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## Which Occupations Do Unemployed Workers Target? Insights from Online Job Search Profiles

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## ABSTRACT

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# Which Occupations Do Unemployed Workers Target? Insights from Online Job Search Profiles

Our study investigates the occupational job search strategies of more than 60,000 unemployed workers in Denmark. We find substantial heterogeneity in how job seekers allocate their search activities across different occupations, and this heterogeneity persists throughout the duration of their unemployment spell. Notably, a considerable proportion of unemployed workers (approximately 30%) search in occupations where they lack relevant experiences. Those aiming for jobs unrelated to their prior experience tend to exhibit the lowest levels of employment and earnings, despite the fact that they target occupations with generally favorable conditions.

**JEL Classification:** J24, J62, J64, D83

**Keywords:** job search, unemployment, occupational mobility, job finding

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# 1 Introduction

Occupational mismatch between workers and vacancies is a significant factor in explaining overall unemployment (see, e.g., Şahin *et al.*, 2014; Patterson *et al.*, 2016; Herz and Van Rens, 2020). As a result, job search assistance often relies on providing occupational advice to facilitate the reemployment prospects of unemployed workers (see, e.g. Belot *et al.*, 2019, 2022; Altmann *et al.*, 2022). Yet, our understanding of job seekers’ occupational trajectories and the consequences for their labor market integration remains limited. This makes it challenging to determine which advice might be effective and to identify individuals who benefit the most.

To address this research gap, we leverage a distinctive combination of online job search data and administrative records from Denmark, enabling us to examine the job search profiles of over 60,000 workers. These search profiles represent the set of occupations in which individuals’ consider to work and provide insights into how they allocate their search efforts across different occupations. Navigating this task is inherently complex, as it requires job seekers to comprehend various aspects of the labor market. Specifically, individuals need to assess how well their personal skills and experience align with different occupations, gauge the potential returns to these skills, and obtain information on the availability of vacancies and the competition they may encounter from other job seekers in each occupation.

Our setting enables us to offer several important insights into the job search behavior of unemployed workers. First, by comparing individuals’ job search profiles and their employment biographies obtained from administrative records, we document substantial heterogeneity in how job seekers allocate their search activities across different occupations. Notably, a considerable proportion of unemployed workers (approximately 30%) target occupations in which they lack relevant experiences. The observed heterogeneity in job seekers’ search strategies is also reflected in their actual job applications and it persists throughout the duration of their unemployment spell. Second, we explore how this heterogeneity correlates with occupation-specific attributes, such as labor market tightness, average wages, and the risk of automation. Compared to the professions they previously held, job seekers generally focus their search activities on occupations with abundant job opportunities (i.e. high labor market tightness) and promising future career prospects (i.e. low risk of automation). Moreover, in particular individuals who exclusively focus their search on occupations where they lack relevant experience target jobs that, on average, offer high wages. This holds in comparison to the occupations where they possess relevant experience, as well as compared to other job seekers who focus on occupations aligned with their personal experience.

Lastly, we examine the relationship between job seekers' search strategies and their subsequent labor market outcomes. Our empirical analysis is based on an occupational fixed effects model, which only compares individuals who worked in the same occupation (4-digit ISCO level) before they became unemployed. We find that workers who target occupations unrelated to their personal experience tend to have the lowest levels of employment and earnings although they focus their search in occupations with the most favorable overall conditions. During the three-year period following their entry into unemployment, these individuals accumulate working hours and earnings that are 4.4% and 5.8% lower, respectively, compared to job seekers who focus exclusively on occupations related to their own experience.

While it is intuitive that the absence of occupational experience could pose challenges in finding a job, it may seem puzzling why job seekers aim for unrelated occupations despite the potential for weaker labor market outcomes. We interpret our findings through the lens of a directed search model where occupations differ regarding the demand for and supply of workers, the value of employment, as well as the degree to which a worker's personal skills and experience align with the job requirements. In line with our empirical observations, it is evident that especially job seekers who have relevant experience in occupations characterized by high competition among job seekers and low wages, may focus their search on occupations for which they lack experience.

Although our empirical design does not allow us to disentangle different mechanisms, we explore two possible motives for the observed occupational search strategy of job seekers in our data. First, job seekers may misperceive their reemployment prospects across occupations, for instance, because they underestimate the significance of occupation-specific experience in attracting job offers. However, additional survey data suggest that job seekers who focus their search on unrelated occupations are aware of their reduced job finding rates in the short-run. Second, job seekers aiming for unrelated occupations may expect to be better off in the long run. Relatedly, we find that workers who had previously earned relatively modest wages within their profession, often target occupations where they lack relevant experience. Moreover, when evaluating their monthly earnings conditional upon finding a new job, we observe an upward trajectory among workers aiming for unrelated occupations compared to those concentrating on related occupations over time. However, the overall employment and earnings of job seekers aiming for unrelated occupations tend to remain significantly lower compared to those focusing on related occupations, at least for a period of three years following their entry into unemployment.

With this in mind, our results offer insights into the literature examining the effects of job search advice (see, e.g., Belot *et al.*, 2019, 2022; Altmann *et al.*, 2022; Dhia *et al.*, 2022) and coun-

selling (see, e.g., Bennis *et al.*, 2013; Behaghel *et al.*, 2014; Krug and Stephan, 2016). Given that job seekers targeting occupations without relevant experience encounter specific challenges in securing employment, it appears plausible that providing job search assistance—guiding them to concentrate their search efforts on occupations aligned with their personal skills—can enhance decision-making for this particular group of job seekers. Moreover, our findings contribute to a growing body of research investigating job search behavior using job applications, survey or online data. For example, Marinescu and Skandalis (2021), DellaVigna *et al.* (2022) and Faberman and Kudlyak (2019) study how the search intensity evolves over the course of the unemployment spell, whereas Krueger and Mueller (2016), Banfi and Villena-Roldan (2019) and Fluchtmann *et al.* (2023) analyze wages that job seekers are willing to accept. In this context, we document that there is significant heterogeneity in the occupational dimension of job search, which is predictive for the labor market integration of unemployed workers.<sup>1</sup> By doing so, we also add to the literature investigating the occupational mobility of workers, underscoring the significance of learning about occupation-specific employment prospects (Gibbons and Waldman, 1999; Neal, 1999; Gibbons *et al.*, 2005; Papageorgiou, 2014; Groes *et al.*, 2015).

## 2 Empirical Setting

Our empirical analysis explores a unique setting that combines detailed information on individuals’ job search profiles, their employment biographies observed in the administrative records, job applications, and labor market outcomes. In what follows, we describe the relevant features of our setting and the sample studied in our empirical analysis.

