

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Social Science Research

journal homepage: www.elsevier.com/locate/ssresearch

Age discrimination in hiring: Relative importance and additive and multiplicative effects

Jeevitha Yogachandiran Qvist^{*}, Christian Albrekt Larsen

Department of Politics and Society, Aalborg University, Fibigerstraede 1, 9220, Aalborg East, Denmark

ARTICLE INFO

Keywords:

Age discrimination
Conjoint survey experiment
Hiring discrimination
Intersectionality

ABSTRACT

In a preregistered nationwide factorial survey experiment among 5017 Danish employers and 20,068 vignettes, we examined the interplay between applicant age (45–75 years) and other applicant characteristics in hiring discrimination. The experiment enabled us to examine the relative importance of age compared to other forms of hiring discrimination, as well as the additive and multiplicative effects. First, regarding relative importance, our study reveals that discrimination against older applicants outweighs other characteristics and persists regardless of the employer's age. Across all industries and sectors, no other applicant characteristics were found to be statistically significantly more important than age. Second, we identified three multiplicative effects that weaken age discrimination: the employers discriminated less against older applicants in terms of previous unemployment, preference for not working full-time, and being male with a Muslim background. We did not find any multiplicative effects between age and other applicant characteristics that strengthen age discrimination in hiring. Third, after accounting for all multiplicative effects, we found strong additive effects, as applicants who are older and have other disadvantaged characteristics have a likelihood of recruitment that is close to zero.

1. Introduction

Hiring decisions are surrounded with uncertainty, as labour is a special and complex commodity. While there is a demand, a supply and a price, as is the case for other markets, the commodity in this case is a human being, who is expected to integrate into and function at a new workplace. Despite this complexity, studies of hiring decisions reveal clear patterns concerning who is rejected and who is hired. Correspondence studies (that is, studies that examine callback rates to actual job advertisements using fictional applications) are often considered the gold standard for analysing employers' discriminatory behaviour. Solid evidence of hiring discrimination is established when researchers are able to control the treatment (e.g. the ethnicity of the applicants) and employers are unaware that they are taking part in an experiment. These field experiments started with a focus on ethnic discrimination in the British and American labour and housing markets, but, since the 1960s and 1970s, have also been conducted in many other countries and contexts (see [Heath et al., 2013](#); [Verhaeghe, 2022](#) for an overview). A recent meta-study of previous correspondence studies on hiring discrimination has found that older applicants, as well as applicants with disabilities and an unattractive physical appearance, seem to be discriminated against as much as candidates with salient racial or ethnic characteristics ([Lippens et al., 2023](#)). For example, a correspondence study from Sweden found that applicants nearing retirement age had callback rates of only 2–3% compared to 15–20% for 35-year-olds

^{*} Corresponding author.

E-mail addresses: jy@dps.aau.dk (J.Y. Qvist), albrekt@dps.aau.dk (C.A. Larsen).

<https://doi.org/10.1016/j.ssresearch.2024.103135>

Received 6 June 2024; Received in revised form 16 December 2024; Accepted 16 December 2024

Available online 6 January 2025

0049-089X/© 2024 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

(Carlsson and Eriksson, 2019). These findings help explain the longer unemployment spells for older workers compared to younger workers and are highly relevant in the context of rising life expectancies and the extension of working lives (OECD, 2019, 2022).

However, even though the negative effect of older age on hiring is a consistent finding in correspondence studies (see Baert, 2018; Batinovic et al., 2022), this research is often limited in its exploration of how age interacts with other applicant characteristics. There are a growing number of field experiments on hiring discrimination that examine the interaction between two applicant characteristics (see e.g. Birkelund et al., 2017; Bygren et al., 2017; Dahl and Krog, 2018; Di Stasio and Larsen, 2020; Gaddis, 2015; Oreopoulos, 2011), but these primarily focus on the interplay between ethnicity, gender, and unemployment status. However, with aging populations, older adults also become an increasingly heterogenous group (Swift and Steeden, 2020). There is therefore a need to study the interplay between age and other characteristics. This provides an understanding of the potential multiple forms of disadvantage, or advantage, that are faced by some older individuals. This knowledge might be useful in tailoring effective anti-discrimination policies. Moreover, the broader intersectionality literature has been criticized for paying little attention to age (Holman and Walker, 2021). Using a preregistered large factorial survey experiment, we set out to close this research gap by examining how the age (ranging from 45 to 75 years) of the applicant, in combination with other applicant characteristics (gender, religious background, unemployment and preference for work schedule) as well as employer characteristics (age), affects hiring discrimination.

Our scenario-based design offers two significant advantages over the previous literature that is based on correspondence studies. First, it allows us to examine the relative importance of age, as well as the additive and multiplicative effects on hiring discrimination of several applicant and employer characteristics instead of only one or two varying characteristics. These various effects are illustrated in Fig. 1. Relative importance refers to the specific impact of each dimension on the outcome variable. Additive effects refer to the combined effect of various characteristics arrived at by summing up their individual effects. In contrast, multiplicative effects (also known as amplified/muted effects) refer to the interaction between two or more characteristics that can change the strength of their impact on employment opportunities, either strengthening or weakening them; see Fig. 1. Second, our study uses a nationwide representative sample of employers drawn from administrative register data. This approach ensures broader generalizability than correspondence studies, which are often limited to particular job types or rely on online platforms with publicly announced job advertisements that do not represent all employers or more informal recruitment processes (Verhaeghe, 2022). By including the entire national labour market, our estimates provide a higher degree of external validity (Deaton and Cartwright, 2018).

2. Theoretical background

Within a neoclassical economic perspective, employers strive for profit maximization by searching for the most productive employee (Hamermesh, 1996). In a state of perfect competition, including full information, an applicant would only be judged on their specific productivity. However, labour is not a standard commodity for which the price (the wage) is the only relevant information needed for recruitment. To assess the profitability of a specific applicant, the employer also needs information about job motivation, ability to cooperate with co-workers, ability to adapt to technological and organizational changes, and ability to interact with customers, among other skills. This additional information is asymmetrically distributed, as the applicant knows more than the employer about their labour supply. At the same time, applicants have a clear incentive to present themselves in the best way (Akerlof, 1970; Larsen and Vesan, 2012). For these reasons, asymmetric information makes the hiring process a risky venture in which an employer, in various ways, attempts to compensate for the lack of (trustworthy) information about a given applicant. A classic strategy is to assess the individual applicant by the perceived or actual average productivity of the group to which the applicant belongs. When an employer rejects an applicant because they belong to a group with low average productivity, this is labelled statistical discrimination (Arrow, 1973). Statistical discrimination is a market-based explanation for why employers, who seek to hire the most productive employees, may reject members of ethnic minorities, older applicants, and women. Regarding age and statistical discrimination, older workers are viewed as lacking hard skills like working hard, mastering new technology, and learning new skills. However, they are perceived as having more soft skills, such as being reliable, loyal, and sociable (Karpinska et al., 2013; Qvist et al., 2023). Statistical discrimination is often contrasted with taste discrimination. Taste discrimination is defined as an employer's willingness to hire a less productive worker because of a preference for a particular characteristic, such as for example being white. Taste discrimination thus occurs when a less productive worker (someone who is white) is chosen over a more productive worker (a black person) because of a preference for a specific characteristic (Becker, 1957). In terms of age and taste discrimination, stereotypes about older people include a mix of positive and negative traits. In general, older people are perceived to be warmer but also less competent than younger individuals (Cuddy and Fiske, 2002).

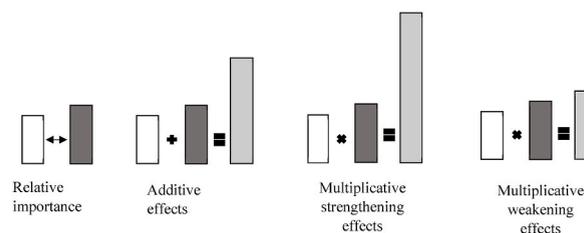


Fig. 1. Illustration of different forms of discrimination effects.

