MERCATUS WORKING PAPER

RIGHT-TO-WORK LAWS AND LABOR MARKET DISCRIMINATION: EVIDENCE FROM A FIELD EXPERIMENT

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SUGGESTED CITATION

Vitor Melo and Liam Sigaud, "Right-to-Work Laws and Labor Market Discrimination: Evidence from a Field Experiment," Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, January 2024.

ABSTRACT

Much research shows widespread hiring discrimination based on various characteristics, such as age. Yet little is known about how government policies may prevent or increase discrimination. This paper develops a framework for understanding right-to-work laws affect labor market discrimination. These laws weaken unions, thereby reducing unions' ability to negotiate wages, benefits, and payment rules above competitive levels. The reduction in compensation floors imposed by unions allows older workers, who face discrimination in labor markets, to accept lower compensation which makes them more attractive to employers. Our model predicts that right-to-work laws decrease discrimination against older workers. We explore evidence from a resume field experiment implemented in all US states to test this prediction. Previous experiments have found substantial age discrimination, particularly against older women. We find that right-to-work laws are associated with a decrease in age discrimination against older women by about 30 percent. This result is robust to various empirical specifications.

METADATA

Keywords: Discrimination, right-to-work laws, field experiments, public policy.

JEL codes: J71, J78, C93, D22

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DISCLAIMER

Right-to-Work Laws and Labor Market Discrimination: Evidence from a Field Experiment

1 INTRODUCTION

A large and influential literature relies on field experiments to examine the extent of various forms of discrimination in labor markets.This literature documents widespread hiring discrimination on the basis of race (Reimers 1983; Bertrand and Mullainathan 2004; and Pager, Bonikowski, and Western 2009), gender (Neumark and McLennan 1995; Azmat and Petrongolo 2014; and Folke and Rickne 2022), age (Johnson and Neumark 1996; Neumark, Burn, and Button 2016, 2019; and Carlsson and Eriksson 2019), ethnic origin (Carlsson and Rooth 2007 and Oreopoulos 2011), physical attractiveness (Hamermesh 2011 and Bóo, Rossi, and Urzúa 2013), and criminal history (Pager 2003 and Baert and Verhofstadt 2015), among others. Many of these forms of discrimination may be affected by various laws and regulations. Yet little is known about how different policies can prevent or contribute to the discrimination found in these field experiments. In this paper, we focus on right-to-work laws, enacted in over half of US states and affecting millions of workers. We model the impact of right-to-work laws on firms' decisions to hire younger and older workers and find that these laws are expected to decrease discrimination against older workers. We then explore evidence from a résumé field experiment implemented in all US states to test this prediction and find that right-to-work laws are associated with a decrease in age discrimination against older women by about 30 percent.

Right-to-work laws are increasingly common in the United States. In 2022, 27 states had right-to-work laws on the books, up from 19 in 1980. The historical roots of these laws go back to the National Labor Relations Act of 1935, which substantially strengthened union rights by allowing union contracts to stipulate that the employer had to require every worker in the bargaining unit to pay dues to the union. The Taft-Hartley Act of 1947 relaxed this restriction, banning so-called closed shop arrangements that prevented employers with unionized workforces from hiring non-union labor and granting states additional flexibility to regulate union contracts. In particular, Congress permitted states to adopt one of two approaches: (1) allow union contracts to require non-union workers to pay agency fees (essentially reduced-rate union dues) or (2) prohibit employees from being compelled to join a union or to contribute anything to support union activities as a condition of employment. The passage of the Taft-Hartley Act led many state legislatures to implement option (2). These laws have become known as right-to-work laws.

As the number of right-to-work states has increased, unionization rates and unions' influence have declined substantially. In 2021, 10.1 percent of US workers were union members, down from 20.1 percent in 1983, the first year for which comparable data are available. An extensive literature documents the negative effects of right-to-work laws on union density. Ellwood and Fine (1987) find that right-to-work laws diminish union membership by 5 to 10 percent in the long run, in line with the conclusion by Moore (1998) that "the available evidence suggests that [right-to-work] laws may reduce the extent of unionization in the long run by 3 to 8 percent." In recent studies, the estimated effect of right-to-work laws on unionization tends to be larger.

Chun (2023) finds that right-to-work laws decrease union coverage by more than 10 percent, while Eren and Ozbeklik (2016) find that right-to-work laws are associated with reductions in private-sector unionization rates of 20 to 30 percent.

