

Gender and Racial Discrimination in Hiring Before and During the COVID-19 Pandemic:
Evidence from a Field Experiment of Accountants, 2018-2020

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Abstract

In this paper, we ask whether macro-level changes during the first year of the COVID-19 pandemic relate to changes in the levels of discrimination against women and Black job-seekers at the point of hire. We develop three main hypotheses: that discrimination against women and Black job-seekers *increases* due to a reduction in labor demand; that discrimination against women *decreases* due to the reduced supply of women employees and applicants; and that discrimination against Black job-seekers *decreases* due to increased attention toward racial inequities associated with the Black Lives Matter protests during the summer of 2020. We test these hypotheses using a correspondence audit study collected over two periods, before and during the early COVID-19 pandemic, for one professional occupation: accountants. We find that White women experience a positive change in callbacks during the pandemic, being preferred over White men, and this change is concentrated in geographic areas that experienced relatively larger decreases in women's labor supply. Black women experience discrimination pre-pandemic but receive similar callbacks to White men during the pandemic. In contrast to both White and Black women, discrimination against Black men is persistent before and during the pandemic. Our findings are consistent with the prediction of gender-specific changes in labor supply being associated with gender-specific changes in hiring discrimination during the COVID-19 pandemic. More broadly, our study shows how hiring decision-making is related to macro-level labor market processes.

The COVID-19 pandemic upended the U.S. labor market in 2020. Following business closures and stay-at-home orders, labor demand and available job vacancies plummeted as employers risked closure (Forsythe et al. 2020). Simultaneously, employment rates reached record lows, corresponding to a peak unemployment rate of 14.7% in April 2020 (Bureau of Labor Statistics 2020). During this tumultuous time period, as schools and childcare centers closed or moved to remote settings, women – and mothers particularly – reduced participation in the labor force, leaving their jobs for care work at higher rates than before the pandemic (Collins et al. 2021; Landivar et al. 2020). Meanwhile, the summer of 2020 witnessed large-scale Black

Lives Matter (BLM) protest events (Buchanan, Bui, and Patel 2020), and some businesses subsequently sought to reduce racial inequality with renewed efforts (Friedman 2020).

Given the historic shifts in labor demand, unequal gendered impacts on labor supply, as well as heightened attention to racial bias, in this paper we ask whether and how the early COVID-19 time period, which we denote as the roughly eight months following the widespread stay-at-home orders in March 2020 but before the arrival of COVID-19 vaccines in the U.S., affects gender and racial discrimination in hiring compared to before the pandemic, for Black men and women and White women, compared to White men. We predict that each of these processes has the potential to shift hiring discrimination uniquely, which allows for an empirical test of how macro-level labor market changes during the early COVID-19 time period relate to changing levels of hiring discrimination. We would expect reduced labor demand to *increase* already-existing discrimination if employers hiring for the few remaining job openings contend with larger job applicant pools and rely more on gender and racial stereotypes to quickly sort through applicants (Botelho and Abraham 2017). Alternatively, gender-specific changes in labor supply may reduce discrimination – or even reverse it – for women job applicants, for example as employers perceive heightened commitment from women applicants compared to before the pandemic, or as they seek to replace exiting women employees with women job candidates because they use gender as an indicator of position fit (Burton and Beckman 2007). A separate prediction arises concerning changing levels of racial discrimination. To be sure, evidence shows that prejudice against Asian and Hispanic Americans increased during the pandemic (Tan, Lee, Ruppanner 2021; Lu, Kaushal, Gaddis 2021). However, employers and other hiring gatekeepers may seek to address underlying biases specifically toward Black men and women job-seekers due to increasing recognition of racial inequalities in

U.S. society spurred by the BLM protests in 2020 (Buchanan, Bui, and Patel 2020), thus reducing discrimination toward Black job applicants.

These three sweeping changes in the U.S. labor market during the early COVID-19 pandemic, therefore, predict three diverging outcomes with respect to hiring discrimination: compared to before the pandemic, gender discrimination and racial discrimination against Black job-seekers may *increase* because of reduced labor demand, gender discrimination against women may *decrease* because of changing workforce composition by gender, and racial discrimination against Black job-seekers may *decrease* due to increased attention toward racial inequities in the U.S. To test these three predictions, we take advantage of a natural experiment that compares levels of hiring discrimination before and during the early pandemic. From November 2018 to February 2020, we conducted a correspondence audit study of a professional occupation (accountants) in the U.S. to assess discrimination in hiring by applicants' gender (men and women) and race (Black and White). Between March and April 2020, we paused data collection as cities and states issued stay-at-home orders in response to the initial COVID-19 case surges. We resumed data collection in May 2020, continuing until November 2020. The two periods of data collection – before and during the early pandemic – allow for a test of how hiring screening discrimination changes over time, as well as an assessment regarding whether the changes in discrimination are concentrated in geographic areas that experience greater changes in job availability, women's labor supply, and Black Lives Matter protest activity.

We find that pre-pandemic, Black men and women, but not White women, experience discrimination relative to White men. During the pandemic, however, Black women receive about equal callbacks to White men, and White women applicants are even preferred in hiring screening outcomes compared to White men. In other words, gender preferences *in favor of*

White women emerge during the early COVID-19 pandemic, and Black women fare relatively better during the pandemic than they did previously. This finding aligns with the prediction that gender-specific changes in labor supply are associated with gender-specific changes in hiring preferences. In contrast to the changing hiring preference patterns for White and Black women, we find persistent hiring discrimination against Black men before and during the early pandemic. In a secondary analysis, we find that the increased preference for White women during the early pandemic is concentrated in geographic areas that experienced larger declines in women's labor supply. In contrast, we find no clear evidence of geographic variation in effects according to either changes in demand for labor or across variation in Black Lives Matter protest activity.

Correspondence audit studies are considered the “gold standard” of detecting hiring discrimination, and yet they often fall short of answering questions related to “how,” “why,” “where,” and “when” discrimination happens (see Pedulla 2018; Gaddis 2019). This paper advances our knowledge of hiring discrimination by addressing “why” and “where” discrimination levels change: we find evidence that employers react to changes in the gender composition of the labor supply, and that changes in discrimination levels, at least for White women, are greatest in those geographic areas which experience the greatest labor supply shift. Empirically, the COVID-19 pandemic provides a unique opportunity to assess the effects of changes in labor supply and changes in labor demand on discrimination levels since, unlike recent recessions, the pandemic produced changes in labor supply rather than solely reflecting changes in labor demand or job availability (Alon et al. 2020). As such, findings that White women, and to a lesser extent Black women, actually benefit in certain hiring contexts during the early pandemic challenges the idea that a reduction in labor demand will result in amplified discrimination (e.g., Krosch, Tyler, and Amodio 2017). Finally, our research shows the

persistence of racial discrimination against Black men and the lack of translation of recent social movements on racial justice into reductions in hiring discrimination for this group of applicants.

Labor Market Disruption and Discrimination

In this section, we begin by describing pre-pandemic evidence regarding gender discrimination against women in hiring, and racial discrimination against Black job-seekers. We then detail the three major macro-level changes that we predict to have effects on hiring discrimination during the early COVID-19 pandemic. We first describe the underlying change in detail and then draw from existing literature and theory to predict how this change relates to hiring discrimination.

Gender and Racial Discrimination in Hiring: Evidence from Before the COVID-19 Pandemic

Economic and sociological research on gender and racial discrimination in hiring, conducted before the COVID-19 pandemic, has documented high levels of racial discrimination against Black job-seekers and varying levels of gender discrimination at the hiring interface (Bertrand and Mullainathan 2004; Di Stasio and Larsen 2020; Erlandsson 2021; Gaddis 2015; Nunley et al. 2015; Quadlin 2018; Quillian et al. 2017; Rivera and Tilcsik 2016; Yavorsky 2019). Audit and correspondence studies, in which fictitious job applications are sent to real job openings, find that job applicants who are perceived to be Black, compared to equivalent applicants perceived to be White, experience reduced callbacks; this bias exists even among highly educated, elite applicants (Bertrand and Mullainathan 2004; Gaddis 2015; Quillian et al. 2017). Gender discrimination in hiring has also been documented, with studies finding that levels of gender discrimination against (White) women are somewhat more context-dependent, varying

by social class (Rivera and Tilcsik 2016), masculinity or femininity of the job (Yavorsky 2019), applicant details such as GPA or field (Quadlin 2018), and gender of the screener (Erlandsson 2021). While few studies have explored how race and gender together affect hiring discrimination, there is evidence that both Black men and Black women face discrimination, compared to White men and women (Bertrand and Mullainathan 2004; Nunley et al. 2015). Taken together, this body of literature shows that prior to the pandemic, applicants' race and gender are salient in the hiring context and are related to hiring outcomes.

Labor Demand During the Early Pandemic

Several macro-level labor market dynamics changed during the early COVID-19 pandemic that, in theory, may have affected discrimination levels at the hiring interface. First, the early COVID-19 pandemic substantially decreased employers' demand for labor in the United States. In mid-March 2020, there were about 815,000 job vacancies per week in the U.S.; by late April 2020, job vacancies dropped by over 40% (Forsythe et al. 2020). While some industries were hit harder than others, the collapse occurred across occupations (Forsythe et al. 2020). The demand for labor rebounded somewhat in April 2020, but did not nearly return to pre-pandemic rates (Shuai, Chmura, and Stinchcomb 2020).

