Labor market returns to MBAs from less-selective universities: Evidence from a field experiment during COVID-19

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Abstract: Master's degree enrollment and debt have increased substantially in recent years, raising important questions about the labor market value of these credentials. Using a field experiment featuring 9,480 job applications submitted during the early months of the COVID-19 pandemic, I examine employers' responses to job candidates with a Master of Business Administration (MBA), which represents one-quarter of all master's degrees in the United States. I focus on MBAs from three types of less-selective institutions that collectively enroll the vast majority of master's students: for-profit, online, and regional universities. Despite the substantial time and expense required for these degrees, job candidates with MBAs from all three types of institutions received positive responses from employers at the same rate as candidates who only had a bachelor's degree—even for positions that listed a preference for a master's degree. Additionally, applicants with names suggesting they were Black men received 30% fewer positive responses than otherwise equivalent applicants whose names suggested they were White men or women, providing further evidence of racial discrimination in hiring practices.

Keywords: field experiment, correspondence study, resume audit study, graduate education, master's degrees, hiring, business education

INTRODUCTION

Following decades of growth in enrollment for master's degrees, U.S. colleges and universities now award more than 40 percent as many master's degrees as bachelor's degrees (U.S. Department of Education, 2022). At the same time that master's enrollment has risen, so too has its cost to students. Between 1996 and 2016, for example, the inflation-adjusted net price for tuition and fees in master's programs rose 79 percent, substantially exceeding the corresponding 47 percent increase for bachelor's programs (Blagg, 2018). To cover these costs, master's recipients take out roughly $50,000 in student loans per borrower for their graduate education (U.S. Department of Education, 2017). Given the scale and expense of these degrees, it is increasingly important to understand how master's degree recipients fare in the labor market.

Prior research has frequently found positive economic returns to master's degrees (e.g., Arcidiacono, Cooley, & Hussey, 2008; Gándara & Toutkoushian, 2017; Grove & Hussey, 2011; Jaeger & Page, 1996), though estimates can vary considerably by field (e.g., Altonji & Zhong, 2020; Stevenson, 2016). While offering valuable insights, these earlier studies typically rely on data from more than a decade ago, when online master's programs were still in their infancy. In the intervening years, the master's degree landscape has changed substantially. For instance, by 2015-16, more than half of master's students enrolled in an online course, and one-third were enrolled in a program that was entirely online (Blagg, 2018). A substantial component of the growth in online master's programs has come from less-selective or effectively open-access institutions, which account for two-thirds of all master's degrees yet receive considerably less attention than the more exclusive, more highly resourced institutions in the R1 Carnegie Classification ("Doctoral Universities: Very High Research Activity").

This study explores how employers respond to job candidates with master's degrees from different subsets of these less-selective institutions. In doing so, I build on research at the undergraduate level that has demonstrated the value of investigating employer differentiation by institutional attributes. For instance, prior studies focused on undergraduate students have found that graduates of for-profit institutions do not fare as well in the labor market as their counterparts with credentials from other sectors (e.g., Cellini & Turner, 2019; Cottom, 2017; Deming et al., 2016), fare no better despite higher prices (Darolia et al., 2015), or fare no better than students with credentials from fictional universities (Deterding & Pedulla, 2016). The extent to which similar patterns are evident at the graduate level remains an unsettled question. Information regarding likely outcomes for master's students from various types of institutions has the potential to help students decide whether or where to enroll for a master's degree, assist policymakers in their efforts to make decisions surrounding institutional accountability and graduate student borrowing, and support institutions in their recruitment practices.

There are several rationales why employers might differentiate between job applicants based on characteristics of their master's-granting institution. First, in accordance with human capital theory, employers may believe that master's degrees from different types of institutions provide applicants with varying levels of economically productive knowledge and skills (Becker, 1964). For example, if employers' past experiences have shown that certain master's programs help students develop skills valued in the workplace, they should respond more favorably to applicants from those programs. As an alternative (or supplement) to human capital theory, job market signaling theory suggests applicants may use educational credentials to convey information about their underlying abilities to employers (Spence, 1973). From this perspective, employers may infer an applicant's capabilities based on the level and format of education an

individual pursues. Employers would likely assign greater weight to credentials that are more difficult to obtain in terms of attributes such as financial cost, selectivity, and convenience (in-person vs. online). Although this study cannot precisely distinguish between human capital and signaling effects, it can determine their combined effect, which is highly relevant to the job search prospects of master's students.

To evaluate labor market returns to master's degrees, I use a field experiment that compares outcomes for job applicants with master's degrees from three types of less-selective institutions. The first are for-profit institutions, which can attract students with their considerable marketing budgets and convenient online formats. Having increased their graduate enrollment more than eight-fold between 1998 and 2018 (U.S. Department of Education, 2020), for-profit institutions account for about one in 10 master's students nationwide, including one in four Black master's students (Baum & Steele, 2017). The second group includes public and nonprofit institutions that primarily offer master's degrees online, some of which are known as "mega-universities" due to the sheer scale of their online enrollment (Gardner, 2019). A third group includes regional public and nonprofit institutions whose master's degrees are primarily on-campus, providing students a nearby in-person option with programming frequently designed around the needs of working students. As a reference point for the decision to not pursue a master's degree, a fourth treatment group includes a set of applicants whose highest credential is a bachelor's degree. Especially given that less-selective institutions such as for-profits serve an outsized share of Black students, students from low-income backgrounds, and older students (Baum & Steele, 2017), understanding the labor market value of master's degrees from these institutions has important equity implications for students who have been historically underrepresented in graduate education.

For the field experiment, I submitted 9,480 fictitious applications to real job openings listed on two large online job boards during the early months of the COVID-19 pandemic, between April 2020 and November 2020.[1] The correspondence study focused in particular on master's degrees in business administration (MBAs), the most common type of master's degree. Accordingly, the experiment featured applications to job openings for eight occupations in business and marketing that span an array of industries and employ a substantial number of master's-holders.[2] Seeking to maximize relevance for working adults, who usually comprise the majority of students enrolled in MBA programs at less-selective institutions, I listed 5-7 years of work experience for the fictitious applicants, including the duration of their MBA program. In light of the potential for discrimination along the dimensions of race and gender, I randomly assigned the applicants names that were likely to be strongly associated with certain race/gender combinations (Black women, Black men, White women, White men).

This study offers two key contributions to the literature on labor market returns to MBAs. First, the results provide insight into the extent to which employers offer interview callbacks and other positive responses to job applicants based on their master's educational background. Overall, I find no significant differences in employer responses depending on whether the fictitious applicant's résumé listed an MBA from a for-profit institution, some other primarily online institution, or a regional institution. Even more strikingly, I find that the MBA-holding candidates fared no better in terms of employer responses than their counterparts who had only a bachelor's degree. These null results are precise, with 95% confidence intervals that rule out

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[1] This timeline means that all data collection took place during the coronavirus pandemic, which I address in greater detail in later sections.

[2] Specifically, these occupations include general and operations managers, management analysts, market research analysts, marketing managers, sales managers, supervisors of non-retail sales workers, supervisors of office workers, and technical sales representatives.

even comparatively small positive effects. Thus, even at the most conspicuous level—whether or not a job candidate had an MBA—employers' response rates did not differ across the treatment groups overall, despite the substantial investments of time and financial resources such degrees entail. Subgroup analyses do suggest one benefit not captured by the overall response rate, though: for jobs that listed the highest salaries, applicants with an MBA from a regional institution received substantially higher response rates than those with only a bachelor's degree. Although this study cannot speak to the outcomes of MBA recipients from R1 institutions, which tend to have greater financial resources and be more selective than the institutions included in the experiment, these findings shed important light on the labor market experiences for the majority of MBA recipients.

Second, this study provides evidence about variations in outcomes by race and gender. Most notably, I find that applicants with names suggesting they were Black men received 30% fewer positive responses from employers than did otherwise comparable applicants whose names suggested they were White women or White men. Such a substantial difference in employer responses points to ongoing labor market discrimination for Black men in particular, even among highly credentialed applicants with at least 5 years of full-time work experience. The stark variation in outcomes by race is all the more remarkable given that the experiment coincided with the racial reckoning of 2020, when employers routinely announced that they were taking bold steps to confront systemic racism (Jan, McGregor, & Hoyer, 2021).

EXPERIMENTAL DESIGN

This correspondence study compares employer callback rates for 9,480 applications from fictitious job applicants who systematically differed in terms of the institution where they purportedly received their MBA (if any). In the field experiment, I submitted applications to real

job openings across 14 metropolitan areas in the United States, with each opening receiving up to four fictitious applications.[3] Similar to previous studies (e.g., Darolia et al., 2015), I used a résumé attribute randomizer from Lahey and Beasley (2009) to develop realistic résumés based on components commonly found in actual résumés. Through this randomization process, the fictitious applicant's master's-granting institution was orthogonal to other résumé attributes. To separately assess potential subgroup differences, I blocked by race and gender (i.e., all four applicants to a given opening had names suggesting the same race and gender as one another). In this study, the outcome of interest was whether an employer offered an interview callback or another positive response to the job candidate. Significant differences in employer responses across the various treatment conditions would provide evidence of employer preferences for job candidates with certain educational backgrounds over others.