Through collective bargaining, unions negotiate contracts with their employers to determine their overall compensation, which includes wages, benefits, paid vacation time, work flexibility and working conditions, among others.[1] A large literature suggests that right-to-work laws weaken union membership rates and revenue, thereby reducing their ability to negotiate compensation above competitive levels (Freeman and Medoff 1981; Garofalo and Malhotra 1992; Hogler, Shulman, and Weiler 2004; Matsa 2010; Eren and Ozbeklik 2016; Quinby 2017; Lin, Bondurant, and Messamore 2018; Chava, Danis, and Hsu 2020; Wexler 2022; and Fortin, Lemieux, and Lloyd 2023). A standard estimate of the union wage premium is 10 to 15 percent (Budd and Na 2000), and some evidence suggests that unions raise wages more for workers with lower skill levels (Card 1996). Lower membership reduces unions' revenues from dues and fees, limiting their ability to fund organizational efforts or hire negotiators (Feigenbaum, Hertel-Fernandez, and Williamson 2018). Quinby (2017) finds that a 2011 law in Tennessee curtailing public school teachers' rights to collectively bargain—conceptually similar to right-to-work laws, albeit narrower in scope—reduced teacher union revenue by 25 percent. Wilmers (2017) shows a direct link between union spending and wages, with a 1 percent increase in spending resulting in a 0.15 to 0.30 percent increase in a proxy for wages. After Michigan passed a right-to-work measure in 2012, the state's largest union lost more than one-third of its active members, accompanied by a sharp decline in union revenues. The Mackinac Center reports that "less direct political spending and, presumably, having fewer boots on the ground, has hurt the union's influence, making it a weaker version of its former self" Skorup (2020). Thus, the vast literature on unions and right-to-work laws, as well as anecdotal examples, suggest that these laws reduce union funding and influence. This reduction in funding and influence undermines unions' ability to set compensation floors above competitive levels.

We model the impact of right-to-work laws on hiring discrimination by first considering a scenario where firms choose to interview an applicant and observe résumé characteristics. Firms interview an applicant if the expected marginal benefit of hiring them, which largely depends on the applicant's marginal productivity, is higher than the expected marginal cost of hiring the applicant, which depends on the competitive compensation for that worker. In the absence of compensation floors, applicants who are perceived to be of lower marginal productivity might still receive an interview if their market compensation is also lower. An applicant whose expected marginal product of labor is $5/hour might be interviewed if their competitive compensation is $4/hour. With a binding compensation floor, however, firms do not interview applicants whose expected marginal productivity is lower than the compensation floor. A firm will not interview an applicant whose expected marginal product of labor is $5/hour if an $8/hour floor is imposed, even if their competitive compensation is $4/hour. An applicant whose expected marginal product of labor is $12/hour and competitive compensation is $10/hour, however, might be interviewed regardless of the compensation floor. These examples

[1] Throughout the paper, we use the term *compensation* to refer to wages, benefits, paid vacation time, work flexibility, and working conditions, among other parts of the total compensation that workers may receive.

illustrate how a compensation floor is expected to decrease the interviews offered to applicants of lower perceived productivity more than applicants with higher perceived marginal productivity.

If older workers are more likely to have lower perceived marginal productivity, the number of interviews they receive will be reduced further than the number of interviews that younger workers receive. Right-to-work laws are expected to decrease union strength and thus decrease unions' ability to set compensation floors above equilibrium levels. This reduction in compensation floors is expected to increase the number of interviews that older workers receive more than the number of interviews that younger workers receive. Thus, our model predicts that right-to-work laws are expected to decrease discrimination against older workers.

In a famous op-ed, Friedman (1966) argues that minimum wages increase discrimination against minority groups because it prevents them from accepting lower wages. The focus of his argument was on minimum wages, but his conceptual framework can be extended to any compensation floor. His argument was never formalized, however. To our knowledge, we are the first to formalize this line of thought and extend it to other policies that affect compensation floors, such as right-to-work laws. The framework from our model can be applied to various other policies that affect compensation floors and, thus, can be a foundation for understanding how other policies affect different forms of hiring discrimination.

Neumark, Burn, and Button (2016) find robust evidence of discrimination in hiring against older women, but much less evidence of discrimination against older men. Empirically, we find that right-to-work laws are associated with substantially less hiring discrimination against older women. The presence of a right-to-work law counteracts about one-third of the baseline discrimination against older women (aged 64–66) compared to younger women (aged 29–31). This effect is even larger than the effect of anti-age-discrimination laws, which Neumark et al. (2019) find to substantially decrease discrimination against older workers. Among men, we find no significant effects of right-to-work laws on age discrimination. Our findings are robust to several different estimation approaches and model specifications.

This paper makes at least three important contributions. First, it provides a theoretical framework and empirical examination of how right-to-work laws affect hiring decisions and discrimination in labor markets. Right-to-work laws are pervasive features of the US labor market, affecting employment conditions for millions of workers. This research is the first to provide a theoretical foundation for understanding employers' behavioral responses to these laws, particularly how discriminatory hiring practices may be affected by these laws. Second, our results and theoretical framework suggest that right-to-work laws may play an important role in reducing age discrimination. As the age distribution of the US workforce continues to shift toward older workers, understanding the determinants of age discrimination in the labor market is increasingly important. Third, we demonstrate how laws and regulations can play important roles in reducing or contributing to hiring discrimination. While this paper focuses on older workers, we hope to convince other researchers that much work is needed to understand how different policies affect various forms of hiring discrimination.