[Figure 1 Here]

Figure 1 illustrates the extent of the decline in job openings for one professional occupation – accountants – which is the occupation that we examine in the correspondence audit study, described in more detail below. Specifically, Figure 1 shows the number of new online job postings for accountants over the audit study data collection time period. These estimates are drawn from proprietary data on online job postings from Burning Glass Technologies (2020), a

labor market analytics company that records all known online job listings daily. Since the number of job openings is a direct measure of employer demand for accountants, it is evident that demand is relatively stable before the COVID-19 pandemic, with some variability month-to-month. Following the initial U.S. response to the COVID-19 pandemic in March 2020, demand for accountants falls sharply: in February 2020, there were 10,091 new online job openings for accountants; by April 2020, there were only 4,262 new job openings for accountants, and the level of demand remains relatively low throughout 2020. The decrease in job demand also varies across locations. For instance, between February to April 2020, accountant job openings in San Jose, California fell 76% whereas accountant job openings only fell 33% in Kansas City over the same time period (Burning Glass Technologies 2020).

Labor Demand and Hiring Discrimination

Based on existing theoretical and empirical work, as demand for labor declines, we expect gender and racial discrimination in hiring to increase (Botelho and Abraham 2017; Simcoe and Waguespack 2011; Tomaskovic-Devey and Avent-Holt 2019). There are two underlying explanations for this prediction. First, if employer demand decreases, it is logical that any given job opening will become more competitive, with an increasing number of applicants in each applicant pool. The literature on search costs and discrimination suggests that as the size of the applicant pool increases, employers spend less time reviewing and comparing each applicant during the screening decision (e.g., Botelho and Abraham 2017). Under these conditions of high search costs and uncertainty, employers especially rely on status indicators such as the perceived gender and race of the applicant to determine which applicants to pay attention to, assess, and ultimately call back (Bartoš et al. 2016; Botelho and Abraham 2017; Simcoe and Waguespack

2011). Employers hiring for a shrinking number of jobs will face a higher volume of applicants and, as a result, will favor selecting applicants that meet their underlying racial and gender tastes (in favor of White men), even if the nature of those tastes have not changed.

Second, and more generally, literature on social closure and intergroup bias suggests that the exclusion of subordinate groups from access to jobs and other organizational resources by dominant groups is likely more pronounced in times of economic scarcity (Tilly 1998; Tomaskovic-Devey and Avent-Holt 2019). As resources become scarcer, a sense of group competition results in negative attitudes toward outgroup members and preference for ingroup members, which in turn leads dominant groups to restrict access to jobs, whether intentionally or not, to those like themselves (Brewer 2001; Riek, Mania, and Gaertner 2006; Tomaskovic-Devey and Avent-Holt 2019). This process will lead to heightened preferences for hiring White men applicants, and reduced hiring chances for other job applicants, compared to when jobs are not a scarce resource, like during the pre-pandemic period (Johnston and Lordan 2016; Krosch, Tyler, and Amodio 2017). The predictions corresponding to reduced labor demand suggest:

Hypothesis 1a: Levels of gender and racial discrimination in hiring increase during the early COVID-19 pandemic, compared to prior to the pandemic.

As a corollary to the general prediction, if Hypothesis 1a holds, we predict that the increase in discrimination during the early COVID-19 pandemic is most concentrated in geographic areas that experience larger decreases in job demand, given that employers are more responsive to local, rather than national, labor market trends (Topel 1986; Moretti 2011):

Hypothesis 1b: The increase in gender and racial discrimination during the pandemic compared to prior is concentrated in geographic areas that experience relatively high decreases in job demand.

Labor Supply During the Early Pandemic

The early pandemic had an uneven impact on labor supply, with women and mothers disproportionately exiting work over men and fathers (Adams-Prassl et al. 2020; Alon et al. 2020; Collins et al. 2020; Landivar et al. 2020).¹ While initial unemployment – involuntary employment lapses from job loss – was widespread and particularly affected workers of color, sustained non-employment due to reductions in labor force participation were clearly gendered (Bureau of Labor Statistics 2020; Collins et al. 2021). Women and mothers took on the brunt of caretaking responsibilities as childcare centers closed, schools paused instruction or turned to remote learning, and as family members fell ill (Lyttelton, Zang, and Musick 2021; Power 2020). As a result, about ten times more mothers than fathers were not working for family reasons during the pandemic’s initial months (authors’ analysis of Flood et al. 2021). Recent research has shown that women and mothers were also more likely to have reduced their work hours, even when remaining employed, likely because of increased obligations in the household (Collins et al. 2020; Fan and Moen 2021).

While there are clear differences in the pandemic’s effect on employment by gender, there is less evidence that the COVID-19 time period had as much of a differential impact by race when comparing White and Black workers. Couch, Fairlie, and Xu (2020) estimate that while unemployment rates of White and Black workers increased during the first wave of COVID-19 (April 2020), the Black-White disparity in unemployment remained relatively stable during this

time. There is some evidence that Black workers have recovered more slowly than White workers, particularly because of racial variation in occupation and industry and the economic crisis concentration in certain occupation and industry groups (Couch et al. 2020; Moen, Pedtke, and Flood 2021; Montenovo et al. 2020), yet within racial/ethnic groups, women have been hit harder than men in terms of unemployment rates (Gezici and Ozay 2020).

[Figure 2 Here]

To illustrate the gendered and racial impacts of the early pandemic on labor supply, Figure 2 presents estimates of employment rates of White and Black men and women over the audit study time period (November 2018-November 2020), among college-educated respondents ages 18-65 from the Current Population Survey (CPS) (Flood et al. 2021).² The left panel of Figure 2 illustrates the employment rates for the full sample of respondents, and the right panel displays employment rates among parents.³ As shown in Figure 2, employment rates for all racial and gender groups decline following the onset of business closures and stay-at-home orders in April 2020. However, the extent of decline and subsequent rebound in employment rates differ by respondents' gender and racial identities. For instance, White men experience the smallest drop in employment, of about 5.9 percentage points from February to April 2020. Over the same time, White women and Black women experience much higher declines in employment, 9.4 and 9.0 percentage points respectively, and do not rebound to their pre-April 2020 employment levels as of November 2020. College-educated, working-aged Black men also experience declines in employment during COVID, but it is likely that the bulk of this decline is concentrated within certain industries or occupations; Gezici and Ozay (2020), for instance, find no difference between White and Black men in the likelihood of nonemployment in industries with high shares of jobs that can be performed remotely.

The right-hand panel of Figure 2 illustrates that gender and racial differences in employment rates during the early pandemic are even more divergent among parents, with mothers, especially White mothers, experiencing some of the sharpest declines in employment in April 2020. This pattern corroborates that mothers are more likely to leave work or remain out of work during the pandemic to provide childcare and schooling assistance (e.g., Collins et al. 2020; Collins et al. 2021; Landivar et al. 2020). Taken together, current evidence suggests that the effect of the early pandemic on labor market participation is primarily a gendered process that cuts across racial lines.

Labor Supply and Hiring Discrimination

Given the uneven effects of the COVID-19 pandemic on the employment rates by gender, we expect changes in gender discrimination, specifically, at the point of hire. We predict that the relative shortage of women and mothers in applicant pools and in the labor market may be associated with employers preferring to hire women applicants more so than they do prior to the pandemic. Several underlying theoretical processes explain this prediction.

First, related to signaling theory (Connelly et al. 2011; Pedulla 2016; Stiglitz 2002; Weisshaar 2018), changes in gendered supply during the pandemic period may alter the information signaled by applicant gender. Prior to the pandemic, a woman job applicant may signal low commitment to work relative to men applicants, due to pervasive gendered stereotypes and beliefs (Ridgeway and Correll 2004). During the early pandemic, the same woman job-seeker may signal a heightened commitment to work by simply applying for a job since many women and mothers exited the labor market due to increased caretaking responsibilities and removed themselves from the applicant pool (Collins et al. 2021; McKinsey

& Company 2021). If that woman applicant remains *employed* during the early pandemic, there is even further opportunity to signal commitment by differentiating from other women and mothers who lost or left their jobs (Weisshaar 2018). Finally, a woman job-seeker – particularly one consistently employed during the early pandemic – can signal she is likely childless, and avoid negative commitment or competence stereotypes associated with motherhood that she may not have avoided prior to the pandemic (Correll et al. 2007).

Second, companies may seek to replace women who exited their firms, and job openings may reflect a replacement of those former employees. Employers may want to hire similar types of job applicants to replace the women they disproportionately lost, either because employers explicitly prefer women applicants to replace exiting women employees, or because they use gender as a proxy to find applicants with skills similar to those possessed by exiting women (Burton and Beckman 2007; Doering and Thébaud 2017). Either way, women applicants may be perceived as better fits to open jobs.

Each of these mechanisms – women signaling increased commitment and employers using gender to hire applicants similar to departing employees – is associated with the disproportionate departure of women and mothers from the workplace, and predicts that women will be preferred during the early pandemic compared to prior.

Hypothesis 2a: Levels of gender discrimination in hiring decrease during the early COVID-19 pandemic, compared to prior to the pandemic.