Target occupations

Business degrees represent fully one-third of master's degrees awarded at for-profit institutions, and about one-quarter of all master's degrees (Table 1).[4] Under the rationale that MBA recipients are typically expecting to enter or continue careers in their field of study, I focused on job openings in business-related occupations. Specifically, within this field, I emphasized occupations with substantial numbers of master's-holders. To identify such positions, I combined data from O*NET OnLine and the U.S. Bureau of Labor Statistics (2019). For consideration, I identified Standard Occupational Classification (SOC) codes in the "Business Management and Administration," "Marketing," and "Finance" O*NET career

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[3] These include the following group of metropolitan areas that vary in geographic location, demographics, and major industries: Atlanta; Boston; Chicago; Cincinnati; Dallas; Denver; Los Angeles; New York City; Miami; Minneapolis; Philadelphia; Seattle; St. Louis; and Washington, DC.
[4] I originally planned to apply to positions in the two most common master's fields, business and health, but ultimately did not apply to health-related occupations due to COVID-19.

clusters that had at least 40,000 employees with a master's degree and in which at least one-tenth

of workers hold a master's degree. Commonly employing individuals with master's credentials,

these occupations represent the types of positions that MBA recipients are likely to seek upon

graduation (e.g., general and operations managers, management analysts).

Educational treatment groups

For each of the job openings I identified, I generated four résumés that corresponded to

the four master's enrollment scenarios.[5] First, one résumé listed a master's degree from a for-

profit institution ("for-profit group"). As shown in Table 1, for-profits represented 8% of all

master's degrees awarded in 2017/2018 and granted 11% of the master's degrees nationwide for

business. To represent for-profits, I randomly assigned the name of one of the nine for-profit

institutions that awarded the most master's degrees in 2017/2018 (roughly in proportion to their

share of master's degrees within the sector). Collectively, these nine institutions awarded 69% of

all master's in business from for-profit institutions, suggesting they are broadly representative of

the sector and would have the greatest name recognition among potential employers (IPEDS,

2019). Examples include the University of Phoenix, Walden University, and Capella University

(for the full list, see Appendix Table A2); all offer degree programs primarily online.[6]

Second, one résumé listed a master's degree from a public or private, not-for-profit

institution that offers the majority of its master's degree programs online ("online group"). Like

for-profit colleges, such institutions offer the convenience of online instruction for these master's

degrees and typically have broad-access admissions policies, but differ in terms of their for-profit

status. To minimize the potential that employers perceive the credential as a traditional master's

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[5] I generated four résumés for each job opening. In some cases, the job posting closed before I was able to submit all four applications. Unsubmitted applications are not included in the analytic sample.
[6] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

degree from one of the most selective business school programs, I excluded institutions in the R1

Carnegie Classification (i.e., "Doctoral Universities: Very High Research Activity") from this

second group. As with the for-profit group, résumés in the online group listed one of the ten

institutions in the category that awarded the largest number of master's degrees. Some of the

most prominent examples include Western Governors University, Southern New Hampshire

University, and Liberty University (for the full list, see Appendix Table A2).[7] The top ten

institutions awarded 44 percent of master's degrees in business from not-for-profit institutions

with primarily online programs (IPEDS, 2019). I excluded institutions that recently transitioned

from for-profit status (most notably Kaplan University, which became Purdue University

Global), since it is unclear how employers might conceptualize them.

Third, one résumé listed a master's degree from a nearby public or private, not-for-profit

institution that offers the majority of master's degrees on campus ("regional group").[8] In this

case, I defined the region based on a distance within 50 miles of the primary city associated with

the job opening, although typically the selected institutions were much closer. Similar to the

online group, I excluded R1 institutions, which frequently have more competitive admissions

policies for master's degrees and may not represent a common component of the choice set for

those contemplating entrance to a master's program at a for-profit or online institution. In this

group, résumés displayed one of the two qualifying institutions in the region that were among

those awarding the largest number of master's degrees in business. For example, for job postings

in Minneapolis, institutions in the regional group could include Augsburg University or the

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[7] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.
[8] The regional group was designed to convey completion of an MBA through an on-campus program that a working professional could complete. Given the proliferation of online MBA programs, however, it is possible that some employers perceived the regional MBA as an online degree.

University of St. Thomas (for the full list, see Appendix Table A2).[9] With the inclusion of this comparison group, the experiment involves a direct comparison between individuals with master's degrees from for-profit institutions, institutions with primarily online master's programs, and regional institutions with primarily on-campus programs.

Fourth and finally, one résumé did not list a master's degree and instead had a bachelor's degree listed as the highest credential earned ("bachelor's-only group"). Rather than only comparing master's degrees earned from one institution type to those earned at another, the presence of the bachelor's-only group provides a baseline reference by which to measure employers' responsiveness to master's degrees. With this reference group, it is possible to measure whether fictitious applicants with master's degrees from certain types of institutions receive higher callback rates than otherwise similarly qualified individuals who lack a master's degree. Likewise, it is possible to ascertain whether employers demonstrate no preference for master's degrees from certain type of institutions over bachelor's degrees (or perhaps view them less favorably). The bachelor's-granting institutions listed were large public institutions that were located in a nearby state and accepted most applicants (for the full list, see Appendix Table A3).

Conveying applicant race and gender

Additionally, to facilitate subgroup analyses while minimizing the number of résumés required, I blocked random assignment by race and gender (i.e., connoting the same race and gender within the set of applicants to a job opening). This decision was based on prior audit/correspondence studies that have shown evidence of hiring discrimination by perceived race and gender (e.g., Bertrand & Mullainathan, 2004; Kang et al., 2016; Pager, 2007; Quadlin, 2018; Quillian & Midtbøen, 2021), although such findings are not universal (e.g., Darolia et al.,

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[9] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

2016). More broadly, an extensive literature has also documented the presence of labor

discrimination by race and gender in non-experimental settings (e.g., Browne & Misra, 2003;

Pager & Shepherd, 2008; Roscigno, Garcia, & Bobbitt-Zeher, 2007; Royster, 2003; Reimers,

1983; Wilson, Tienda, & Wu, 1995), providing additional motivation to examine to what extent

such dynamics were present in the context of this study.

   To do so, I used applicant names to signal race and gender, a common approach used in

prior studies (e.g., Deming et al., 2016; Oreopoulos, 2011). Certainly, no subset of names can

perfectly capture the full linguistic, cultural, and religious breadth of individuals who share a

particular racial or gender identity, and not all individuals have names that are strongly aligned

with their race or gender. However, prior research has documented an extensive history of

racially distinct names (e.g., Cook, Logan, & Parman, 2014; Cook, Parman, & Logan, 2022), and

there is evidence to suggest that racially distinct names can effectively convey the putative race

of an individual (e.g., Butler & Homola, 2017). For the racial groups, I focused in particular on

names likely to be associated with White and Black students because they accounted for more

than 80 percent of graduate students at for-profit institutions in 2017 (U.S. Department of

Education, 2018).

   Drawing on work from Gaddis (2017) regarding the racial perceptions of names, I

included first names that are commonly associated with White and Black individuals from the

middle two quartiles in terms of mother's education level. By doing so, I sought to avoid using

racially distinct names that also convey differential information about socioeconomic status. I

used 16 first names (4 for each race-by-gender group), all of which were relatively common for

babies born in the early 1990s and are almost exclusively identified with a single gender (Social

Security Administration, 2019). For each racial group, résumés listed one of four surnames. In

the 2010 Census, the surnames for White applicants corresponded to White individuals more than 90 percent of the time, and the surnames for Black applicants corresponded to Black individuals more than 50 percent of the time (U.S. Census Bureau, 2019).

Rather than using all 64 possible permutations of names by race and gender, I used the 16 combinations shown in Appendix Table A1.[10] When Gaddis (2017) used this approach of combining first names and surnames that are both strongly identified with a single racial group, respondents had a high likelihood of identifying names with the expected racial group (at least 90 percent of the time for the distinctly White names and at least 80 percent for the distinctly Black names).

Résumé attributes

In addition to the applicant's name, all résumés included several key features. One of these was the applicant's educational history. An applicant's master's degree (or lack thereof) was listed according to their experimental condition (for-profit group, online group, regional group, bachelor's-only group). The full list of master's degree institutions is provided in Appendix Table A2. For those applicants with master's degrees, the field of study was based on titles used at the institution from which they purportedly received their degree and the type of occupation to which they were applying. For instance, the résumé for an applicant in the regional group who earned their master's degree from Northern Illinois University would have listed an "MBA in Marketing Management" if they were applying to positions as a marketing manager. Applicants listed that they earned their master's degree in May 2020, which was intended to signal that they were near graduation or recent graduates.[11]

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[10] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.
[11] By consistently using May 2020 as a graduation date, I also sought to minimize the amount of the time that employers expected the students in the regional group had spent online due to COVID-19.

In the educational history section, all applicants listed a bachelor's degree from a large, public institution in a nearby state that had an acceptance rate above 50 percent. As with the master's degree fields of study, to help ensure the résumés appeared realistic, I used institution-specific terminology for bachelor's degrees that were aligned with the job opening for which an individual was applying (e.g., "B.B.A. in Business Management" from Kent State University). See Appendix Table A3 for the full list of undergraduate institutions.[12]

To produce findings applicable to master's recipients with a modest amount of work experience, I randomly assigned undergraduate graduation years of 2013-2015 (i.e., 5-7 years since undergraduate degree). The use of multiple graduation years within an applicant set was aimed at slightly differentiating the résumés without dramatically affecting their perceived level of experience. In line with common patterns for bachelor's and master's degree recipients with career experience, no résumés listed grade point averages.