It is notoriously difficult for researchers to distinguish between statistical and taste discrimination. The critical task is to keep information on productivity constant across matched applicants, which is typically done through similar resumés (e.g. Oreopoulos, 2011). However, this method is made difficult because all relevant information for the productivity assessment, such as co-workers' willingness to cooperate with an applicant, is not included in a resumé (see Heckman and Siegelman, 1993 for this critique), and by the simple fact that employers do not pay attention to long resumés (Bertrand and Duflo, 2017; Oreopoulos and Dechief, 2012). Keeping productivity constant is also a challenge for our study. We asked employers to assess the likelihood of employment for (random) profiles of applicants who all had the formal competencies to do the core tasks in the workplace. However, having applicants who meet the formal competencies and randomizing five profile characteristics, which are kept constant through statistical modelling, does not mean that we can keep the applicants' (imagined) productivity constant. Furthermore, any judgment under uncertainty is likely to be influenced by heuristics and biases, such as the anchoring effect (Tversky and Kahneman, 1974), which makes it difficult to distinguish taste discrimination, understood as explicit preferences, from subconscious mechanisms (e.g. Crandall and Eshleman, 2003; Oreopoulos and Dechief, 2012). Thus, we basically accept that employers' underlying motivation and decision heuristics are something of a black box for experimental research in this field, including our own.

The classic discussion about taste versus statistical discrimination is further complicated by the fact that applicants have multiple traits that employers are likely to consider in their assessments. This simple fact was one reason for abandoning the field experiment in which actors go out to search for jobs (audit studies); for example, a black actor has many characteristics other than their skin colour (Neumark, 2010). Within sociology and social psychology, theories about this have been proposed through the lens of intersectionality. The argument was originally developed in the context of ethnic minority women and was framed as a double jeopardy problem that came in two versions: an *additive* version that expected the disadvantage of being a member of an ethnic minority and a woman to add up to high levels of disadvantage, and a *strengthening multiplicative* version that expected the disadvantage to be even higher than the additive version would suggest, see Fig. 1 (Berdahl and Moore, 2006). The intersectionality concept has been used to pinpoint these positions of extra disadvantage and the distinct stereotypes formed in the intersections between categories, such as the black American welfare queen or the young aggressive black American male (Gilens, 2009; Larsen, 2013). In the same way, older applicants could potentially face a situation in which new stereotypes in the intersections between age, gender and religious background (see below) lead to high levels of discrimination. However, intersections might also weaken existing stereotypes. In an American hiring correspondence study, for example, Pedulla (2018) found the negative consequences of previous unemployment to be less important for black job applicants, 'which posits that when individuals evaluate others that occupy multiple social positions about which stereotypes are highly congruent, such as being black and being unemployed, the additional category membership will have limited influence over the ultimate evaluation' (Pedulla, 2018, p. 1477). In other words, because the characteristics of these identities overlap so heavily, one finds weakening multiplicative effects. This has not been studied for the effect of age in combination with other characteristics on hiring discrimination, but Kang et al. (2014) argue that positive stereotypes about older people attenuate the negative perceptions of being black: that is, there is a weakening multiplicative effect. It is such potential multiplicative mechanisms that we set out to explore.

2.1. Hypotheses

In our experimental setup, we examine employers' hiring discrimination across five applicant characteristics: age, gender, religious background, employment status, and preferences for working full time or less than full time. The effects of the first four characteristics have been studied (often independently) in the existing literature on labour market discrimination (Bertrand and Duflo, 2017; Birkelund et al., 2022). The final characteristic, preference for full-time or less than full-time work, is included because of the high proportion of older workers indicating a preference for reduced working hours as an alternative to retirement (Charles and Decicca, 2007), as well as the high proportion of part-time workers across European labour markets, especially among women (Statistics Denmark, 2017). We randomized the job applicants based on the characteristics shown in Table 1. As a result, we had 216 different combinations of job profiles (see Supplementary Fig. 1 for examples of the vignettes).

In our preregistration, we posit a number of hypotheses for the Danish labour market that focus on 1) the main effects of all applicant characteristics, 2) the multiplicative effects of age and other applicant characteristics, and 3) the multiplicative effects of age and employer's age. These hypotheses are summarized in Table 2.¹ Our preregistration can be accessed here: https://osf.io/xkury?view_only=328e71380483460bbcbd9414895ecfcf.

2.2. Main effects

First [Hypothesis 1], age discrimination in hiring processes tends to increase with age, because employers perceive that the productivity of older employees decreases as the result of a decline in physical and cognitive abilities and/or an increase in impairments (Batinovic et al., 2022; Lösbroek et al., 2021; Oude Mulders et al., 2014; van Dalen et al., 2010). Our age bracket is from 45 to 75 years of age. This age bracket includes applicants below and above the statutory retirement age in Denmark, which has been increased from 65 to 67 years and in the future will increase with life expectancy. By 2022, the employment rate in Denmark for men aged 65 to 74 was 24 per cent, and for women it was 11 per cent. Employment after the statutory retirement age is considered a suitable way to increase the labour supply among older retirees; this increased supply is needed because of the aging population (Naegele and Baucknecht,

¹ The numbering and wording of the hypotheses have been adjusted to fit the article, but the hypotheses themselves have not been altered.

Table 1
Characteristics of job applicant vignettes.

| Characteristic | Categories |
|-------------------------------|--|
| Age | 45 years old/55 years old/60 years old/65 years old/70 years old/75 years old |
| Gender | Male/Female |
| Religious background | Christian background/Muslim background/Hindu background |
| Employment status | Currently employed/Has not been employed for the past 3 months/Has not been employed for the past 18 months. |
| Preferences for work schedule | Preference for working full time/Preference for working less than full time |

Table 2
Overview of initial preregistered hypotheses.

| Hypothesis | Main effects of job applicant characteristics |
|---|--|
| 1. | Discrimination in hiring increases with the age of the applicant. |
| 2. | Having a non-Christian background increases discrimination in hiring. |
| 2.1 | Applicants with a Muslim background are more likely to be discriminated against in hiring compared to applicants with a Hindu background. |
| 3. | Unemployed applicants are more likely to be discriminated against in hiring compared to employed applicants. |
| 3.1 | Discrimination in hiring increases with the length of unemployment. |
| 4. | Applicants with a preference for working less than full time are more likely to be discriminated against in hiring compared to applicants with a preference for working full time. |
| 5. | There is no overall gender discrimination in hiring. |
| Multiplicative effects of job applicant characteristics | |
| 6. | Discrimination in hiring against the unemployed increases with age. |
| 7. | The discrimination penalty in hiring is more pronounced for older females with a Muslim background than it is for older Christian females. |
| Multiplicative effects of job applicant and employer characteristics | |
| 8. | Age discrimination in hiring against older applicants is stronger among younger employers than among older employers. |

2019), and an increasing share of employees in Denmark wish to work beyond the statutory retirement age (Andersen et al., 2023).

Second [Hypothesis 2], in a European/Danish context a Christian background has historically indicated membership of the native majority group (in the American context, this is often operationalized as being white), and we expected non-membership to be associated with discrimination. Whether the penalty for not belonging to the majority group is a matter of statistical or taste discrimination is difficult to tell, but previous studies have consistently found negative effects across different contexts (Lippens et al., 2023). Specifically, for the European/Danish context [Hypothesis 2.1], we expected this penalty for not belonging to the majority to be more severe for applicants with a Muslim background than for other non-majority members (which, following Hedegaard and Larsen (2022), was operationalized as having a Hindu background). A recent meta-analysis of European correspondence studies on labour market discrimination found that callback rates are particularly low for applicants with Muslim names/origin countries (Baert, 2018). This could be attributed to a lack of human capital, given that many (recent) Muslim minorities have arrived in Europe as humanitarian migrants, but it might also be attributed to taste discrimination, as a particular strain of anti-Muslim sentiment has emerged in Europe, including in Denmark (Alba and Foner, 2015; Danmarks Videncenter for Integration, 2020; Helbling, 2014; Statham and Tillie, 2016).²

Third [Hypotheses 3 and 3.1], regarding unemployed applicants, there is strong evidence that unemployment, especially longer spells of unemployment, has 'scarring effects', as unemployment causes a deterioration in future labour market opportunities (Gangl, 2006; Nilsen and Reiso, 2011), partly because employers may perceive unemployment as a negative signal of unobserved characteristics, such as job motivation or a decay in human capital. For employment status, we distinguished between currently employed, signalling that the individual had been selected by another employer; unemployed for 3 months, signalling potential rejection from other employers for a short period (often labelled frictional unemployment); and unemployed for 18 months, signalling rejection from other employers.

