much larger than the training estimate. In contrast, none of the aggregate measures are correlated with economic uncertainty. This is reassuring, as current labor market conditions should have little effect on hiring decisions discouraged by expectations of future uncertainty. Overall, these results support that survey responses capture firms’ hiring situations.

⁹ Unfilled vacancies are estimated from the data source *Rekrutteringssurvey*.

Table 3
Hiring obstacles and aggregate labor market conditions.

Hiring obstacles:	Skill shortage (1)	Labor costs (2)	Search (3)	Training (4)	Uncertainty (5)
Labor market tightness	0.09*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.04* (0.02)	-0.01 (0.02)
<i>N</i>	2059	2059	2059	2059	2059
Unfilled vacancies	0.15*** (0.02)	0.07*** (0.02)	0.08*** (0.02)	0.05** (0.02)	-0.04 (0.02)
<i>N</i>	2029	2029	2029	2029	2029

Note: This table reports univariate OLS estimates of the relationship between hiring obstacles from our survey and aggregate labor market conditions. Aggregate conditions are measured at the occupational level using administrative data and linked to the survey through firms' occupational employment shares. These measures are standardized as *Z*-scores. Asterisks denote statistical significance at the 1%, 5%, and 10% levels (***, **, *), with standard errors reported in parentheses.

A potential concern is that the survey asks firms to respond to a hypothetical scenario in which they need to hire. Firms with recent hiring needs may have different experiences or concerns than those without such needs. To address this, we use another survey question asking whether firms planned to hire new employees in 2020. A total of 1072 firms (52% of the baseline sample) answered yes.

The question does not specify whether firms successfully hired or only attempted to recruit, ensuring that all firms with hiring intentions (regardless of outcomes) are identified. Figure A.5 shows responses to the hiring difficulties question for this subsample. The results are virtually identical to those for the full sample. This finding suggests that firms with hiring plans in 2020 do not systematically differ from other firms in their responses, reducing concerns that survey answers are biased by actual hiring behavior.¹⁰

Previous studies document labor shortages across countries (e.g., [Haskel and Martin, 2001](#), [Bergeaud et al., 2022](#), [Terry and De Zeeuw, 2018](#)). Unlike these studies, we measure the prevalence of search and training frictions, showing that they are critical in making hiring difficult.¹¹ We also provide evidence on the time required for new hires to reach peak productivity. We find that 25% of firms expect at least a year for new hires to match average productivity, consistent with [Caplin et al. \(2022\)](#) and [Bertheau et al. \(2022\)](#).¹²

Finally, our findings support models incorporating vacancy posting and training costs. The Diamond–Mortensen–Pissarides framework matches US labor dynamics when hiring costs include a fixed component ([Pissarides, 2009](#); [Faccini and Yashiv, 2022](#)). Consistent with [Den Haan et al. \(2021\)](#), we also find that economic uncertainty discourages hiring.

Overall, our analysis highlights search and training frictions as central to firms' hiring decisions.

4. Hiring obstacles, firm and labor market characteristics

The previous section documented obstacles that discourage firms from hiring despite labor needs. We now examine how these obstacles vary with firm and labor market characteristics.

4.1. Firm characteristics

We focus on firm size, age, wage premium from an AKM model, labor productivity (value added per worker), and the firm's employment share in its local labor market. For comparability, these characteristics are standardized (*Z*-scores). [Table 4](#) reports marginal effects from ordered probit models estimating the probability that firms agree or strongly agree with each hiring obstacle. The regressions include regional and industry fixed effects and control for firm performance and workforce composition. Controls include ownership type, capital stock, liquidity, revenue and employment changes, subcontracting, worker representation, educational attainment of new hires, and average employee characteristics (unionization, gender, age, tenure, education, and routine task intensity).

Hiring obstacles are more prevalent among smaller and younger firms. A one standard deviation (SD) decrease in firm size increases the probability that search time is a hiring obstacle by 2.97 percentage points (pp) and training time by 3.85 pp. Similarly, younger firms are more likely to cite these obstacles, with effects of -2.89 pp for search time and -3.51 pp for training time, even

¹⁰ We compare our findings with predictions from a search and matching model (Appendix D). The model predicts that skill shortages, higher labor costs, longer search or training times, and greater economic uncertainty all reduce vacancy creation by lowering the expected profitability of jobs. These predictions align with our empirical results.

¹¹ There is a literature measuring training requirements and their impact using data that directly elicit training duration, such as O*NET. See, for instance, [Feng and Graetz \(2020\)](#) and [Cairó and Cajner \(2018\)](#).