Moreover, since employers may respond to women exiting their own firms, rather than a national decline in women's employment, if Hypothesis 2a holds, then we would expect as a

corollary prediction that the decrease in gender discrimination is concentrated in geographic areas which experience greater decreases in women's labor supply.

Hypothesis 2b: The decrease in gender discrimination during the pandemic compared to prior is concentrated in geographic areas that experience relatively high decreases in women's labor supply.

Black Lives Matter Protests and Hiring Discrimination

The summer of 2020 saw a crescendo of Black Lives Matter (BLM) protests in response to the murder of George Floyd on May 25th, 2020. News outlets suggested that these BLM protests represented the largest protest participation rates ever in U.S. history (Buchanan, Bui, and Patel 2020), although the intensity of protests varied: cities like Los Angeles and Minneapolis experienced high levels of protest activity, but others like Atlanta and Birmingham experienced far lower (Ferrer and Nguy 2021). Compared to previous years of BLM protest activity, these summer protests were more racially and ethnically diverse, including substantial participation of White protesters (Fisher 2020). Moreover, opinion polls show that public sentiment toward the BLM movement in the U.S. shifted favorably over the last several years, resulting in increased recognition of systemic racism against Black Americans (Cohn and Quealy 2020; Pew Research Center 2017). Support for the BLM movement itself increased by over 25 percentage points when measured in the summer of 2020 compared to 2018, with a majority of White Americans supporting the BLM movement for the first time ever (Cohn and Quealy 2020; Thomas and Horowitz 2020). The increase in BLM support and growing awareness of systemic racism against Black Americans is despite a concurrent *increase* in racial prejudice against Asian and Hispanic Americans during the COVID-19 pandemic due to their despicable and xenophobic

depiction as carriers of the COVID-19 virus in popular media and in political rhetoric (Tan, Lee, Ruppanner 2021; Lu, Kaushal, Gaddis 2021).

The recent attention paid toward racism against Black Americans in the U.S. has the potential to reduce hiring discrimination directed toward Black job-seekers in two ways. First, due to the BLM protests and subsequent media attention to racism, corporate America may face greater pressures to hire and retain Black employees and address racism within their organizations (Jan et al. 2020). For instance, research shows that companies have publicly fired leaders who expressed racist beliefs (Johnsson and Black 2020), released statements in support of BLM protesters (Hsu 2020), and engaged in renewed efforts to reduce racial inequalities in their internal evaluation processes, organizational structures, and leadership representation (Friedman 2020).⁴ It is possible that corporations implement changes to their hiring processes to address hiring discrimination toward Black applicants.

This is an optimistic depiction of corporate response to the BLM movement; thus, a second way in which the BLM movement may reduce hiring discrimination is through its influence on individual hiring gatekeepers' evaluation processes. Through their individual support for or participation in the BLM protests, hiring gatekeepers may be aware of racial inequities and may work to reduce their conscious or unconscious racial biases against job applicants they perceive to be Black (Mazumder 2019; Sawyer and Gampa 2018). Either a top-down organizational response to the BLM movement in the form of structural changes to the hiring process, or a bottom-up response of hiring gatekeepers, may decrease discrimination toward Black men and women job applicants during the early pandemic compared to prior.

Hypothesis 3a: Levels of racial discrimination in hiring for Black men and Black women decrease during the early COVID-19 pandemic, compared to prior to the pandemic.

While we predict a general decrease in discrimination against Black job-seekers in response to the rising racial awareness of the BLM protest movement, employers may be more responsive the closer the protests are to their physical locations. To be sure, employers may increase discrimination against Black job-seekers in backlash to BLM protests, but there is some historical precedent to assume a “positive” response. In the 1970s, many employers were spurred into compliance with equal opportunity laws, in part, out of concern for the growing civil protest among racial minorities, and the fear that being perceived as not supporting the movement would lead to boycotts or violence (Dobbin 2009). Local BLM protests may similarly spurn employers into “positive” action, not through goodwill, but through fear of the economic consequences if they did not. This leads to our corollary prediction:

Hypothesis 3b: The decrease in racial discrimination against Black men and Black women during the pandemic compared to prior is concentrated in geographic areas that experience relatively high BLM protest activity.

Intersectional and null effects of macro-level changes during the COVID-19 pandemic

Taken together, three major processes have changed the labor market and racial consciousness during the COVID-19 pandemic, and each offers different predictions as to whether and how these underlying changes relate to racial and gender discrimination in hiring. Less clear are the predictions regarding the *intersectional* changes in discrimination, and specifically whether and how discrimination against Black women changes during the early pandemic differently from Black men or White women.

Intersectional scholars have long argued that race and gender are not experienced as separate and isolated entities but are mutually constitutive dimensions that together shape patterns of inequality (e.g., Collins 2015; Cho, Crenshaw, and McCall 2013). We cannot expect that Black men and women experience the same change in discrimination during the pandemic because they share the same racial categorization, nor Black and White women because they share the same gender categorization: the experience of Black women is not simply additive of Black men and White women combined (Ken and Helmuth 2021; King 1988). And yet while discrimination against Black women may have changed differently during the pandemic time period compared to either group, the complexity and contextuality of intersectionality and the flexibility of intersectional theory does not offer *a priori* predictions about the direction of the difference (Collins 2015). For example, regarding Hypothesis 2a, Black women may experience a *smaller* reduction in discrimination than White women due to gendered changes in labor supply: since college-educated White mothers experienced sharper reductions in work hours and non-employment rates compared to Black mothers (see Figure 2), employers may specifically desire to hire White women to replace them. On the other hand, Black women may experience a *greater* reduction in discrimination than White women if the strong signal of childless status, flexibility, and commitment to work associated with women applicants during the early COVID-19 pandemic counteract stereotypes of Black women as mothers and as lacking the right attitude for work (Kennelly 1999). We leave open the possibility for intersectional results without a firm commitment to formal hypotheses, and instead explore the experiences of Black women in more detail in the discussion, following our results.

Finally, we suggest that a viable prediction is the null hypothesis that hiring discrimination does not change during the early pandemic. If hiring discrimination remains

similar during the COVID-19 pandemic as compared to prior, employers are operating under a “business as usual” model, and macro-level economic changes may not influence their individual decisions. Considering how gender and race are embedded within organizational practices and structures (Acker 2006; Ray 2019), and some structural changes take time, gender and racial evaluation processes in hiring decisions may not change much during this period. We leave open this possibility, which we explore in the results.

In brief, our primary predictions outlined in Hypotheses 1a, 2a, and 3a relate to changes in gender and racial discrimination during the early COVID-19 pandemic compared to pre-pandemic levels and form the basis for our primary analysis below. In our secondary analysis, we investigate whether geographic areas that experience larger changes in job demand, women’s labor supply, and BLM protests, are associated with larger changes in discrimination levels, formally predicted in corollary Hypotheses 1b, 2b, and 3b.

DATA AND METHODS

Data

We conducted a correspondence audit study (Gaddis 2018; also see Neumark 2012) over a two-year period, from November 2018 to November 2020. Using randomly assigned names to signal the applicant’s gender (man, woman) and race (Black, White), we sent 7,870 resumes of fictitious senior accountant applicants to senior accountant job postings across the 50 most populated U.S. cities through a large online job listing website. The fictitious applicants were currently employed, had no gaps in their employment history, and the cover letter indicated that they were relocating and therefore searching for a new job.⁵ We used web scraping techniques to gather all senior accountant jobs listed on the online job board within each city and we selected a

random sample from this population of jobs for application. To reduce employer suspicion, we sent two resumes constructed from different templates and with different cities of residence and undergraduate universities to each job opening, one day apart. Sending two resumes, instead of one, to each job opening, also has the advantage of being a more statistically efficient design and requiring researchers to apply to fewer job openings in most cases (Vuolo, Uggen, and Lageson 2018; Larsen 2020).⁶

To design applicant materials, we first created two resume and cover letter templates modeled from publicly available resumes and cover letters from job search engines. To ensure the resumes were perceived as high quality, we included top accounting firms in the applicants' work histories. We also selected three universities that are among the top 15 national universities (U.S. News 2021) and are highly ranked in accounting or finance programs. We then pre-tested the resumes and cover letters using accountant respondents on Amazon Mechanical Turk (MTurk), a crowd-sourced survey platform, to ensure the fictitious resumes and cover letters were perceived as equal in competence, commitment, leadership, warmth, friendliness, and general quality. We drew from Gaddis (2017) to select applicant names. Following methodologies in Gaddis (2017) and Crabtree and Chykina (2018), we then tested first and last names on MTurk to determine which first and last name combination effectively signal race and gender while reducing associations with other factors, like social class. We used two sets of first and last names for each of the four gender and race combinations to better ensure that differences in employer treatment is due to gender and race rather than something peculiar about one name or another.⁷

We focus on one occupation and job level – senior accountants – for both theoretical and practical reasons. Accounting is a common occupation, and accounting positions are frequently

filled through online job board settings, unlike some other high-skill occupations such as scientists or lawyers.⁸ Additionally, there are higher levels of gender and racial diversity among accountants than for many other types of highly skilled occupations. About 59.6% of accountants are women, 32.7% are non-White, and 9.1% are Black (U.S. Census Bureau 2019). Finally, and on a practical level, focusing on one occupation allows us to have adequate sample sizes to estimate the change in gender and racial discrimination before and after the beginning of the COVID-19 pandemic, as well as to incorporate city-level indicators. The decision to focus on one occupation is not uncommon in audit studies (see, for example, Rivera and Tilcsik 2016), but we note that it may limit generalizability and consider this possibility in the discussion section.