Fourth [Hypothesis 4], regarding work schedule, reduced working hours are among the various flexible working arrangements that employers are adopting in the current job market (Cooper and Baird, 2015; Kelly and Kalev, 2006). These arrangements, if voluntary, could appeal to many older employees. They can potentially boost employee productivity and loyalty, which has led some employers to favour part-time workers. However, evidence from the previous literature indicates that employers seeking part-time workers discriminate more on the basis of family and parenthood status than those seeking full-time workers (Becker et al., 2019). This finding

² Our categorization is in contrast to race-based categorization, which is highly salient in the American context (Drouhot and Nee, 2019). It is important to note that we use the term religious background rather than individual religion, as we are referring here to the religious upbringing or affiliation of an individual, which may include the religious traditions, beliefs, and practices to which they were exposed while growing up or within their cultural context. As such, the term does not necessarily say anything specific about the religious beliefs to which the individual applicant personally adheres or with which they identify. In the Danish context, explicitly stating one's religion on a CV or application is uncommon. However, the religious background of an applicant might be inferred through indicators such as name, picture, or country of origin. It is therefore likely that employers can deduce this information about the applicant.

suggests that employers searching for part-time workers may be (particularly) concerned about issues such as lower commitment and increased sick leave. Thus, searching for part-time work could be perceived as a signal of weaker career ambitions or a lower commitment to the workplace. We therefore expected higher discrimination effects for an applicant who stated a preference for less than full-time work rather than full-time work. We captured the preference for work schedule by distinguishing between full-time and less than full-time work.

Finally, we included gender as a varying characteristic in our study. We have competing hypotheses regarding the effect of gender. Given that we study applicants aged 45 and above in the Danish context, which is characterized by gender equality norms and high female employment rates (Guetto et al., 2015), we preregistered an expectation of no gender discrimination in our study [Hypothesis 5]. Some previous literature does indeed indicate a general absence of gender discrimination in hiring (Bertrand and Duflo, 2017; Birkelund et al., 2022; Bygren et al., 2017). Other research finds that women face statistical discrimination, primarily when pregnancy and subsequent parental leave are potential factors (Gangl and Ziefle, 2009), which is irrelevant for our study because of our age group. However, gender might interact with other characteristics (see below).

2.3. Additive and multiplicative effects

Our main interest is how the effect of age interacts with the effects of the other traits that we manipulated. If multiplicative effects were absent, one would have a case of additive effects, as discussed in the intersectionality literature. If one found strengthening multiplicative effects, one would have a case of intensified age discrimination for particular groups, which has also been discussed in the intersectionality literature. Finally, if one were to find weakening multiplicative effects, one would have a case that contradicts the expectations of the intersectionality literature.

As for the scarring effect of unemployment on hiring discrimination, we expected it to increase with age, as previous research has indicated that older workers are less likely than young workers to re-enter employment after a period of unemployment [Hypothesis 6]. Research has also shown that longer durations of unemployment among older workers are more strongly associated with their age than are such stretches among younger workers (Axelrad et al., 2018). Next, we expected that the discrimination penalty in hiring is more pronounced for older females with a Muslim background than it is for older Christian females [Hypothesis 7]. Based on the previous literature, one could expect that associations with the stereotypes of dangerous Muslim men would be reduced as the age of the male applicants increases (not in our preregistration). This weakening multiplicative male age effect is what American social psychological literature has found for the stereotype of dangerous black and Arab men (Bergstrom et al., 2024; Kang et al., 2014). However, for Muslim females, we preregistered a strengthening multiplicative age effect in hiring discrimination. In the Danish context, older females with Muslim backgrounds have low employment rates, which has spurred a new sub-stereotype about traditional Muslim gender norms (in contrast to the majority of females) and free-riding on the generous Danish social assistance benefits (in contrast to the hardworking majority) (Braidahl and Larsen, 2016). These biases may also be rooted in the (perceived) deficit of human capital within this particular group (Koopmans, 2016), which may be further amplified by ageist stereotypes. Consequently, the combination of being an older woman and having a Muslim background could generate a strengthening multiplicative effect. This would be a case of intersections giving rise to a specific negative sub-stereotype.

We also proposed a last hypothesis on the multiplicative effect of applicant age and employer age. Our expectation was rooted in the concept of homophily and the tendency to favour in-groups, which is also a key source of taste-based discrimination (Erlandsson, 2019; McPherson et al., 2001); this implies that employers prefer job applicants who are similar to them in specific traits. Therefore, we hypothesized that age discrimination against older applicants is stronger among younger employers than among older employers

Table 3
Descriptive characteristics of the employers and workplaces.

| | Percent | Mean | SD | Min | Max |
|--|---------------|-------|------|-----|-----|
| <i>Employer characteristics</i> | | | | | |
| Age | | 53.08 | 9.33 | 21 | 84 |
| Female | 53 | | | | |
| <i>Workplace sector</i> | | | | | |
| Private sector | 78 | | | | |
| Public sector | 11 | | | | |
| Other | 11 | | | | |
| <i>Workplace industry</i> | | | | | |
| Agriculture, forestry, fishing | 3 | | | | |
| Manufacturing, mining, quarrying | 9 | | | | |
| Construction | 9 | | | | |
| Trade and transport | 32 | | | | |
| Information and communication | 4 | | | | |
| Financial insurance | 2 | | | | |
| Real estate | 2 | | | | |
| Other business service | 11 | | | | |
| Public administration, education, health | 23 | | | | |
| Arts, entertainment, and other services | 4 | | | | |
| N observations (employers) | 20,068 (5017) | | | | |

[Hypothesis 8].

3. Data and methods

3.1. Data

The factorial survey experiment was conducted between October and December 2022 on a representative sample of Danish workplaces with five or more employees. The sample was stratified by the size of workplace and industry and drawn from the Central Company Register, where each company in Denmark has a unique identification number. We sampled the employers at the workplace level, which refers to a unit located at one address. Thus, the workplace can be an organizationally delimited part of a larger company. We conducted the factorial survey experiment as part of a more extensive survey about managing an aging workforce. The survey was answered by the HR manager or the personnel manager at each workplace. In the letter accompanying the survey questionnaire, we assured the employers that all their responses would remain anonymous. A total of 5017 employers completed the survey, which corresponded to a response rate of 25.1%. This response rate is modest compared to individual level surveys but is similar to other surveys conducted at the organizational level, where response rates typically range from 20% to 30% (Brewster et al., 1994; Principi et al., 2020). Across industries and workplace sizes, there was good representation. However, the response rate was slightly lower among workplaces with between five and nine employees and within the information and communication industry. To account for potential selection bias, we applied weights based on industry, workplace size, and region in the analyses. Table 3 shows the descriptive characteristics of the employers and workplaces for the variables used in the analysis and supplementary analyses.

3.2. Research design and variables

Our research was conducted as a factorial survey experiment. We presented vignettes representing different job applicants, and, within each vignette, we simultaneously manipulated selected characteristics that describe the profile. Compared to traditional survey research, this approach is particularly suitable for examining discriminatory behaviour, as it allows for a more accurate reflection of the employers' evaluation by presenting real scenarios. Despite being monitored and the fact that the factorial survey experiment was conducted as part of a larger survey on managing an aging workforce, the employers may not have been fully aware of the controlled variations in each vignette, as the vignettes also varied on parameters other than age. This may have reduced the influence of social desirability norms (Wallander, 2009).

Each employer was first shown two randomized job applicants at the same time, and this was followed by an additional screen with two randomized job applicants. Thus, each of the 5017 employers evaluated four job profiles, which resulted in 20,068 observations. The employers were given the following introduction: "Imagine a situation where you were hiring a new employee. In the following, we will show you two applicants that you are to assess. After that, we will show you two additional applicants. All applicants have the formal competencies to conduct the workplace's core task." For each job applicant, we asked "How likely is it on a scale from 0 to 10 that you would hire applicant [number]? 0 indicating 'very unlikely' and 10 indicating 'very likely'." Following Lössbroek et al. (2021) we used the term 'hireability score' to label the employers' assessments of the applicants on a scale from 0 to 10. We then asked the employer, for each pair of applicants, to choose between the two: "Who would you choose if you were to choose one of these two applicants?" This brought us a step closer to simulating the decision-making process involved in recruitment. We consider these two measures to be complementary, as they offer different perspectives on the hiring process. We present the results for both outcomes and interpret consistent results as an indication of increased reliability (largely, our results are consistent across the two measures).

We randomized the order of the characteristics such that the employers were not met with the categories in the same order. In Supplementary Tables 1–5, we have performed a balance check to assess the reliability of the random assignment of job profile characteristics. The tables demonstrate a successful randomization of all five treatment variables, as evidenced by the balanced distribution for different key characteristics of the workplace. In the analysis, we also included information about the employer's age, and in the robustness check, we considered the employer's gender as well. Information about the age and gender of the employer was taken from questions in the survey, where we asked, "How old are you?" and "What is your gender?"