¹² Our analysis relies on categorical firm responses to construct comparable measures of hiring frictions across firms. These measures capture the prevalence of different frictions, rather than structural estimates of search or matching parameters.

Table 4
Factors altering firms hiring decisions and firm characteristics.

Question: What factors can discourage the firm from recruiting despite the potential need?					
Hiring obstacles:	Skill shortage (1)	Labor costs (2)	Search (3)	Training (4)	Uncertainty (5)
Size	1.25 (1.27)	-2.15 (1.31)	-2.97** (1.40)	-3.85*** (1.45)	-1.79 (1.21)
Age	-2.13* (1.19)	-1.94 (1.27)	-2.89** (1.29)	-3.51*** (1.25)	-1.66 (1.24)
Productivity	1.10 (1.20)	-3.62*** (1.32)	-0.86 (1.32)	-2.06 (1.29)	-5.03*** (1.38)
Wage premium	0.20 (1.18)	-3.94*** (1.19)	-0.93 (1.15)	0.74 (1.09)	-2.17* (1.17)
Local empl. share	-1.18 (1.55)	0.75 (1.51)	-5.43*** (1.88)	-1.06 (1.78)	-2.50** (1.18)
Wage floor	-7.39** (3.58)	-9.40** (3.93)	-0.92 (3.90)	0.02 (3.74)	4.02 (4.04)
N	2059	2059	2059	2059	2059
Probability	0.73	0.37	0.35	0.33	0.36
Additional controls	Yes	Yes	Yes	Yes	Yes

Note: The table shows ordered probit marginal effects of firm characteristics on the probability of agreeing with different hiring obstacles. The exact wording of the hiring obstacles is reported in Section 3.1. Firm characteristics are measured using administrative data and are normalized (i.e., converted to a Z-score), except for whether the firm is covered by wage floors (indicator). Additional controls include firm, workforce, and respondent characteristics, as well as 59 industry- and 5 region-fixed effects, and firm-specific labor market tightness (see Section 2.4). Asterisks show statistical significance at the 1, 5 and 10% level (***, **, * respectively). Standard errors are in parentheses.

after controlling for wages and productivity. These findings align with evidence that young firms often face unique hiring challenges despite offering competitive wages.¹³

Two mechanisms may explain these patterns. First, younger firms may have limited referral networks, an important channel for attracting high-quality workers (Topa, 2011; Hensvik and Skans, 2016). Second, job seekers may perceive younger firms as riskier employers due to their limited track record. This uncertainty, as shown by Kim (2023), can dampen the growth of high-potential firms. Given the importance of young firms in job creation (Decker et al., 2014), policies aimed at reducing hiring frictions may be especially beneficial for this group.

Beyond firm size and age, we also examine whether firms' wage policies mitigate hiring obstacles. In search-theoretic models, higher wages attract more job seekers, both employed and unemployed. Consistent with this prediction, Table 4 shows, conditional on a productivity level, firms with higher wage premiums are less concerned about labor costs: a one standard deviation increase in wage premium reduces the likelihood of reporting labor costs as an obstacle by 3.94 pp. However, wage premiums and productivity are not associated with other obstacles such as skill shortages, search frictions, or training time. This suggests that labor markets are not perfectly competitive and that higher wages alone cannot fully offset hiring frictions. Similar patterns appear in Table 2, which shows only a weak correlation between labor cost concerns and skill shortages. These findings relate to Mueller et al. (2024), who report a small negative correlation between vacancy duration and starting wages.¹⁴

Overall, while more productive, high-paying firms are somewhat less affected by hiring obstacles, the differences are not large enough to eliminate the impact of search and training frictions. This implies that even desirable employers face constraints that limit their ability to fill vacancies, and reducing these frictions could increase job creation.

Finally, we find that higher productivity significantly reduces the impact of economic uncertainty, lowering the probability that firms cite uncertainty as an obstacle by 5.03 pp. This aligns with Den Haan et al. (2021), who show that volatility raises the option value of waiting, discouraging low-productivity firms from posting vacancies and thereby dampening job creation.

4.2. Labor market characteristics

In addition to firm characteristics, a well-established literature predicts that labor market conditions also shape hiring decisions. Monopsony theory predicts that in less competitive markets, firms face fewer hiring frictions due to reduced competition for

¹³ Previous studies show that young firms are typically matched with lower-quality workers despite being high-wage firms (Babina et al., 2019; Sorenson et al., 2021).