We contribute to the vast empirical literature on discrimination in the labor market, building on conceptual foundations established in Gary Becker's *The Economics of Discrimination* in 1957 and later refined by Krueger (1963), Arrow (1971), Stiglitz (1973), and others. This

literature has found evidence of pervasive labor market discrimination across a range of characteristics. Research on labor market discrimination on the basis of age, however, is fairly sparse. While most studies detect strong age discrimination in most employment contexts, the effects vary by gender and industry Riach and Rich (2010), Carlsson and Eriksson (2019), and Neumark, Burn, and Button (2019). Moreover, little research has explored evidence from field experiments to examine the effects of government policies on hiring discrimination. To our knowledge, the work of Agan and Starr (2018) on the effects of ban-the-box laws, Neumark et al. (2019) on state anti-age-discrimination laws, Brandon et al. (2023) on minimum wages, and this paper are the only ones to do so. Given the extensive reach of state and federal laws in labor markets, elucidating their effects of labor market discrimination is an important goal.

In addition to contributing to the understanding of the effects of government policies on labor market discrimination, this paper sheds light on the effects of right-to-work laws. The existing literature on right-to-work laws focuses on their effects on union membership and density (Carroll 1983; Ellwood and Fine 1987; Moore 1998; Dinlersoz, Hernandez-Murillo, et al. 2022; Hogler, Shulman, and Weiler 2004; Eren and Ozbeklik 2016; Chava, Danis, and Hsu 2017; and Chun 2023), wages (Reed 2003; Eren and Ozbeklik 2016; and Jordan et al. 2016), employment (Kalenkoski and Lacombe 2006; Bausman, Craddock, and Kwan 2017; and Chava, Danis, and Hsu 2017, 2020), industrial development (Moore 1998), and economic growth (Hicks and LaFaive 2013; Vedder and Robe 2014; Bausman, Craddock, and Kwan 2017; and Chava, Danis, and Hsu 2017). To our knowledge, this work is the first to study the relationship between right-to-work laws and labor market discrimination.

2 MODEL

Consider a scenario where firms choose among applicants who are either old (64–66 years old in the context of our empirical study) or young (29–31 years old in the context of our empirical study). Let $O_i \in \{1, 0\}$ represent whether a given applicant is old or not. Additionally, applicants are differentiated by X_i, which represents other characteristics observable in résumés, which include education, skills, languages, and formatting, among others. The primary difficulty in estimating age discrimination in non-experimental contexts is that $Cov(O_i, X_i) \neq 0$. Thus, older workers may receive fewer interviews and consequently fewer job offers because of differences in education or skills, among others. In our empirical work, we rely on evidence from a nationwide field experiment that randomly assigns age to fictitious applicants, which means that in the context of our experiment, $Cov(O_i, X_i) = 0$.

Firms receive applications and choose among applicants i for a job that offers some compensation (which includes wages, benefits, paid vacation time, work flexibility, and working conditions, among others). Applicants are also applying for jobs in many other firms that observe O_i and X_i. Let the compensation be exogenously determined by competition and be a function of O_i and X_i. Let $c(O_i, X_i)$ represent the expected compensation that a firm needs to pay for worker i to accept the position. Consider first a scenario where right-to-work laws are present and unions have little power to set compensation above competitive equilibrium levels.

Firms observe O_i and X_i and then choose to invite an applicant for an interview or not, which is represented by $Y_i \in \{1, 0\}$. We define age discrimination (AD) as the expected difference in callbacks between applicants who are old and young but are otherwise identical in all ways that

can be observed by employers prior to an interview. Formally, AD is given by

$$AD = \mathbb{E}\left[\mathbb{P}\left[Y_i = 1 \mid O_i = 1, X_i\right] - \mathbb{P}\left[Y_i = 1 \mid O_i = 0, X_i\right]\right], \tag{1}$$

where $AD < 0$ implies discrimination against older workers while $AD > 0$ implies discrimination against younger workers.

The benefit that firms receive from hiring an applicant depends on applicant i's quality, Q_i, which is their marginal product of labor. However, firms cannot observe Q_i and must make decisions based on observable characteristics of applicants' résumés. We assume that while firms do not observe Q_i, they have an information set ξ, which represents information and beliefs about observed characteristics of applicants (O_i, X_i). Firms form expectations of quality based on their information set such that $q_i(O_i, X_i) \equiv \mathbb{E}(Q_i|\xi)$. $\mathbb{E}(q_i|O_i, X_i)$ may differ from $Q_i(O_i, X_i)$ since, in addition to information about observed characteristics of applicants, firms have their own beliefs about how these characteristics are associated with Q_i. We assume that the perceived marginal productivity of older workers is no greater than the perceived marginal productivity of younger workers such that $(q_i|O_i = 1, X_i) \leq (q_i|O_i = 0, X_i)$.

Firms may also have a taste-based preference to hire younger workers over older workers. Let p represent the firm's taste-based disutility associated with hiring an older worker. Let $p \leq 0$, such that the lower the p the greater the disutility that firms receive from hiring an older worker. The firm offers an interview to an applicant if the expected marginal benefit, which includes both the expected marginal product of labor and the taste-based disutility, is greater than the marginal cost of hiring the applicant. The expected marginal cost of hiring an applicant depends on the competitive compensation for that worker, which is a function of their observable characteristics. The firm's decision is defined according to the following:

$$Y_i = \mathbb{1}\{\underbrace{q_i\left(O_i, X_i\right) + pO_i}_{\text{expected benefit}} \geq \underbrace{c(O_i, X_i)}_{\text{expected cost}}\}. \tag{2}$$

The decision to call back an applicant depends not only on the expected benefit of hiring that resident but also on the expected cost of the compensation necessary for the applicant to accept the position. A firm looking to hire an entry-level software engineer might want to hire a PhD engineer from Harvard University, but may choose not to interview a candidate from Harvard if the expected compensation required to keep them is higher than the expected benefits of hiring them.