3.3. Estimation strategy

We applied ordinary least squares (OLS) regressions to estimate both hireability scores and whether the employer selected a specific job applicant. The first dependent variable, hireability score, is equivalent to the Likert scale ranging from 0 to 10, where 0 indicates very unlikely to be hired and 10 indicates very likely to be hired. The average hireability score across all job profiles was 4.15 (SD = 3.24). The second dependent variable, the selection outcome, measures the likelihood of being selected, with the forced selection between two applicants naturally resulting in 50% of profiles being selected over other (randomized) profiles. We estimated the average marginal component effect (AMCE) by separately regressing the hireability score and the probability of being selected on the attribute values. We included interaction terms between two or more characteristics to test whether the applicants' hiring opportunities depended on the combination of various characteristics. As the vignettes are the units of the analysis, our dataset includes 20,068 observations from 5017 employers. To obtain accurate variance estimates, we used clustered standard errors at the employer level because the choice outcomes from the same employer are not independent (Hainmueller et al., 2014). To avoid composition effects in the paired forced-choice conjoint designs, we applied the average component preference (ACP) estimate, as suggested by Ganter (2023), to test for the sensitivity of the results concerning the second dependent variable. As opposed to the AMCE framework, where

each vignette is treated as a single observation, the ACP method accounts for the paired nature of forced-choice designs. In this approach, one observation corresponds to a choice between two applicants (Ganter, 2023). Thus, for this sensitivity analysis, we used a paired dataset. Full regression tables are available in the supplementary material.

4. Results

4.1. Main effects of job applicant characteristics

Fig. 2 shows the effect of the applicant characteristics (having a specific characteristic compared to a reference group) on the employers' assessments on the hireability score from 0 to 10 (left panel) as well as on the likelihood for each characteristic of being selected by the employer over other randomized profiles (right panel). The estimates are controlled for all other (manipulated) characteristics, and thus reveal the relative strength of various forms of discrimination. These effects are illustrated in Fig. 2 (left and right panels).

The left panel shows that female applicants have a 0.11 lower hireability score than male applicants. However, when we look at gender differences in the likelihood of being selected by the employer, the results (Fig. 2, right panel) show that female applicants do not have a statistically significant lower chance of being chosen (over other candidates) than male applicants, in line with our pre-registration for applicants aged 45 years and above. Thus, Hypothesis 5 is partially confirmed. We observe that employers select applicants based on their age, which also aligns with our preregistered hypotheses. Fig. 2 shows that a 55-year-old applicant has an estimated 0.19 lower hireability score than a 45-year-old applicant. The hireability score is 0.79 lower for a 60-year-old applicant, 1.57 lower for a 65-year-old applicant, 2.66 lower for a 70-year-old applicant, and 3.20 lower for a 75-year-old applicant compared to a 45-year-old applicant. From the right-hand panel, we observe that the lower likelihoods of being selected (over other candidates) in comparison with a 45-year-old are 2, 9, 16, 34, and 44 percentage points. Applicants with a Muslim or Hindu background also have statistically significantly lower hireability scores than applicants with a Christian background. The hireability score is 0.78 lower for profiles with a Muslim background and 0.62 lower for profiles with a Hindu background. Their chances of being selected over other profiles are, respectively, 6 and 3 percentage points lower than for applicants with a Christian background. Additionally, when comparing the effect sizes of applicants with a Muslim background to those with a Hindu background, applicants with a Muslim background exhibit statistically significantly lower hireability scores and likelihood of being selected (p-values = 0.0125 and 0.0014, respectively). These findings confirm our preregistered hypotheses. Also, in support of our preregistered hypothesis, we find that employed applicants are statistically significantly favoured over unemployed applicants, and this effect increases with the length of unemployment. The hireability score is 0.57 lower for profiles with 3 months without employment and 1.18 lower for profiles with 18 months without employment compared to employed applicants. Their chances of being selected over other profiles are 6 and 21 percentage points lower than for employed applicants. Finally, in line with our preregistered hypothesis, a preference for working less than full time gives a 0.59 lower hireability score and a likelihood of being chosen 9 percentage points lower than other profiles. In this experimental setup, the manipulation of age supersedes any of the other manipulations.

To further assess the sensitivity of the results concerning the second dependent variable—the likelihood of being selected—we utilized the average component preference method, as recommended by Ganter (2023) for forced-choice experiments. This method accounts for the paired nature of the data by systematically comparing the two applicants in each pair. In doing so, the estimation

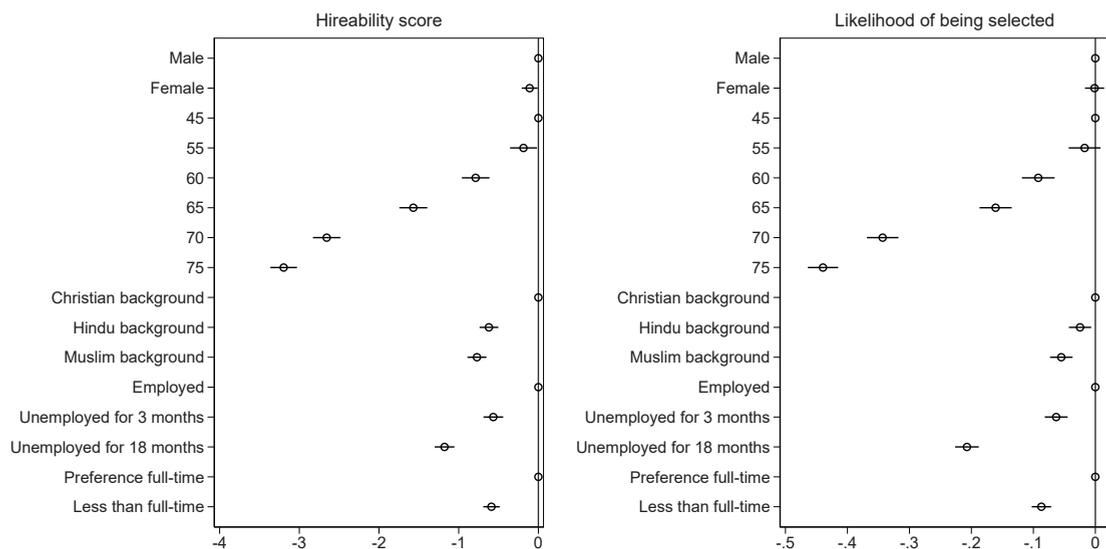


Fig. 2. Relative importance of applicant characteristics on hireability score (left panel) and likelihood of being selected (right panel). Note: Full regression model available in Supplementary Table 6.

adjusts for any imbalance in the number of categories across different attributes. Fig. 3 illustrates the within-attribute range and the variability of ACP estimated for the second dependent variable. The range measures the largest variation in preferences, that is, the least and most preferred levels for each attribute. The variability measures how spread out the preferences are for a given attribute, capturing how much, on average, preferences deviate from indifference (zero).

For both the range measure and the variability measure, this analysis also shows that age is the most important attribute for preferences, while gender and religious background are the least important attributes.

In Supplementary Figures 2-5 and 7-9, we break down the estimated hireability scores (AMCE), likelihood of selection (AMCE), and the range and variability of ACP by industries and sectors. Based on the effect sizes, all the measures indicate that age has a stronger effect than any other attribute. However, when examining the range and variability of preferences within each attribute in the forced-choice framework, we find that in some industries and sectors—specifically the information and communication sector, financial insurance, real estate, and other business services, as well as the public sector—the importance of other characteristics, mainly employment status, is not statistically significantly different from the importance of age. Nevertheless, in none of the industry or sector analyses are any applicant characteristics statistically significantly more important than age.

4.2. Multiplicative effects

Next, we tested whether discrimination in hiring against the unemployed increases with age. Since the observed age trend follows a linear pattern, with 75-year-old applicants facing the most significant disadvantage in hiring, we treat the age variable as linear in the interaction analyses.

Contrary to our preregistered hypothesis, older unemployed applicants were not more likely to be discriminated against than younger unemployed ones. Indeed, we found the opposite effect, as illustrated in Fig. 4. Fig. 4 (left panel) shows that discrimination against the unemployed significantly decreases with age. This is indicated by the decreasing gap in hireability scores between individuals unemployed for both 3 months and 18 months compared to those who are employed: the gap decreases significantly as the applicant’s age rises. Similarly, a statistically significant multiplicative weakening effect with age can be observed in the likelihood of being selected over other profiles (right panel) when comparing applicants unemployed for 18 months and employed applicants.