¹⁴ We show more financial variables in Table A.2 in the appendix. We find that firms with higher capital intensity or higher revenue growth rate are less likely to report hiring frictions.

workers (Manning, 2021). We proxy monopsony power by a firm's employment share within its local labor market, defined by region¹⁵ and two-digit industry. This measure captures local labor market concentration rather than firm size or productivity.

Consistent with the theory, firms with greater monopsony power are significantly less likely to report search frictions as a hiring obstacle, with the estimate (−5.43 pp) larger in magnitude than those for firm age or size. The same pattern emerges for economic uncertainty (−2.50 pp), suggesting that a stable labor supply potentially mitigates uncertainty-related hiring concerns. However, monopsony power is not associated with lower concerns about training time or skill shortages, echoing our earlier finding that high wages do not offset these frictions.

We also examine the role of wage floors, which cover 17% of firms in our sample. Coverage reduces the probability that firms report labor costs as an obstacle by 9.40 percentage points and skill shortages by 7.39 percentage points, while having no statistically significant effect on reported search frictions. This pattern is difficult to reconcile with a strongly binding cost channel, under which higher mandated wages would be expected to increase hiring difficulties. Instead, it points to wage floors operating primarily through an information and matching channel.

In our framework (see Appendix D), wage floors affect hiring through two opposing mechanisms. A binding wage floor raises vacancy-posting costs, while an information and matching channel improves firms' position in the wage-offer distribution. The latter operates not only through workers' search intensity, but also through firms' relative position on the job ladder. By providing clearer information about prevailing market wages, wage floors can correct firms' beliefs about the wages required to attract workers, allowing firms to attract acceptable candidates even if search effort does not change.

This interpretation is consistent with recent evidence showing that hiring difficulties can also stem from misperceptions about the wage distribution besides labor costs (e.g., Cullen et al., 2025).¹⁶ In the Danish institutional context, wage floors apply mainly to inexperienced workers and are often close to wages that firms already pay, making them unlikely to bind strongly. Instead, they primarily function as a coordination and information device that reduces uncertainty about feasible wages and narrows wage-expectation gaps.

4.3. Job amenities

Beyond wages and labor market conditions, job amenities may also influence hiring obstacles. Firms with unfavorable job traits could have different characteristics (e.g., low productivity), which might partly drive our previous results. To account for this, we control for the share of the firm's wage bill devoted to non-standard working conditions. These include irregular schedules (night work, public holidays, delayed lunch, on-call duty, relocation) and irregular environments (outdoor work, extreme weather). We also measure positive non-wage amenities, labeled "employee benefits", such as free cars, meals, lodging, multimedia, taxable health insurance, canteen arrangements, and work clothes. These variables are excluded from our main analysis because the data with such information (LONN) is available only for a subsample of firms, reducing the sample size by half.

Table A.5 reports the estimates. Non-standard work conditions are positively associated with reporting search as a hiring obstacle (2.46 pp), consistent with evidence that unfavorable job amenities reduce labor supply (Maestas et al., 2023). Despite the smaller sample, patterns across firms remain similar to our main specification: younger firms continue to report higher exposure to hiring obstacles, and higher wage premiums still reduce concerns about labor costs (−3.55 pp vs. −3.94 pp in the main results).

Overall, these findings show that our main results are unlikely to be driven by unobserved differences in job amenities, reinforcing the associations documented in Table 4.

4.4. Robustness checks and heterogeneity analysis

We perform several checks to confirm that our findings are robust across specifications. Using OLS instead of ordered probit or unweighted regressions yields similar results (Table A.1 and A.3). To address concerns about the hypothetical nature of the survey question, we re-estimate the main model using only firms that planned to hire in 2020 (Table A.4). The results remain consistent despite the smaller sample.

We also examine heterogeneity in the effects across the distribution of firm characteristics. For each firm, we calculate the marginal effects and average them by decile (Figure A.6). The patterns confirm our baseline findings: search and training costs are less important for larger and older firms, labor cost concerns decline with the wage premium, and both labor cost and uncertainty are less binding for high-productivity firms. Finally, search frictions and uncertainty diminish as monopsony power increases.

Overall, the impact of hiring obstacles increases most rapidly for firms at the lower end of the distributions of size, age, productivity, wages, and labor market power, reinforcing our main conclusions.

¹⁵ We divide Denmark into five regions.

¹⁶ See also Bertheau and Hoeck (2025) and Friedrich and Zator (2024).