**Job search profiles:** When becoming unemployed, job seekers in Denmark have to register on the central online platform of the public employment services, called *jobnet.dk*, in order to receive unemployment insurance (UI) benefits.<sup>2</sup> During the registration process, they are required to create a personalized job search profile, including the specific occupations they consider to work in. They can choose from a comprehensive list of approximately 1,020 occupations, which serves as the foundation for receiving vacancy suggestions on the online platform. In our empirical analysis, we examine the search profiles of 61,223 individuals who became unemployed and received UI benefits in 2017 and 2018 after having been employed for at least six months. The

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<sup>1</sup>Consistent with our findings, Fluchtmann *et al.* (2023) also observe that a significant portion of job applications is directed towards vacancies unrelated to job seekers’ prior occupations. However, in contrast to our analysis, their study does not explore the attributes of these occupations or the labor market outcomes associated with different occupational search strategies.

<sup>2</sup>The monthly benefits are set at 90% of a worker’s previous wage, capped at DKK 18,633 (approximately \$2,700 in 2018 values). About 75% of UI benefit recipients receive the maximum benefit amount, resulting in an effective average replacement rate of roughly 60%.

search profiles, which they specified during the registration process, provide us with individual-level data about their preferences regarding the occupations they consider during job search. For our analysis, we use the four-digit occupational identifier code based on the Danish version of the International Standard Classification of Occupations (ISCO), resulting in 427 distinct occupations for our study.

**Employment biographies:** In addition to their search profiles, we also take into account job seekers' occupational history, that is, the occupations in which they were previously employed. For this purpose, we rely on administrative records that offer detailed monthly employment information for all workers in Denmark since 2008, including an occupational identifier based on the ISCO classification system. This data allows us to explore the intersection between job seekers' search profiles and the occupations in which they were employed during the ten-year period prior to their current unemployment spell (see Section 4.1 for further details).

**Job applications:** While receiving UI benefits, individuals are required to actively search and apply for jobs and they have to document their search activities in a centralized online system called *joblog*. It is mandatory to provide information about the job applied for, including the job title, as well as the name and address of the prospective employer (see Fluchtmann *et al.*, 2023, for further details). The application data supplements the job search profiles by including an identifier for the occupation associated with the corresponding vacancy, allowing for direct comparison with the occupations listed in individuals' search profiles.<sup>3</sup>

**Labor market outcomes:** Finally, the register data provide us with detailed information on job seekers' labor market outcomes. This includes their working hours, labor earnings, and the occupations in which they are employed for each month within a period of three years after becoming unemployed. In summary, our comprehensive dataset enables us to document heterogeneity in job seekers' search profiles taking into account their occupational history and allows to explore how their search profiles manifest in individuals' job applications and actual job matches.

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<sup>3</sup>UI benefit recipients are required to document a minimum number of two applications per week. Consequently, registered applications may not capture all search activities, making it challenging to draw conclusions about the overall search effort. However, previous findings by Fluchtmann *et al.* (2023) indicate that the data provide insights into how job seekers allocate their applications across different occupations.



### 3 Theoretical Considerations

To guide our empirical analysis, we first briefly discuss some of the theoretical aspects related to job seekers' occupational search strategies and illustrate factors influencing it. To that end, we sketch an job search model where unemployed workers can direct their effort towards different types of jobs (see also Belot *et al.*, 2019; Wright *et al.*, 2021).

While they are unemployed, individuals receive a flow of benefits,  $b$ , and decide to search for employment in different occupations indexed  $i \in \{1, \dots, I\}$ . The search effort allocated to occupation  $i$  is denoted  $s_i$ . Job seekers are uncertain regarding their employment prospects within the various occupations. The perceived chances of attracting job offers in the various occupations,  $\lambda_i = J(s_i, x_i, \theta_i)$ , depend on the occupation-specific search effort and two additional factors. First, job seekers are more likely to attract job offers when their personal skills align with the requirements of a profession, particularly if they possess relevant experience from previous employment spells in that specific occupation. The alignment of individuals' skills and occupational experience with the requirements of occupation  $i$  is represented by  $x_i$ , with higher values indicating a higher level of compatibility. Second, there are differences in the availability of vacancies and the competition from other job seekers across occupations characterized by the occupation-specific labor market tightness,  $\theta_i$ . The effort costs,  $\gamma(s)$ , depend on the total effort level across all occupations, with  $\gamma'(s) > 0$  and  $\gamma''(s) > 0$ . Finally, the value of being employed in occupation  $i$ , is denoted by  $V_i(w_i, q_i)$  capturing occupational differences in wages,  $w_i$ , and how secure jobs are, with  $q_i$  indicating the separation rate in a particular occupation.

Individuals maximize their perceived present value of income over an infinite horizon with discount rate  $\rho$ :

$$\rho U = \max_{s_1, \dots, s_I} \left[ b - \gamma(s) + (1 - \prod_i (1 - \lambda_i(s_i, x_i, \theta_i))) \max_i (V_i(w_i, q_i) - U) \right]. \quad (1)$$

The optimal search strategy is characterized by the vector  $S^* = (s_1, \dots, s_I)$  and the search profile contains all occupations with  $s_i > 0$ . When choosing their search profile, individual job seekers may take into account various considerations.

**Returns to skills and experience:** Focusing their search efforts on occupations aligned with job seekers' skills and experience should, all else being equal, enhance their chances of reemployment (i.e.,  $\partial \lambda_i / \partial x_i > 0$ ). Hence, for a given tightness and value of employment, individuals may optimally prioritize their search activities on occupations that align with their personal skills and experience. Supporting this notion, existing empirical evidence suggests substantial returns

to occupational tenure (Shaw, 1984; Kambourov and Manovskii, 2009) and occupational-specific skills (Neal, 1995; Parent, 2000).

**Labor market tightness:** The optimization problem becomes more complex when job seekers account for differences in the demand for and supply of workers across occupations. When there are labor shortages in some occupations and excess labor supply in others, it is optimal to allocate more effort to labor markets that are less crowded (i.e. high  $\theta_i$ ) as these occupations should be characterized by high job finding rates (i.e.  $\partial\lambda_i/\partial\theta_i > 0$ ). Therefore, we anticipate that especially job seekers qualified for occupations with an oversupply of labor (i.e. low  $\theta_i$ ) may improve their reemployment prospects by searching in occupations where they lack relevant skills.

**Wages:** Additionally, the job finding prospects in the various occupations might be intricately linked to the perceived value of being employed. For instance, the literature on directed search suggests a trade-off between the likelihood of receiving an offer upon applying and the value of being employed (see, e.g., Moen, 1997; Nekoei and Weber, 2017; Wright *et al.*, 2021). Therefore, targeting occupations characterized by high job finding rates might come at the cost of lower wages. On the other hand, it is also conceivable that occupations experiencing labor shortages may offer higher wages, as firms may aim to attract additional workers to fill these positions.

**Job destruction:** Finally, job seekers may consider not only the current labor market situation, but also assess how their job prospects evolve in the future. Occupations differ regarding the risk that job matches will be destroyed, for instance, due to technological progress (Autor *et al.*, 2003; Autor and Dorn, 2013). This is captured by the occupation-specific separation rate,  $q_i$ , also impacting the expected value of being employed (i.e.  $\partial V_i/\partial q_i < 0$ ). It is evident that job seekers should optimally concentrate their search efforts on occupations that are more future-proof (relatively small  $q_i$ ) as opposed to those expected to experience a decline (relatively large  $q_i$ ).