Given that we did not originally collect the data to document effects before and during the pandemic, data collection occurred unevenly over time. We collected our data in three waves corresponding to the academic calendar. To illustrate effects over time, we collapse these data into 14 time periods such that there are sufficient observations in each time period for reasonable analysis. The time periods are displayed in Table 1. Note that nation-wide stay-at-home orders took place between time period 9 and time period 10, in April 2020.

[Table 1 Here]

Variables

For our dependent variable, we use a “callback,” which is recorded when an applicant receives a request for an interview or a positive response asking for additional information. For example, one employer emailed our applicant saying: “I’m impressed with your experience and would like to set up a 30-minute phone interview to learn more about you and answer any questions you may have.” As is typical with correspondence audit studies (e.g., Butler and

Crabtree 2017), we did not count generic automated responses sent to all applicants as callbacks (e.g., automated invitations to complete a skills test).

Our primary independent variables are the applicant's perceived gender and race (White and Black women and men) and a dichotomous variable indicating whether the application occurred during the early-COVID-19 pandemic period or prior. We use the initial cascade of state stay-at-home orders as the demarcation as the start of the COVID-19 pandemic. From March 19, 2020, to April 6, 2020, nearly all states issued some form of stay-at-home order.⁹ We designate applications that occurred prior to this benchmark as before the COVID-19 pandemic and applications that occurred after this benchmark as during the pandemic.¹⁰ In addition to analyses conducted for the full sample of job applications before and during the COVID-19 pandemic, we conduct analyses across geographic areas. In these analyses, we categorize geographic areas according to whether they are high or low on accountant labor demand changes, women's employment rate changes, and levels of BLM protest activity; each measure corresponds to each of the above three hypotheses.

As a measure of employer demand for labor, we use the monthly number of online job postings for accountants in each city from the audit study data, from proprietary job listing data from Burning Glass Technologies (2020). To capture changes in employer demand before and during the early COVID-19 time period, we calculate the percent change in the city's average monthly number of new job postings during period 9 in our audit data (December 2019 through February 2020) compared to period 10 (May and June 2020). We categorize cities as having low or high labor demand changes if they are below/equal to or above the median change in labor demand for the 50 cities in our sample.

To measure women's labor supply, we use the Current Population Survey to derive estimates of college-educated women's employment rates at the geographic division level (Flood et al. 2021). Divisions are smaller geographic areas than regions, but larger than states, and our data cover all nine geographic regions in the US.¹¹ We use division as the geographic unit of analysis because of data constraints at smaller geographic levels (e.g., state or city). We estimate college-educated women's employment rates at time period 9 and time period 10, and calculate the percent change in rates of employment between these two periods. We then categorize divisions that are above or below/equal to the median change in college-educated women's employment at the division level, to differentiate between contexts that experienced lower or higher gendered employment shocks.¹²

We capture city-level variation in the count of BLM protest events in each city since George Floyd's murder on May 25th, 2020, to the end of our collection period in November 2020. We estimate the number of protest events using public data from the U.S. Crisis Monitor, a project of the Armed Conflict Location and Event Data Project (ACLED 2020). This data collects the dates, locations, and actors in all events that involve political violence and demonstration in the U.S. since May 1st, 2020. We categorize cities based on whether they fall above or below/equal to the median number of BLM protests in Spring/Summer, 2020, per 1000 city residents, for the 50 cities in our data.¹³

Finally, we include control variables for region of the job posting (Northeast, Midwest, South, and West), the order in which the application was sent (first or second applicant), and a dichotomous variable indicating whether the job application was submitted through the job board website or directly to the employer's website.

Analytical Strategy

We rely on a quasi-experimental research design in which we treat the early COVID-19 pandemic as a macro-level shock to the labor market. Given that we have data on gender and racial variation in callbacks at the hiring stage before and during the pandemic, we estimate a causal relationship between the pandemic period and gender and racial hiring decisions by calculating the change across callback rates (and gaps in callback rates) from before the first COVID-19 stay-at-home orders to after the stay-at-home orders. We begin by presenting the simple trends in callbacks over time for Black men, White women, and Black women, relative to White men.

To more rigorously test our hypothesized relationship between the pandemic and levels of gender and racial discrimination (Hypotheses 1a, 2a, and 3a), we conduct a logistic regression model and present exponentiated coefficients in terms of the odds ratio of receiving a callback. We interact applicant gender, race, and the COVID-19 pandemic period indicator and include a set of control variables as described in the previous section.¹⁴

We conclude with an analysis in which we take advantage of geographic variation in labor demand, labor supply, and BLM protests to test our corollary Hypotheses 1b, 2b, and 3b. We examine variation in callback rates across geographic areas that experience above- or below-median changes in labor demand (Hypothesis 1b), women's employment (Hypothesis 2b), and BLM protest activity (Hypothesis 3b) to determine if geographic areas with larger changes along these measures are associated with larger changes in discrimination levels, aligning with the predictions above. We conduct separate logistic regression analyses on the likelihood of receiving a callback which interact applicant gender, race, the COVID-19 pandemic indicator, and an indicator for either (a) cities with an above-median percent decrease in labor demand for

accountants, (b) geographic divisions with an above-median decrease in women’s employment rates, or (c) cities with an above-median count of BLM protests (standardized by population) following George Floyd’s murder. Each of these additional analyses uses the same controls as in the primary analysis.

RESULTS

Changes in Callback Rates by Gender and Race Before and During the Early COVID-19 Pandemic

[Figure 3 Here]

Figure 3 presents the smoothed average callback rate, relative to White men applicants’ callbacks, over the duration of our correspondence audit study. While there is some variation month-to-month, a consistent pattern emerges across the two time periods. Before the pandemic (time periods 1 through 9, from November 2018 to February 2020), White women have similar callback rates to White men, and Black women and Black men face disadvantages in callbacks. During the early pandemic (time periods 10 through 14, from May to November 2020), White women and Black women’s relative callbacks increase, and Black men’s relative callbacks are similar compared to prior to the pandemic.

[Table 2 Here]

Table 2 presents the average callback rates before and during the early COVID-19 pandemic by applicant gender and race, and the absolute change in callbacks before, compared to during, the pandemic. Here we confirm the finding from Figure 3, which is that White and Black women increase their callback rates across the two time periods, and White and Black men experience similar callback rates during both periods. While White women’s callback increases

are slightly larger than Black women's, the magnitudes of the callback increases are not statistically different. Note that while both White and Black women, therefore, experienced similar *changes* in callbacks over the early pandemic period, Black women started at an initial disadvantage pre-pandemic, meaning that their resulting callback rates are not as high as White women during the early pandemic period.

[Table 3 and Figure 4 here]

Table 3 presents the logistic regression results, and Figure 4 presents the average marginal effect (AME) estimates of each applicant's race and gender, compared to White men, in the before and after stay-at-home-order periods, as well as the change in average marginal effect estimates between time periods.¹⁵ We include 95% confidence intervals. We refer to Figure 4 for ease of interpretation given the challenges of interpreting interaction effects in logistic regression models (Mize 2019).

Figure 4 shows that before the pandemic, Black men experience bias in hiring decisions compared to White men, with callback rates being about 4.4 percentage points lower than White men ($p < .01$). White women experience, on average, slightly lower callbacks than White men, but the small difference is not statistically significant (marginal effect of 1.8 percentage points). Black women experience callback rates 3.3 percentage points lower than White men ($p < .05$). After the stay-at-home orders, Black men continue to experience discrimination, with callback rates being about 4.0 percentage points lower than White men's ($p < .05$); Black women experience very similar callbacks to White men, on average (AME = 0.2 percentage points, $p = 0.921$), and White women experience significantly higher callbacks than White men (AME = 4.5 percentage points; $p < .01$). The far-right panel of Figure 4 displays the change in average marginal effects over the two time periods. For Black men, there is no significant change in

discrimination after the stay-at-home orders compared to prior. For White women, the magnitude of the change is large and significant: the callback rate difference between White women and White men increases by 6.4 percentage points after the stay-at-home orders ($p < .01$). For Black women, the average marginal effect estimate increases in magnitude, but not significantly ($p = .144$). However, note that the increase in the average marginal effect for Black women is not significantly different from the increase for White women, nor is the effect on the odds ratio of receiving a callback different for Black women and White women (Table 3). Thus, while the evidence is less definitive for Black women, it still suggests that they experience a decrease in discrimination during the pandemic time period. In short, these results confirm the earlier descriptive callback rates over time, showing that during the pandemic, White women experience preferences in hiring and Black women experience less discrimination, while Black men face persistent discrimination compared to White men.

Variation in Callbacks by Geographic Context During the Early COVID-19 Pandemic, Across Levels of Labor Demand, Women's Labor Supply, and BLM Protest Activity

The results in the main analysis are consistent with Hypothesis 2a, that gendered changes in labor supply are associated with gendered changes in hiring preferences. In this section, we provide results from secondary analyses to further assess whether shifts in levels of discrimination during the early pandemic vary according to changes in labor demand and supply, and BLM protest activity level, across geographic contexts.