Another section focused on prior work history. I based résumé attributes for work experiences on the backgrounds of individuals who currently work in such roles, as well as common requirements for the positions according to O*NET OnLine (U.S. Bureau of Labor Statistics, 2020). For each occupation, there were four work history templates, leading to a total of 32 unique work history templates across the eight occupations of interest. Within each work history template, the names of employers and work locations varied based on the metropolitan area. For example, someone with experience as an assistant grocery manager in Denver listed the employer as Safeway, while a similar résumé in Boston listed the employer as Stop & Shop Supermarket. By using actual employer names and job titles from the region, along with accompanying descriptions of duties and outcomes, I hoped to improve the likelihood that

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[12] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

employers perceive the résumés as those of viable candidates. For consistency and to increase

the study's relevance for working adults, all job candidates indicated that they were employed

for the 5-7 years following receipt of their bachelor's degree (including the time during which

they earned their master's degree, if applicable). Applicants also reported some part-time

employment during their undergraduate education, primarily in the retail and service sectors. To

improve realism, I included occasional stretches of 1-2 months without employment.

 For information on additional résumé details, see Appendix B.

Application procedures

I used two high-volume national job search websites to identify and apply to job

openings. To increase the generalizability of the findings and ensure a sufficient pool of job

postings, I searched for positions in 14 U.S. metropolitan areas. After searching exclusively in

Dallas during a pilot that lasted from April 17, 2020, through May 1, 2020, I rotated through the

list of cities, searching for job postings in two or three metropolitan areas per weekday. I

searched for job titles associated with each of the target occupations. For instance, based on data

from O*NET OnLine, I searched for marketing manager positions using job titles such as

"marketing manager," "brand manager," and "marketing director," among others. To increase

the share of positions requiring master's degrees, I also separately searched for postings that

corresponded to the target occupations and specifically mentioned phrases such as "master's

degree," "master's preferred," or "MBA."

To illustrate trends in the number of potentially eligible job postings, Figure 1 depicts the

number of job listings on one of the online job boards that matched these qualifying job titles

between the weeks beginning March 8, 2020, and November 8, 2020. Figure 1 includes counts

for the three most common occupations used in the experiment as well as counts for registered

nurses, which serve as a proxy for healthcare demand. From Figure 1, it is evident that job

postings generally increased over time in all four occupations shown. Spikes in postings for

general and operations managers in June coincided with business re-openings, and upticks in

postings for registered nurses coincided with regional COVID-19 outbreaks. In short, Figure 1

conveys that while online job postings largely halted for the two weeks following the COVID-19

emergency declaration on March 13, 2020, there was generally a substantial and growing pool of

job openings throughout the timeframe of the experiment, which began on April 17, 2020. These

job postings reflect the fact that candidates with more extensive educational backgrounds tended

to have greater employment opportunities during the early months of the pandemic than their

peers with fewer educational credentials. For example, individuals age 25 and older with at least

a bachelor's degree suffered less dramatic swings in their unemployment rate during the study

period, peaking at 8.4% in April 2020, compared to 15.3% for those with some college but no

bachelor's degree (U.S. Bureau of Labor Statistics, 2022a). Roughly 60% of employees with a

bachelor's degree or higher teleworked in May 2020 (U.S. Bureau of Labor Statistics, 2022b),

meaning their employment status was less contingent on physical workplace openings than it

was for individuals with lower levels of formal education.

For each potentially relevant job posting, I reviewed details about the job opening to

determine whether it met my inclusion criteria. To be eligible, job openings must have required

at least a bachelor's degree and fewer than 10 years of work experience. Additionally, the job

duties needed to substantially align with those of the target occupation. (For instance, searches

for a "management analyst" sometimes returned job postings for a "risk management analyst," a

separate position that was not included in the list of targeted occupations.) Further, I only

considered job openings that would permit a successful applicant to work full-time within 50

miles of the metropolitan area. Finally, I excluded job postings from staffing agencies and

executive recruiters, since it was typically not possible to discern whether their clients were

employers to which I had submitted prior applications. To limit the burden on individual

employers and in accordance with my agreement with my university's Institutional Review

Board, I only applied to one job opening per employer.

Based on the steps outlined above, I identified approximately 20 eligible job postings per

day to which I applied. For each qualifying position, I used the résumé attribute randomizer from

Lahey and Beasley (2009) to generate four résumés. For many job openings, the job search

websites enabled me to apply by providing the résumé and limited contact information (e.g.,

applicant name and email address). A limited number of applications required more extensive

data entry for fields that were duplicative of details included in the résumé. In all cases, I

provided information based on the randomly generated résumé. When I encountered an

application system that required professional references or customized free response answers, I

did not submit applications for that job opening.[13] For each job opening, I submitted résumés

over two to three business days, minimizing the likelihood they were associated with one

another. Details about the information I recorded for each application are available in Appendix

B.

Table 2 provides an overview of the applications submitted across the eight occupations

of interest. For each occupation, Table 2 lists sample job titles and the number of applications

submitted. The most prevalent occupations in the experiment included general and operations

managers, sales managers, and marketing managers. For each of those three occupations, there

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[13] In practice, it was uncommon to encounter applications with requirements for professional references or customized free responses. During a two-week period in September 2020 during which I applied to nearly 200 job openings, for instance, I only needed to curtail the application process for two openings.

were nearly 2,000 applications submitted. The fourth column of Table 2 indicates the share of

job postings that listed a master's degree as preferred or desirable. Overall, nearly 40 percent of

listings indicated some form of preference for a candidate with a master's degree, suggesting that

these positions had high educational expectations, as intended. The share of positions seeking a

candidate with a master's degree ranged from 13 percent (for first-line supervisors of non-retail

sales workers) to 68 percent (for marketing managers). Based on the job postings that listed

salary ranges, the final column provides the average minimum salary. Across all occupations, the

low end of the salary range was $66,081, on average.

Summary statistics for résumé attributes, both overall and by experimental condition, are

shown in Appendix Table A4.[14] In particular, this table focuses on three sets of attributes: the

race/gender suggested by each applicant's name, the number of years of work experience, and

the template used for résumé formatting. For each set of attributes, the second column ("Overall

share") indicates the proportion of applications with a particular attribute. The third through sixth

columns show the share of résumés with that attribute that displayed each experimental

condition. The final column presents the results of chi-squared tests that jointly assess whether

the listed attributes and experimental conditions are independent. For all sets of attributes, these

results help affirm that the randomization process worked as expected.

Tracking employer responses

I tracked employer responses by checking the email accounts and voicemail boxes

associated with each applicant daily until 3 weeks after the submission of the final application. I

read or listened to each message to determine whether the employer had made an interview

callback or some other form of positive feedback. Interview callbacks involved a clear request to

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[14] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's
website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

speak with the candidate about the position; given the ongoing COVID-19 pandemic, such requests were almost exclusively for meetings via telephone or teleconferencing software (e.g., Zoom). Other types of positive responses included a number of indications that the candidate was proceeding towards the next stage of the hiring process. Examples of these other positive responses included requests for additional information not required in original application (e.g., willingness to work in-person), encouragement to complete a customized skills assessment, or an invitation to apply to a different position with the same employer. I did not treat automated replies from employers, such as messages denoting receipt of the application and other messages that were sent within seconds of application submission, as positive responses.[15] When an employer made an interview callback or another positive response, I replied to the employer within one business day via email or telephone and asked to be removed from consideration.[16]

ANALYSIS

Due to the random assignment of master's background conditions on the résumés (i.e., for-profit group, online group, regional group, bachelor's-only group) and perceived race and gender, regression models are capable of providing causal estimates. In the main analysis, I use a linear probability model to compare each master's treatment group to the bachelor's-only group. For the binary dependent variables, linear probability models and logit specifications are expected to produce substantially similar estimates for the parameters of interest in this study

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[15] Because I submitted up to four applications per job opening, automated or generic messages were somewhat more apparent than they might have been if I had only submitted one application per opening.
[16] Because employers occasionally offered callbacks to multiple candidates, I provided one of several different rationales for declining the employer's invitation (e.g., accepting a job offer elsewhere, receiving a promotion internally). The goal of this step was to provide closure and enable the employer to move on to true candidates for the position. Indeed, for several job openings, I turned down a callback for one job candidate, only to receive a callback for a different candidate shortly thereafter—suggesting the employers were able to continue their hiring process promptly after I declined the invitation.

(Angrist & Pischke, 2009), which I confirmed to be the case in supplementary analyses

(available upon request).