## 4 Empirical Analysis

It becomes apparent that individuals navigating the job search process must evaluate various factors including (1) the alignment between own skills and experience with different occupations, (2) the competition they encounter from others, (3) occupation-specific wages and (4) the risk of jobs being destroyed in the future. In our empirical analysis, we examine how these factors influence the search behavior of unemployed workers and we analyze the associated labor market

outcomes. In what follows, we characterize job seekers’ search profiles taking into account their occupational experience, study how this consideration set translates into actual job applications, and explore occupation-specific attributes, including labor market tightness, average wages, and the risk of automation associated with the targeted occupations. Lastly, we assess the extent to which search profiles can predict variations in job seekers’ labor market outcomes.

#### 4.1 Heterogeneity in job search profiles and applications

We commence our analysis by comparing job seekers’ search profiles with their occupational experience, aiming to assess the extent to which unemployed workers possess the relevant skills for the occupations they consider. To that end, we use all occupations in which a given worker has been employed over the past ten years. We then identify occupations that require a similar set of skills and experiences based on the O\*NET matrix of related occupations (see, e.g., Allen *et al.*, 2012). For each occupation, they suggest up to ten related occupations for which skills are transferable. Using this information, we classify each of the occupations included in the search profile as either *related* or *unrelated* to the occupations in which the job seeker previously worked. Subsequently, we calculate the proportion of unrelated occupations within each individual’s search profile.<sup>4</sup>

**Distribution of search profiles:** Panel A of Figure 1 shows the resulting distribution of related and unrelated occupations across individuals’ search profiles. We find that approximately 30% of unemployed workers exclusively target occupations in which they have worked before, respectively occupations which are directly related (see leftmost bar in Panel A of Figure 1). Conversely, an equally-sized group of job seekers (i.e. approximately 29%) solely aims for occupations that have no direct relationship to those in which they have already gathered experience (see rightmost bar). Lastly, there is a remaining group of unemployed workers (i.e. approximately 41%) who aim for both related and unrelated occupations. Throughout our following analysis, we always distinguish between these three groups of job seekers with (1) related profiles, (2) mixed profiles and (3) unrelated profiles.

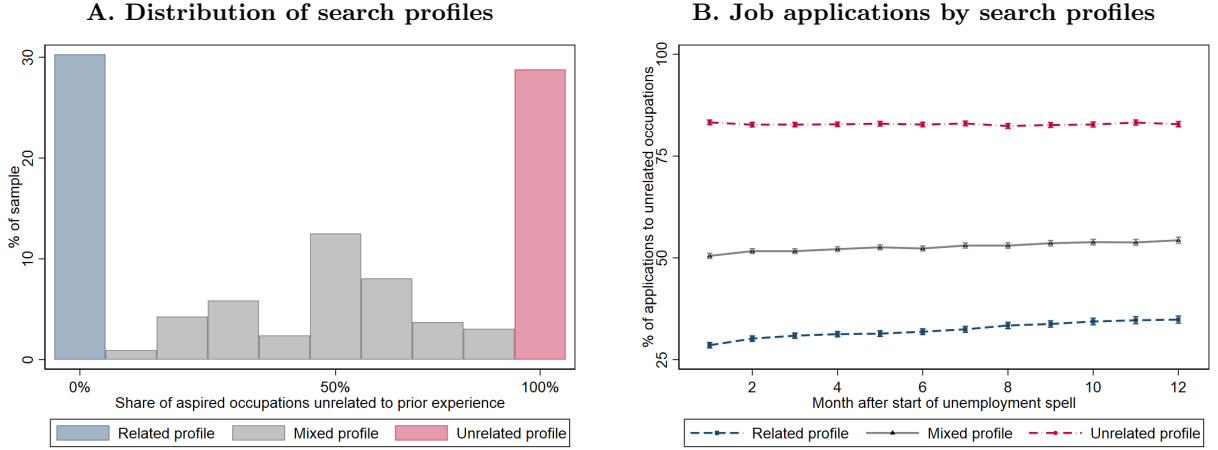
**Job applications over time:** To begin with, we examine to what extent individuals’ search profiles are reflected in their actual job applications.<sup>5</sup> Therefore, we assess the proportion of registered job applications directed towards occupations unrelated to job seekers’ prior experi-

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<sup>4</sup>More precisely, the set of related occupations comprises all the occupations in which the job seeker had previous work experience and the related occupations identified through the O\*NET matrix. All remaining occupations are categorized as unrelated to the job seeker’s personal experience.

<sup>5</sup>On average, individuals sent about 48.5% of their job applications to occupations included in their search profile.

Figure 1: Heterogeneity in search profiles and job applications



*Note:* The figure illustrates heterogeneity in job seekers' search profiles and their actual job applications accounting for prior occupational experience.

Panel A depicts the distribution of a variable measuring the share of occupations included in the search profile where individuals possess no relevant labor market experience (assessed based on their employment biographies and the O\*NET matrix of related occupations). The blue bar identifies job seekers who solely consider occupations where they have relevant experience (related profile), while the red bar identifies those who only consider occupations without relevant experience (unrelated profile). The gray bars identify job seekers who consider both related and unrelated occupations (mixed profile). Panel B depicts the percentage of registered job applications targeting occupations unrelated to the prior experience of job seekers, categorized by three distinct types of search profiles. To account for unobserved heterogeneity, we display predictions derived from regressions that incorporate individual fixed effects.

ence. To account for dynamic selection over the unemployment spell, we estimate regressions controlling for the elapsed unemployment duration and individual fixed effects. Panel B of Figure 1 depicts the resulting predictions for the three distinct types of search profiles. It turns out that these groups of job seekers exhibit distinct application behaviors over the course of their unemployment spell. In the first month of their spell, individuals with related search profiles (represented by the blue line) allocate 29% of their job applications to occupations where they lack prior experience. Although this percentage slightly increases as the unemployment spell progresses (reaching 35% by the 12<sup>th</sup> month of unemployment), it stays significantly lower than that of job seekers with mixed and unrelated profiles. To be more precise, individuals with search profiles exclusively composed of unrelated occupations (represented by the red line) direct approximately 83% of their applications towards unrelated occupations. This fraction remains stable throughout the first year of unemployment. For individuals with mixed profiles, the proportion of applications sent to unrelated occupations consistently falls between the corresponding values of the other two groups, ranging from 50% to 55%.<sup>6</sup>

**Who targets unrelated occupations?** Job seekers' decision whether to consider related or unrelated occupations might be driven by their personal characteristics. For example, certain

<sup>6</sup>The observed pattern is consistent with recent findings by Fluchtmann *et al.* (2023), indicating that, on average, job seekers in Denmark sent approximately 43% of their job applications to occupations unrelated to their previous job. This proportion slightly increases over the duration of the unemployment spell.

workers may exhibit a greater occupational flexibility due to their educational background or their personal circumstances, making the distinction between related and unrelated occupations less significant for them. In this context, it is noteworthy that we observe a significant portion of job seekers, comprising at least 25%, exclusively focusing on unrelated occupations across various subgroups within the study population. As shown in Appendix Figure A.1, this observation holds true when dividing the sample by individuals' gender, age, education or previous wages. Moreover, Appendix Table A.1 presents conditional correlations based on regressions accounting for fixed effects for job seekers' previous occupation. Thereby, we explore how individuals' personal characteristics shape the decision to aim for related and unrelated occupations, comparing job seekers' with similar occupational backgrounds. Most notably, we observe that job seekers with unrelated search profiles had previously earned approximately 6% lower wages within their profession than job seekers with related profiles. Additionally, those aiming for unrelated occupations are slightly more often male, they exhibit a higher chance to have a tertiary education and the number of distinct occupations they held in the past is significantly lower than for job seekers' with related profiles.