Now consider a scenario without right-to-work laws. The absence of these laws strengthens unions to impose a compensation floor above the market equilibrium compensation of some applicants. Let c^F be the compensation floor imposed by such restriction. We assume that perceptions of marginal productivity and competitive compensation levels do not change with the compensation floor.[2] Workers whose competitive equilibrium compensation is below or equal to its expected marginal product of labor would receive an interview in the absence of this

[2] A compensation floor that makes low marginal productivity labor more costly may lead firms to shift production toward using more high marginal productivity labor. This mechanism would further reinforce the prediction that binding the compensation floor will increase discrimination against groups that are disproportionately perceived to be of lower marginal productivity. Yet, we assume this general equilibrium effect away for simplicity and because the overall conclusion of the model is not changed by it.

compensation floor. However, if the expected marginal product of a given applicant is below c^F and a compensation floor is imposed, the applicant will no longer receive an interview. More formally, a given applicant i whose $c^F > q_i(O_i, X_i)$ will not receive an interview. Some groups of applicants (e.g., older applicants) are likely to be perceived to have lower expected marginal productivity than other groups. The groups who are perceived to be of lower marginal productivity are thus more likely to be affected by the price floor, which leads to proposition 1.

Proposition 1 *If older applicants are perceived by employers to have lower marginal productivity of labor or if firms have taste-based preferences against older workers, right-to-work laws will decrease discrimination against older applicants.*

Consider first a scenario where the firm does not have a taste-based penalty for older workers such that $p = 0$ and where older workers are perceived to be of lower marginal product such that $q_i(O_i = 1, X_i) < q_i(O_i = 0, X_i)$. In this scenario, only groups with perceived quality (i.e., expected marginal product) below c^F are affected by this restriction. At the margin, older workers are more likely to have a perceived quality below c^F since $q_i(O_i = 1, X_i) < q_i(O_i = 0, X_i)$. Thus, even if the firm does not have a taste-based penalty for older workers, a price floor is expected to disproportionately reduce the number of interviews that older workers receive.

Now consider a scenario where older and younger workers are perceived by firms to be of the same quality such that $q_i(O_i = 1, X_i) = q_i(O_i = 0, X_i)$, but firms have a taste-based penalty associated with older workers such that $p < 0$. A given applicant i whose $c^F > q_i(O_i, X_i) + pO_i > c(O_i, X_i)$ would be offered an interview if right-to-work laws were in place and unions were not able to set a binding compensation floor. Yet, this applicant would not be offered an interview if right-to-work laws are in place and c^F is imposed as their compensation floor. Older and younger workers are perceived to be of same quality, but older workers face a taste-based penalty such that they are more likely to be affected by the compensation floor. Thus, in the presence of taste-based discrimination against older workers, right-to-work laws are expected to be associated with less discrimination against older workers.

Our model considers two conditions: one where older workers are perceived to be of lower marginal productivity and another where older workers face a taste-based penalty. Right-to-work laws are expected to be associated with less discrimination against older workers if at least one, but not necessarily both, of these conditions hold. Much research shows the presence of discrimination against older workers Johnson and Neumark (1996), Neumark, Burn, and Button (2016, 2019), and Carlsson and Eriksson (2019). Employers likely perceive older workers to be less productive, particularly in low-skilled jobs where physical demands are high. It is also possible that managers prefer to work with younger workers. Many social groups and friendships are formed in the workplace, and thus preferences for specific groups of people are likely to exist. Managers, particularly in retail, may prefer to be around younger workers.

