Higher education advances: Examining predictors of graduate school enrollment, employers'

perceptions of master's degrees, and contingent faculty unionization

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CHAPTER 1

Introduction

1.1 Objective

While undergraduate enrollment has slightly declined since 2010, graduate education represents an area of continued expansion within the U.S. higher education landscape (U.S. Department of Education, 2020a).[1] The number of individuals with graduate degrees has nearly doubled since 2000 (U.S. Census Bureau, 2019a). Following such growth, graduate programs now account for nearly one-sixth of all students enrolled in postsecondary institutions and one-fourth of the postsecondary degrees awarded annually (U.S. Department of Education, 2020b; U.S. Department of Education, 2020c). Graduate degree recipients also represent about 15 percent of adults in the labor force—a share that translates to approximately 15 million workers with graduate degrees (Brundage, 2017). With institutions awarding nearly one million new graduate degrees each year (U.S. Department of Education, 2020c), the prominence of graduate education within the postsecondary sector is poised to increase in the years ahead.

Students participating in graduate education pursue a wide array of objectives. According to the nationally representative National Postsecondary Student Aid Study (2021a), students seeking a master's degree accounted for the vast majority of graduate students in the 2015-16 academic year (69 percent). Another 11 percent were seeking a professional doctoral degree (e.g., law or medicine), while 10 percent were pursuing a research doctorate (e.g., Ph.D.) and an additional 1 percent were enrolled in some other doctoral degree program. Postbaccalaureate and

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[1] Except where otherwise noted, I use the term "graduate education" to refer to postbaccalaureate enrollment at all levels, including certificates, master's degrees, professional degrees, and doctoral degrees.

post-master's certificate programs represented an additional 6 percent of graduate enrollment. The remaining 2 percent of graduate students were enrolled in classes but were not seeking a credential. Throughout this dissertation, I use the overarching term "graduate education" to refer to all of these graduate enrollment types collectively, unless otherwise noted.

The available research base suggests several benefits that students may expect to receive by enrolling in graduate programs. Since graduate degrees are a prerequisite for entrance to certain professions—particularly in health care, academia, and law—graduate degrees can provide students with access to careers they could not otherwise pursue (e.g., Weinberg, 2008). For positions that do not explicitly require a graduate degree, an advanced credential may also provide a comparative advantage relative to other job candidates (Verhaest et al., 2018). There is also longstanding evidence of an earnings premium for individuals with a graduate degree, on average, relative to bachelor's degree recipients (e.g., Baum, 2014). These economic advantages may accrue to graduate degree recipients because such credentials serve as common pathways to managerial and executive positions (Eide, Brewer, & Ehrenber, 1998), provide greater access to higher-paying organizations (Engbom & Moser, 2017), and are sometimes linked to prescribed salary increases in fields such as teaching (Kolbe & Strunk, 2012), among other reasons. Consequently, graduate degree-holders account for a disproportionate share of high net-worth individuals, comprising more than 40 percent of the wealthiest decile of Americans (Keister, 2014; Baum & Steele, 2017). Other potential benefits of graduate education include the opportunity to pursue intellectual interests or develop a social status that is a key part of one's identity (Schleef, 2000).

Beyond such potential benefits, however, it is also important to consider the investments required for graduate education and the mechanisms by which returns to graduate education may

vary systematically. In addition to requiring substantial time investments, graduate programs can impose considerable financial costs for students, both in terms of direct expenses and foregone earnings. With the ability to borrow Graduate PLUS loans up to the full cost of attendance for their program, graduate students take out an average of almost $18,000 per year in federal loans to pay for their education, nearly four times the amount borrowed annually at the undergraduate level (College Board, 2018). In part due to such differential borrowing levels, 40 percent of all federal student loans now go to graduate students (College Board, 2018). Thus, at both the individual and national level, the ability of graduate students to secure jobs that enable them to successfully repay their student loans deserves attention.

Additional evidence also suggests the potential for graduate education to exacerbate existing sources of inequality. In recent decades, the children of more socioeconomically advantaged parents have received a disproportionate share of the economic benefits of graduate degrees, suggesting that graduate education has reinforced existing class differences instead of promoting intergenerational social mobility (Torche, 2011). Further, there is substantial variation in the returns to graduate education by degree program, field, and institutional characteristics, with differential access and attainment by ascriptive characteristics (e.g., Altonji, Arcidiacono, & Maurel, 2016; Posselt & Grodsky, 2017). In science, technology, engineering, and mathematics (STEM) fields, for instance, historically underrepresented racial/ethnic minority (URM) students accounted for 22 percent of bachelor's recipients, 13 percent of master's recipients, and 9 percent of doctoral recipients in 2016 (National Science Foundation [NSF], 2019a). While women have generally reached parity for degrees in the social and biological sciences at all levels, they earn less than one-third of master's and doctoral degrees in such STEM fields as computer science, engineering, and the physical sciences (NSF, 2019a). In professional education, similar patterns

of underrepresentation are evident. URM students represent just 21 percent of J.D. recipients, despite representing nearly one-third of the U.S. population (Law School Admission Council, 2019). In medical school, approximately one-sixth of entrants are URM students (Boatright et al., 2018).