## 4.2 Occupation-specific attributes

As laid out in Section 3, individuals' search strategies should be influenced not only by their personal skills and experience. Therefore, we proceed to analyze the average attributes of occupations associated with different search profiles. Specifically, we explore three dimensions that are potentially important for how job seekers direct their search efforts. First, we assess the labor market tightness specific to each occupation measured at the beginning of individuals' unemployment spell. We consider the ratio of posted vacancies in a particular occupation to the number of job seekers who have specified the same occupation in their search profile. Second, we examine the occupational earnings potential by calculating the average hourly wages paid to workers within each occupation in the calendar year 2016 (i.e. the year prior to the beginning of the first unemployment spells in our data). Third, we analyze a measure of the risk that a specific occupation may be impacted by future automation or computerization, as calculated by Frey and Osborne (2017). This measure complements our analysis by offering insights into how job seekers' long-term labor market prospects may evolve if they target a particular occupation.

The decision to target unrelated occupations may depend on the labor market conditions in the occupations where individuals have acquired the relevant skills. Therefore, we not only analyze the attributes of the occupations included in job seekers' actual search profile, but also evaluate their counterfactual profiles, encompassing all occupations where an individual

possesses relevant experience.<sup>7</sup> Figure 2 displays the average occupation-specific attributes of job seekers’ actual search profiles (blue solid lines) and their counterfactual profiles (red dashed lines) separated for the three groups described earlier.

The comparison yields several intriguing insights. First, job seekers with unrelated search profiles possess experience that aligns with professions characterized by relatively poor labor market conditions. Specifically, their counterfactual profiles include occupations with a high degree of competition, low average wages and a high risk of automation compared to job seekers with mixed and related profiles. Second, compared to the jobs they previously held, unemployed workers generally tend to concentrate their search activities on occupations with abundant vacancies and promising future career prospects. Across all three groups, the average search profile is characterized by significantly higher labor market tightness (see Panel A) and a lower risk of automation (see Panel C) compared to the counterfactual profile. Lastly, we observe important differences when comparing the earnings potential across search profiles (see Panel B). Job seekers with search profiles unrelated to their prior experience aim for professions that, on average, offer high wages. This holds in comparison to the occupations where they possess relevant experience, as well as compared to other job seekers with mixed or related search profiles. Specifically, individuals with unrelated profiles consider occupations with an average hourly wage that is approximately 4% higher than the wage paid in the occupations where they have relevant experience. Conversely, job seekers with mixed and related profiles target occupations with lower earnings potential compared to the average occupation in their respective counterfactual profiles. In summary, our analysis indicates that individuals who aim for jobs in occupations without prior experience target relatively ambitious positions compared to job seekers who focus on occupations closely aligned with their own work experience.

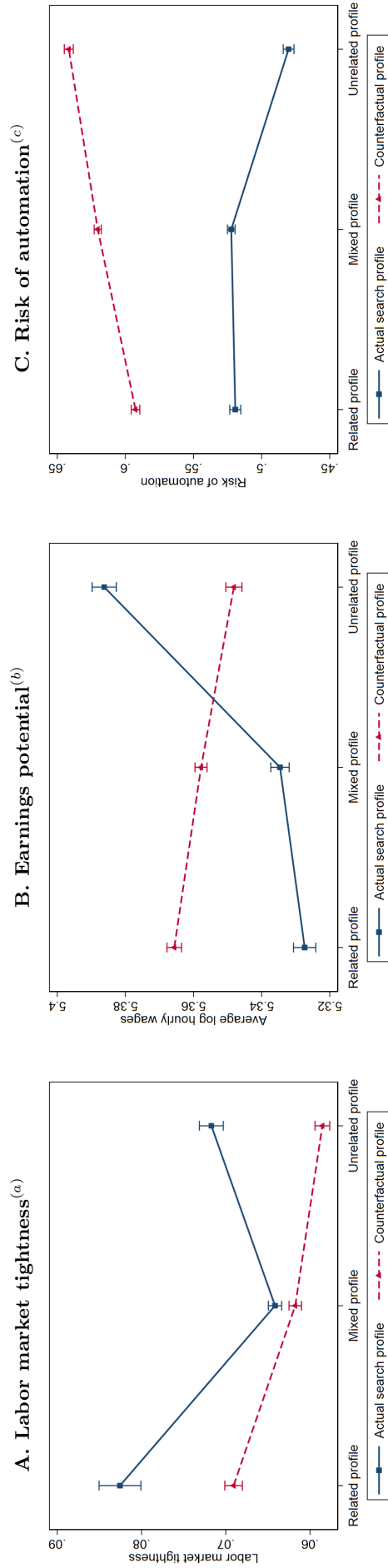
### 4.3 Do search profiles predict labor market outcomes?

Next, we investigate the relationship between job seekers’ search profiles and their labor market outcomes. Our analysis encompasses the extensive margin of employment, which examines whether job seekers are employed 12 and 36 months after they became unemployed, respectively. Moreover, we apply the same occupation categorization as used for the search profiles to distinguish between employment in occupations related to and unrelated to job seekers’ prior oc-

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<sup>7</sup>The counterfactual profile includes all occupations where a worker has previously been employed and all related occupations identified using the O\*NET matrix. For job seekers who exclusively seek employment in occupations related to their prior experience (related profiles), the actual search profile is a subset of the counterfactual profile. Conversely, for those with unrelated profiles, there is no overlap between the actual search profile and the counterfactual profile.

Figure 2: Attributes of actual job search profiles and counterfactual profiles



*Note:* The figure illustrates the average attributes of all occupations included in job seekers' actual search profile (blue solid line) and their counterfactual profiles (red dashed line) for the three search groups (related, mixed and unrelated profiles). The counterfactual profile includes all occupations where a worker has previously been employed, as well as all related occupations identified using the O\*NET matrix.

<sup>(a)</sup>Refers to the ratio of posted vacancies in a particular occupation to the number of job seekers who have specified the same occupation in their search profile at the beginning of the unemployment spell.

<sup>(b)</sup>Refers to the average log hourly wage paid to workers in the corresponding occupation in the calendar year 2016.