We found a similar pattern when we interacted age with preference for work schedule (see Fig. 5, not preregistered). The gap between the lower hireability score of applicants who prefer to work less than full time and the higher hireability score of those who prefer full-time work is greatest for the 45-year-olds and decreases significantly with age. Thus, if anything, we found weakening multiplicative effects. This means that the scar effect of being unemployed and the negative signal of preferring *not* to work full time are somewhat reduced for older applicants.

Based on our preregistered hypotheses, we also expected that gender discrimination would be notably more pronounced for older females with a Muslim background than older females with a Christian background. Our analysis does not find evidence for the strengthening multiplicative hypothesis, as the three-way interaction effects were not statistically significant. If anything, the three-way interaction term indicates the opposite effect, that age discrimination is less pronounced for older Muslim females than it is for older Christian females (see Fig. 6, left panel, and Supplementary Table 9). However, we observe a significant interaction effect among males on hireability scores: the Muslim penalty is less severe for older males than for younger males. This is shown in Fig. 6, right-hand panel. For the probability of being selected, we do not find any significant interaction effects between gender, age, and religious background. Thus, the overall finding is that the weakening effects of age on religious background are modest, which is not surprising as the effect of religious background was modest in the first place.

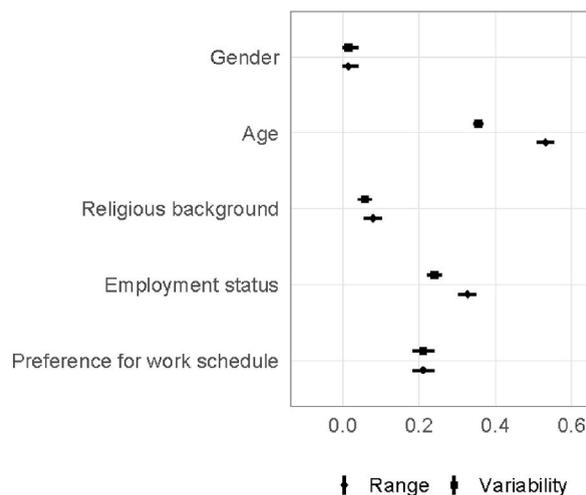


Fig. 3. Within-attribute range and variability of ACP associated with applicant characteristics.

Note: 95% confidence intervals with clustering at the employer level. The estimated ACP are available in Supplementary Fig. 6.

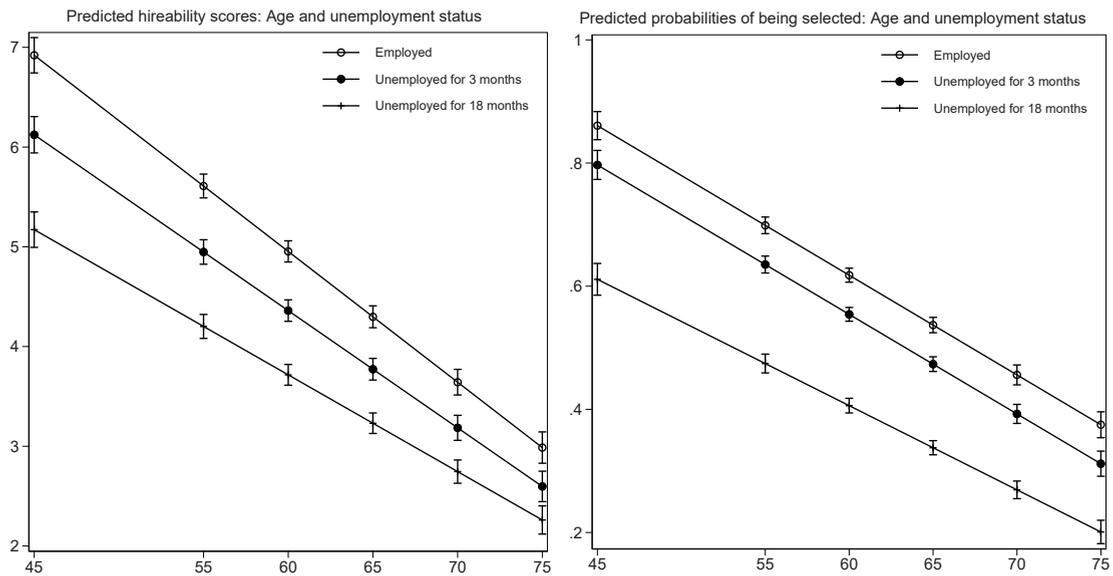


Fig. 4. Predicted hireability scores (left panel) and predicted probabilities of being selected (right panel). Age and unemployment status. Note: Based on full models with interaction terms between age and unemployment status, see [Supplementary Table 7](#).

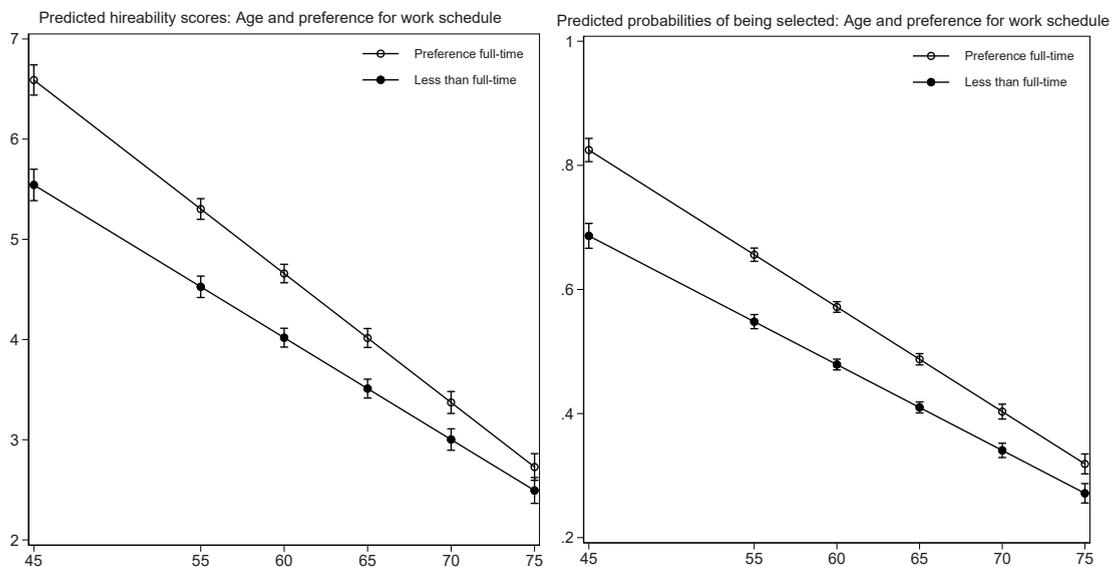


Fig. 5. Predicted hireability scores (left panel) and predicted probabilities of being selected (right panel). Age and preference for work schedule. Note: Based on full models with interaction terms between age and preference for full time, see [Supplementary Table 8](#).

4.3. Additive effects of job applicant characteristics

To illustrate the additive effects of different profiles, [Fig. 7](#) shows the estimated hireability scores (left panel) and predicted probabilities of being selected (right panel) for six different profiles based on a full-factorial model that accounts for the interactions between all attributes. The profile at the bottom represents the highest likelihood of selection, while the profile at the top represents the lowest likelihood of selection. The remaining four profiles fall progressively (at the quantiles) between these two extremes.