Given the growing role of graduate degree programs within postsecondary education and the consequential nature of such growth, this three-essay dissertation examines several key stages related to graduate education. Collectively, these essays span from graduate school choice to the labor market experiences of graduate degree recipients. Taken together, these studies contribute to literatures examining who enrolls in graduate degree programs, how students fare in their job search following receipt of a master's degree, and what challenges some graduate degree recipients face in the workplace.

1.2 Overview of papers

In the three papers that comprise this dissertation, I use a variety of methods and data sources to answer a range of questions on topics related to graduate education. As a preview of the dissertation, below I provide an overview of each paper, in turn. For each, I begin by listing the title and motivating question. Afterwards, I provide a synopsis of the study background, data, methods, and primary findings.

Paper 1: Back to the books: Graduate enrollment of Great Recession-era bachelor's recipients

- *What factors are associated with graduate enrollment, particularly in terms of four dimensions along which there has been underrepresentation within graduate education historically: race/ethnicity, gender, first-generation status, family income background?*

For a variety of professional careers, graduate education has long served as a prerequisite (e.g., Morelon-Quainoo et al., 2009). During the Great Recession, which began in 2007, many employers raised their educational expectations for positions that historically required a bachelor's degree, often maintaining such elevated requirements thereafter (Hershbein, & Kahn, 2018). Further emphasizing the growing salience of graduate education to labor market opportunities, the Bureau of Labor Statistics (2019a) has projected that positions requiring a master's, professional, or doctoral degree will experience the fastest growth rates between 2018 and 2028. Even when a graduate credential is not required, "overqualified" graduate degree recipients may receive more favorable assessments from prospective employers (Verhaest et al., 2018). With growth in employer expectations and preferences for graduate degrees, it is increasingly important to consider what factors are associated with enrollment in graduate school. At the national level, however, the majority of prior work on the topic draws on bachelor's recipients from 1992-93 (e.g., Mullen, Goyette, & Soares, 2003; Perna, 2004; Tienda & Zhao, 2017). Yet there is reason to believe that factors shaping graduate enrollment may have shifted in the intervening years, particularly with the expansion of graduate programs based partly or entirely online.

Relying on data from the 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12), I use a binomial logistic regression model to identify whether certain attributes are associated with higher or lower odds of graduate enrollment. The B&B:08/12 data comes from the most recent nationally representative cohort on which to conduct this analysis. The attributes I include in the analysis focus on demographic factors, academic and financial resources, and proxies of social and cultural capital. I disaggregate results by degree type, field of study (e.g., business vs. STEM within master's degrees, law vs. medicine within professional degrees), and

institutional sector (e.g., for-profit). The study therefore offers updated evidence on whether several aspects of a student's background remain significant predictors of graduate enrollment overall, as well as whether such characteristics help predict their type of graduate enrollment (e.g., degree type, field, sector).

Based on this approach, this study offers several insights into the predictors of graduate enrollment. First, the results suggest higher enrollment odds for women (relative to men) in sub-master's and master's programs, but relatively lower odds for women's enrollment in professional and research doctorate programs. This result is consistent with earlier work (e.g., Mullen, Goyette, & Soares, 2003; Perna, 2004) and reinforces a longstanding relationship between gender and the pursuit of certain types of graduate programs. Second, in a departure from some prior research, this study identifies significant relationships between parental education levels and a student's odds of graduate enrollment. In particular, I find that bachelor's recipients whose parents earned graduate degrees had higher odds of enrolling in such programs themselves, potentially pointing to an intergenerational accumulation of advantage. Additionally, this study is among the first to generate estimates for the odds of enrolling in for-profit institutions, an important contribution in light of the dramatic expansion of for-profit enrollment between the 1990s and 2000s. Even after controlling for a variety of contextual factors, I find that Black students had increased odds of postbaccalaureate enrollment in a for-profit institution.

Paper 2: Master's for hire: Experimental evidence on employers' perceptions of master's degrees from for-profit institutions

- *Do employers offer callbacks to job applicants at different rates depending on whether the applicant has a master's degree from a for-profit institution, a master's degree from*

some other primarily online institution, a master's degree from a regional institution, or

only a bachelor's degree?

Whereas the first paper explores factors related to graduate school entrance, the second paper focuses on the job search prospects facing master's recipients. An emphasis on job search activities for master's students is particularly worthwhile in light of such programs' rapid expansion in recent decades, with two master's degrees now awarded for every five bachelor's degrees (Blagg, 2018). The transition from a master's degree program to a new employer is a consequential step for hundreds of thousands of master's recipients per year. With 15 percent of adults in the labor force holding a master's degree (Brundage, 2017), employers have considerable experience distinguishing between job candidates with (and without) master's degrees. In this process, employers may use attributes of the master's-granting institution to evaluate job candidates. For instance, human capital theory would suggest that employers may assess candidates based on the perceived quality of the training received in the master's program, while signaling theory would suggest that the master's student's choice of institution and program is an effort to provide the employer with a signal of their underlying ability. To date, however, no published research has examined employers' relative preferences between master's degrees earned at for-profit institutions and other relatively broad-access institutions, which collectively enroll the majority of master's students. At the undergraduate level, résumé correspondence studies involving for-profit institutions have generally found that for-profits have higher prices than public institutions, but their graduates do not receive higher interview callback rates from employers (Darolia et al., 2015; Deming et al., 2016). At the master's level, however, employers' preferences based on sector (e.g., for-profit vs. nonprofit) and format (e.g., online vs. on-campus) remain unknown.