The primary model of interest is outlined in equation 1, as follows:

$$Y_{ijm} = \beta_0 + \beta_1 forprofit_i + \beta_2 online_i + \beta_3 regional_i + X_{ijm}\beta + \epsilon_{ijm} \qquad (1)$$

For equation 1, Y_{ijm} is a binary indicator that represents each outcome (i.e., receiving any

positive feedback or specifically receiving an interview callback request) for fictitious applicant i

in connection with occupation j in metropolitan area m. The labels $forprofit_i$, $online_i$, and

$regional_i$ represent an application's assignment as having a master's degree from a for-profit

institution, other primarily online institution, or regional institution that primarily awards

master's degrees through online programs, respectively, with the bachelor's-only group serving

as the omitted reference group. X_{ijm} represents a vector of application attributes, including the

applicant's suggested race and gender, years of work experience (based on bachelor's graduation

year), metropolitan area, occupation type, the order in which the application was submitted (i.e.,

first, second, third, or fourth), and the undergraduate institution listed in the applicant's

educational history section. I cluster standard errors at the level of the job posting. For subgroup

analyses, I use equation 1 after restricting the sample to groups of interest.

RESULTS OF THE FIELD EXPERIMENT

Descriptive summary

Overall, 5.6 percent of applications received some form of positive response, with 4.3

percent receiving a clear request to schedule an interview. Figure 2 provides an overview of the

average positive response rates (shown in blue squares) and callback rates (shown in green

circles) for each treatment group, along with the 95% confidence intervals. The unadjusted rate

of positive responses ranged from 5.2 percent to 5.7 percent across the four treatment groups,

while the interview callback rate ranged from 4.0 to 4.5 percent. On both measures, no treatment group was measurably different from the others.

Appendix Table A5 provides an overview of variation in positive response rates by occupation, metropolitan area, and the minimum salary listed.[17] For occupations, the 3.2 percent positive response rate for marketing manager applications represented the low end, while the 13.1 percent positive rate for market research analysts was the highest among occupations in the experiment. Across metropolitan areas, positive response rates varied somewhat less, ranging from 3.1 percent in New York City to 8.0 percent in Cincinnati. Looking at response rates by salary, there was a clear pattern of declining positive response rates as the listed minimum salary increased. For positions with a minimum salary of $50,000 or less, the positive response rate was 11.2 percent, compared to just 4.1 percent for positions with a minimum salary above $70,000. For positions that did not provide salary ranges, the positive response rate was 4.7 percent.

The rate of positive responses showed strong variation based on the race and gender suggested by the applicant's name. As also shown in Figure 3, the positive response rate for applicants likely to be perceived as Black men was just 4.3 percent, significantly lower than the rate at which applicants presumed to be White women and White men received positive responses (6.1 percent and 6.2 percent, respectively). Consequently, résumés with names corresponding to Black men received 30 percent fewer positive responses from employers than did résumés with names corresponding to White applicants.

Main regression estimates

Table 3 shows the primary estimates for the effect of an applicant's master's degree background on their probability of receiving a positive response or interview callback. Relative

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[17] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

to the bachelor's-only reference group, the results in Table 3 indicate that no master's treatment resulted in higher employer response rates, either in terms of overall positive responses or interview callbacks in particular. In fact, all point estimates are slightly negative for the master's treatment groups, though none reach conventional levels of significance. These point estimates are relatively close to zero, with none more extreme than -0.5 percentage points. As a result, based on the upper end of the 95% confidence intervals for the estimates, these findings rule out positive effects on employer responses as small as 0.5 percentage points for the regional master's group (9 percent of the baseline mean), 0.8 percentage points for the for-profit master's group (14 percent of the baseline mean), and 0.9 percentage points for the online master's group (15 percent of the baseline mean).

Robustness checks for the main regression estimates

I also explored several checks to determine the robustness of the results in Table 3 to various alternative specifications and restrictions. The results of these checks are presented in Appendix Table A6.[18] For the first set of estimates in Appendix Table A6, I re-ran the linear probability model after adding job-opening fixed effects, reflecting the fact that randomization occurred at the level of the job opening. As shown in the first set of columns, this approach yielded very similar point estimates to the main model.

The second set of columns restricts the for-profit and online treatment groups to the four institutions in each category that awarded the most master's degrees. The goal of this check was to assess whether the observed null findings remain even when focusing specifically on the institution names with which employers are most likely to be familiar. In both cases, the four largest institutions accounted for approximately three-quarters of master's degrees awarded

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[18] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

among the for-profit and online institutions used in the experiment. The results of this second check are substantially aligned with the results from Table 3, suggesting the findings are not driven by the least well-known institutions in the for-profit and online master's treatment groups.

The third check of Appendix Table A6 examines the robustness of the results to the exclusion of cases in which all four applications received a positive response from the employer.[19] In such instances, one might be concerned that the job opening was nonselective and would have offered positive responses to all applicants, regardless of qualifications. In the extreme, such job openings may represent positions outside the scope of the experiment, such as positions with multilevel marketing organizations. Even after removing the 24 job openings that provided positive feedback to all applicants, the third set of results in Appendix Table A6 displays estimates that closely resemble the primary regression estimates.

As a final check in Appendix Table A6, I excluded job openings that received fewer than 40 applications. This approach is meant to address concerns about employers detecting the experiment. Since the fictitious résumés made up at least 10% of the applicant pool for these job openings, they seem most at risk of experimental detection. This robustness check yields results that align with the main findings, with no estimates that are significant at conventional levels. Together, these robustness checks reinforce the consistency of the results and provide some assurances that the findings are not unduly sensitive to slight changes in the sample or modeling strategy.

Results by race/gender, education requirements, applications, and salary

To examine potential heterogeneity in effects, Table 4 provides estimates for four subgroups. The first set of results separately analyzes effects for the four race/gender groups in

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[19] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

the experiment (i.e., Black women, Black men, White women, and White men), as signaled by

applicant name. For applications with the names of White men, résumés listing regional master's

degrees were 2.0 percentage points less likely to receive a positive response than otherwise

comparable résumés that listed only a bachelor's degree. Such a difference amounts to a 32

percent decrease in the likelihood of receiving a positive response from an employer, relative to

the bachelor's-only group. For the rest of the subgroup estimates that are based on the

race/gender signaled, it is not possible to reject the null hypothesis that the positive response rate

for the master's group and the bachelor's-only group are equivalent. Due to the reduction in

sample size, however, it is similarly not possible to rule out some large effects.

The remaining three subgroup analyses in Table 4 address various indicators of the

competitiveness for a given job opening. These three subgroup analyses are intended to focus on

meaningful dimensions along which the applicant pool for positions may have differed. First, I

differentiate between positions that listed a bachelor's as the highest education requirement and

positions that indicated a preference for candidates with a master's degree. Candidates with only

a bachelor's degree experienced a higher positive response rate at positions where the highest

requirement was a bachelor's (6.3 percent) than they did at positions that preferred candidates

with master's degrees (4.4 percent). These descriptive findings comport with the employer

preferences conveyed in the job listing. Among applicants in the master's treatment groups,

however, there was no clear evidence that their master's degree improved their chances of

receiving a positive response, even among job openings that stated a preference for master's

credentials. (As noted for the race/gender subgroup analysis, though, it is not possible to rule out

modest positive effects.)

A second measure of the competitiveness for a given job opening is the number of applications received. One of the two job boards provided this information for the majority of job openings, and as a result, the number of applications was available for slightly less than half of all résumés submitted. In the subgroup analysis in Table 4, I distinguish between job openings that received up to or more than 65 applications, which was the median value. (The average number of applications per job opening was 99.) As might be expected based on the application volume, the positive response rate was higher for low-application positions (7.1 percent) than in the high-application positions (5.3 percent). None of these subgroup estimates emerged as statistically significant, though the standard errors are somewhat imprecise.

Salary information represents the final indicator of a job's competitiveness. For job openings that provided a salary range (or single value), I recorded the lowest value listed as an indicator of the minimum guaranteed salary. Table 4 distinguishes between job openings that listed minimum salaries up to or above the median value of $65,000. As one might expect, lower-paying positions offered positive responses at a substantially higher rate than higher-paying positions. Notably, positions with starting salaries above $65,000 offered positive response rates that were 2.5 percentage points higher (56 percent of baseline) to applicants listing regional master's degrees. For-profit and online master's groups also had positive point estimates for higher-paying jobs, though they do not reach conventional levels of statistical significance.

DISCUSSION

As more students pursue master's degrees and take on the debt frequently associated with such degrees, it becomes more vital to understand the labor market implications of these credentials. Towards that end, this study provides insight into employers' responses to the single

most common master's degree, the MBA, at a broad set of less-selective institutions that serve the vast majority of MBA students.

Overall, employers offered positive responses to applicants 5.6 percent of the time, equivalent to approximately one positive response per 18 applications. Such an employer response rate is broadly consistent with many prior correspondence studies of employers, although it falls on the lower end. For example, Deterding & Pedulla (2016) found a 6 percent overall callback rate, while Bertrand & Mullainathan (2004) and Deming and colleagues (2016) each detected an 8 percent callback rate. Several factors may help account for the somewhat lower rate of positive responses observed in this study. First, whereas prior studies often focused on entry-level positions that sought candidates with only a bachelor's degree, 40 percent of positions in this study explicitly listed a preference for master's degrees. Second, the study occurred during the COVID-19 pandemic. As a result, there may have been elevated competition for the constrained supply of available job openings in certain occupations, particularly early in the experiment. Finally, because I sent up to four résumés per employer, it may have been more evident when employers sent automated responses, whereas correspondence studies with a single résumé per employer may have treated such communications as if they were genuine callbacks.