[Table 4 and Figure 5 here]

Table 4 shows the average marginal effects of applicant gender/race, compared to White men, across geographic contexts and for the pre- and during-pandemic periods. Figure 5 visually shows the difference in average marginal effects after the stay-at-home orders compared to before the orders, to better display how discrimination levels have changed.

Variation Across Labor Demand Contexts

We begin by determining if callback rates for Black men and women and White women job applicants, compared to White men applicants, vary across cities that experience large decreases in labor demand compared to cities that experience smaller decreases. Recall that we classify cities with relatively large decreases in labor demand as those for which the change in monthly accountant job postings is above the median level change for all cities in our sample. The top panel of Table 4 shows the average marginal effects of applicant gender/race relative to White men on the predicted probability of a callback before and after the stay-at-home orders, across cities that experience low and high drops in labor demand. We find no evidence to support Hypothesis 1b: the change in discrimination levels after the stay-at-home orders is substantively similar in cities with high and low decreases in demand. For instance, the average marginal effect for White women relative to White men increases 6.6 percentage points ($p < .05$) in cities with high decrease in demand, while the average marginal effect increases 6.0 percentage points ($p = .18$) in cities with low decrease in demand, and the difference is not significant. The top panel of Figure 5 visually displays these results.

Variation Across Labor Supply Contexts

Next, we examine whether results vary across geographic contexts that experience low or high changes in women's labor supply. The middle panel of Table 4 shows variation in the average marginal effect on callbacks by gender and race before and during the pandemic, compared to White men, for geographic contexts that experience lower and higher decreases in women's labor supply. We find evidence to support Hypothesis 2b for White women, but less evidence in support of Hypothesis 2b for Black women. In geographic divisions with relatively low decreases in women's supply we see no significant changes in discrimination rates for White and Black women, nor for Black men. However, we find that White women experience a significant *increase* in callback preferences over White men in those geographic contexts that experience above-the-median declines in college-educated women's employment levels ($p < .01$). This increase is almost 5 times greater than the increase in divisions with smaller declines in women's employment (a 9.2 percentage point increase compared to 1.9 percentage point increase). We do not find a significant change in discrimination against Black women in geographic divisions with low or high declines in women's labor supply, indicating that employers' responses to women's labor supply particularly benefits White women, compared to Black women; we discuss possible explanations for this finding in the discussion section below. As expected, we do not find variation in discrimination against Black men according to geographic variation. The middle panel of Figure 5 visually shows how the change in the average marginal effect for White women relative to White men is concentrated in divisions with larger declines in women's employment.

Variation Across Contexts by Levels of Black Lives Matter Protest Activity

The bottom panel of Table 4 shows the average marginal effect estimates of each gender and race grouping relative to White men before and during the pandemic in cities with low and high BLM protest count after May 25th, 2020. This analysis speaks to Hypothesis 3b, to assess whether Black applicants fare relatively better in hiring screening decisions in contexts with particularly high prevalence of BLM activity. The average marginal effect point estimates suggest discrimination against Black men, relative to White men, decrease to a greater extent in cities with high BLM protest activity than in cities with low BLM protest activity, although these differences are not statistically significant. In contradiction with hypothesized expectations, discrimination against Black women, relative to White men, decreases to a greater extent in cities with *low* rather than high BLM protest activity, although, again, these differences are not statistically significant. These results suggest that the city-level intensity of summer 2020 BLM protests do not have a clear association with reduced discrimination against Black men and Black women, lending little support for Hypothesis 3b. The bottom panel of Figure 5 shows the relative consistency in the change callback rate gaps, compared to White men, across cities' BLM protest intensity levels.

DISCUSSION

The U.S. labor market experienced historic shifts during the early COVID-19 pandemic. As businesses temporarily closed and faced economic pressures to adapt to the pandemic environment, job availability plummeted and, while some industries and companies rebounded, most continued to face prolonged reductions in job availability (Forsythe et al. 2020). At the same time, the workforce itself changed, due to the gendered nature of labor force attachment, as women and mothers reduced work hours and exited paid employment at higher rates than men

and fathers (Collins et al. 2020; Collins et al. 2021; Fan and Moen 2021; Landivar et al. 2020). Meanwhile, the early pandemic time period corresponded with heightened attention to racial bias, following the murder of George Floyd and the large-scale Black Lives Matter protests in the summer of 2020.

In this paper, we consider how these macro-level labor market dynamics relate to changes in the level of discrimination in the hiring screening process by applicants' perceived gender and race. For each of the three processes that have uniquely marked the labor market during the early COVID-19 pandemic – reductions in labor demand, gendered changes in labor supply, and increased national attention to racism – we draw from extant literature to produce three hypotheses as to how the underlying process relates to discrimination against women and Black job-seekers in hiring. We suggest that reduced job availability may increase any pre-existing discrimination, as employers more readily rely on gender and racial stereotypes to make screening decisions (Botelho and Abraham 2017; Simcoe and Waguespack 2011). In contrast, the gendered change in labor supply may increase preferences for women job applicants, for example as employers use gender as a proxy to replace vacancies that were previously filled by women employees (Burton and Beckman 2007; Doering and Thébaud 2017). Finally, the Black Lives Matter protests and subsequent attention to racial biases and unequal treatment of Black employees in workplaces may be associated with decreased discrimination toward Black job-seekers, as companies and hiring gatekeepers increase efforts to reduce on-the-job racial biases (Friedman 2020).

We test these theoretical predictions using a large-scale correspondence audit study of accountants, comparing the callback rates of fictitious job applicants who applied to real job openings during two time periods: prior to the COVID-19 pandemic (November 2018-February

2020) and during the early pandemic (May-November 2020). As our fictitious job applicants remained unchanged during the two time periods, this offers a natural experiment to allow us to assess whether employers' responses to job applicants by gender (men, women) and race (Black, White) change during the early pandemic, compared to previous months. We find that both White and Black women applicants experience increased callbacks during the pandemic, such that White women applicants are even preferred over White men applicants during the early pandemic period. This finding aligns with Hypothesis 2a, that gendered changes in labor supply are associated with increases in employers' preferences for women. We find no support for the prediction that decreases in demand for labor lead to an increase in discrimination, nor do we find support for predictions that there are reductions in racial bias against Black applicants: in fact, hiring discrimination against Black men remains fairly stable during the early pandemic, compared to the pre-pandemic period. By relying on geographic variation in changes in labor demand, women's employment, and BLM protest activity, we document results consistent with Hypothesis 2b in that White women's callback advantage over White men during the COVID-19 period is concentrated in geographic areas with larger drop-offs in women's employment rates. We find little evidence of variation in callback differences across city-level measures of labor demand and BLM protest levels, which suggests that there has been a limit, at least in the relatively short-term, to the translation of recent social movements on racial justice into concrete reductions in bias against Black workers during hiring decisions.

Importantly, we do not find that the Black women's change in discrimination is concentrated in geographic divisions that are associated with a decrease in women's employment rates, in contrast to White women. One potential reason for this difference is that employers may respond to the disproportionate exit of women from the labor market by attempting to hire not

only women, but *same-race* women, to replace them. Since Black women only constitute 6.4% of accountants in 2020, compared to 53.5% for White women (authors' calculation based on Flood et al. 2021), any changes in discrimination for Black women will be more subtle and less easily detectable across geographic locations. These nuanced intersectional findings, and the possible theories underlying these findings, are worthy of future research, which we discuss in more detail below.

CONCLUSION

The findings from this paper have both theoretical and applied contributions that build on our understanding of hiring discrimination as contingent on context, and in particular, on the theoretical importance of the macro-level labor market context in which meso-level hiring decisions of hiring managers are embedded. We draw theoretical attention to the importance of labor supply composition in employers' decision-making processes. Whether through resume information signaling or employers' desire to replace exiting employees with similar others, we suggest that labor supply matters for employers' gender and racial preferences. As such, we build on research that demonstrates how demand-side characteristics shape supply (Brands and Fernandez-Mateo 2017; Abraham and Burbano 2021), by showing that supply-side characteristics also shape demand: applicant or existing workforce compositions shape employers' preferences by gender. The COVID-19 pandemic offers a unique opportunity to test how changes in both labor demand and supply affect hiring discrimination. While previous research on economic recessions finds that discrimination against racial minorities increases during recessions, because of a decrease in job demand (Johnston and Lordan 2016; Krosch, Tyler, and Amodio 2017), the COVID-19 pandemic is unique compared to prior recessions in

that it resulted in both labor demand and supply composition changes, as women disproportionately exited the labor market (Alon et al. 2020). By exploiting the period's simultaneous macro-level economic shifts, we therefore advance theory by showing the importance of macro labor supply changes on meso-level hiring outcomes.

We contribute to an intersectional understanding of gender and racial discrimination in the labor market in two general ways. First, our findings highlight the unique experience of Black men who face consistent discrimination before and during the early COVID-19 pandemic, compared to White and Black women who experience improved hiring screening outcomes, and compared to Asian and Hispanic Americans who, according to other studies, face increasing racial prejudice due to their perceived association with the COVID-19 virus (Lu, Kaushal, Huang, and Gaddis 2021). Our study highlights how discrimination against Black men, in particular, may be relatively more impervious to changing labor market conditions – in line with meta-analysis studies showing little change in racial discrimination against Black job-seekers over time (Quillian et al. 2017).