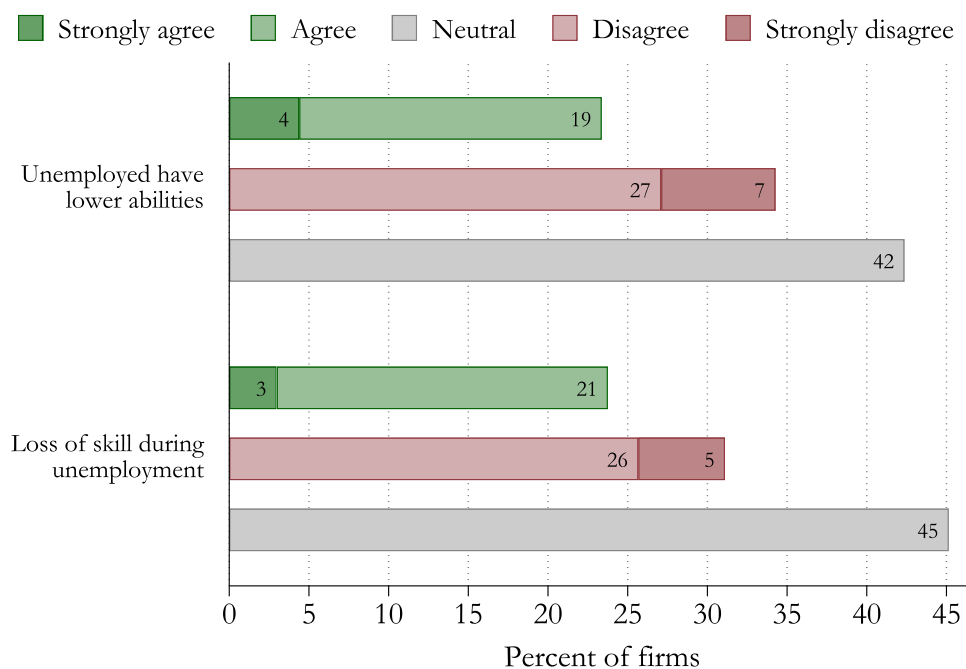


Fig. 2. Firms' beliefs about hiring already employed over unemployed workers.

Note: The figure shows responses to the question: Tell us your thoughts about hiring other firms' employees. Please express your opinion on the following statements: "We prefer to hire candidates who are employed as the unemployed lose their skills" (labeled "Loss of skill during unemployment"), and "We prefer to hire candidates who are employed because unemployed workers have lower abilities than those who are employed" (labeled "Unemployed have lower abilities").

5. Hiring obstacles and beliefs about workers with different employment statuses

The previous section documents the factors that influence hiring decisions and their variation across firms using firm characteristics from matched employer–employee, vacancy, and financial account data. This section complements the analysis by investigating how the hiring factors vary with the subjective beliefs of the firms, using survey data on attitudes toward hiring employed versus unemployed workers.

Our analysis builds on [Faberman et al. \(2022\)](#), who show that employed workers search more effectively than unemployed workers, though the reasons remain unclear. One explanation is that some firms prefer hiring from the employed.¹⁷ Such preferences may disadvantage unemployed job seekers, who account for 40% of applications in the US ([Faberman et al., 2022](#)). We proceed in three steps. First, we document firms' beliefs about unemployed and employed applicants. Second, we show that firms preferring employed workers hire more from other firms. Lastly, we link these beliefs to their reported hiring obstacles.

5.1. Firms' beliefs about the unemployed and the employed

Duration dependence (i.e. the decline in reemployment prospects with unemployment length) is well documented. Two mechanisms may explain why unemployed workers are viewed less favorably: (i) negative selection, where they had lower skills before unemployment, and (ii) skill depreciation, where skills deteriorate during unemployment.

To measure these beliefs, we asked firms to state their agreement with two statements: (1) "We prefer to hire employed candidates as the unemployed lose their skills", capturing beliefs about skill depreciation; and (2) "We prefer to hire employed candidates because unemployed workers have lower skills than those employed", capturing beliefs about negative selection. The first belief relates to mixed evidence on skill depreciation ([Cohen et al., 2025](#); [Arellano-Bover, 2022](#); [Dinerstein et al., 2022](#)), while the second aligns with negative selection models ([Gibbons and Katz, 1991](#)).

[Fig. 2](#) summarizes the responses. We find substantial heterogeneity: 24% of firms agree that skills depreciate during unemployment, and 23% believe unemployed workers are negatively selected. These beliefs are correlated but not identical, and overall 31% of firms agree with at least one of the statements. This indicates that a sizable share of firms expresses a preference for hiring already employed workers.