This study offers some of the first experimental evidence on employer responsiveness to master's degrees from various types of institutions. If employers distinguished between job candidates based on their MBA background, one would expect this preference to be evident through elevated callback rates and other positive feedback from employers. Instead, I find that none of the master's degree groups examined received a higher overall rate of positive response than the others. More consequentially, none of the three master's treatment groups examined fared any better than applicants with only a bachelor's degree. Thus, not only did employers fail

to differentially prefer certain MBAs over others, but they also did not significantly differentiate between candidates with only a bachelor's and those with an MBA from a less-selective institution. The main findings therefore indicate that, far from providing applicants with a boost in the hiring process, the MBAs examined had no net effect on employers' perceptions of job candidates.

The similar employer responses across the experimental treatment conditions could reflect several possible scenarios. Of these, the first and most direct explanation would be that none of the MBAs imparted additional information that encouraged employers to differentially pursue candidates with those credentials. Under this explanation, employers may not have perceived the MBA programs examined as developing students' human capital or signaling desired skills and qualities.

Alternatively, a second explanation could be that employers perceived differences in applicant qualifications based on their master's degree background, but other factors (e.g., assumptions about employment duration or applicants' salary requirements) resulted in equivalent responses. Concerns about employee turnover may have been especially pronounced in the midst of the pandemic, leading employers to avoid selecting some applicants despite otherwise viewing them as better-suited for the position. In a similar vein, employers could have associated the treatment groups with different skill levels but, based on prior experience, also anticipated that applicants had correspondingly different salary expectations. Varying earnings expectations seem likely based on Appendix Table A7,[20] which shows that real-world earnings in the first year after receiving an MBA differed substantially across the institutions listed in the experiment, ranging from $57,500 for those who earned an MBA at for-profits to $91,200 for

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[20] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

those who earned an MBA at a regional institution. Concerns about meeting salary expectations may also help explain the negative effect of regional MBAs on positive response rates for White men, who are more likely to engage in salary negotiations, make larger salary requests, and have higher pay expectations than women and racially minoritized applicants (Barron, 2003; Heckert et al., 2002; Hernandez et al., 2019). Such salary-contingent decision-making would also be consistent with subgroup findings in Table 4, which show that job openings listing a starting salary above $65,000 had elevated rates of positive response for regional MBAs (and positive point estimates for the for-profit master's and online master's groups, as well). Thus, when employers reduced the information asymmetry by prespecifying a desired salary range, employers did appear to reward some MBA credentials for higher-salary jobs.

A third explanation is that employers have preferences based on applicants' master's degree backgrounds, but did not associate the specific institutions mentioned in the experiment with the intended treatment group. I took several steps to minimize this possibility. The graduate institutions included the 9 for-profit and 10 other primarily online institutions that grant the most master's degrees nationwide, and the regional institutions for each metropolitan area included two large universities that were likely to have significant regional name recognition. This means that the results are based on a variety of institutions that reflect each category, rather than being contingent on a single arbitrary example. To confirm that the breadth of institutions did not itself introduce challenges, one of the robustness checks restricted the for-profit and other primarily online institutions to only the four institutions with the largest enrollments nationwide. After restricting the sample to these four most conspicuous institutions in the for-profit and online groups, the results in Appendix Table A6 substantially reaffirm the main findings.[21]

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[21] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

Additionally, it is possible that some employers presumed that applicants from the regional group completed their MBA online (rather than in-person, as the experiment sought to convey); even if so, this misinterpretation reflects the way these employers would be likely to view actual candidates with in-person MBAs from regional institutions.

One might also expect an employer's familiarity with master's programs to vary based on the frequency with they encountered job candidates with master's degrees. In the subgroup analyses in Table 4, I therefore examine outcomes for the 39% of job listings that specifically mentioned a preference for master's degrees. Even for these positions where employers stated a preference for master's degrees, applicants in the three MBA treatment groups were not preferred. For these ostensibly master's-seeking job listings, the contrast between the stated preferences and the observed outcomes could reflect employers' preferences for applicants with MBAs from R1 institutions, but not any of the less-selective institutions included in the study.

These positive response rates also varied by the suggested race and gender of the fictitious applicant, which was randomly assigned. In particular, the descriptive findings revealed a significantly lower rate of positive responses for applicants whose names suggested they were Black men (4.3 percent), relative to those with names suggesting the applicant was a White woman (6.1 percent) or White man (6.2 percent). The raw positive response rate for applicants with names suggesting they were Black women (5.7 percent) was also nominally lower than that of presumably White applicants, although the difference was not statistically significant at conventional levels. These findings are in line with prior research that detects longstanding labor market discrimination against Black job applicants (e.g., Quillian et al., 2017). While such prior research has frequently occurred in the context of hiring for low-wage, entry-level positions or other roles that do not require a bachelor's degree (e.g., Agan & Starr, 2018; Pager, Bonikowski,

& Western, 2009), this study provides additional evidence for the ongoing presence of racial discrimination in the market for bachelor's and master's degree recipients.

Limitations of the experiment

In considering these results, it is important to remain mindful of several constraints of this experiment. First, the outcome of interest is whether an individual receives positive feedback from employers in the initial stage of hiring. While this outcome is common among correspondence studies, it has implications for the interpretation of findings. For instance, in this approach, it is not possible to track a fictitious applicant through to the point of an official job offer, although Bertrand and Mullainathan (2004) have emphasized that employer callback rates are informative about such later-stage outcomes. (Recent work further suggests that additional racial discrimination is evident at those later stages of the hiring process [Quillian, Lee, & Oliver, 2020].) Even if this study tracked job offers, though, it might not cover the most salient outcomes for some individuals who pursue MBAs. For example, rather than seeking to obtain a new position, some students enroll in MBA programs to improve their prospects for raises or promotions within their current role, and others pursue degrees out of an intrinsic motivation for personal growth and cognitive development (Flynn, 2006; Francois, 2014; Vance, 2015). Thus, this experimental outcome is unable to fully capture the diverse objectives individuals seek to achieve by pursuing a master's degree.

Second, there are generalizability constraints for this study based on the occupations studied and the application format. For instance, not all individuals with an MBA pursue a career in one of the business-related occupations examined in this study. Nevertheless, this experiment covers job openings that represent a major subset of career options for MBA recipients. Additionally, the sample of job openings in this study came from two large online job boards.

Consequently, the experiment exclusively studies outcomes for outside applicants to publicly available online job postings. Such online job searches were commonplace even as early as 2011, when 76% of those unemployed and looking for work performed online job searches, as well as 48% of those who were laid off (Faberman & Kudlyak, 2016). However, this study cannot speak to the perceptions of academic credentials in hiring contexts that rely heavily on employee referrals and networking prior to (or perhaps instead of) public job postings.[22] Therefore, the results from this experiment are particularly relevant when applicants are unable to rely on social networks formed during degree programs. Such scenarios may be especially pertinent for graduates of for-profit and other primarily online MBA programs, who may not experience the type of sustained, in-person interaction with faculty and peers that is conducive to traditional professional networking.

Third, the interpretation of the null findings is contingent on salary information that is largely unavailable. Specifically, the null results in terms of positive response rates could still be consistent with a boost for MBA-holders in terms of salary. Such benefits for MBA-holders could occur if they received higher callback rates for better-paying jobs than their peers with only a bachelor's degree (as suggested in Table 4 for regional MBAs among the positions that listed a salary range), if they received higher pay than bachelor's-holders regardless of the salary range, or both. Without receiving formal job offers listing a salary, it is not possible to know whether the MBA treatment groups would have received a salary boost overall relative to the bachelor's-only group, but it is worth considering this possibility.

Finally, the data collection period coincided with the COVID-19 pandemic, which had far-reaching consequences for the labor market. Tens of millions of workers lost their jobs or

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[22] Although there are no definitive data on the share of positions filled through employee referrals, a study of 1,000 employers found referrals accounted for about one-third of hires in 2016 (SilkRoad, 2017).

received furloughs (Daly, Buckman, & Seitelman, 2020), leading to heightened competition for a diminished pool of job openings (Forsythe et al., 2020). During such times of economic crisis, prior research has shown that employers tend to raise skill expectations and minimum education requirements (Hershbein & Kahn, 2018; Modestino et al., 2020). As a result, these conditions, while unique, may represent the kind of scenario for which individuals imagine their MBA will prove useful in terms of their employment prospects. Yet there is also some recent evidence that returns to MBAs can be dampened during times of economic crisis. Drawing on administrative data from Ohio, Minaya and colleagues (2022) have found diminished returns to MBAs in terms of wages during the Great Recession. If similar patterns held for interview callbacks during the pandemic, then the results of this study may understate the returns to less-selective MBAs during more favorable periods of economic activity.

CONCLUSION

The academic institutions examined in this study account for more than two-thirds of all master's degrees granted in the United States, yet to date there has been limited research on the ways their master's degrees may affect employer interest in a job candidate. Seeking to help fill the gap, this study provides causal estimates for the effects of earning an MBA on a job candidate's likelihood of receiving interview callbacks and other positive responses from an employer. The core findings of this study call into question whether MBAs from less-selective institutions are an effective means of increasing a new employer's interest in a job candidate. Overall, candidates with MBAs from for-profit, online, and regional institutions experienced similar outcomes: they fared no better than comparable applicants with only a bachelor's degree.