To address this question, I conducted a field experiment to assess employers' preferences between master's degrees based on attributes of the degree-granting institution. Through a résumé correspondence study, I submitted applications to business-related positions for fictitious applicants who were observationally similar (e.g., comparable work histories and undergraduate education) but who differed systematically in terms of their graduate education background. The four treatment arms included having earned a master's degree from a for-profit institution (e.g., University of Phoenix), a master's degree from another primarily online institution (e.g., Western Governors University), a master's degree from a regional institution that primarily awards degrees for on-campus programs (e.g., Northern Illinois University for the Chicagoland area), or no master's degree (i.e., applicants with a bachelor's degree only). These various options represent the range of broad-access graduate schools that are within the choice set for a substantial number of prospective master's students. To explore possible variation in benefits (or disadvantages) that accrue to master's-degree holders, the résumé correspondence study blocked by gender and race for each job posting (i.e., all fictitious job candidates had names suggesting they are the same gender and race as one another). The aim of the study was to identify the extent to which individuals benefit from earning a master's degree at various types of institutions, an unresolved question that is particularly relevant for students who are likely to borrow substantial amounts in graduate student loans.

Two primary findings emerged from this field experiment. First, descriptive results revealed that applicants with names suggesting they were Black men received 30% fewer positive responses from employers than otherwise similar applicants with names suggesting they were White men or White women. This significant disparity in employer responses contributes additional evidence to a robust literature on race-based employer discrimination in the labor

market. Second, I detect no significant differences in employer callback rate by treatment condition, ruling out even modest effects. Not only do the three master's treatment groups (i.e., for-profit master's, online master's, and regional master's) fail to produce meaningfully different employer responses from one another, but they also all fail to yield a higher positive response rate than the bachelor's-only reference group. These results are evident across a variety of robustness checks and heterogeneity analyses, with some subgroup estimates actually revealing negative coefficients for master's-credentialed candidates relative to bachelor's-only candidates. Only one subgroup analysis, involving high-salary positions, identifies a positive effect of holding a broad-access master's degree on a job candidate's likelihood of receiving a positive response. These findings have significant implications for a range of stakeholders, including prospective students, academic institutions, employers, and policymakers.

Paper 3: On the tenuous track: Contingent faculty unionization at 4-year private, nonprofit institutions

- *What are the antecedents to unionization efforts among contingent faculty members at private universities?*

While the résumé correspondence study for the second paper focuses on the non-academic labor market, this third paper has relevance for many graduate students who pursue work within academia—specifically, as contingent faculty. With the share of contingent faculty rising from 34 percent of the academic workforce in 1975 to 57 percent in 2015 (Shulman et al., 2017), such positions represent an increasingly common occupation for graduate degree recipients. In recent years, concerns about compensation, benefits, and working conditions for contingent faculty members have prompted the establishment of contingent faculty unions

nationwide. While these unions are intended to help contingent faculty members advocate for better contract terms and working conditions, the unionization process itself can be arduous and contentious.

The unionization movement among contingent faculty members has gained momentum at 4-year private institutions in particular, where the number of certified unions increased 26 percent between 2012 and 2016, relative to a 2 percent increase at public institutions over the same period (Herbert, 2017). Previous studies have touched on related topics, such as the economic and institutional factors contributing to the share of non-tenure-track faculty (Zhang, Ehrenberg, & Liu, 2015), the relationship between contingent faculty and institutional policies and practices (e.g., Kezar & Sam, 2013), and the content of collective bargaining agreements that apply to contingent faculty (Rhoades, 2017). However, no published work has systematically sought to identify the factors that have contributed to rapid growth in the number of contingent faculty unions at 4-year private institutions.

To better understand the expansion of collective action among contingent faculty, I conducted an event history analysis based on data from the National Labor Relations Board (NLRB), which certifies union elections for private organizations, and other institution- and state-level sources. This study examines the relationship between organizational attributes and the propensity to hold a contingent faculty unionization election. As the first study to examine the relationship between institutional attributes and unionization among contingent faculty at private institutions, this paper identifies conditions that precede union certification elections.

Results of the discrete-time survival analysis affirmed several hypotheses developed based on the frameworks of institutional logics and isomorphism. In particular, this study suggests that factors positively associated with contingent faculty unionization votes include

being located in states with more liberal state legislatures and the number of other academic institutions in the state that held union certification elections for contingent faculty. Conversely, factors linked to lower odds of holding contingent faculty unionization votes include having a religious affiliation (other than Roman Catholic) and being designated as a special-focus institution (e.g., art school). These findings may be of interest to contingent faculty, universities, policymakers, and unions in their efforts to determine the relative likelihood of unionization under various conditions.