The first applicant (from the bottom) is a 45-year-old employed male with a Christian background who prefers to work full time. This profile has a hireability score of 7.53 and a 91% chance of being chosen over another (randomized) profile. The most disadvantaged profile is a 75-year-old female with a Muslim background who has been unemployed for 18 months and prefers not to work full time. This profile has a hireability score of 1.63 and a 7% chance of being chosen over another (randomized) profile. When changing the age from 75 to 65 and the religious background from Muslim to Hindu, the hireability score increases to 3 and the likelihood of selection rises to 30%. When the age, religious background, and employment status are further changed to 70, Christian,

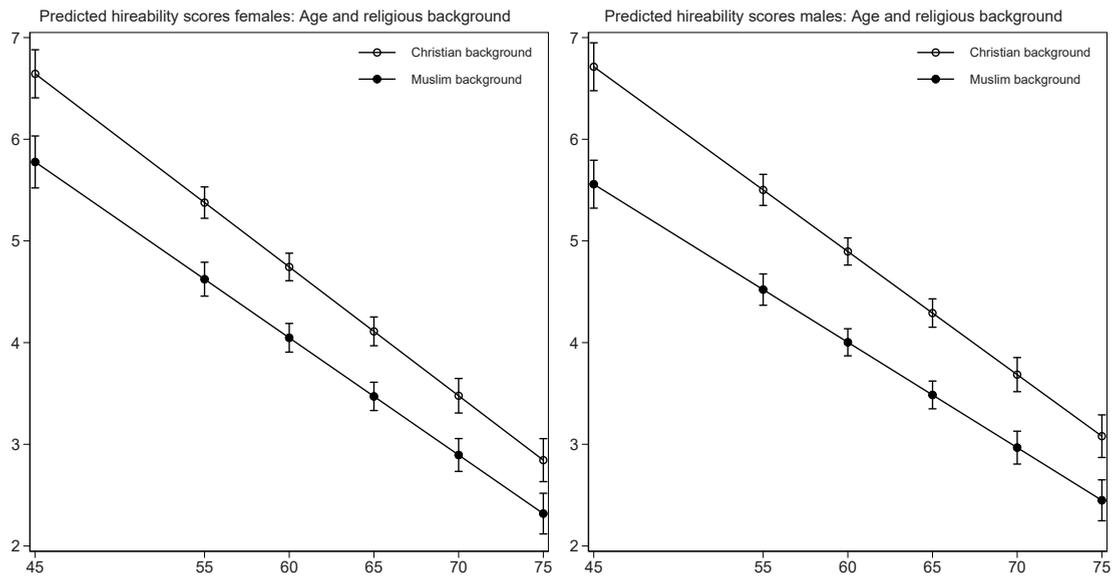


Fig. 6. Predicted hireability scores females (left panel) and males (right panel). Age and religious background.
 Note: Based on full models with interaction terms between gender, age, and religious background, see [Supplementary Table 9](#).

and employed, respectively, the hireability score rises to 3.75, and the predicted probability of being selected is 45%. These findings reveal effect sizes that make recruitment highly likely for some profiles and close to impossible for others.

4.4. Multiplicative effects between job applicant characteristics and employer characteristics

In the last part of our analysis, we tested how applicant age may interact with employer age. According to our preregistered hypothesis, we expected that age discrimination against older applicants would be stronger among younger employers than among older employers. We did not find support for this hypothesis, as the interaction effects between applicant age and employer age were statistically insignificant. It did not matter whether employer age was included as a linear effect or as dummy variables divided into quartiles; see [Supplementary Tables 10 and 11](#). Thus, age discrimination is as severe among older employers as it is among younger employers.

5. Discussion and conclusion

Our factorial survey experiment revealed that age discrimination supersedes other commonly studied forms of discrimination, such as those based on gender and ethnicity. This finding resembles the findings from meta studies of correspondence studies, where the difference in callbacks from employers is typically larger across age groups than for other manipulated traits ([Lippens et al., 2023](#)). Our experiment validated this finding using an employer sample that covers an entire national labour market. Our supplementary material shows that the relative importance of age remains consistent across ten industries, as well as in both the public and the private sector. In some sectors, the relative importance of other factors, particularly employment status, was not statistically different from the importance of age. However, in no industry or sector did any applicant characteristic prove to be statistically more important than age. These findings underscore the pervasive nature of age discrimination in the labour market, highlighting its broad impact across industries and sectors. Additionally, the study found that age discrimination in hiring remains consistent regardless of the age of the employer. In contrast to gender discrimination, for which the previous literature has shown that male recruiters are less likely to discriminate against male applicants in gender-mixed occupations ([Erlandsson, 2019](#)), we find that homophily or in-group favouritism does not seem to influence age discrimination. Furthermore, we tested whether employer gender interacted with applicant age, and found that age discrimination in hiring also remains consistent regardless of the employer's gender (see [Supplementary Table 12](#)). These results suggest that age discrimination in hiring is a pervasive issue that cuts across both employer age and gender.

The design also allowed us to study the interplay between age and other applicant characteristics. We found three multiplicative weakening age effects. Employers were less concerned with the unemployment status and preference for non-full-time work of older applicants, particularly those above the statutory retirement age. The penalty for these characteristics is smaller for older applicants than for younger applicants. We also found that the 'Muslim penalty' is smaller for older than it is for younger male applicants, which resembles the pattern found for stereotypes of black people in the US ([Bergstrom et al., 2024](#)). Furthermore, we did *not* find any multiplicative strengthening age effects, contradicting our preregistration hypothesis about the scarring effect of unemployment and the sub-stereotype of older Muslim women. These findings can be given two different interpretations. The first is that older age makes employers more tolerant of other negative characteristics. The second interpretation is that age discrimination is so forceful that it

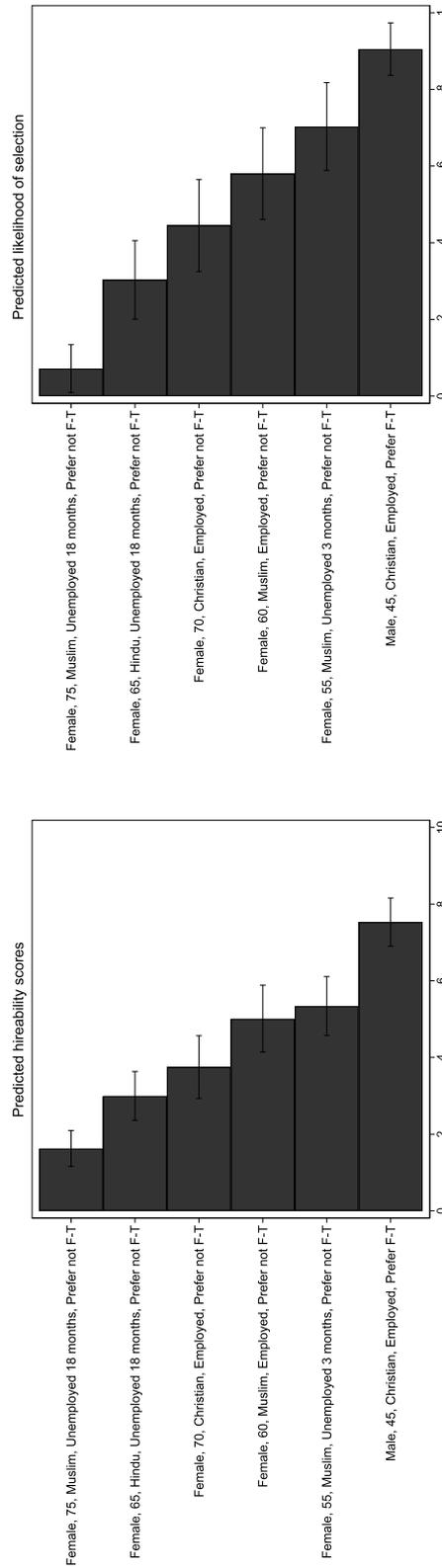


Fig. 7. Additive effects of applicant characteristics on hireability score (left panel) and the likelihood of being selected (right panel) with 95% confidence intervals.

lowers hiring chances irrespective of other attributes of the applicant, because of the overlapping stereotypes of old age and other negative characteristics. Overall, we show that even after taking the multiplicative weakening effects into account, the chances of being hired for those with older profiles are much smaller than for those with middle-aged profiles. Our full model shows that some applicant profiles have a close to zero likelihood of being recruited while others seem sure of recruitment. Consequently, our study revitalizes selection mechanisms in the recruitment processes as a potent explanation for why some groups have lower employment rates and longer unemployment spells than others.

Our study has some limitations. A dominant theme in the literature is that both correspondence studies and our factorial survey experiment might not be able to keep the applicants' productivity constant. Thus, as already mentioned, our study cannot distinguish between statistical and taste discrimination, which remains an important area for future research to address. Further empirical research is needed to investigate the different reasons why employers reject older applicants. In contrast to correspondence studies, a limitation of our scenario-based setup is that employers are aware of being monitored, and the cost of not discriminating is zero as the decisions are hypothetical. However, both phenomena may reduce hiring discrimination, which turns our analysis into a conservative test of discrimination.