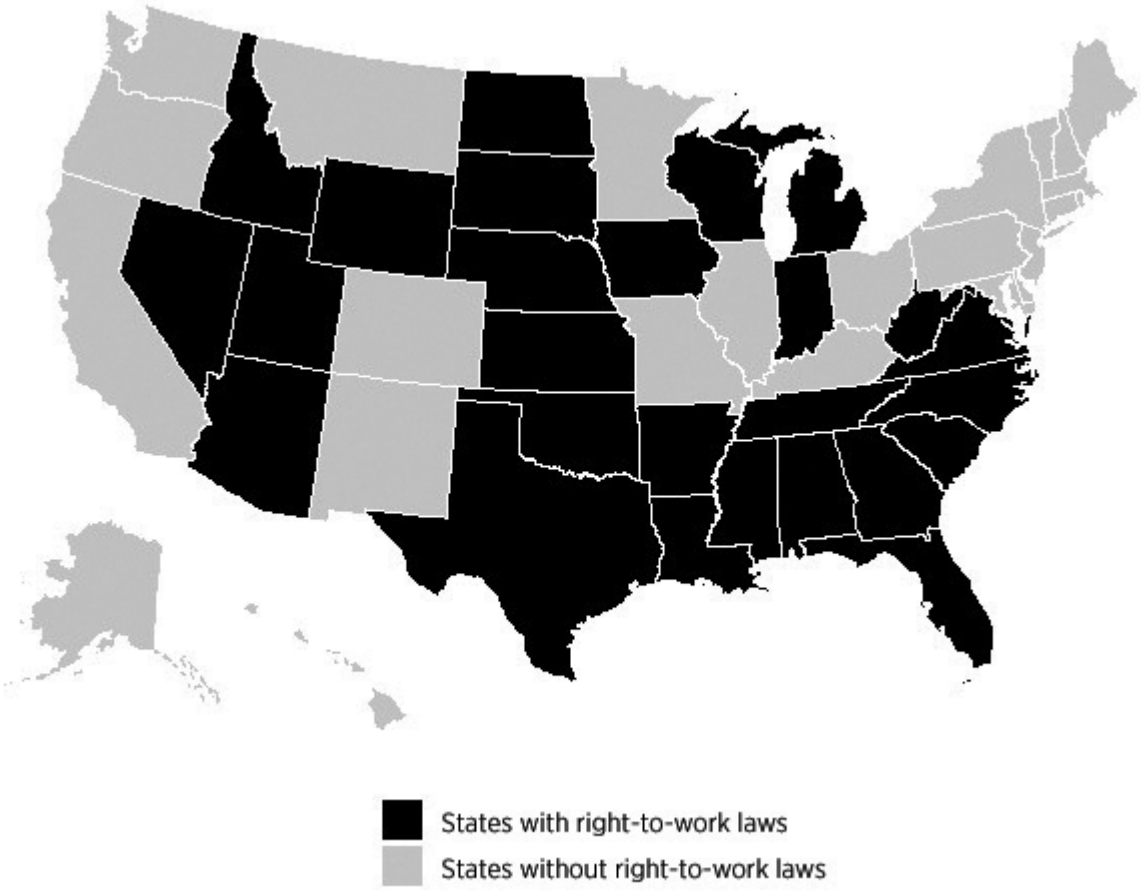
3 DATA

As of 2022, 27 states and the territory of Guam had passed right-to-work laws. (Michigan repealed its right-to-work statute in early 2023.) The majority of these laws were adopted in the 1940s and 1950s, shortly after the Taft-Hartley Act was passed by Congress. Six states have enacted right-to-work laws since 2000: Oklahoma (2001), Indiana (2012), Michigan (2012), Wisconsin (2015), West Virginia (2016), and Kentucky (2017). Ten states have added right-to-work

clauses to their state constitutions to supplement statutory right-to-work protections. The constitutional changes had no practical effect on the legal obligations of employers and labor unions or the rights of workers in these states, seemingly serving instead to make future attempts to reverse the policy more difficult. Meanwhile, in 2022, Illinois voters approved a constitutional clause prohibiting right-to-work laws in the state.

Figure 1 shows the status of right-to-work protections in each state in 2016, the year our data were collected. Note that although Kentucky is a right-to-work state (as of 2023), it is not highlighted on the map because its status changed after 2016. Similarly, while Michigan is no longer a right-to-work state, it is highlighted on the map because its status changed in 2023.

FIGURE 1. State Right-to-Work Laws in 2016



We explore data from a correspondence field experiment on labor market discrimination implemented by Neumark et al. (2019) in all 50 US states (for our analysis, we drop data from Arkansas, West Virginia, Wyoming, and South Dakota because these states had very few observations). The primary goal of the experiment was to estimate the association between state anti-age-discrimination statutes and age discrimination. The authors sent fictitious résumés to listings for retail sales positions and recorded whether each fictitious applicant received a

"callback." An applicant was deemed to have received a callback if they received a response by phone or email that was either unambiguously positive (e.g., "Please call to set up an interview.") or ambiguous (e.g., "Please return our call. We have a few additional questions."). All applicants belonged to one of two age groups: "young" workers were 29–31 years of age and "old" workers were 64–66 years of age. Ages were conveyed on the résumés by the year of high school graduation. Names were selected based on Social Security Administration data matched to each age and sex cohort. In each case, first and last names were chosen to signal that the applicant was Caucasian. Using data scraped from résumés of actual retail job applicants, the job and education history on each résumé was tailored to match the city from which the job listing originated.

To identify jobs, research assistants regularly monitored a popular, nationwide job-posting website using a well-specified set of criteria. In response to each job listing, the authors sent out a quadruplet of résumés consisting of young and old male applicants and young and old female applicants. Half the résumé quadruplets included higher skills, and half did not. Higher-skilled résumés listed five characteristics, selected randomly from a pool of seven. Five of the seven skills were general: a bachelor of arts degree; fluency in Spanish as a second language; an "employee of the month" award on the most recent job; one of three volunteer activities (food bank, homeless shelter, or animal shelter); and an absence of typographical errors. Two skills were specific to retail sales: proficiency in Microsoft Office and experience with programs used to monitor inventory (e.g., VendPOS, AmberPOS, and Lightspeed). Moreover, each of the four résumés in the quadruplet was randomly assigned a different résumé template, which ensured that all four résumés looked different. Data were collected from February to July 2016. In total, 14,428 applications were submitted to 3,607 jobs.