<sup>(c)</sup>Refers to the risk that a specific occupation may be impacted by future automation or computerization as calculated by Frey and Osborne (2017).

cupational experience. Lastly, we assess the total working hours and labor earnings accumulated over one- and three-year periods.

We estimate occupational fixed effects models of the following form:

$$Y_i = \beta_0 + T_i\beta_1 + X_i\beta_2 + \kappa_j + \varepsilon_{ij}, \quad (2)$$

where  $Y_i$  is the outcome of interest,  $T_i$  refers to indicators for the three search groups (i.e. having related, mixed or unrelated search profiles), and  $X_i$  is a vector of individual-level control variables measured at the beginning of the unemployment spell (including fixed effects for the month of entry into unemployment). Moreover, we account for fixed effects identifying the individuals' last occupation  $\kappa_j$ . Thereby, we only exploit variation in search profiles among job seekers sharing similar occupational backgrounds. Standard errors are clustered at the level of job seekers' previous occupation.

**Employment differences across search profiles:** Table 1 shows that there are notable differences in the labor market integration of unemployed workers with different search profiles. Overall, job seekers who focus on occupations closely aligned with their own professional background (i.e. those with related profiles) experience the most favorable labor market outcomes both in the short- and long-run. These individuals exhibit significantly higher employment rates, accumulate a greater number of working hours, and generate higher earnings over one- and three-year horizons compared to the two other groups with mixed or unrelated search profiles (see columns 1, 6, and 7 in Table 1, respectively).

Conversely, job seekers who exclusively consider occupations unrelated to their prior experience demonstrate the lowest levels of employment and earnings among the three groups. They face a 5.0 percentage points lower likelihood of being employed one year after becoming unemployed ( $p < 0.001$ ) compared to those solely targeting related occupations. Likewise, they work approximately 66 hours less ( $p < 0.001$ ) and earn around DKK15,400 less ( $\approx$  USD 2,270;  $p < 0.001$ ) during the one-year period. These figures represent relative differences of 9.7% and 11.3%, respectively, when comparing the estimated coefficients to the baseline employment and earnings levels for job seekers with related profiles. When considering the three-year period, the estimated effects on employment and earnings continue to be negative and statistically significant. However, it is worth noting that the relative effects become somewhat smaller over time, as the overall levels of employment and earnings decrease by approximately 4.4% and 5.8%, respectively (see columns 6 and 7 in the lower panel of Table 1).

The weaker labor market outcomes observed among job seekers aiming for unrelated occupations can be attributed to their reduced likelihood of securing employment in professions where



Table 1: Differences in labor market outcomes across search profiles

Dependent variable	Employed after 12 months					Cumulative outcomes within 12 months	
	In any occupation	In related occupation	In unrelated occupation	In stored occupation	In non-stored occupation	Working hours	Labor earnings
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Search profile (ref.: related profile)							
Mixed profile	-0.018*** (0.0043)	-0.048*** (0.0049)	0.030*** (0.0027)	-0.0276*** (0.0065)	0.0095* (0.0052)	-20.6*** (6.5)	-6,638*** (1260.1)
Unrelated profile	-0.050*** (0.007)	-0.107*** (0.008)	0.057*** (0.004)	-0.1463*** (0.0111)	0.0962*** (0.0120)	-65.7*** (9.1)	-15,409*** (1,958)
P-value (mixed = unrelated)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mean value dep. variable	0.429	0.355	0.074	0.2240	0.2050	676.5	136,225
(related profile)							
No. of observations	61,223	61,223	61,223	61,223	61,223	61,223	61,223
Individual-level control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupational fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable	Employed after 36 months					Cumulative outcomes within 36 months	
	In any occupation	In related occupation	In unrelated occupation	In stored occupation	In non-stored occupation	Working hours	Labor earnings
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Search profile (ref.: related profile)							
Mixed profile	-0.005 (0.004)	-0.074*** (0.005)	0.069*** (0.005)	-0.0263*** (0.0080)	0.0217*** (0.0077)	-25.0 (18.5)	-14,279*** (3,731)
Unrelated profile	-0.040*** (0.006)	-0.188*** (0.010)	0.148*** (0.008)	-0.2456*** (0.0149)	0.2054*** (0.0157)	-108.6*** (9.1)	-29,134*** (1,958)
P-value (mixed = unrelated)	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Mean value dep. variable	0.799	0.613	0.186	0.3840	0.4160	2,440.9	495,348
(related profile)							
No. of observations	61,223	61,223	61,223	61,223	61,223	61,223	61,223
Individual-level control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupational fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table reports differences in labor market outcomes between job seekers with related, mixed and unrelated search profiles. In all specifications, we control for individual characteristics (including educations, socio-demographic information, characteristics of the last job, month of entry into unemployment) and fixed effects for the previous occupation. Standard errors reported in parenthesis are clustered at the level of job seekers' previous occupation before unemployment (four-digit ISCO level). \*\*\*/\*\*/\* indicates statistical significance at the 1%/5%/10%-level, respectively.

they have acquired relevant experience in the past. For example, the probability of being reemployed in an occupation that is related to those in which they have worked before is significantly lower for job seekers targeting unrelated occupations compared to those with related profiles (see column 2). At the same time, individuals seeking employment unrelated to their previous experience encounter an increased likelihood of finding jobs in occupations unrelated to their prior background (see column 3). Notably, however, the occupations in which these individuals find employment are not necessarily the ones they initially targeted. Instead, as indicated in column 4 of Table 1, the group of workers with unrelated profiles has the lowest likelihood of actually finding a job in one of the occupations they specified in their search profile.

**Heterogeneity by attributes of search profiles:** The adverse employment effects of searching in unrelated occupations are noteworthy, particularly considering that these job seekers target occupations with favorable overall attributes. To further explore the role of occupation-specific labor market conditions, Table A.2 shows heterogeneous effects for job seekers facing different levels of competition, as indicated by quartiles of the average labor market tightness among the occupations within their search profile. It becomes evident that job seekers with unrelated profiles experience reduced levels of employment and earnings, irrespective of the labor market conditions within the occupations they consider. This pattern aligns with the notion that workers experience returns to occupation-specific skills, which makes it challenging for those aiming for unrelated occupations to secure employment.

#### 4.4 Exploring two possible mechanisms

The results presented above raise the question of why such a large portion of job seekers aim for unrelated occupations, even though this strategy is associated with weaker labor market outcomes. Although our empirical design does not allow us to disentangle different mechanisms, our data allows us to shed further light on two possible motives that could be relevant for individuals' search strategies: (i) misperceptions regarding reemployment prospects across occupations and (ii) long-run career expectation.

**Misperceptions about occupational compatibility:** Job seekers may have imperfect knowledge regarding their employment prospects within different occupations. For instance, they may lack information regarding the extent to which their own skills align with specific occupations, or they may underestimate the significance of occupation-specific experience in attracting job offers. As a result, they may allocate their search efforts across occupations in a suboptimal manner, disproportionately focusing on occupations where they lack relevant experience. In

this case, job seekers aiming for unrelated occupations would overestimate their job finding prospects within the targeted occupations, leading them to hold overly optimistic beliefs regarding their overall job finding prospects.