1.3 Contributions to the literature

These three dissertation papers offer distinct contributions to the study of graduate education, covering topics ranging from graduate school enrollment to postgraduate labor market experiences. In each case, the findings have relevance for groups that have historically been marginalized. In the first paper, I update earlier work on graduate enrollment predictors, paying special attention to variations in enrollment patterns by degree type, academic field, and sector. To do so, I relied on a more recent iteration of B&B to examine the role of gender, race/ethnicity, first-generation status, and family income background in graduate enrollment outcomes. As a result, among studies of graduate enrollment, I offer the first evidence that specifically identifies predictors of graduate enrollment in the for-profit sector. Similarly, this paper is the first to distinguish between law school and medical school enrollment, which prior studies have not disaggregated. Based on nationally representative data, these findings provide an updated understanding of the ways that graduate enrollment is stratified along dimensions such as gender, race/ethnicity, parental education status, and family income.

Through the résumé correspondence study for my second paper, which took place between April and November 2020, I generated the earliest large-scale experimental evidence of employers' perceptions of master's credentials from for-profit and other broad-access institutions. The types of institutions examined in this study account for the majority of all master's degrees granted in the United States, yet to date there has been limited research on the ways such credentials may affect employer interest in a job candidate in business, the most common master's field at for-profits. By focusing on a suite of options that may represent the substantial choice set for a large number of prospective master's applicants (i.e., master's enrollment at a broad-access institution or no master's enrollment at all), the findings from this study should offer insight to policymakers, institutions, employers, and students alike. By further exploring potential variation by applicants' race and gender, I sought to determine whether labor market benefits (or penalties) of master's degrees from broad-access institutions are allocated evenly across demographic groups. Such questions are especially important in light of the disproportionately high representation of Black students, lower-income students, and older students in for-profit master's programs (Baum & Steele, 2017).

Finally, the third paper offers insight into a burgeoning social movement—contingent faculty unionization. In particular, it provides evidence on potential institution- and state-level attributes that serve as antecedents to unionization efforts. Better understanding the factors that contribute to the unionization phenomenon has high relevance for graduate students set to enter positions as contingent faculty members, current contingent faculty members who are charting their career path, and university administrators. Such findings also have significant equity implications, given that approximately three-quarters of faculty from underrepresented

racial/ethnic backgrounds work in contingent positions (American Federation of Teachers, 2010).

1.4 Dissertation structure

The dissertation presents each paper as a separate chapter. Thus, Chapter 2 corresponds to the first paper, which focuses on graduate enrollment predictors. Similarly, Chapter 3 represents the second paper, the field experiment involving master's degrees, and Chapter 4 covers the entirety of the third paper, which discusses contingent faculty unionization efforts. Within each chapter there is a corresponding literature review relevant to the topic discussed. The dissertation ends with Chapter 5, which presents overall conclusions and recommendations based on the findings from the three studies.

CHAPTER 2

Back to the books: Graduate enrollment of Great Recession-era bachelor's recipients

2.1 Introduction

In recent decades, enrollment in U.S. graduate education[2] has continued to increase, rising 41 percent between 2000 and 2018 (U.S. Department of Education, 2020a). Such enrollment gains in graduate programs reflect several ongoing trends. First, a growing share of adults in the United States have earned a bachelor's degree. Over the two decades between 1999 and 2019, the proportion of adults age 25 or older with a bachelor's degree increased from 25.2 percent to 36.0 percent (U.S. Department of Education, 2020d). Second, a higher proportion of bachelor's recipients have enrolled in graduate programs over time. For instance, 34 percent of bachelor's recipients from 1992-93 enrolled in a graduate program within 4 years, compared to 39 percent of 2007-08 bachelor's recipients within the same timeframe (Baum & Steele, 2017). The rise in master's degree programs in particular has been quite notable, with two master's degrees now awarded for every five bachelor's degrees (Blagg, 2018), leading to media reports that have somewhat hyperbolically identified master's degrees as "the new bachelor's" (Pappano, 2011). Third, graduate enrollment among international students has generally increased over the last few decades (Okahana & Zhou, 2018), with notable exceptions in recent years.

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[2] This paper primarily uses "graduate education" to refer to programs that require at least a bachelor's degree for entry, such as post-baccalaureate certificates, master's programs, post-master's certificates, first-professional doctoral programs, and research doctoral programs. "Post-bachelor's" programs in this paper refer to programs taken after earning a bachelor's degree, which can include programs at the sub-master's level (e.g., undergraduate/technical certificate, associate's degree, additional bachelor's degree).

Prior research has highlighted associations between graduate enrollment and outcomes across a number of dimensions. In terms of earnings, Valletta (2015) identified a 30 percent wage premium for graduate degree recipients relative to other bachelor's-holders, an advantage that has widened since 1970. Similarly, graduate degree recipients also account for a disproportionate share of high net-worth individuals, comprising more than 40 percent of the wealthiest decile of Americans (Baum & Steele, 2017; Keister, 2014). Such economic advantages often accrue to graduate degree recipients because such credentials serve as common pathways to managerial and executive positions (e.g., Eide, Brewer, & Ehrenberg, 1998). Additionally, by definition, access to graduate education at the doctoral level also shapes the composition of the workforce in certain professions, including law, medicine, and academia (e.g., Weisenberg, 2008). Historically, graduate education has served as a mechanism for social reproduction, with the children of highly educated, affluent parents disproportionately pursuing graduate education themselves and receiving the attendant benefits (Posselt & Grodsky, 2017; Torche, 2011).