In table 1, we present descriptive statistics for key variables in our analysis. Approximately one-third of our observations come from right-to-work states (denoted "RTW" in table 1). "Callback" is a dummy for whether the applicant received a positive (e.g., "Please call to set up an interview.") or ambiguous (e.g., "Please return our call. We have a few additional questions.") response, either by email or phone. "Old" is a dummy for whether the applicant is in the 64–66 age group. The interaction between Old and the presence of a right-to-work law in a state ("Old * RTW") is our primary variable of interest. The remaining variables come directly from Neumark et al. (2019). "Low Firm Size" indicates whether a state's anti-age-discrimination law applies to firms with fewer than 10 workers. "Damages Age" and "Damages Disability" indicate whether a state's anti-age-discrimination law allows for larger damages than federal limits. "Disability Definition" indicates whether a state has adopted a broader definition of disability than the federal standard established in the Americans with Disabilities Act (ADA). The remaining variables indicate different applicant characteristics/skills that may influence the hiring decision, including being currently unemployed; speaking Spanish fluently; using correct grammar on the résumé; possessing a college degree; being named "employee of the month" in one's most recent job; volunteering at a food bank, homeless shelter, or animal shelter; being familiar with computer systems (Microsoft Office and programs used to monitor inventory); and having previous customer service experience. Table 1 shows a strong balance between right-to-work and non-right-to-work states for each variable, giving us confidence that the experiment's randomization protocol was successful.

TABLE 1. Summary Statistics of Key Variables

	Females				Males			
	RTW		Non-RTW		RTW		Non-RTW	
N	2,336		4,848		2,336		4,848	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Callback	0.22	0.42	0.25	0.43	0.21	0.41	0.21	0.41
Old	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Old * RTW	0.5	0.5	0	0	0.5	0.5	0	0
Old * Low Firm Size	0.18	0.38	0.5	0.5	0.18	0.38	0.5	0.5
Old * Damages Age	0.22	0.42	0.42	0.49	0.22	0.42	0.42	0.49
Old * Damages Disability	0.084	0.28	0.18	0.38	0.084	0.28	0.18	0.38
Old * Disability Definition	0	0	0.18	0.38	0	0	0.18	0.38
Currently Unemployed	0.48	0.5	0.49	0.5	0.48	0.5	0.49	0.5
Spanish Fluency	0.37	0.48	0.37	0.48	0.36	0.48	0.36	0.48
Correct Grammar	0.38	0.49	0.36	0.48	0.36	0.48	0.35	0.48
College Degree	0.38	0.48	0.38	0.48	0.36	0.48	0.36	0.48
Employee of the Month	0.35	0.48	0.37	0.48	0.35	0.48	0.37	0.48
Volunteering	0.34	0.48	0.35	0.48	0.36	0.48	0.37	0.48
Computer Skills	0.37	0.48	0.37	0.48	0.39	0.49	0.35	0.48
Customer Service Experience	0.38	0.49	0.36	0.48	0.38	0.49	0.39	0.49

Note: "RTW" = right-to-work. "Callback" is a dummy for whether the applicant received a positive or ambiguous response. "Old" is a dummy for whether the applicant is in the 64–66 age group. The interaction between Old and the presence of a right-to-work law in a state ("Old * RTW") is our primary variable of interest. "Low Firm Size" indicates whether a state's anti-age-discrimination law applies to firms with fewer than 10 workers. "Damages Age" and "Damages Disability" indicate whether a state's anti-age-discrimination law allows for larger damages than federal statutes. "Disability Definition" indicates whether a state has adopted a broader definition of disability than the federal standard established in the Americans with Disabilities Act (ADA). The remaining variables capture different applicant characteristics/skills (e.g., possessing a college degree or speaking Spanish fluently).

4 EMPIRICAL STRATEGY

The key empirical question addressed in this paper is whether right-to-work laws are associated with differences in the relative callback rate of older workers. Recognizing that gender may be a strong independent determinant of discrimination, we estimate separate models for males and females. Since our outcome variable is binary—callback/no callback—we estimate probit, logit, and linear probability models. For probit models, we estimate the following equation:

$$P(Callback_{i,s} = 1|Z_{i,s}) = \Phi(\beta_1 Old_i + \beta_2 (Old * RTW)_{i,s} + State_s + X_i\lambda + \varepsilon_{i,s}), \quad (3)$$

where $Callback_{i,s}$ is a dummy for whether individual i in state s received a callback, Old_i is a dummy for whether individual i is "old," and $Old * RTW_{i,s}$ is an interaction of the dummy for "Old" and the presence of a right-to-work law in state s. Following Neumark et al. (2019), we include state fixed effects represented by $State_s$. This specification controls for fixed differences

in callback rates among workers in different states. These inter-state differences are substantial and could introduce omitted variable bias in the absence of state fixed effects.

X_i is a matrix of control variables that includes interactions of a dummy indicating whether the applicant is "Old" with state laws related to age and disability discrimination in employment. In some specifications, we also control for various characteristics of applicants—such as possessing a bachelor's degree, being fluent in Spanish, or having won an "employee of the month" award at one's most recent job—and dummies for various résumé characteristics. Résumé characteristics include the order in which applications were submitted to the employer, the résumé template, the email script, and the format used to submit the application.