To explore this mechanism, we use additional data from an online survey that was answered by a subset of our sample at the beginning of the unemployment spell. The survey serves as preparation for the first caseworker meeting and includes questions about job seekers' perceived labor market chances. Irrespective of their search profile, job seekers in our sample display a notable level of optimism regarding their reemployment prospects. For example, about 19% of job seekers with related profiles expect to secure a job within one month, whereas only 2% achieve this.<sup>8</sup> However, as shown in column (1) of Table 2, individuals with unrelated search profiles are 6.6 percentage points less likely to anticipate securing new employment within the next month than their counterparts with related profiles ( $p < 0.001$ ). When comparing perceived and actual job finding rates over the same period (see column 4 of Table 2), it is also evident that the overoptimism regarding their one-month job finding rate is less pronounced among individuals targeting unrelated occupations. This indicates that these job seekers are, to some extent, aware that it may take them longer to leave unemployment. However, notwithstanding this result, individuals targeting unrelated occupations may still misjudge their long-run labor market prospects. In this context, it is worth noting that we find no evidence for reduced overoptimism about three- or six-month job finding rates among job seekers with unrelated profiles.

**Long-run career expectations:** In a related manner, individuals may aim for professions where they lack experience in the hope to reap benefits in the future. In that case, they may deliberately accept reduced short-run job finding rates because they anticipate, for instance, long-run wage increases. While our findings indicate that individuals with unrelated search profiles tend to accrue lower earnings even over a three-year period, we also found evidence suggesting that the adverse effects diminish over time. To further study how job seekers' prospects evolve over time, Figure 3 illustrates the relationship between job seekers' search profile and their employment status, as well as their log monthly earnings conditional upon being employed, spanning a 36-month period following the start of their unemployment spell. Searching for unrelated occupations comes with a sizable and statistically significant employment and earnings penalty compared to job seekers targeting related occupations during the initial months after becoming unemployed (see Panel B of Figure 3). However, as time progresses, the adverse ef-

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<sup>8</sup>This pattern corresponds to findings from the US (Balleer *et al.*, 2021; Mueller *et al.*, 2021; Spinnewijn, 2015) and Germany (Caliendo *et al.*, 2023; Kassenboehmer and Schatz, 2017; van den Berg *et al.*, 2023), similarly demonstrating that displaced workers often maintain excessively optimistic beliefs.

Table 2: Differences in subjective beliefs across search profiles

Dependent variable	<b>A. Perceived job finding rate<sup>(a)</sup></b>		
	Within one month	Within three months	Within six months
	(1)	(2)	(3)
Search profile (ref.: related profile)			
Mixed profile	-0.012 (0.011)	-0.010 (0.016)	0.011 (0.007)
Unrelated profile	-0.066*** (0.015)	-0.005 (0.017)	0.002 (0.009)
<i>P</i> -value (mixed = unrelated)	0.000	0.796	0.275
No. of observations	3,527	3,527	3,527
Mean value dep. variable (related profile)	0.186	0.711	0.969
Individual-level control variables	Yes	Yes	Yes
Occupational fixed effects	Yes	Yes	Yes
Dependent variable	<b>B. Difference between perceived and actual job finding rate<sup>(b)</sup></b>		
	Within one month	Within three months	Within six months
	(4)	(5)	(6)
Search profile (ref.: related profile)			
Mixed profile	-0.015 (0.012)	-0.002 (0.023)	0.051** (0.023)
Unrelated profile	-0.072*** (0.015)	-0.011 (0.024)	0.041 (0.027)
<i>P</i> -value (mixed = unrelated)	0.000	0.694	0.614
No. of observations	3,527	3,527	3,527
Mean value dep. variable (related profile)	0.167	0.558	0.657
Individual-level control variables	Yes	Yes	Yes
Occupational fixed effects	Yes	Yes	Yes

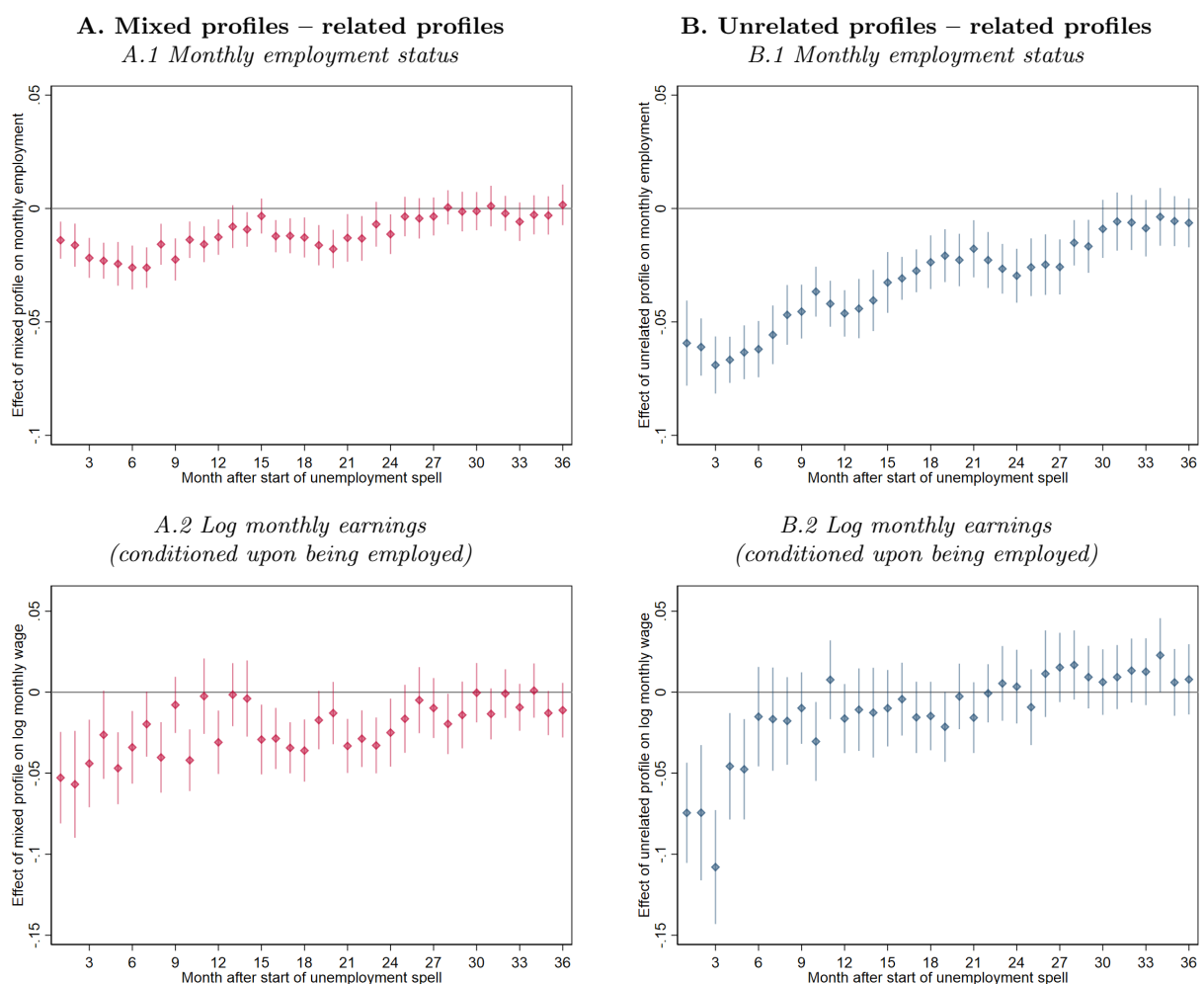
*Note:* The table reports differences in survey responses between job seekers with related, mixed and unrelated search profiles. Standard errors reported in parenthesis are clustered at the level of job seekers' previous occupation before unemployment (four-digit ISCO level). In all specifications, we control for individual characteristics (including educations, socio-demographic information, characteristics of the last job, month of entry into unemployment) and fixed effects for the previous occupation. \*\*\*/\*\*/\* indicates statistical significance at the 1%/5%/10%-level, respectively.