By focusing on a suite of options that may represent the substantial choice set for a large number of prospective MBA applicants, the findings from this study are intended to offer insight

for prospective students, universities, employers, and policymakers alike. For prospective students, who face average debt burdens of $39,200-$46,500 for MBAs at the institutions examined (see Appendix Table A7) in addition to other financial and time costs, the finding that new employers did not reward the MBAs early in the hiring process may diminish their enthusiasm for the credentials.[23] In future work, it could be valuable to examine to what extent awareness of this outcome influences the graduate school decision-making of prospective MBA students. For instance, given that individuals exhibit optimism that they will consistently experience above-average outcomes (e.g., Taylor & Brown, 1988; Weinstein, 1980), they may not shift their behavior even when confronted with these findings.

At the employer level, these results raise several points for closer examination. Of particular concern is the finding that employers were 30% less likely to offer positive responses to applicants with names suggesting they were Black men than they were for presumably White applicants, despite otherwise comparable résumés. During a time when employers nationwide profess a desire to increase workplace racial/ethnic diversity (e.g., Flory et al., 2021), such stark evidence of racial discrimination in the selection process for bachelor's-requiring positions points to considerable challenges ahead. Without identifying and addressing of the sources of disparate hiring outcomes—whether originating from hiring managers' evaluations of candidates (e.g., Agerström & Rooth, 2011), algorithmic bias (e.g., Garcia, 2016), the use of information external to the application (e.g., Acquisti & Fong, 2020), recruitment strategies (e.g., Neckerman & Kirschenman, 1991), or other mechanisms—it will not be feasible to achieve racial/ethnic equity in hiring.

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[23] All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at http://onlinelibrary.wiley.com.

Another notable finding for employers was that even for positions that explicitly mentioned a preference for master's degrees, employers did not prefer master's-degreed candidates. This counterintuitive finding suggests several potential avenues for research. For instance, do employers indeed have a preference for applicants with master's degrees, but only from the R1 institutions that were excluded from this study? Alternatively, if employers do not exhibit a preference for master's degrees from any institution, does the mention of a master's degree serve some alternative function, such as encouraging certain applicants to opt-out of the applicant pool?

For the types of institutions included in this study, these results may shed new light on longstanding perceptions of reputation and competitive advantages. In contrast to prior research showing that key decision-makers tended to have negative perceptions of degrees from for-profit and online programs (e.g., DeFleur & Adams, 2004; Hall, 2010), I do not find meaningful differences in employers' responses to applicants with MBAs from for-profit, online, and regional institutions. Further, with none of the MBAs demonstrating a greater positive response rate than applicants with only a bachelor's degree, these results may cast doubt on the value proposition that these MBAs present to prospective applicants. Coupled with the fact that there is already a crowded market for graduate degrees, the findings reinforce how difficult it is for MBA programs to stand out from their competitors and help prospective students fulfill their aspirations.

Finally, this study offers several lessons and considerations for policymakers. The first concerns the finding that employers responded to candidates similarly regardless of their educational background. Unlike undergraduates, who face annual caps on their federal borrowing, graduate students are able to borrow Grad PLUS Loans up to the total cost of

attendance (U.S. Department of Education, 2021). In part as a result, loans for graduate school have come to account for 40% of all student debt, although graduate students only represent 19% of borrowers (Center for American Progress, 2020). Policymakers concerned about rising levels of student debt may wish to identify approaches that minimize borrowing for MBA programs and ensure MBA students can successfully repay the amounts they do borrow. Absent such steps, the types of MBAs examined in this study appear to run the risk of contributing to students' debt load without substantially altering their employment prospects. Second, the discrimination detected against applicants in the experiment who were likely to be perceived as Black men aligns with an extensive literature on racial discrimination in hiring, which has remained steady over the past three decades (Quillian et al., 2017). In order for the U.S. Equal Employment Opportunity Commission (EEOC) to fulfill its mission of preventing discrimination on the basis of protected attributes such as race, it may be necessary for policymakers to allow the EEOC to deploy alternative investigative or enforcement mechanisms.

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Table 1. Master's degrees awarded in 2017/2018, by field and institution characteristics

Group	All master's degrees		Master's in business		Business as share of all master's within group
	Count	Group share	Count	Group share	
For-profit	63,807	8%	20,739	11%	33%
Primarily online (non-R1)	117,826	14%	34,285	18%	29%
Primarily not online (non-R1)	357,342	43%	75,040	39%	21%
R1	283,103	34%	62,749	33%	22%
Total	822,078	100%	192,813	100%	23%

Source: Integrated Postsecondary Education Data Systems (IPEDS), 2017/2018 Completions.
*Note*s: R1 = 2018 Carnegie Classification for "Doctoral Universities: Very High Research Activity." Business includes Classification of Instructional Programs (CIP) codes for "Business, Management, Marketing, and Related Support Services." "Primarily online" includes public and private, not-for-profit institutions in which at least half of master's programs are offered online. "Primarily not online" includes public and private, not-for-profit institutions in which less than half of master's programs are offered online.

Table 2. Occupation-level summary

Occupation category	Example job titles	Applications submitted	Share submitted to positions that listed preference for a master's	Average minimum salary listed*
General and operations managers	General manager, operations director, store manager	1,989	0.258	$62,803
Sales managers	Sales manager, sales director, district sales manager	1,973	0.398	$70,557
Marketing managers	Marketing manager, account supervisor, brand manager	1,839	0.680	$72,010
Management analysts	Management analyst, management consultant, business analyst	1,420	0.426	$71,333
Sales representatives, wholesale and manufacturing	Sales representative, account representative, sales consultant	1,277	0.178	$61,587
First-line supervisors of office and administrative workers	Office manager, office coordinator, customer service manager	388	0.186	$55,533
Market research analysts and marketing specialists	Market researcher, market analyst	382	0.662	$61,868
First-line supervisors of non-retail sales workers	Sales supervisor, sales team leader	212	0.132	$57,169
Total		9,480	0.394	$66,081

Notes: Occupation categories are based on the Standard Occupational Classification (SOC) system. Applications were submitted between April and November 2020. *Salary information is based on 3,128 applications to job postings that provided a salary range.

Table 3. Effect of master's degree background on probability of positive response and interview callback

	Outcome: Positive response		Outcome: Interview callback	
	Estimates	Percent of baseline mean	Estimates	Percent of baseline mean
Treatment group				
For-profit master's	-0.0002 (0.0051) [0.9764]	-0.3	-0.0018 (0.0046) [0.7234]	-3.5
Online master's	-0.0013 (0.0052) [0.7983]	-2.3	-0.0026 (0.0046) [0.5666]	-5.8
Regional master's	-0.0053 (0.0053) [0.3101]	-9.2	-0.0054 (0.0046) [0.2421]	-11.9
Control variables	X		X	
Mean for bachelor's-only group	0.0574		0.0452	
Applications	9,480		9,480	

Notes: Table reports marginal effects from a linear probability model. Standard errors are clustered at the level of the job opening. Standard errors are shown in parentheses, and p-values are shown in brackets. The bachelor's-only group serves as the omitted reference group. Additional control variables include race, gender, metropolitan area, job type, resume order, undergraduate institution, undergraduate year, and template version. *** < .01; ** < .05; * < .10

Table 4. Effects of master's degree background on probability of positive response, by subgroup

	Observations	Positive response for bachelor's-only group	Marginal effect (standard error)		
			For-profit master's	Online master's	Regional master's
Race/gender					
Black women	2,388	0.0565	0.0006	-0.0095	-0.0110
			(0.0100)	(0.0110)	(0.0101)
Black men	2,438	0.0431	0.0088	0.0031	0.0051
			(0.0086)	(0.0097)	(0.0099)
White women	2,333	0.0609	-0.0029	-0.0145	0.0002
			(0.0109)	(0.0107)	(0.0111)
White men	2,321	0.0625	-0.0133	0.0111	-0.0199*
			(0.0118)	(0.0109)	(0.0110)
Education requirement listed					
Bachelor's only	5,745	0.0632	-0.0001	0.0055	-0.0030
			(0.0069)	(0.0072)	(0.0071)
Master's preferred	3,735	0.0439	-0.0006	-0.0111	-0.0087
			(0.0075)	(0.0073)	(0.0076)
Applications					
Up to 65	2,140	0.0706	-0.0005	-0.0032	-0.0098
			(0.0114)	(0.0119)	(0.0120)
More than 65	2,111	0.0531	-0.0060	-0.0080	0.0122
			(0.0110)	(0.0109)	(0.0114)
Salary range (starting point)					
Up to $65,000	1,781	0.0949	-0.0039	-0.0178	0.0012
			(0.0153)	(0.0152)	(0.0156)
More than $65,000	1,347	0.0438	0.0110	0.0080	0.0245**
			(0.0098)	(0.0118)	(0.0122)