In light of the potential social and economic consequences of graduate enrollment, this analysis builds on several prior studies that have sought to identify factors associated with participation in graduate programs using nationally representative data sources. Early work from Mullen, Goyette, and Soares (2003) focused on the role of parental education in shaping students' postgraduate enrollment decisions. Incorporating concepts from both the traditional human capital framework and social/cultural capital, Perna (2004) examined graduate enrollment variation by gender and race/ethnicity. Adapting Perna's conceptual model for college choice to the graduate level, English & Umbach (2016) developed a three-stage model that incorporated demographic characteristics, social and cultural capital, and attributes of the student's

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undergraduate institution. Exploring variation in graduate enrollment by race and undergraduate institution, Tienda & Zhao (2017) called attention to the timing of graduate enrollment.

These prior studies have provided strong contributions to the knowledge base regarding factors associated with graduate school enrollment. One central limitation of such studies, however, involves the age of the data examined. Specifically, the majority of research based on the Baccalaureate and Beyond Longitudinal Study (B&B) focuses on bachelor's recipients from 1992-93 (e.g., Mullen, Goyette, & Soares, 2003; Perna, 2004; McAnulty, 2009; Tienda & Zhao, 2017), with occasional examination of bachelor's recipients from 2000-01 (English & Umbach, 2016). In the intervening years, graduate education has undergone a marked change, both in terms of educational offerings and student body composition. For example, among U.S. residents, White students accounted for 86% of graduate students in 1990, compared to 69% in 2010 (U.S. Department of Education, 2017c). Another dramatic shift over this time has been the rise of for-profit universities, which underwent dramatic growth in the 1990s and 2000s. While for-profits have facilitated access for a wide away of traditionally underserved groups in higher education (Deming, Goldin, & Katz, 2012), a range of studies have found that the returns to undergraduate credentials at for-profits are comparatively modest, especially when considering costs for such for-profit programs relative to public sector alternatives (e.g., Cellini & Chaudhary, 2014; Darolia et al., 2015).

In addition to data limitations based on the age of the data, these prior studies have tended to focus on graduate education at high levels of aggregation. For instance, some studies treated the outcome as any type of postgraduate education (e.g., English and Umbach, 2016), while others have focused on enrollment by credential type (e.g., Perna, 2004). Yet an extensive body of literature has emphasized the significant variation of experiences and outcomes based on

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graduate field of study (e.g., Altonji, Arcidiacono, & Maurel, 2015; Posselt & Grodsky, 2017).

To date, only a limited number of studies have considered variation in graduate enrollment by field, and even those have typically focused on a small number of groupings, such as a master's in education or business (Titus, 2007) or a comparison of "hard" and "soft" fields (McAnulty, 2009).

This study provides three key contributions to the study of factors associated with graduate enrollment. First, this study uses more recent data than prior work in the academic literature, offering an opportunity to identify ways the odds of graduate enrollment may have changed in recent years. Second, to the extent possible, I disaggregate results by field of study (i.e., education, business, health, STEM, social sciences, other field) in an effort to identify potential sources of variation even within a single type of graduate degree. Third, this paper also examines enrollment by the control of the destination institution, thereby generating estimates for the odds of enrolling in for-profit institutions in particular. Throughout the paper, I focus on the odds of enrollment associated with four dimensions of underrepresentation in postgraduate programs: gender, race/ethnicity, parental education, and family income.

To position this work in the context of prior studies on graduate enrollment predictors, this paper begins with a review of relevant literature. I then provide an overview of the Baccalaureate and Beyond Longitudinal Study, which serves as the primary data source for the paper, including the rationale for the outcome variables and control variables. Afterwards, I outline the binomial logistic regression method used for analysis, including the advantages of converting results into odds ratios. I then summarize the results, both in terms of overall program of study as well as the field-specific results for master's and professional degree programs. The

paper concludes with a discussion of some of the potential practical and policy-relevant implications of the findings.

2.2 Literature

2.2.1 Conceptual framework

In contrast to proposed models of undergraduate college choice (e.g., Hossler, Braxton, & Coopersmith, 1989; Perna, 2006), the academic literature includes comparatively few suggested frameworks for graduate school choice (e.g., English & Umbach, 2016; Kallio, 1995; Poock & Love, 2001). One recent effort to develop an integrated approach to graduate school choice has come from English and Umbach (2016). They extended on the earlier work of Perna (2004), who proposed that enrollment decisions involved a modified econometric framework. In addition to the traditional measures of human capital that Becker (1962) outlined (e.g., academic abilities) and other financial resources, Perna (2004) suggested and demonstrated that social and cultural capital measures served as significant predictors of enrollment in graduate programs for recent bachelor's recipients. Following the modified human capital framework demonstrated in Perna (2004) and English and Umbach (2016), this study evaluates graduate school decision-making as a process related to academic and financial resources, social capital, cultural capital, and demographic characteristics.