<sup>(a)</sup>The perceived job finding rate is elicited through a voluntary online survey administered to all newly unemployed job seekers between January and August 2017 with a response rate of approximately 40%. Depicted are responses to the following question: *How quickly do you think you will find a new job?*. About 80% of respondents answer the survey within two after registering as unemployed.

<sup>(b)</sup>Refers to the difference between an indicator taking the value of one if the individual expects finding a job within one, three, or six months, and another indicator that takes the value of one if the individual actually secures a job within the corresponding period.

fects diminish. Around 30 months after becoming unemployed, the employment rates of both groups align at similar levels. Meanwhile, the monthly earnings of individuals with unrelated search profiles begin to exceed those of job seekers exclusively focused on related occupations after approximately two years. While most of the monthly earnings differences are insignificant at conventional levels, the overall trend indicates that the job quality of workers aiming for unrelated occupations tends to improve in comparison to those searching within related occupations. However, assuming a monthly wage premium of 2.5% for individuals with unrelated search profiles—the maximum within the first 36 months—in the future, it would still require more than five additional years for them to compensate their short-term earnings loss.

Figure 3: Relationship between search profiles and monthly labor market outcomes over time



*Note:* The figure depicts differences in log monthly wages between job seekers with mixed (Panel A) and unrelated (Panel B) search profiles relative to those with related profiles including 90% confidence intervals. The sample consists of all workers who are employed in a given month. In all specifications, we control for individual characteristics (including education, socio-demographic information, characteristics of the last job, month of entry into unemployment) and fixed effects for the previous occupation. Standard errors reported in parenthesis are clustered at the level of job seekers' previous occupation before unemployment (four-digit ISCO level).

## 5 Conclusion

Our study provides new insights into the search strategies of unemployed workers. By exploring novel online data on their job search profiles, we illustrate that a considerable proportion of job seekers aims to work in occupations where they lack relevant experiences. Although these workers seek jobs in occupations with the most favorable overall conditions, they experience reduced levels of employment and earnings compared to those targeting occupations aligning with their labor market experience. It is essential to note that workers’ unobserved characteristics might be correlated with their search strategy and it is inherently challenging to assess the extent to which these factors contribute to the lower employment levels among those focusing to work in unrelated occupations. Nevertheless, the observed pattern aligns with the idea that workers experience substantial returns to occupation-specific skills.

Although additional survey evidence indicates that individuals searching in unrelated occupations are aware that they face reduced short-run job finding rates, it is conceivable that these job seekers misjudge their job prospects across occupations in the longer run. For instance, they may explore alternative career paths in hopes of enhancing their future job prospects. Aligning with this notion, we observe that the job quality of workers aiming for unrelated occupations, measured by their monthly earnings, tends to improve over time relative to job seekers targeting related occupations. However, the overall employment levels and earnings of job seekers searching in unrelated occupations tend to remain significantly lower compared to their counterparts aiming for professions related to their prior experience, at least for a period of three years following their entry into unemployment.

Our findings might carry significant implications for labor market policy, emphasizing the need to tailor job search advice to both individuals’ search strategies and their personal skills. In particular, workers who aim for jobs in fields that do not align with their prior labor market experience might especially benefit from occupational recommendations, as they are studied in several recent online labor market experiments (Altmann *et al.*, 2022; Belot *et al.*, 2019, 2022; Dhia *et al.*, 2022). For this group of job seekers, it could be effective to provide information about professions where they possess the corresponding skills and guide their search activities towards these relevant jobs. Studying the causal effects of providing such basic advice on the search behavior and employment outcomes of unemployed workers offers an intriguing avenue for future research.

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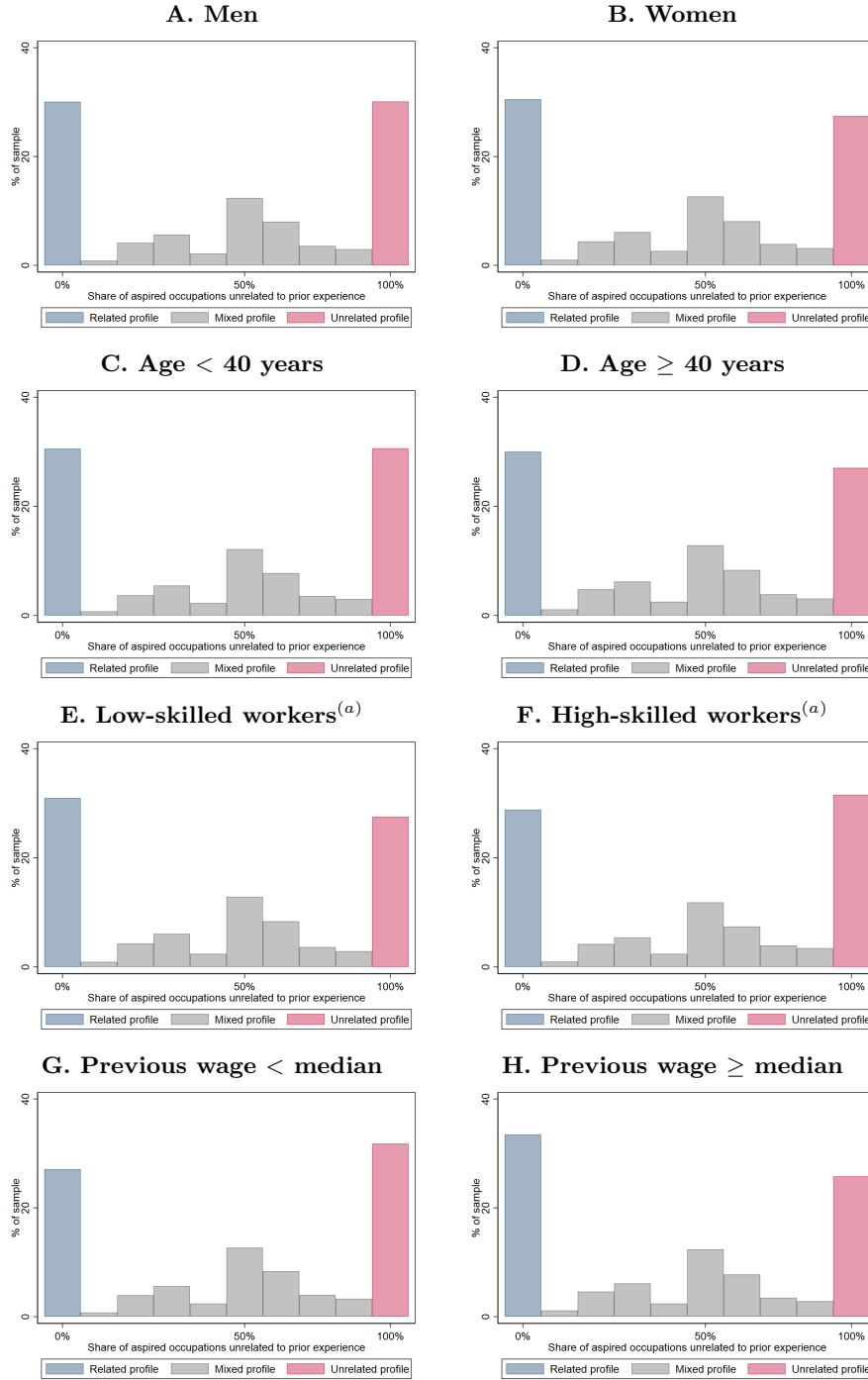
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## A Online Appendix: Additional Figures and Tables