Our logit models are identical, except that the distribution of errors is assumed to be logistic rather than normal. Our linear probability models are of the form

$$P(Callback_{i,s} = 1|Z_{i,s}) = \beta_1 Old_i + \beta_2 (Old * RTW)_{i,s} + State_s + X_i\lambda + \varepsilon_{i,s}, \quad (4)$$

where $Callback_{i,s}$, Old_i, $Old * RTW_{i,s}$, $State_s$, and X_i are the same as in equation 3.

5 RESULTS

We present our main regression results in table 2 (for females) and table 3 (for males). For concision, we only show our coefficients of interest: "Old," which captures the difference in the probability of a callback for a 64- to 66-year-old applicant, relative to a young (29- to 31-year-old) applicant, and the interaction between "Old" and the presence of a right-to-work law in the applicant's state. This latter coefficient is of primary interest.

We find substantial age discrimination among women (table 2). Depending on the estimation strategy, older applicants are approximately 13–19 percentage points less likely to receive a callback than younger applicants. We also find that right-to-work laws are associated with a large (approximately 30 percent), statistically significant reduction in age discrimination among female job applicants. Alternative specifications, such as controlling for applicant skills and résumé characteristics, yield very similar results.

Table 3 shows that age discrimination among men is much lower than age discrimination among women, which is consistent with the previous literature on age discrimination Neumark, Burn, and Button (2019). We find that older men are only 3.7 percent less likely to receive a call back than younger men. This effect represents less than 30 percent of the level of age discrimination found among women. Our estimates of age discrimination among men are also only significant at the 10 percent level (as opposed to the 1 percent level of significance found for women). We find no evidence that right-to-work laws have any effect on age discrimination among men. The results are consistent in all estimation approaches examined in this paper.

As an additional check, we perform a leave-one-out analysis in which states are iteratively dropped from the sample. In figure 2, we show the results of this exercise among women, using probit models. The association of right-to-work laws with age discrimination is attenuated and no longer significant at the 10 percent level when Indiana, Maryland, Michigan, or Minnesota are excluded. Since most of these states have above-average unionization rates according to the Bureau of Labor Statistics (2022), it is reasonable that they would be important contributors to the average effect we detect in the full sample. The magnitude and significance of the effect are

TABLE 2. Results for Females

Outcome: Callbacks	(1)	(2)	(3)
Probit			
Old	–0.142***	–0.138***	–0.140***
	(0.0292)	(0.0293)	(0.0279)
Old x Right to Work	0.0467**	0.0436**	0.0411**
	(0.0185)	(0.0189)	(0.0195)
Logit			
Old	–0.135***	–0.132***	–0.135***
	(0.0278)	(0.0284)	(0.0275)
Old x Right to Work	0.0419**	0.0392**	0.0379*
	(0.0179)	(0.0186)	(0.0197)
Linear Probability Model			
Old	–0.188***	–0.186***	–0.187***
	(0.0385)	(0.0380)	(0.0352)
Old x Right-to-work	0.0743***	0.0716***	0.0676***
	(0.0227)	(0.0227)	(0.0223)
Controls			
State FE	Yes	Yes	Yes
Age discrimination laws	Yes	Yes	Yes
Applicant skills	No	Yes	Yes
Résumé characteristics	No	No	Yes
Observations	7,184	7,184	7,184
Mean of dep. variable	0.241	0.241	0.241

We report average marginal effects. Standard errors are clustered at the state level and shown in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

robust to other state exclusions. This demonstrates that our findings are broadly consistent across the United States, and not an artifact of a single idiosyncratic state.

6 CONCLUSION

A large literature shows widespread discrimination in labor markets on the basis of race, gender, age, and criminal background, among others. This literature has been influential because many scholars and the general public recognize the value in understanding and minimizing hiring discrimination. This paper is one of the first to examine evidence from a field experiment to understand the effects of a labor policy, particularly right-to-work laws, on hiring discrimination. Right-to-work laws prohibit workers from being compelled to financially contribute to a labor union as a condition of employment. These laws exist in more than half of US states and exert substantial influence over labor markets. Yet their effects on discrimination have not been previously studied.