Traditional econometric theory suggests that individuals assess monetary and nonmonetary costs and benefits when making decisions, ultimately coalescing around actions that maximize their perceived utility (Ehrenberg, 1991). Under such a process, an individual's evaluation of the decision to pursue graduate education might include such elements as increased earnings potential, elevated social status, and expanded occupational prospects. Against such

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benefits, an individual would also weigh the prospect of foregone earnings during their period of graduate enrollment, as well as expenses associated with the graduate program (including any debt incurred). This traditional economic theory suggests that an individual's financial and academic resources may shape their assessment of these relative costs and benefits (Becker,1962). For instance, individuals with higher undergraduate debt burdens may evaluate the prospect of a certain level of graduate debt differently from peers with lower undergraduate debt. Likewise, individuals with disparate undergraduate grade point averages may assess the costs of graduate education differently in light of their current levels of human capital.

Social capital reflects the extent of an individual's social connections and ability to use such connections in a "more or less durable network" to access resources (Bourdieu, 1986). For example, in the context of graduate education, students who attend selective institutions for their bachelor's degree may disproportionately benefit from accumulated knowledge at their institution about elements of successful applications to professional degree programs and research doctorates in particular, along with elevated perceptions of letters of recommendation from their faculty (Grove & Wu, 2007). Students who begin their postsecondary education at community colleges and later complete their bachelor's degree may also miss on formative periods of friend formation at their bachelor's-granting institution, thereby resulting in relatively lower social capital to leverage in their graduate school decision-making process (Perna, 2004).

Cultural capital represents a set of learned behaviors, norms, and dispositions that affect their ability to thrive in a variety of social environments (Bourdieu, 1986). Individuals tend to acquire cultural capital through exposure to specific activities that are imbued with cultural meaning, such as cultural or artistic events (English & Umbach, 2016). Familiarity with particular markers of cultural distinction may portend different outcomes in graduate enrollment,

especially to the extent that some forms of cultural capital (e.g., familiarity with so-called "standard English") are valued more than others (e.g., non-standard vernacular English) in the admissions process. Such personalized experiences are highly dependent on the unique context of each individual's upbringing. Direct measures of such cultural capital are rare, leading prior researchers to rely on a medley of proxies for cultural capital, such as parental education level (e.g., Perna, 2004).

2.2.2 Four dimensions of underrepresentation in graduate education

While graduate education in the U.S. is highly stratified along a wide array of attributes (Posselt & Grodsky, 2017), this study focuses on four dimensions of underrepresentation in graduate education that have received extensive attention: gender, race/ethnicity, parental education, and family income. First, a broad body of research has documented historic differences in graduate enrollment by gender (e.g., American Association for the Advancement of Science, 1992; Perna, 2004). Over time, however, women have increased as a share of graduate students, and as of fall 2016 accounted for the majority of first-time students in master's and doctoral (Okahana & Zhou, 2017). Indeed, since 2002, women have earned a slight majority of all research doctorate degrees in the U.S., but their 51 percent share of research doctorate recipients remains lower than women's share of bachelor's degrees (NSF, 2018). However, greater disparities in enrollment between women and men remain by field, particularly in science and engineering (e.g., Sax, 2001). For instance, as of 2014, women accounted for just 42 percent of all master's and doctoral students in science, engineering, and health fields (NSF, 2016). Such underrepresentation for women in science and engineering is not universal, though, with women's accounting for 57 percent of graduate programs in the field of biological sciences

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(NSF, 2016). In response to such historic underrepresentation of women, selective graduate programs appear to provide a modest preference to women in their admissions decisions (Attiyeh & Attiyeh, 1997).

Differences in graduate enrollment along racial and ethnic lines have also been the focus of a large body of prior literature. Research in this vein has sought to explore potential reasons for the underrepresentation of Black, Latinx, and Native American students at the graduate level, particularly in light of evidence that Black and Latinx students have higher educational aspirations than their White peers (Pascarella, Wolniak, Pierson, & Flowers, 2004). Such disparities are particularly acute at the professional and research doctorate levels. For instance, in 2008, Latinx and Black students accounted for no more than 12 percent of professional and research doctorate recipients, despite representing a combined 27 percent of the population (Aud, Fox, & KewalRamani, 2010). A subset of such literature has focused on the relationship between affirmative action and graduate admissions (e.g., Rothstein & Yoon, 2008), including several studies examining the effects of affirmative action bans (Garces, 2012; Garces, 2013; Garces & Mickey-Pabello, 2015). Other work has focused on the experiences of especially underrepresented subgroups, such as Black women in science and engineering (Patton & Harper, 2003).