Second, we demonstrate how levels of discrimination change differently over time at different intersections of gender and race, which we argue has important implications for how scholars interpret intersectional differences in discrimination. For instance, we find that during the pandemic period in our study, Black women's callback rates are equal to White men's callbacks, and squarely between Black men's level of disadvantage and White women's level of preference. Based on this snapshot in time, we might erroneously conclude that the findings are an example of discrimination against Black women as additive, with employers' preferences in favor of women "canceling out" negative discrimination against Black job-seekers (e.g., Pedulla 2014). Alternatively, we might erroneously conclude that the findings support theories of

intersectional invisibility – that under certain circumstances Black women are less affected by gender and racial stereotypes than White women and Black men at the hiring interface (e.g., Ridgeway and Kricheli-Katz 2013). Instead, we depict a more nuanced story: Black and White women both experience an increase in callback rates during the early pandemic, but because Black women have lower callback rates than White women before the pandemic and thus have a larger gap to cover, and because they experience a somewhat smaller callback increase, White women are preferred relative to White men during the early pandemic whereas Black women are not. On balance, our results are in line with, but add nuance to, previous work that suggests that Black women face unique and complex discrimination processes that differ from Black men and White women (see McCall 2005; King 1988; Collins 2015).¹⁶

Finally, the *lack* of support for Hypothesis 3 regarding a decrease in racial discrimination against Black job-seekers during the early pandemic tempers expectations relating to widespread racial progress in the United States following the BLM protests. Polling continues to show that Americans are more aware of racial injustices and the need for addressing bias (IGPA 2021); U.S. companies have made rounds of public statements regarding the importance of racial diversity in the workforce and poured billions of dollars into diversity and inclusion initiatives (Fluker 2021). And yet, despite these efforts, it seems that there is little immediate effect on racial discrimination against Black applicants, particularly bias against Black men.

This paper has several limitations, each of which inspires avenues for future research. First, the study is limited to one relatively gender-balanced occupation (accountants), and given the ample sociological evidence that occupational context relates to hiring decision-makers' preferences about the gender and race of job applicants (González, Cortina, and Rodríguez 2019; Yavorsky 2019), we expect that findings may not generalize to, for instance, non-professional or

male-dominated occupations. Moreover, future studies to understand the effects of rising racial awareness due to BLM protests on racial discrimination might include a direct measure of an increase in racial awareness, as well as BLM protest events, which would allow researchers to capture potentially opposite reactions to BLM protests rather than aggregate employer responses.

Another worthwhile avenue for future research relates to examining hiring discrimination processes during the pandemic for additional social-demographic groups. For instance, extending this research beyond the Black/White dichotomy to study Latinx and Asian job-seekers is an important and understudied line of inquiry. Moreover, our research documents White women's advantages in job-seeking during the pandemic; whether this advantage applies to White mothers is unknown. The fictitious job-seekers in our study are currently employed and have continuous work histories, and different patterns may apply to those who are unemployed or who temporarily left work to care for family, both of which are common experiences during the pandemic (Pedulla 2016; Weisshaar 2018). Following Pedulla (2016), for instance, it is possible that among applicants with a gap in employment, women experience an even greater advantage compared to men if employers perceive the employment gap as unusual for men but not for women. In addition, the resumes we use signal relatively elite applicants who worked at top accounting firms, attended elite universities, and follow standard work trajectories. We expect these types of applicants to be less negatively impacted by the pandemic, and future work should examine how these impacts vary across different levels of qualification and background.

Exploring the underlying mechanisms that link macro-level economic shocks to micro-/meso-level decisions is perhaps the most fruitful area for additional research, and our research leaves unanswered many additional questions. Do hiring decision-makers respond to changes in supply and demand because of *real* or *perceived* changes? There has been ample media attention

given to the uneven gendered impact of the pandemic on job loss (e.g., Taub 2020), but it is unclear how employers feel this impact. To what extent are available jobs during the early pandemic intended to fill vacancies, compared to jobs that are newly created positions? Do smaller-scale unexpected shocks to labor supply or applicant pools during non-pandemic periods have similar impacts as labor market changes at the divisional or national level? Having more granular intersectional data at the firm-level, in particular, on the composition of the applicant pool and employee turnover, is fundamental to consider how these mechanisms might differ across gender and racial groups. There are many more avenues for research to extend our understanding of these mechanisms as they relate to economic system shocks and to examine the extent to which these results generalize beyond the exceptional circumstances of the pandemic period.

Finally, an important question is whether the changes in the levels of discrimination in the early COVID-19 pandemic are a permanent feature of the labor market. Since the data collection occurred for this study, new COVID-19 variants have spread, governments and corporations continue to modify their responses to the pandemic, and workers continue to adjust their behavior based on limited and often faulty information (Shockley et al. 2021). Perhaps most importantly, COVID-19 vaccines have become widely available to the American public, if not yet fully adopted (CDC 2022). Given these recent pandemic-related changes, it is difficult to say whether or how discrimination patterns have changed since November 2020. However, the underlying state of the labor market may provide some hints. By August 2021, college-educated women's employment rate had nearly fully recovered, and for White college-educated women mothers, the employment rate had fully recovered (authors' analysis of Flood et al. 2021). If the decrease in gender discrimination against women is associated with women's disproportionate

exit from the labor market, the return of pre-pandemic labor supply levels suggests that gender discrimination rates may also have returned to pre-pandemic levels. No matter the current state of discrimination, it is clear is that gender and race continue to matter in hiring screening decisions, even if who specifically benefits or loses change during economic downturns, recoveries, and labor supply shocks. Until we take steps to change organizational structures, cultures, and evaluation processes, we expect to continue to see gender and racial differences in labor market outcomes.

Footnotes

¹ The early pandemic was associated both with heightened unemployment (e.g., from job loss) and reduced labor force participation (e.g., from individuals exiting work for caregiving reasons). In the empirical analyses below, we consider demographic changes to employment rates, since nonemployment may be for multiple underlying reasons.

² We focus on college-educated respondents given that this population is directly relevant to our correspondence audit study, which examines accountants – a profession that requires a college degree.

³ While our empirical audit study does not explicitly feature parent applicants, the employment rates of mothers and fathers are relevant to employers' interpretation of women job applicants, described in more detail below.

⁴ Adidas, for instance, stated on June 9th, 2020, that at least 30% of new U.S. employees would be Black or Latinx (Friedman 2020).

⁵ Depicting applicants as continuously employed simplifies our analysis and interpretation of the results, but it also potentially limits the generalizability of our findings, which may not apply to men or women who experienced gaps in employment before or during the pandemic.

⁶ Multiple fictitious applicants per job opening may bias selection decisions depending on the applicant pool size (Larsen 2020). We demonstrate that our results hold when restricting the analysis to job openings that received one applicant (see Appendix A).

⁷ See Appendix B for details on the audit study design.

⁸ See <https://www.roberthalf.com/blog/job-market/what-are-the-best-job-hunting-options-for-accountants> for details on accountant job listing processes.

⁹ See <https://www.nashp.org/2020-state-reopening-chart>, which details stay-at-home order timing across states.

¹⁰ We recognize that the pandemic is not a discrete event, and there could be complex temporal variation in hiring processes during various time periods in the pandemic. We address this possibility in several ways. First, we present the smoothed callback rates over time (see Figure 1) to illustrate variation during the early pandemic period. We additionally replicate the main findings using a county-level demarcation for the start of the pandemic based on the first peak of COVID-19 cases occurring between April and September 2020 (see Appendix A). We also ran supplemental models examining variation in callbacks within two time periods of the pandemic, the early shock (spring and summer) and rebound (fall), and found no substantive differences in results (see Appendix table A1).

¹¹ See <https://www.census.gov/programs-surveys/economic-census/guidance-geographies/levels.html> for geographic regions and divisions.

¹² More precise measures of labor supply such as information on applicant pools are not readily available for the pandemic time period and across geographic contexts. We therefore use changes in employment rates to provide a close approximation to labor supply levels.

¹³ For more detail on the measures, see Appendix B.

¹⁴ In a supplementary analysis (see Appendix A) we analyze the time periods before the pandemic and during the early pandemic separately, to enable the use of month fixed effects. The results are nearly identical to the main results reported here.

¹⁵ See Appendix B for a table of average marginal effects as well as a detailed discussion of descriptive statistics.

¹⁶ It is possible that Black women benefit from BLM protest activity more so than Black men, and do not benefit from gendered supply changes. However, we find no supporting evidence in our analysis of geographic variation in BLM protest activity levels.

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Table 1. Number of Applications and Aggregation by Time Period

Time Period	Application Month and Year	Percent	N
1	November 2018 – January 2019	5.8	459
2	February 2019	9.0	709
3	March 2019	6.1	480
4	May 2019 – June 2019	6.0	470
5	August 2019	1.7	130
6	September 2019	8.8	695
7	October 2019	4.8	381
8	November 2019	4.8	375
9	December 2019 – February 2020	2.1	166
----- Stay-at-Home-Orders -----			
10	May 2020 – June 2020	11.8	927
11	July 2020	16.2	1271
12	August 2020	8.2	646
13	September 2020	7.3	577
14	October 2020 – November 2020	7.4	584

Note: Number of applications by time period, for the correspondence audit study data collection. Time periods 1-9 correspond to the pre-pandemic period, and time periods 10-14 correspond to the pandemic period. Source: correspondence audit study data of accountants, November 2018-November 2020.