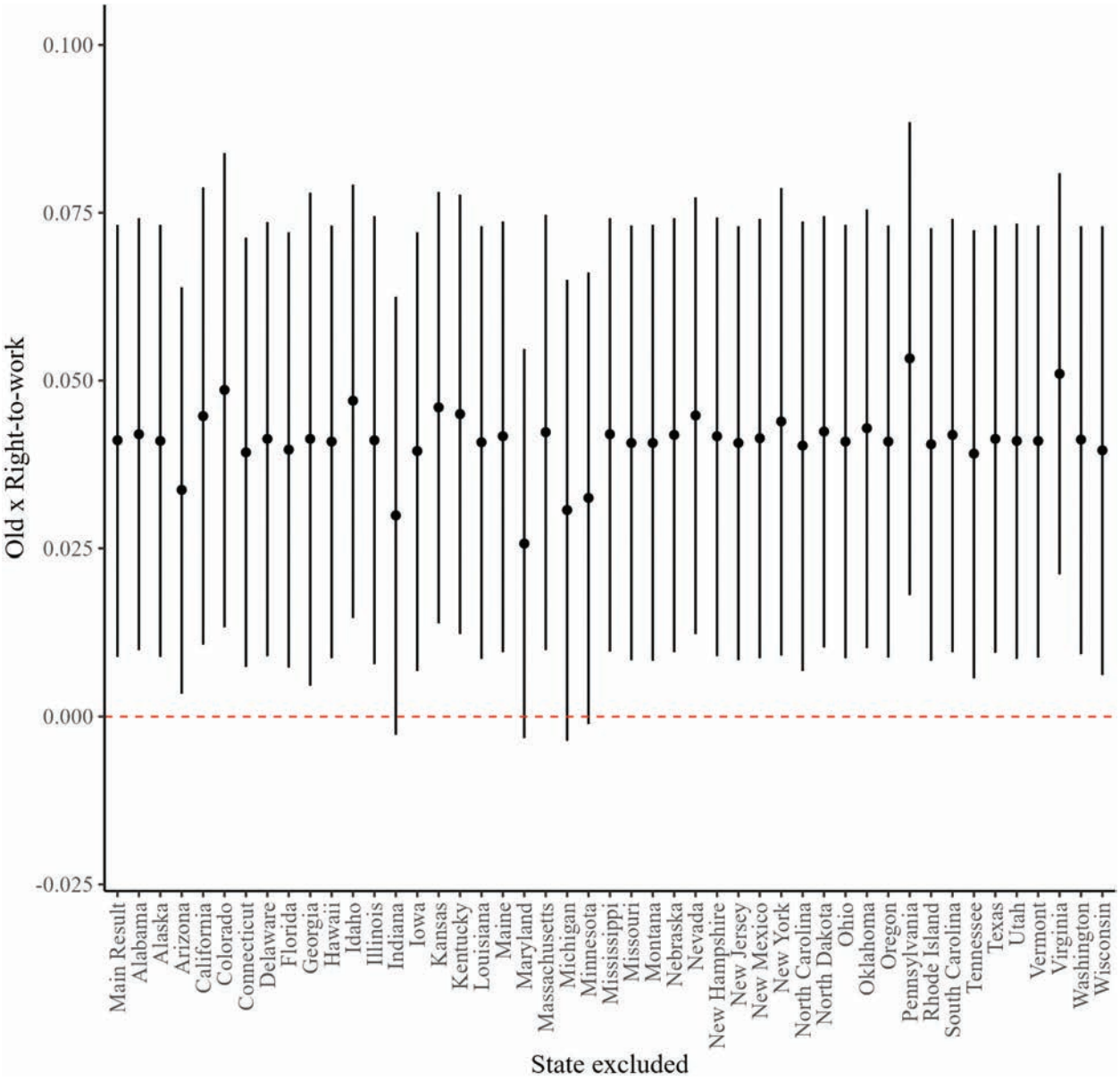
TABLE 3. Results for Males

Outcome: Callbacks	(1)	(2)	(3)
Probit			
Old	–0.0379*	–0.0340*	–0.0369*
	(0.0198)	(0.0185)	(0.0199)
Old x Right to Work	–0.0178	–0.0196	–0.0226
	(0.0151)	(0.0138)	(0.0143)
Logit			
Old	–0.0356*	–0.0323*	–0.0357*
	(0.0193)	(0.0180)	(0.0194)
Old x Right to Work	–0.0185	–0.0202	–0.0230
	(0.0151)	(0.0138)	(0.0142)
Linear Probability Model			
Old	–0.0560**	–0.0526**	–0.0571**
	(0.0240)	(0.0230)	(0.0246)
Old x Right to Work	–0.0127	–0.0142	–0.0159
	(0.0175)	(0.0167)	(0.0172)
Controls			
State FE	Yes	Yes	Yes
Age discrimination laws	Yes	Yes	Yes
Applicant skills	No	Yes	Yes
Résumé characteristics	No	No	Yes
Observations	7,184	7,184	7,184
Mean of dep. variable	0.212	0.212	0.212

We report average marginal effects. Standard errors are clustered at the state level and shown in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In this paper, we formalize a model of hiring discrimination building on the conceptual framework described by Friedman (1966). Our model shows that right-to-work laws are expected to reduce age discrimination in hiring by allowing older workers to accept lower compensation. We then leverage evidence from a résumé field experiment to estimate the effect of right-to-work laws on age discrimination in the retail labor market. Consistent with the predictions of our model, we find that the presence of a right-to-work law in a state is associated with a 30 percent reduction in age discrimination among women. Our work highlights the effects of public policies on hiring discrimination and explores a previously overlooked consequence of right-to-work laws. Additional work is needed to better understand how other policies may affect hiring discrimination and how right-to-work laws may affect other forms of discrimination.

FIGURE 2. Leave-one-out analysis



Note: We present average marginal effects from probit models for females. All models include state fixed effects and controls for state anti-age-discrimination laws, applicant skills, and résumé characteristics (equivalent to column 3 in tables 2 and 3). This analysis is done to show that no single state is driving the results of our analysis. Error bars represent 90 percent confidence intervals.

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