In postsecondary education, longstanding evidence indicates that there is underrepresentation of students whose parents completed relatively lower levels of education. First-generation college students, whose parents did not complete college, have emerged as a subgroup of particular interest to policymakers and institutions (Cataldi, Bennett, & Chen, 2018). As an example of the underrepresentation such students experience in graduate education, 18 percent of research doctorate recipients were first-generation college students in 2016, despite

accounting for 33 percent of all postsecondary students (National Science Foundation, 2018; Skomsvold, 2015). Recognizing such underrepresentation, scholars have explored challenges that first-generation students experience once they enroll in graduate education. Such studies have frequently identified aspects of a "hidden curriculum," a system of norms and expectations that are rarely communicated directly and which first-generation college students must uncover without the ability to learn from their parents' experiences in graduate school (e.g., Gardner & Holley, 2011; Lunceford, 2011). Following the introduction of student affairs resources designed to support first-generation undergraduates, some institutions have recently begun offering programming and information designed to assist first-generation students at the graduate level, as well (e.g., Liu, 2017).

The fourth dimension of graduate school underrepresentation that this study examines is the family income background of a student. There is consistent evidence that students from lower-income families enroll in graduate school at lower rates than their higher-income peers. For example, among 2008 bachelor's recipients, 39 percent of graduates from the lowest income quartile enrolled in graduate school, compared to 45 percent of their peers from the highest income quartile (Baum & Steele, 2017). Policymakers have identified such disparities in enrollment by family income background as a domain for intervention. The U.S. Department of Education's Ronald E. McNair Post-baccalaureate Achievement Program is specifically designed to help guide low-income students into graduate programs, along with first-generation college students and members of underrepresented minority groups (Ishiyama & Hopkins, 2003).

2.2.3 Prior research

Several studies regarding the relationship between participation in graduate education and each of the four dimensions of underrepresentation at the center of this study (gender, race/ethnicity, parental education, and family income) rely on data from nationally representative data sources, primarily various iterations of the Baccalaureate and Beyond Longitudinal Study (B&B). Using data from B&B:93/97, Perna (2004) specifically examined the role of gender and race/ethnicity on graduate enrollment, using enrollment at the sub-master's, master's, and professional degree levels as the primary outcome. In the analysis, Perna (2004) found that women had higher odds of enrollment at the sub-master's and master's levels relative to men, but significantly lower odds of enrollment in a professional degree program. For race/ethnicity, Perna's (2004) results indicated higher odds of sub-master's enrollment for Latinx and Asian students; higher odds of master's enrollment for Black, Latinx, and other-race students; and higher odds of professional degree enrollment for all non-White racial/ethnic groups, after controlling for the other factors in the model. For parental education, Perna (2004) found lower odds of master's and professional degree enrollment for students whose parents had a bachelor's degree or below, compared to students whose parents had an advanced degree. Also drawing on B&B:93/97, an analysis from Mullen, Goyette, & Soares (2003) emphasized the potential role of parental education on graduate enrollment. Mullen, Goyette, & Soares (2003) identified a significant relationship between parental education and enrollment in a master's overall, but found no such direct relationship for MBA, professional, or research doctorate programs, net of other factors. Estimates from Mullen, Goyette, & Soares (2003) also showed significantly lower odds of enrolling in an MBA, professional, or research doctorate program for women, after controlling for other measures. In the final major study based on B&B:93/97 discussed here, Zhang (2005) explored the relationship between graduate enrollment and family income and

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first-generation status, among other factors. Zhang's (2005) findings suggested that family

income had a statistically significant positive association with graduate enrollment for recent

bachelor's recipients, though the magnitude was small in practical terms (i.e., 0.37% increase in

likelihood of graduate enrollment per $10,000 increase in family income). Likewise, Zhang

(2005) identified significant but modest relationship between parental education and graduate

enrollment, amounting to a 2.8% lower likelihood of graduate enrollment for first-generation

college students, net of other variables.

Focusing on graduate enrollment within 1 year of a bachelor's degree using the

B&B:2000/01 dataset, English and Umbach (2016) focused on any type of graduate enrollment

(regardless of level) as their primary outcome. Using such an approach, English and Umbach

(2016) found elevated odds of enrollment for Black students (relative to White students) and

students whose parents had a bachelor's or master's degree (relative to high school education or

less), but no significant differences in enrollment odds for women, students from other

racial/ethnic groups, or dependent students of various family income backgrounds.

In addition to research based on B&B, additional evidence comes from other nationally

representative studies, as well as purposeful or convenience samples of particular institutions or

fields. Combining data from the National Longitudinal Study of 1972 and the High School and

Beyond's 1980 and 1982 cohorts, Ekstrom (1991) considered all four dimensions of

underrepresentation emphasized in this study. One caveat for Ekstrom's (1991) work is that the

outcome used was application to a graduate program, rather than the graduate enrollment

measure of interest in the current study. Across the three examined studies, Ekstrom (1991)

found consistently higher odds of application for men, mixed results for White students

(significantly positive in the earliest study), mixed results by parental education (significantly

positive in the latter two studies), and no significance in terms of family income, after controlling for other factors in the model. Using data from the longitudinal Cooperative Institutional Research Program, Ethington and Smart (1986) examined graduate enrollment behaviors of students 9 years after they entered college in fall 1971. Similar to English and Umbach's (2016) work, the overall outcome in Ethington and Smart (1986) was enrollment in any type of graduate program. Ethington and Smart (1986) did not find family education level or family income to have a significant relationship with graduate enrollment directly, but they argue that such family background variables operated indirectly (e.g., through choice of undergraduate institution) to shape decisions regarding graduate school enrollment.