Notes: Table reports results from a linear probability model, with control variables as specified in Table 3. Subgroup analyses by application volume and salary not available for all job openings. Standard errors are shown in parentheses. The bachelor's-only group serves as the omitted reference group. *** < .01; ** < .05; * < .10
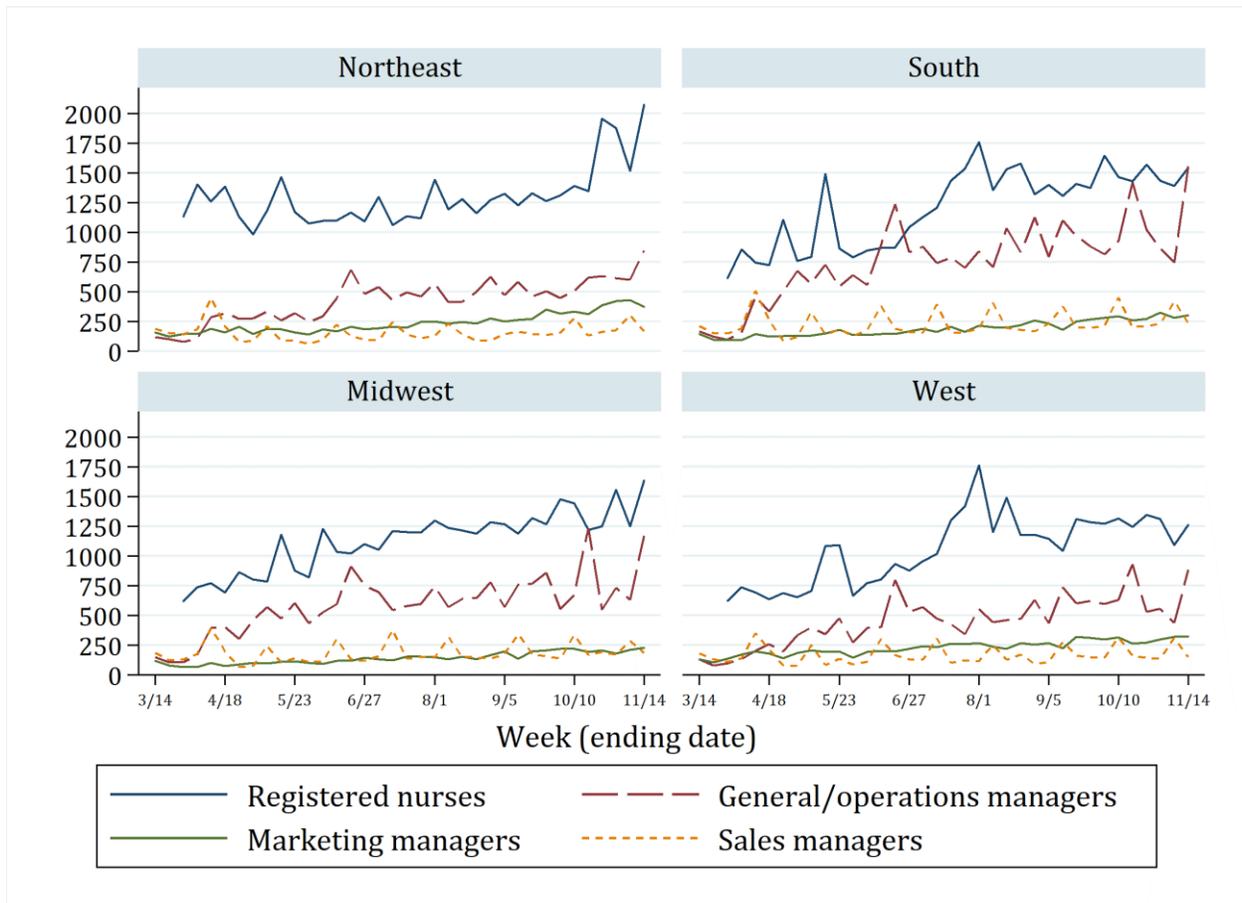
Notes: This figure presents the number of bachelor's-requiring job postings listed each week on one of the online job boards used in the field experiment. Job postings were linked to occupations based on common phrases in job titles (e.g., "general manager," "GM," "store manager," "business manager," "operations manager," and "operations director" for general and operations managers). Metropolitan areas were grouped into four regions: Northeast (Boston, New York City, Philadelphia), South (Atlanta, Dallas, Miami, Washington), Midwest (Chicago, Cincinnati, Minneapolis, St. Louis), and West (Denver, Los Angeles, Seattle). Counts cover the period from March 8, 2020, through November 14, 2020.

Figure 1. Weekly Job Openings Posted, by Region and Occupation.

Notes: This figure summarizes employer responses to applications, broken out by the educational treatment group listed on the résumé. Blue squares represent the share of applications that received any type of positive response, and green circles represent the subset that received a clear interview callback. Bars provide the 95% confidence intervals. The field experiment was conducted from April 2020 through November 2020.

Figure 2. Employer Response Rates, by Treatment Group.
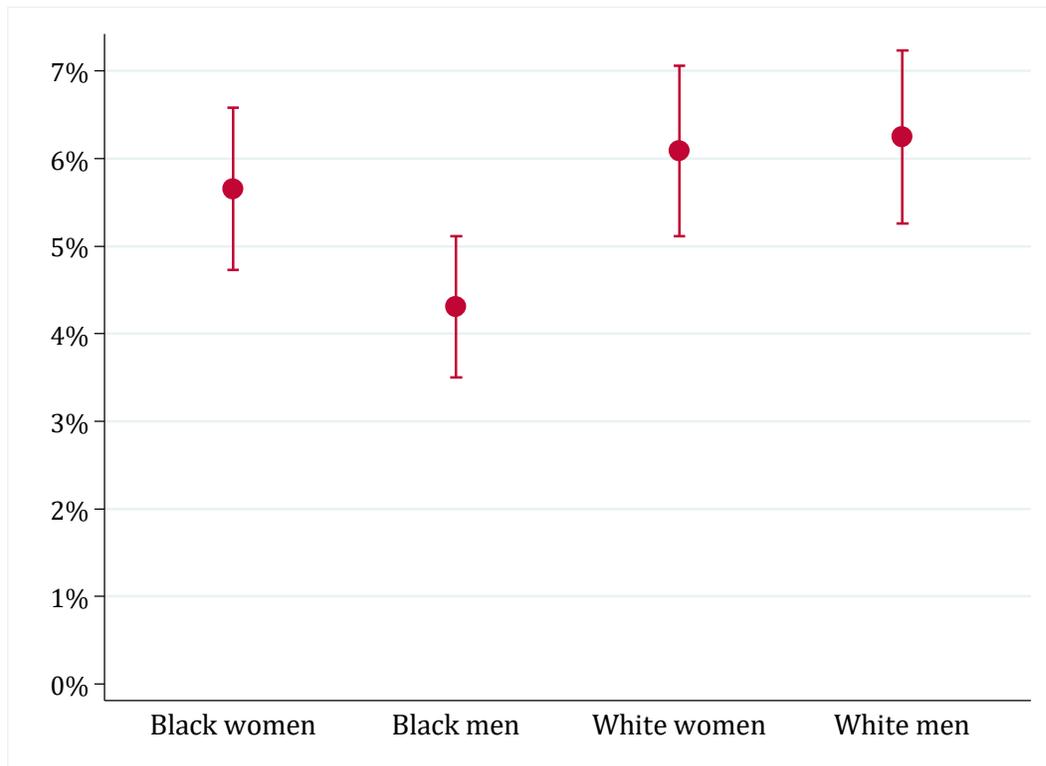
Notes: This figure depicts the share of applications that received a positive response from an employer, based on the race and gender that were signaled on the résumé. Dots represent the average positive response rate for each group, and bars provide the 95% confidence intervals. The field experiment was conducted from April 2020 through November 2020.

Figure 3. Positive Response Rates, by Race/Gender Suggested Through the Applicant's Name.

APPENDIX A. SUPPLEMENTAL TABLES

Table A1. Institution names used for graduate degrees

Online not-for-profit institutions	*For-profit institutions*
Western Governors University	University of Phoenix
Southern New Hampshire University	DeVry University
University of Maryland Global Campus	Strayer University
Liberty University	Grand Canyon University
Wilmington University	Ashford University
Brandman University	Walden University
National University	South University
Colorado State University-Global Campus	Capella University
Indiana Wesleyan University	American Public University
Saint Leo University	

Regional not-for-profit institutions

Atlanta
    Kennesaw State University
    Clayton State University

Boston
    Suffolk University
    Bentley University

Chicago
    Northern Illinois University
    DePaul University

Cincinnati
    Miami University of Ohio
    Wright State University

Dallas
    University of Dallas
    Texas Christian University

Denver
    University of Denver
    Metropolitan State University of Denver

Los Angeles
    California State University, Northridge
    California State University, Long Beach

Miami
    Nova Southeastern University
    Florida Atlantic University

Minneapolis
    University of St. Thomas
    Augsburg University

New York
    Baruch College, CUNY
    Hofstra University

Philadelphia
    La Salle University
    Thomas Jefferson University

Seattle
    Seattle University
    University of Washington-Bothell

St. Louis
    University of Missouri-St. Louis
    Lindenwood University

Washington, DC
    American University
    Loyola University Maryland

Note: Institutions within each subgroup are listed in descending order based on the number of master's degrees awarded.