¹⁷ See, e.g., [Kroft et al. \(2013\)](#), [Eriksson and Rooth \(2014\)](#), [Farber et al. \(2019\)](#), and [Cohen et al. \(2025\)](#).

To our knowledge, evidence on firms' perceptions of hiring employed over unemployed workers is scarce. [Bewley \(1999\)](#) finds that 30 out of 99 firms interviewed in 1992 in the US consider being unemployed a negative factor for job seekers. Our result, despite being from a different country setting and with a much larger sample size, is close in terms of the share of firms with similar beliefs.

Before reporting our results on firms' beliefs about the unemployed and their hiring decisions, we first investigate whether such preferences are based on objective differences in ability between the employed and the unemployed using individual-level labor market data. Worker abilities are hard to observe. We use the worker fixed effects from an AKM model as a proxy for workers' abilities.

To avoid potential bias from wage changes following an unemployment spell, we construct AKM worker fixed effects using hourly wage information from 2008 to 2019 only and do not use post-2019 wages. Employment status (employed or unemployed) is defined using a 2019 snapshot. Unemployed workers in the 2019 snapshot are required to have recent employment histories between 2015 and 2018, so their worker fixed effects are identified using wage observations close in time to the classification year.¹⁸

To quantify the difference in worker abilities, we plot the position of the worker effect percentile of the unemployed in the overall worker effect distribution. Figure A.7 reports the result. Specifically, the horizontal axis shows the percentile of the unemployed worker effects, and the vertical axis shows the corresponding percentile of the unemployed worker effects in the whole workforce. The median worker effect of the unemployed is equivalent to the 32nd percentile of all workers (both employed and unemployed). Figure A.8 shows the distribution of the worker effects by employment status. These results show that firms' preference for hiring employed over unemployed workers is not unfounded. It is consistent with the study by [Mueller and Spinnewijn \(2023\)](#), who show that the dynamic selection into long-term unemployment can explain half of the decline in the job finding rate, and [Faberman et al. \(2022\)](#), who show that 61% of the unemployed and employed wage differential can be attributed to unobserved worker heterogeneity.

In the following analysis, we include the difference in worker abilities between the two groups in our regressions. This variable is constructed using the occupational level worker effect difference, weighted by the occupation share in each firm. A more detailed explanation of how this variable is constructed can be found in Appendix C.2

5.2. Do firms' preferences for employed workers translate into hiring differences?

We next examine whether firms' stated preferences for hiring employed rather than unemployed workers are reflected in their actual hiring behavior. The dependent variable is the poaching rate from our survey ("What percentage of your employees are recruited from other firms?"), and the key explanatory variables capture firms' beliefs about skill depreciation and negative selection. Panels A and B of Figure A.9 show the distribution of the poaching rate reported by firms and the poaching rate by sector, respectively. A third of the firms state that up to a fifth of the workers come from other firms, while a quarter say that at least 90% come from other firms.

We investigate whether firms' preferences for the employed over the unemployed impact their hiring behavior. The outcome variable is the poaching rate from our survey, and we use firms' preferences for hiring already employed workers as the explanatory variables. The results are shown in [Table 5](#).

We find that preferring the employed for either reason (skill depreciation or negative selection) is associated with an increase in the poaching rate by around 10 percentage points. These results suggest that firms' preference for the employed over the unemployed does indeed affect their actual hiring behavior.

5.3. Hiring obstacles and firms' beliefs about the unemployed

Having shown that firms hold heterogeneous beliefs about job seekers and that these beliefs influence hiring behavior, we now ask whether employers who prefer to hire already employed workers face greater hiring difficulties. We hypothesize that such preferences, driven by concerns about skill depreciation or adverse selection, restrict the pool of acceptable candidates and thereby increase hiring obstacles.¹⁹

To test this, we create a dummy variable indicating whether firms agree with at least one statement expressing a preference for hiring employed workers. [Table 6](#) reports results from specifications analogous to [Table 4](#), controlling for firm and labor market characteristics as well as differences in worker abilities between employed and unemployed candidates. This approach reduces concerns that labor market tightness drives both preferences and obstacles.