Meta-studies of correspondence studies have typically found limited differences across countries (Lippens et al., 2023). However, we recognize that discrimination might vary across countries. Like other countries, Denmark has ratified all UN agreements against discrimination and is obliged to follow EU anti-discrimination laws. Additionally, the country has had a law in place since 1996 that prohibits discrimination based on age, race, skin colour, ethnicity, religion, political views, sexual orientation, or disability. Since the 1990s, shifting Danish governments and stakeholders such as highly organized unions and employers' organizations have promoted the idea of an inclusive labour market (Bredgaard, 2004). For this reason, the pronounced discrimination effects found in this study apply to a broad, heterogeneous national labour market that potentially could have segments of employers interested in hiring those profiles that 'mainstream' employers may avoid. Consequently, we would perceive Denmark to be one of the least likely countries for labour market discrimination—that is, it is likely that other countries will face similar or greater challenges in securing the chances of older applicants searching for new jobs.

CRedit authorship contribution statement

Jeevitha Yogachandiran Qvist: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Christian Albrekt Larsen:** Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Funding

This work was supported by TrygFonden.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssresearch.2024.103135>.

References

- Akerlof, G.A., 1970. The market for "lemons": quality uncertainty and the market mechanism. *Q. J. Econ.* 84 (3), 488–500.
- Alba, R., Foner, N., 2015. *Strangers No More – Immigration and the Challenges of Integration in North America and Western Europe*. Princeton University Press.
- Andersen, L.L., Sørensen, O.H., Meng, A., Sundstrup, E., 2023. Motiver, muligheder og barrierer for et længere arbejdsliv i Danmark. Det Nationale Forskningscenter for Arbejdsmiljø.
- Arrow, K.J., 1973. The theory of discrimination. In: Ashenfelter, O., Rees, A. (Eds.), *Discrimination in Labour Markets*. Princeton University Press, pp. 3–33.
- Axelrad, H., Malul, M., Luski, I., 2018. Unemployment among younger and older individuals: does conventional data about unemployment tell us the whole story? *Journal of Labour Market Research* 52, 3. <https://doi.org/10.1186/s12651-018-0237-9>.
- Baert, S., 2018. Hiring discrimination: an overview of (almost) all correspondence experiments since 2005. In: Gaddis, S. (Ed.), *Audit Studies: behind the Scenes with Theory, Method, and Nuance*. Springer International Publishing, pp. 63–77. <https://doi.org/10.2139/ssrn.2960547>.
- Batinovic, L., Howe, M., Sinclair, S., Carlsson, R., 2022. Ageism in hiring: a systematic review and meta-analysis of age discrimination. *PsyArXiv*. <https://doi.org/10.31234/osf.io/sbzmw>.
- Becker, G., 1957. *The Economics of Discrimination*. University of Chicago Press.
- Becker, S.O., Fernandes, A., Weichselbaumer, D., 2019. Discrimination in hiring based on potential and realized fertility: evidence from a large-scale field experiment. *Lab. Econ.* 59, 139–152. <https://doi.org/10.1016/j.labeco.2019.04.009>.
- Berdahl, J.L., Moore, C., 2006. Workplace harassment: double jeopardy for minority women. *J. Appl. Psychol.* 91 (2), 426–436. <https://doi.org/10.1037/0021-9010.91.2.426>.
- Bergstrom, V.N.Z., Cadieux, J., Thakkar, D., Chasteen, A.L., 2024. Same view, different lens: how intersectional identities reduce Americans' stereotypes of threat regarding Arab and Black men. *Group Process. Intergr. Relat.* 27 (2), 348–365. <https://doi.org/10.1177/13684302231153802>.
- Bertrand, M., Duflo, E., 2017. Field experiments on discrimination. In: Banerjee, A.V., Duflo, E. (Eds.), *Handbook of Economic Field Experiments*, vol. 1. Elsevier, pp. 309–393. <https://doi.org/10.1016/bs.hefe.2016.08.004>.
- Birkelund, G.E., Heggebo, K., Rogstad, J., 2017. Additive or multiplicative disadvantage? The scarring effects of unemployment for ethnic minorities. *Eur. Socio Rev.* 33, 17–29. <https://doi.org/10.1093/esr/jcw030>.