Table 2. Employer Callback Rates (Percent) by Applicant Gender and Race Before and During the Early COVID-19 Pandemic (Initial Wave of Stay-at-Home Orders)

	Before	After	Change
Callback Rate (Average)	18.2	20.3	2.1 [*]
White Men	20.7	20.2	0.5
Black Men	16.1 ^{**}	16.3 [*]	0.2
White Women	18.8	24.5 [*]	5.6 ^{**°}
Black Women	17.3 ⁺	20.4	3.1 ⁺

Note: N = 7,870. Source: correspondence audit study data of accountants, November 2018-November 2020. Change column refers to the absolute change in callbacks across the two time periods (After - Before), and estimates may vary by one decimal place due to rounding.

*** p<0.001, ** p<0.01, * p<0.05, +p<0.10; two-tailed t-test comparison. “Before” and “After” significance indicators refer to a comparison to the within-period callback rate of White men. “Change” significance indicators refer to the before/after within-group difference.

° p<0.05, two-tailed t-test comparison to the “Change” rate of White men.

Table 3. Logistic Regression Model of Receiving an Employer Callback Before and During the Early COVID-19 Pandemic, in Odds Ratios.

Woman Applicant	0.89 (0.10)
Black Applicant	0.74** (0.08)
Woman Applicant x Black Applicant	1.22 (0.19)
After Initial Wave of Stay-at-Home Orders	1.09 (0.13)
Woman Applicant x After Orders	1.46* (0.21)
Black Applicant x After Orders	1.04 (0.16)
Black Applicant x Woman Applicant x After Orders	0.83 (0.18)
Geographic Region (Ref= Northeast)	
Midwest	1.21† (0.13)
South	1.07 (0.10)
West	0.91 (0.08)
Second Applicant to Job Posting	0.89* (0.04)
Application Through Job Board	0.81** (0.06)
Constant	0.28

Note: N = 7,870. Source: correspondence audit study data of accountants, November 2018-November 2020.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10. Standard errors clustered by job listing.

Table 4. Average Marginal Effects of Applicant Gender and Race Groupings Relative to White Men, Before and During the Early COVID-19 Pandemic

	Black Men		White Women		Black Women	
	Labor Demand Decrease					
	Low	High	Low	High	Low	High
Before Initial Stay-at-Home Orders	-0.055+ (0.029)	-0.038* (0.019)	-0.036 (0.031)	-0.011 (0.020)	-0.039 (0.031)	-0.030 (0.020)
After Initial Stay-at-Home Orders	-0.063* (0.031)	-0.031 (0.019)	0.024 (0.033)	0.055** (0.021)	0.013 (0.033)	-0.004 (0.020)
Change in Average Marginal Effect Before and After Stay-at-Home Orders	-0.007 (-0.042)	0.007 (0.027)	0.060 (0.046)	0.066* (0.028)	0.052 (0.045)	0.026 (0.028)
	Women's Employment Decrease					
	Low	High	Low	High	Low	High
Before Initial Stay-at-Home Orders	-0.033 (0.025)	-0.051* (0.020)	-0.014 (0.026)	-0.022 (0.021)	-0.037 (0.026)	-0.033 (0.022)
After Initial Stay-at-Home Orders	-0.050+ (0.026)	-0.035 (0.021)	0.006 (0.029)	0.070**† (0.022)	-0.007 (0.027)	0.007 (0.022)
Change in Average Marginal Effect Before and After Stay-at-Home Orders	-0.017 (-0.036)	0.017 (0.029)	0.019 (0.039)	0.092** (0.031)	0.030 (0.038)	0.040 (0.031)
	BLM Protests Presence					
	Low	High	Low	High	Low	High
Before Initial Stay-at-Home Orders	-0.035+ (0.021)	-0.054* (0.024)	-0.020 (0.022)	-0.015 (0.025)	-0.037 (0.023)	-0.030 (0.024)
After Initial Stay-at-Home Orders	-0.043+ (0.023)	-0.038 (0.024)	0.054* (0.024)	0.036 (0.026)	0.020 (0.024)	-0.016 (0.024)
Change in Average Marginal Effect Before and After Stay-at-Home Orders	-0.008 (-0.031)	0.017 (0.034)	0.075* (0.032)	0.051 (0.036)	0.056+ (0.033)	0.014 (0.034)

Note: N = 7,870. Standard errors clustered by job listing. Source: audit correspondence study data of accountants, November 2018-November 2020.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$, compared to White men within time period/geographic group. † $p < 0.10$, two-tailed test of significance between geographic areas categorized as “low” and “high” decrease in labor demand, women’s employment, or presence of BLM protests within time period.



Figure 1. Accountant online job postings, November 2018 to November 2020. Source: Burning Glass Technologies Labor Insights data.

Employment Rates By Month: Nov. 2018-Nov.2020; College Educated Respondents

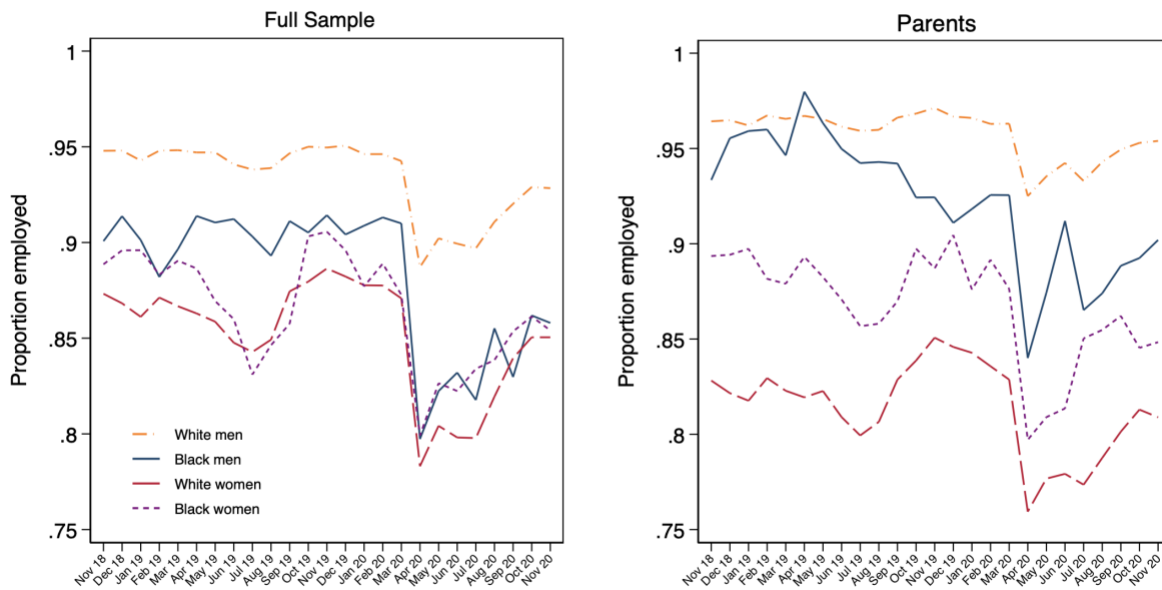


Figure 2. Estimates of employment rates by month from November 2018 to November 2020 among college-educated respondents, ages 18-65 in the Current Population Survey. Note: estimates are weighted, and the sample excludes respondents who are in school or who are retired. Both part-time and full-time employment are included in the employed group. The “White” racial group includes non-Hispanic White respondents, and the “Black” racial group includes non-Hispanic Black and biracial Black respondents.

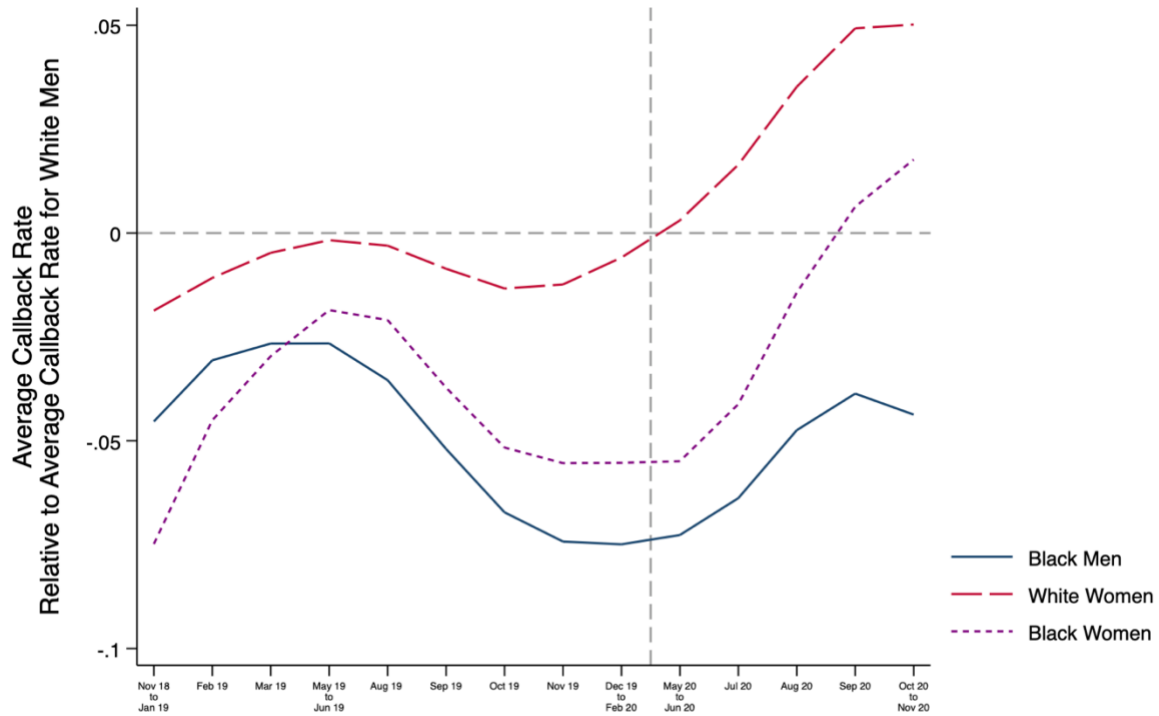


Figure 3. Callback rates over time, relative to White men applicants, by applicant gender and race. LOWESS smoothing of average callbacks by time period, with 0.8 bandwidth. Source: Correspondence audit study data of accountants, November 2018–November 2020.