We find that a preference for hiring candidates who are already employed is strongly associated with higher reported hiring obstacles (7.29–10.48 pp), with the expected exception of economic uncertainty.²⁰

Our novel descriptive evidence on the firm side complements existing descriptive evidence on the worker side ([Faberman et al., 2022](#)). In particular, we find that some firms prefer to hire already employed workers. While this preference may be partly explained by differences in worker abilities between employed and unemployed job seekers, we also identify a separate role for employers'

¹⁸ The AKM specification includes year fixed effects and flexible age controls (quadratic and cubic age terms interacted with education), so worker fixed effects capture time-invariant skill components net of life-cycle wage growth and cohort differences. Combined with the requirement that unemployed workers in 2019 have recent employment histories, this ensures that worker effects for employed and unemployed individuals are identified over comparable career stages.

¹⁹ A detailed exploration of this mechanism is beyond the scope of this paper but remains a plausible channel.

²⁰ [Table A.6](#) reports the firm characteristics included in the regression.

Table 5
Firms' beliefs about the unemployed and poaching rate.

Q: What percentage of your employees are recruited from other firms?		
	(1)	(2)
Prefer to hire employed: loss of skill	10.41*** (1.95)	
Prefer to hire employed: ability		11.89*** (2.01)
<i>N</i>	2020	2020
Mean Dep. Var.	51.96	51.96
Adj.R2	0.143	0.147
Additional controls	Yes	Yes
Δ E -U abilities	Yes	Yes

Note: This table reports OLS estimates of the effect of firms' beliefs about hiring already employed workers over unemployed workers on their poaching rate. Column 1 includes the belief that skills deteriorate during unemployment, while Column 2 includes the belief that unemployed workers have lower abilities. Asterisks indicate statistical significance at the 1%, 5%, and 10% levels (***, **, *). Standard errors are reported in parentheses.

Table 6
Factors altering hiring decisions and firms' beliefs about the unemployed.

Question: What factors can discourage the firm from recruiting despite the potential need?					
Hiring obstacles:	Skill shortage (1)	Labor costs (2)	Search (3)	Training (4)	Uncertainty (5)
Prefer hiring employed	10.48*** (2.28)	9.00*** (2.38)	7.83*** (2.30)	7.29*** (2.21)	1.75 (2.23)
<i>N</i>	2031	2031	2031	2031	2031
Probability	0.73	0.37	0.35	0.33	0.36
Firm characteristics	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes
Δ E -U abilities	Yes	Yes	Yes	Yes	Yes

The table reports the marginal effects from ordered probit regressions of firms' preference for hiring employed over unemployed candidates on the probability of agreeing with different hiring obstacles. Prefer hiring employed is an indicator variable. Firm characteristics (listed in Table 4) are included as controls. Asterisks denote statistical significance at the 1%, 5%, and 10% levels (***, **, * respectively). Standard errors are reported in parentheses.

preferences. Specifically, our measure of these preferences is unrelated to firm characteristics, and the effect on hiring behavior remains after controlling for firm-level measures of worker ability differences.

Overall, our findings suggest that the composition of the job seeker pool shapes hiring decisions.²¹ While standard models predict a preference for unemployed applicants, our evidence indicates that firms' hiring behavior varies systematically with the employment status of job seekers. These patterns point to economically relevant heterogeneity between employed and unemployed workers, which we leave to future work to quantify and decompose.

6. Conclusion

This paper provides new evidence on the determinants of firms' hiring decisions using a novel survey of Danish employers linked to administrative data. We directly measure factors that discourage hiring despite labor needs and relate them to firm characteristics and beliefs.

We find three main results. First, search and training frictions, covering both search and training time, are important determinants of hiring decisions. Second, these constraints are particularly relevant for smaller and younger firms. High-wage firms are less likely to report labor costs as an obstacle but face similar search and training frictions, indicating that higher wages alone do not remove all hiring barriers. Third, subjective beliefs matter: around 30% of firms prefer hiring employed workers due to concerns about negative selection or skill depreciation among the unemployed, and these beliefs are strongly linked to multiple hiring obstacles even after controlling for worker abilities.

Overall, firms face several hiring obstacles that vary with both firm characteristics and beliefs about job seekers. By moving beyond vacancy data and directly eliciting employers' obstacles, this study complements existing evidence on the demand side of the labor market. Policies that reduce search and training costs or address misperceptions about unemployed workers could improve matching efficiency.

²¹ The composition of the job seeker pool can also amplify macroeconomic shocks. Specifically, feedback between employed workers' search efforts and firms' vacancy creation incentives amplifies the economy's response to a negative productivity shock and generates empirically plausible declines in vacancies (see also [Eeckhout and Lindenlaub, 2019](#)).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.euroecorev.2026.105277>.

Data availability

The data that has been used is confidential.

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