- Birkelund, G.E., Lancee, B., Larsen, E.N., Polavieja, J.G., Radl, J., Yemane, R., 2022. Gender discrimination in hiring: evidence from a cross-national harmonized field experiment. *Eur. Socio Rev.* 38 (3), 337–354. <https://doi.org/10.1093/esr/jcab043>.
- Bredgaard, T., 2004. Corporate social responsibility between public policy and enterprise policy. *Transfer: European Review of Labour and Research* 10 (3), 372–392.
- Breidahl, K.B., Larsen, C.A., 2016. The myth of unadaptable gender roles: attitudes towards women's paid work among immigrants across 30 European countries. *Journal of European Social Policy* 26 (5), 387–401.
- Brewster, C., Hegewisch, A., Mayne, L., Tregakis, O., 1994. Methodology of the price waterhouse cranfield Project. In: Brewster, C., Hegewisch, A. (Eds.), *Policy and Practice in European Human Resource Management*. Routledge, pp. 230–245.
- Bygren, M., Erlandsson, A., Gähler, M., 2017. Do employers prefer fathers? Evidence from a field experiment testing the gender by parenthood interaction effect on callbacks to job applications. *Eur. Socio Rev.* 33 (3), 337–348. <https://doi.org/10.1093/esr/jcx051>.
- Carlsson, M., Eriksson, S., 2019. Age discrimination in hiring decisions: evidence from a field experiment in the labor market. *Lab. Econ.* 59, 173–183. <https://doi.org/10.1016/J.LABECO.2019.03.002>.
- Charles, K.K., Decicca, P., 2007. Hours flexibility and retirement. *Econ. Inq.* 45 (2), 251–267. <https://doi.org/10.1111/J.1465-7295.2006.00009.X>.
- Cooper, R., Baird, M., 2015. Bringing the 'right to request' flexible working arrangements to life: from policies to practices. *Employee Relat.* 37 (5), 568–581. <https://doi.org/10.1108/ER-07-2014-0085>.
- Crandall, C.S., Eshleman, A., 2003. A justification-suppression model of the expression and experience of prejudice. *Psychol. Bull.* 129 (3), 414–446.
- Cuddy, A.J.C., Fiske, S.T., 2002. Doddering, but dear: process, content, and function in stereotyping of older persons. In: Nelson, T.D. (Ed.), *Ageism: Stereotyping and Prejudice against Older Persons*. MIT Press, pp. 3–29.
- Dahl, M., Krog, N., 2018. Experimental evidence of discrimination in the labour market: intersections between ethnicity, gender, and socio-economic status. *Eur. Socio Rev.* 34 (4), 402–417. <https://doi.org/10.1093/esr/jcy020>.
- Danmarks Videncenter for Integration, 2020. Knap 80.000 kristne har ikke-vestlig baggrund. Videncenter for Integration.
- Deaton, A., Cartwright, N., 2018. Understanding and misunderstanding randomized controlled trials. *Soc. Sci. Med.* 210 (December 2017), 2–21. <https://doi.org/10.1016/j.socscimed.2017.12.005>.
- Di Stasio, V., Larsen, E.N., 2020. The racialized and gendered workplace: applying an intersectional lens to a field experiment on hiring discrimination in five European labor markets. *Soc. Psychol. Q.* 83 (3), 229–250. <https://doi.org/10.1177/0190272520902994>.
- Drouhot, L.G., Nee, V., 2019. Assimilation and the second generation in Europe and America: blending and segregating social dynamics between immigrants and natives. *Annu. Rev. Sociol.* 45, 177–199. <https://doi.org/10.1146/ANNUREV-SOC-073117-041335>.
- Erlandsson, A., 2019. Do men favor men in recruitment? A field experiment in the Swedish labor market. *Work Occup.* 46 (3), 239–264. <https://doi.org/10.1177/0730888419849467>.
- Gaddis, S.M., 2015. Discrimination in the credential society: an audit study of race and college selectivity in the labor market. *Soc. Forces* 93 (4), 1451–1459. <https://doi.org/10.1093/sf/sou111>.
- Gangl, M., 2006. Scar effects of unemployment: an assessment of institutional complementarities. *Am. Socio. Rev.* 71 (6), 986–1013. <https://doi.org/10.1177/000312240607100606>.
- Gangl, M., Ziefle, A., 2009. Motherhood, labor force behavior, and women's careers: an empirical assessment of the wage penalty for motherhood in Britain, Germany, and the United States. *Demography* 46 (2), 341–369. <https://doi.org/10.1353/DEM.0.0056>.
- Ganter, F., 2023. Identification of preferences in forced-choice conjoint experiments: reassessing the quantity of interest. *Polit. Anal.* 31 (1), 98–112. <https://doi.org/10.1017/pan.2021.41>.
- Gilens, M., 2009. *Why Americans Hate Welfare: Race, Media, and the Politics of Antipoverty Policy*. University of Chicago Press.
- Guetto, R., Luijckx, R., Scherer, S., 2015. Religiosity, gender attitudes and women's labour market participation and fertility decisions in Europe. *Acta Sociol.* 58 (2), 155–172. <https://doi.org/10.1177/0001699315573335>.
- Hainmueller, J., Hopkins, D.J., Yamamoto, T., 2014. Causal inference in conjoint analysis: understanding multidimensional choices via stated preference experiments. *Polit. Anal.* 22 (1), 1–30. <https://doi.org/10.1093/pan/mpt024>.
- Hameresh, D.S., 1996. *Labor Demand*. Princeton University Press.
- Heath, A., Liebig, T., Simon, P., 2013. *Discrimination against Immigrants – Measurement Incidence and Policy Instrument*. OECD Publishing, Paris.
- Heckman, J., Siegelman, P., 1993. The Urban Institute audit studies: their methods and findings. In: Fix, M.E., Struyk, R.J. (Eds.), *Clear and Convincing Evidence: Measurements of Discrimination in America*. The Urban Institute Press, pp. 187–258.
- Hedegaard, T.F., Larsen, C.A., 2022. Who can become a full member of the club? Results from a conjoint survey experiment on public attitudes about the naturalisation of non-EU migrants in Germany, the Netherlands, Sweden and Denmark. *Scandinavian Political Studies* 45 (4), 433–455.
- Helbling, M., 2014. Opposing Muslims and the Muslim headscarf in western Europe. *Eur. Socio Rev.* 30 (2), 242–257.
- Holman, D., Walker, A., 2021. Understanding unequal ageing: towards a synthesis of intersectionality and life course analyses. *Eur. J. Ageing* 18, 239–255. <https://doi.org/10.1007/s10433-020-00582-7>.
- Kang, S.K., Chasteen, A.L., Cadieux, J., Cary, L.A., Syeda, M., 2014. Comparing young and older adults' perceptions of conflicting stereotypes and multiply-categorizable individuals. *Psychol. Aging* 29 (3), 469–481. <https://doi.org/10.1037/a0037551>.
- Karpinska, K., Henkens, K., Schippers, J., 2013. Retention of older workers: impact of managers' age norms and stereotypes. *Eur. Socio Rev.* 29 (6), 1323–1335. <https://doi.org/10.1093/esr/jct017>.
- Kelly, E.L., Kalev, A., 2006. Managing flexible work arrangements in US organizations: formalized discretion or 'a right to ask'. *Soc. Econ. Rev.* 4 (3), 379–416. <https://doi.org/10.1093/ser/mwl001>.
- Koopmans, R., 2016. Does assimilation work? Sociocultural determinants of labour market participation of European Muslims. *J. Ethnic Migrat. Stud.* 42 (2), 197–216. <https://doi.org/10.1080/1369183X.2015.1082903>.
- Larsen, C.A., 2013. *The Rise and Fall of Social Cohesion: the Construction and De-construction of Social Trust in the US, UK, Sweden and Denmark*. Oxford University Press.
- Larsen, C.A., Vesan, P., 2012. Why public employment services always fail. *Double-sided asymmetric information and the replacement of low-skill workers in six European countries*. *Publ. Adm.* 90 (2), 466–479.
- Lippens, L., Vermeiren, S., Baert, S., 2023. The state of hiring discrimination: a meta-analysis of (almost) all recent correspondence experiments. *Eur. Econ. Rev.* 151, 104315. <https://doi.org/10.1016/J.EUROCOREV.2022.104315>.
- Lössbroek, J., Lancee, B., Van Der Lippe, T., Schippers, J., 2021. Age discrimination in hiring decisions: a factorial survey among managers in nine European countries. *Eur. Socio Rev.* 37 (1), 49–66. <https://doi.org/10.1093/esr/jcaa030>.
- McPherson, M., Smith-lovin, L., Cook, J.M., 2001. Birds of a feather: homophily in social networks. *Annu. Rev. Sociol.* 27, 415–444.
- Naegele, G., Baucknect, J.J., 2019. Extending working lives. In: Walker, A. (Ed.), *The Future of Ageing in Europe*. Palgrave Macmillan, pp. 107–142.
- Neumark, D., 2010. Detecting discrimination in audit and correspondence studies. *NBER Work. Pap.*, 16448 <https://doi.org/10.1257/0002828042002561>.
- Nilsen, Ø.A., Reiso, K.H., 2011. Scarring Effects of Unemployment. NHH Department of Economics Discussion. <https://doi.org/10.2139/ssrn.1972294>. Paper 26.
- OECD, 2019. *Working Better with Age*. OECD.
- OECD, 2022. *OECD Better Life Index – Health*. OECD. <https://www.oecdbetterlifeindex.org/topics/health/>.
- SSRN: Oreopoulos, P., Dechief, D., 2012. Why do some employers prefer to interview Matthew, but not Samir? New evidence from Toronto, Montreal, and Vancouver <https://ssrn.com/abstract=2018047>.
- Oreopoulos, P., 2011. Why do skilled immigrants struggle in the labor market? A field experiment with thirteen thousand resumes. *Am. Econ. J. Econ. Pol.* 3 (4), 148–171.
- Oude Mulders, J., van Dalen, H.P., Henkens, K., Schippers, J., 2014. How likely are employers to rehire older workers after mandatory retirement? A vignette study among managers. *Economist* 162 (4), 415–431. <https://doi.org/10.1007/s10645-014-9234-8>.

- Pedulla, D.S., 2018. How race and unemployment shape labor market opportunities: additive, amplified, or muted effects? *Soc. Forces* 96 (4), 1477–1506. <https://doi.org/10.1093/sf/soy002>.
- Principi, A., Bauknecht, J., Di Rosa, M., Socci, M., 2020. Employees' longer working lives in Europe: drivers and barriers in companies. *Int. J. Environ. Res. Publ. Health* 17 (5), 1658. <https://doi.org/10.3390/ijerph17051658>.
- Qvist, J.Y., Nielsen, P., Larsen, C.A., 2023. Arbejdsgivernes praksisser og holdninger til seniorerne i perioden 2018-2022. Aalborg University. [Arbejdsgivernes-praksisser-og-holdninger-til-seniorer-i-perioden-2018-2022.pdf](https://www.aau.dk/~socio/Arbejdsgivernes-praksisser-og-holdninger-til-seniorer-i-perioden-2018-2022.pdf).
- Statham, P., Tillie, J., 2016. Muslims in their European societies of settlement: a comparative agenda for empirical research on socio-cultural integration across countries and groups. *J. Ethnic Migrat. Stud.* 42 (2), 177–196.
- Statistics Denmark. Andel af danskere på deltid er over EU-gennemsnit. Statistics Denmark. www.dst.dk/nyt/24077.
- Swift, H.J., Steeden, B., 2020. Exploring Representations of Old Age and Ageing. *Literature Review*. Centre for Ageing Better. <https://kar.kent.ac.uk/98817/1/Exploring-representations-of-old-age.pdf>.
- Tversky, A., Kahneman, D., 1974. Judgment under uncertainty: heuristics and biases: biases in judgments reveal some heuristics of thinking under uncertainty. *Science* 185 (4157), 1124–1131.
- van Dalen, H.P., Henkens, K., Schippers, J., 2010. How do employers cope with an ageing workforce? Views from employers and employees. *Demogr. Res.* 22 (June 2014), 1015–1036. <https://doi.org/10.4054/DemRes.2010.22.32>.
- Verhaeghe, P.-P., 2022. Correspondence studies. In: Zimmermann, K.F. (Ed.), *Handbook of Labor, Human Resources and Population Economics*. Springer, pp. 1–19. https://doi.org/10.1007/978-3-319-57365-6_306-1.
- Wallander, L., 2009. 25 years of factorial surveys in sociology: a review. *Soc. Sci. Res.* 38 (3), 505–520. <https://doi.org/10.1016/j.ssresearch.2009.03.004>.