Average Marginal Effects of Applicant Race/Gender Compared to White Men, Before and During the Early COVID-19 Pandemic

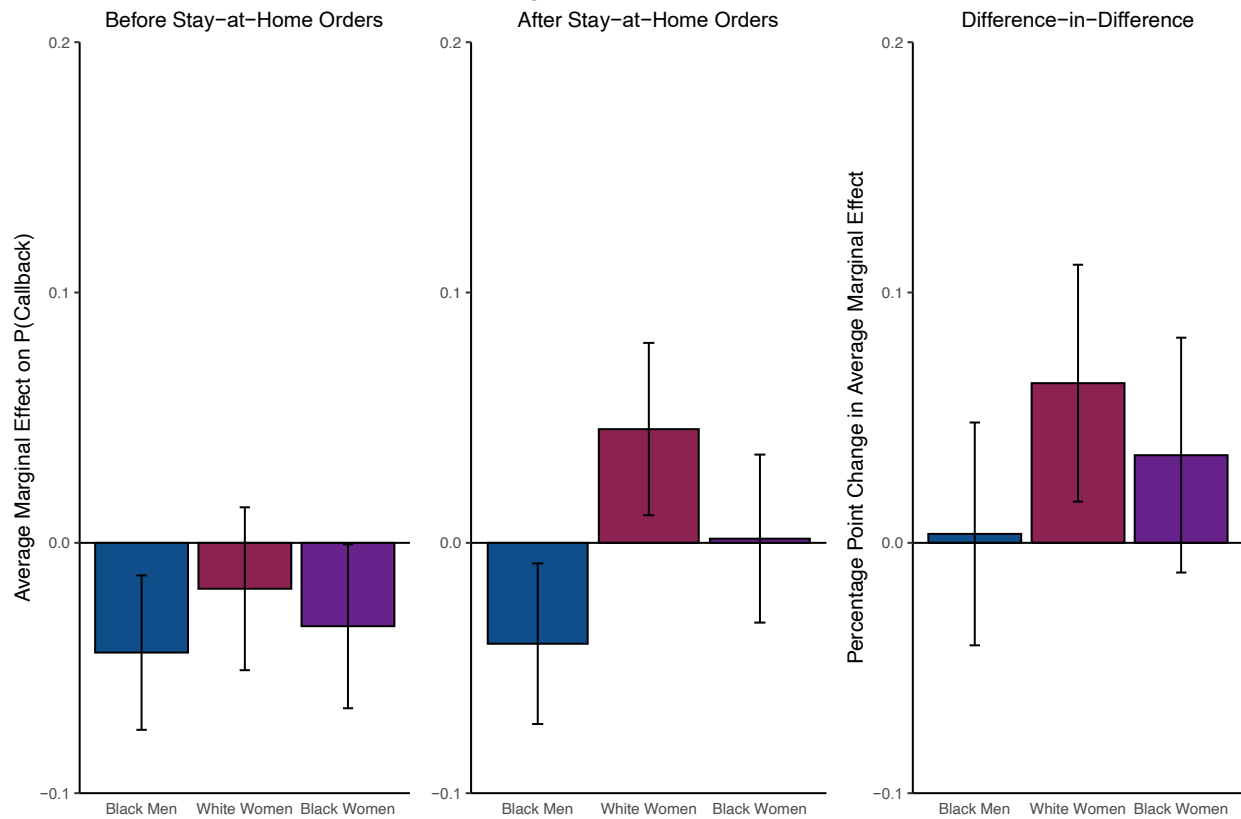


Figure 4. Average marginal effects of applicant race/gender, compared to White men applicants, before and during the early COVID-19 pandemic. 95% confidence intervals are presented.

Source: Correspondence audit study data of accountants, November 2018-November 2020. Average marginal effects (left, middle) and changes in average marginal effects (right) are derived from the regression analysis in Table 3.

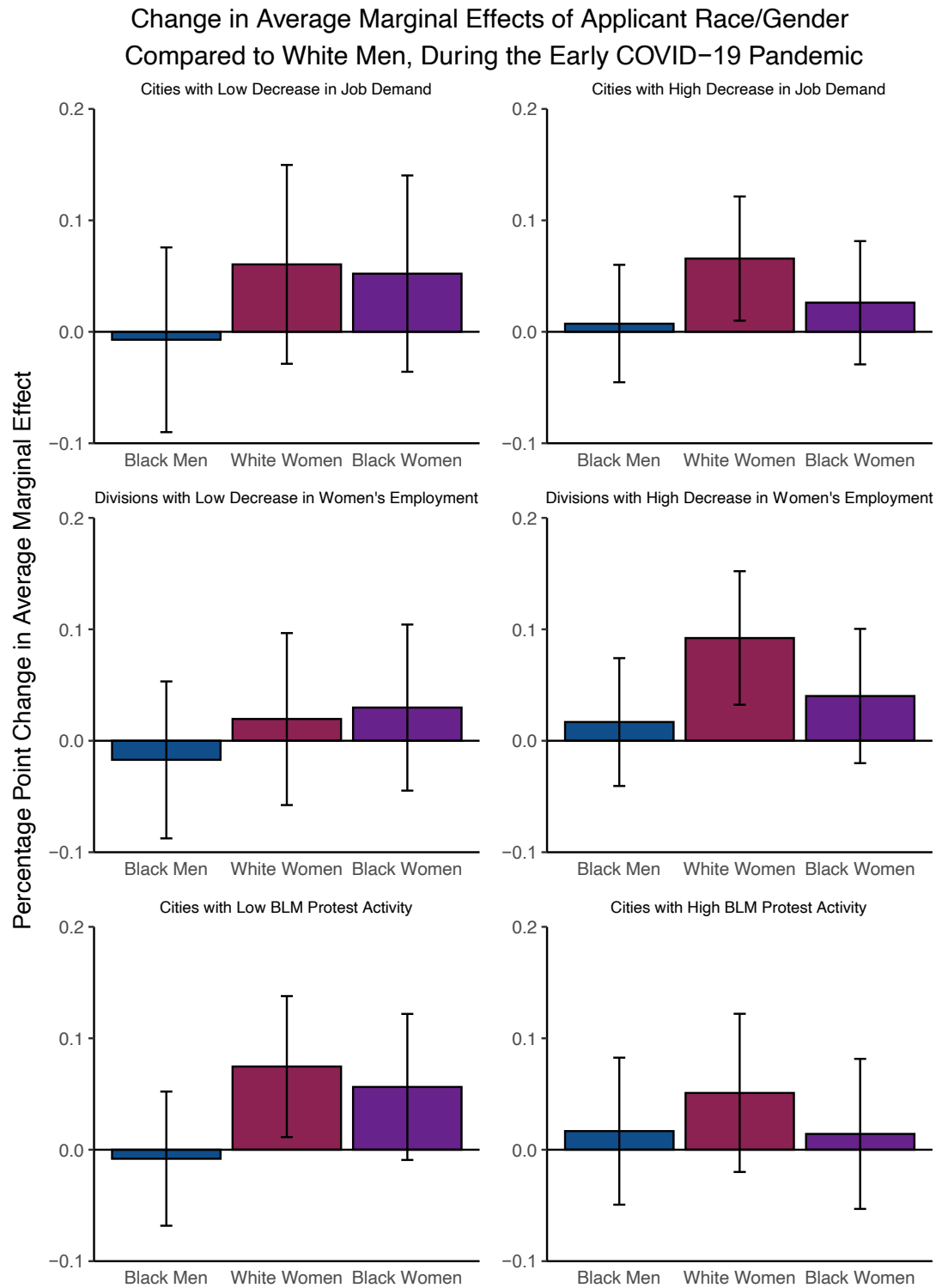


Figure 5. Change in average marginal effects of applicant race/gender, relative to White men, during the early COVID-19 pandemic time period compared to prior. 95% confidence intervals are presented. Source: Correspondence audit study data of accountants, November 2018-November 2020.