Table A2. Institution names used for undergraduate degrees, by region of job opening

	Midwest
Institution Name	State
Ball State University	Indiana
Grand Valley State University	Michigan
Kent State University	Ohio
University of Illinois at Chicago	Illinois
University of Kansas	Kansas

	Northeast
Institution Name	State
Rutgers University-Newark	New Jersey
Temple University	Pennsylvania
University at Albany, SUNY	New York
University of Massachusetts-Lowell	Massachusetts
University of Rhode Island	Rhode Island

	South
Institution Name	State
East Carolina University	North Carolina
University of Houston	Texas
University of Louisville	Kentucky
University of Tennessee-Knoxville	Tennessee
Virginia Commonwealth University	Virginia

	West
Institution Name	State
Oregon State University	Oregon
University of Arizona	Arizona
University of Colorado-Denver	Colorado
University of Nevada-Reno	Nevada
Washington State University	Washington

Table A3. Names used in experiment for applicants to convey race and gender

Race	Women	Men
	Gender	
Black	Shanice Banks	Terrell Dorsey
	Monique Dorsey	DeAndre Jackson
	Ebony Mosley	Jerome Banks
	Tanisha Jackson	Tyrone Mosley
White	Amy Snyder	Dustin Snyder
	Heidi Olson	Hunter Olson
	Kristen Wagner	Scott Wagner
	Stephanie Hansen	Seth Hansen

Table A4. Summary statistics for submitted résumés

Attribute	Overall share	Share in each experimental condition				*p*-value of χ^2 test
		Bachelor's-only	For-profit master's	Online master's	Regional master's	
	(1)	(2)	(3)	(4)	(5)	(6)
Race/gender suggested by name						
Black women	0.252	0.250	0.250	0.251	0.250	
Black men	0.257	0.251	0.249	0.249	0.251	
White women	0.246	0.250	0.250	0.250	0.249	
White men	0.245	0.249	0.252	0.249	0.250	> 0.999
Work experience						
5 years	0.332	0.243	0.252	0.251	0.254	
6 years	0.330	0.254	0.245	0.251	0.250	
7 years	0.338	0.253	0.254	0.247	0.246	0.920
Template						
Style 1	0.251	0.237	0.254	0.244	0.266	
Style 2	0.249	0.261	0.242	0.258	0.239	
Style 3	0.250	0.241	0.258	0.253	0.247	
Style 4	0.250	0.261	0.247	0.243	0.249	0.255
Total sample size	9,480	2,369	2,373	2,367	2,371	

Notes: Final column shows the results of the chi-squared test to assess whether treatment assignment and the attribute listed were jointly independent. Work histories varied by metropolitan area and occupation. Template styles determined characteristics such as the font used and whether section headings were bold or underlined, among other slight differences. Proportions may not sum to one due to rounding.

Table A5. Descriptive statistics for positive responses and interview callbacks

Attribute	Applications	Positive response	Interview callback
Overall	9,480	0.056	0.043
Treatment group			
Bachelor's-only	2,369	0.057	0.045
For-profit master's	2,373	0.057	0.043
Online master's	2,367	0.056	0.042
Regional master's	2,371	0.052	0.040
Race/gender suggested by name			
Black women	2,388	0.057	0.040
Black men	2,438	0.043	0.034
White women	2,333	0.061	0.052
White men	2,321	0.062	0.046
Occupation			
General/operations manager	1,989	0.040	0.031
Management analyst	1,420	0.065	0.055
Marketing manager	1,839	0.032	0.021
Market research analyst	382	0.131	0.105
Sales manager	1,973	0.036	0.026
Sales representative	1,277	0.103	0.081
Supervisor, nonretail sales workers	212	0.108	0.071
Supervisor, office workers	388	0.057	0.044
Metropolitan area			
Atlanta	578	0.055	0.045
Boston	901	0.052	0.038
Chicago	1,045	0.062	0.052
Cincinnati	237	0.080	0.034
Dallas	1,009	0.068	0.038
Washington, DC	1,008	0.074	0.063
Denver	438	0.059	0.050
Los Angeles	1,131	0.040	0.034
Miami	256	0.035	0.027
Minneapolis	377	0.066	0.064
New York City	1,277	0.031	0.025
Philadelphia	495	0.077	0.055
Seattle	503	0.044	0.042
St. Louis	225	0.071	0.044
Minimum salary listed			
Up to $50,000	821	0.112	0.079
$50,001-$60,000	654	0.090	0.067
$60,001-$70,000	612	0.056	0.036
More than $70,000	1,041	0.041	0.030
No salary information	6,352	0.047	0.038

Notes: Interview callbacks refer to cases in which an employer requested to speak with the applicant about the job opening. Other examples of positive responses include customized invitations to complete skills assessments, requests for information not originally requested (e.g., willingness to work in-person), and encouragement to consider different but related job openings.

Table A6. Robustness checks for effect of master's degree background on probability of positive response

	Job opening fixed effects		Restricted to four most common for-profit/online institutions		Dropping cases with four callbacks		Dropping cases with fewer than 40 applications	
	Coefficient	Percent of baseline mean	Coefficient	Percent of baseline mean	Coefficient	Percent of baseline mean	Coefficient	Percent of baseline mean
Treatment group								
For-profit master's	-0.0016	-2.8	-0.0003	-0.5	-0.0001	-0.5	0.0010	-0.5
	(0.0059)		(0.0058)		(0.0051)		(0.0055)	
	[0.7880]		[0.9643]		[0.9798]		[0.8512]	
Online master's	-0.0028	-4.9	-0.0029	-5.3	-0.0013	-2.7	0.0006	1.1
	(0.0060)		(0.0059)		(0.0053)		(0.0055)	
	[0.6376]		[0.6213]		[0.8016]		[0.9127]	
Regional master's	-0.0062	-10.8	-0.0053	-9.6	-0.0054	-11.3	-0.0032	-5.9
	(0.0061)		(0.0053)		(0.0053)		(0.0055)	
	[0.3077]		[0.3108]		[0.3063]		[0.5586]	
Control variables	X		X		X		X	
Job opening fixed effects	X							
Bachelor's-only group mean	0.0574		0.0552		0.0478		0.0538	
Applications	9,480		8,298		9,384		8,330	

Notes: Table reports marginal effects from a linear probability model. Standard errors are clustered at the level of the job opening. Standard errors are shown in parentheses, and p-values are shown in brackets. The bachelor's-only group serves as the omitted reference group. Additional control variables include race, gender, metropolitan area, job type, resume order, undergraduate institution, undergraduate year, and template version. *** < .01; ** < .05; * < .10

Table A7. Stafford and Grad PLUS Loan debt and earnings of master's recipients in business, by graduate institution type

Sector	Mean loan debt	Median post-master's earnings
For-profit treatment group institutions	$45,773	$57,544
Online treatment group institutions	$39,210	$67,631
Regional treatment group institutions	$46,468	$91,211
R1 institutions	$54,016	$97,211

Notes: R1 = 2018 Carnegie Classification "Doctoral Universities: Very High Research." Data come from the College Scorecard for cohorts in academic years 2016/2017 and 2017/2018 and are restricted to master's recipients in business management, administration, and operations (4-digit CIP code 52.02). Mean loan debt is based on Stafford and Grad PLUS Loans. Earnings are based on the first year after completing the master's credential among individuals working and not enrolled in postsecondary education.

APPENDIX B. ADDITIONAL APPLICATION DETAILS

Beyond the features of the résumé described in the manuscript, there were several additional components. All résumés included contact information based on the names used for the applicant. As a result, there were 16 email addresses that correspond to the name combinations used for applicants (involving names, middle initials, and sometimes numbers), all using one of two popular free email services. Similarly, I used multiple phone numbers to ensure that each applicant to a given position could provide a unique phone number. Checking emails and voicemails for these accounts enabled me to determine which applicants receive an expression of interest or callback for a given job posting. I also listed a physical mailing address based on an actual apartment complex in each city, although I listed apartment numbers that do not exist. I did not expect employers to communicate with applicants via physical mail, and I received no notifications that employers had tried to send physical materials to the applicant. The physical mailing addresses were located in nearby ZIP codes with similar rent and were primarily intended to signal the applicant's geographic proximity to the employer.

A section also listed additional qualifications and skills. Some entries in this section included broadly applicable attributes (e.g., teamwork, leadership). Other entries pointed to familiarity with software and other tools commonly listed in job openings for the occupation (e.g., Salesforce, Google Analytics). In an effort to improve consistency within the résumé, the set of qualifications and skills were perfectly aligned with the applicant's work history (i.e., all applicants with a particular work history showed the same qualifications and skills). This meant, for instance, that an applicant who listed experience with a particular piece of software in one of the bullets included in their work history also listed that piece of software in their skills section.

Finally, I used four overall résumé templates to distinguish the applicants from one another. These templates slightly varied in terms of factors such as font used. The first résumé template used Times New Roman font, while the second used Cambria, the third used Arial, and the fourth used Calibri. The résumé templates also differed modestly in terms of bolding, italicization, and the type of bullets used for work experiences and skills. Without such variation, the similarity in résumé layouts might be especially conspicuous to prospective employers.

For each job opening to which I applied, I recorded several pieces of information. Through the résumé randomizer, I saved all résumé attributes generated for the application. These attributes included the applicant's name (and, by extension, suggested race and gender) and experimental treatment condition, along with a variety of other key details. Examples of this information include the occupation type, the metropolitan area for the posting, the names of undergraduate and graduate institutions, the résumé template used, the work history listed, and the number of years of work experience. In addition, I recorded several elements from the job posting itself: the highest education level required/desired, the expected salary range (if listed), and the geographic location of the position. I also noted the date on which I submitted each application. Lastly, one of the job search websites displayed the number of applicants to certain job openings after a particular time interval. In those cases, I recorded the number of applicants for the job opening on the first day that information became available.