Figure A.1: Distribution of search profiles for different subgroups



*Note:* The figure illustrates heterogeneity in job seekers' search profiles for different subgroups. It depicts the distribution of a variable measuring the share of occupations included in the search profile where individuals possess no relevant labor market experience (assessed based on their employment biographies and the O\*NET matrix of related occupations). The blue bar identifies job seekers who solely consider occupations where they have relevant experience (related profile), while the red bar identifies those who only consider occupations without relevant experience (unrelated profile). The gray bars identify job seekers who consider both related and unrelated occupations (mixed profile).

<sup>(a)</sup> The group of (low-skilled) high-skilled workers includes all individual (not) holding a short-cycle tertiary education, a bachelor's degree or a master's degree.

Table A.1: Relationship between search profile and individual characteristics

Dependent variable	Mixed profile (0=related profile)	Unrelated profile (0=related profile)
	(1)	(2)
Male	-0.006 (0.009)	0.028* (0.015)
No. of distinct previous occupations	-0.001 (0.002)	-0.050*** (0.003)
Age (ref.: below 25 years)		
25–35 years	0.200*** (0.014)	0.032** (0.015)
36–45 years	0.218*** (0.015)	-0.025 (0.019)
45–55 years	0.191*** (0.015)	-0.017 (0.022)
above 55 years	0.146*** (0.014)	-0.009 (0.020)
Married	-0.014** (0.006)	-0.028*** (0.009)
Danish Citizen	0.033** (0.013)	-0.011 (0.014)
Previous hourly wage (log)	-0.063*** (0.015)	-0.066*** (0.019)
Previous weekly working hours (log)	-0.004 (0.004)	-0.037*** (0.006)
Level of education (ref.: primary or missing)		
Lower secondary	0.089*** (0.016)	-0.003 (0.024)
Upper secondary	0.089*** (0.016)	0.019 (0.023)
Short-cycle tertiary	0.188*** (0.021)	0.182*** (0.027)
Bachelor's degree or equivalent	0.098*** (0.019)	0.124*** (0.033)
Master's degree or equivalent	0.165*** (0.019)	0.143*** (0.036)
No. of observations	43,673	36,083
Occupational fixed effects	Yes	Yes

*Note:* The table reports regression results of indicator for having mixed and unrelated profiles, respectively, on individual characteristics. The dependent variables are set to zero for job seekers with related profiles. In all specifications, we control for the month of entry into unemployment and fixed effects for the previous occupation. Standard errors reported in parenthesis are clustered at the level of job seekers' previous occupation before unemployment (four-digit ISCO level). \*\*\*/\*\*/\* indicates statistical significance at the 1%/5%/10%-level, respectively.

Table A.2: Differences in labor market outcomes across search profiles by labor market tightness

Dependent variable	Cumulative outcomes within 12 months		Cumulative outcomes within 36 months	
	Working hours	Labor earnings	Working hours	Labor earnings
	(1)	(2)	(3)	(4)
<b>A. Average labor market tightness in search profile: first quartile</b>				
Search profile (ref.: related profile)				
Mixed profile	-10.1 (10.7)	-4,231** (2,153)	26.3 (35.9)	1,291 (7,401)
Unrelated profile	-51.3*** (14.3)	-12,999*** (2,600)	-99.9** (43.9)	-29,126*** (7,488)
No. of observations	15,211	15,211	15,211	15,211
<b>B. Average labor market tightness in search profile: second quartile</b>				
Search profile (ref.: related profile)				
Mixed profile	-26.0*** (9.9)	-7,342*** (1,976)	-36.8 (30.2)	-18,641*** (6,474)
Unrelated profile	-65.7*** (13.3)	-14,579*** (2,858)	-116.6*** (41.9)	-28,984*** (8,587)
No. of observations	15,212	15,212	15,212	15,212
<b>C. Average labor market tightness in search profile: third quartile</b>				
Search profile (ref.: related profile)				
Mixed profile	-10.5 (9.9)	-4,798** (2,070)	0.6 (28.6)	11,700* (6,581)
Unrelated profile	-72.2*** (14.3)	-17,340*** (3,073)	-102.4** (45.8)	-31,727*** (10,171)
No. of observations	15,210	15,210	15,210	15,210
<b>D. Average labor market tightness in search profile: fourth quartile</b>				
Search profile (ref.: related profile)				
Mixed profile	-22.7* (13.4)	-6,582** (2,970)	-54.0 (35.6)	-17,326** (8,293)
Unrelated profile	-66.5*** (15.7)	-14,066*** (3,333)	-95.8** (42.6)	-16,528* (9,229)
No. of observations	15,210	15,210	15,210	15,210
Individual-level control variables	Yes	Yes	Yes	Yes
Occupational fixed effects	Yes	Yes	Yes	Yes

*Note:* The table reports differences in labor market outcomes between job seekers with related, mixed and unrelated search profiles separated for quartiles of the average labor market tightness among the occupations within job seekers' search profile. In all specifications, we control for individual characteristics (including educations, socio-demographic information, characteristics of the last job, month of entry into unemployment) and fixed effects for the previous occupation. Standard errors reported in parenthesis are clustered at the level of job seekers' previous occupation before unemployment (four-digit ISCO level). \*\*\*/\*\*/\* indicates statistical significance at the 1%/5%/10%-level, respectively.