Taken together, this prior research reveals several primary findings regarding underrepresentation and graduate school enrollment. First, in terms of gender, prior research that has explored variation by degree type has indicated higher odds of enrollment for women at sub-master's and master's levels, but higher odds for men at the professional or research doctorate levels (Mullen, Goyette, & Soares; Perna, 2004). Results for racial/ethnic groups have tended to show elevated graduate enrollment odds for students from some underrepresented backgrounds, after controlling for other attributes, although some evidence indicates that the pattern varies by degree type (English & Umbach, 2016; Perna, 2004). For parental education, past findings have been generally mixed, with occasional significance related to graduate school enrollment overall or at the master's level in particular (Ekstrom, 1991; Ethington & Smart, 1986; Mullen, Goyette, & Soares, 2003; Perna, 2004). Across prior studies, family income has not been a strong predictor of graduate enrollment behavior, although several authors have outlined indirect mechanisms, such as standardized test scores, through which family income may affect such

decisions and opportunities (Ekstrom, 1991; English & Umbach, 2016; Ethington & Smart, 1986; Zhang, 2005).

2.3 Data

This study relies on restricted-use data from the 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12), which surveyed a nationally representative sample of about 14,600 bachelor's degree recipients from the 2007-08 academic year (Cominole, Shepherd, & Siegel, 2015). In their base interview and during follow-up interviews 1 and 4 years after their bachelor's degree, survey respondents received a series of questions about enrollment in postsecondary degree and certificate programs after their bachelor's degree. For the first research question, outcome variables for this study include binary indicators for whether a particular credential type (i.e., any graduate degree/certificate, master's degree, professional doctoral degree, research doctorate degree) was the student's highest level of enrollment as of 2012. For the second research question, outcome measures include binary indicators based on field-degree combinations (i.e., master's in education, business, health, STEM, social science, or other field; professional degree in law vs. medicine). Drawing from earlier conceptualizations of graduate enrollment predictors (e.g., Perna, 2004; English & Umbach, 2016), this study will examine three sets of potential predictors: demographic (e.g., gender, race/ethnicity, age), cultural and social capital (e.g., parental education, family income, immigrant status) and characteristics of the student's undergraduate experience (e.g., Carnegie classification, sector, major).

The analytic sample restricts the overall B&B:08/12 sample in several ways. First, I restrict the sample to respondents who completed all three rounds of interviews and the transcript data collection (e.g., major, undergraduate GPA), since the variables of interest include measures

found throughout these components of the survey. Given this data availability requirement, this study applies transcript weights (i.e., WTF000) to analyses (Cominole, Shepherd, & Siegel, 2015). Additionally, I focus on first-time bachelor's recipients, rather than students who earned a second bachelor's degree (e.g., to facilitate a career change). Therefore, I exclude students who had received a bachelor's degree prior to 2007-08. Finally, I exclude bachelor's degree recipients who were not U.S. citizens or residents at the time of their bachelor's degree attainment. The resulting sample includes 12,410 bachelor's degree recipients from the 2007-08 academic year.[3]

2.3.1 Dependent variables

This study examines four sets of dependent variables, all measured as binary indicators. In each case, individuals are represented with a value of one if their highest post-bachelor's program was the one listed and a zero otherwise. The first set of outcomes relate to the highest post-bachelor's program in which a student had enrolled as of the 2012 survey, which was conducted 4 years after the student earned a bachelor's degree in 2007-08. After initial classification as either having no post-bachelor's enrollment or any post-bachelor's enrollment, bachelor's recipients were classified as having either a highest enrollment at the sub-master's (i.e., undergraduate or technical certificate, associate's, or additional bachelor's level), master's level, professional doctoral level (i.e., law, health professions, or theology), or research doctorate level.[4] A second set of outcomes included whether a student's highest enrollment was for a

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[3] Due to the sampling restrictions (e.g., the emphasis on respondents who completed all three rounds of interviews and the transcript data collection), this analytic sample may differ meaningfully from the B&B:08/12 sample as a whole. For example, sample members who responded in all three rounds of interviews likely had a higher inclination to complete surveys and may have had more consistent contact information than counterparts who did not respond in all three rounds. For additional details on efforts to locate B&B sample members and improve response rates, see Cominole, Shepherd, & Siegel (2015).
[4] Due to their limited frequency, I did not construct unique outcome measures for post-baccalaureate certificate programs, post-master's certificate programs, and unspecified "other" doctoral programs.

master's degree in each of the five most common master's fields or field groupings: education;

business; health; science, technology, engineering, and mathematics (STEM);[5] or the social

sciences.[6] The third set of outcomes distinguished whether a bachelor's recipient's highest

postgraduate enrollment was in a professional degree in law or a professional degree in health

professions (e.g., medicine, dentistry, podiatry, veterinary medicine). Finally, in light of the

dramatic expansion of for-profit education in recent decades (U.S. Department of Education,

2020e), the last group of outcomes indicated whether each bachelor's recipient enrolled in a for-

profit institution for their highest postgraduate enrollment, both overall and by degree level.

2.3.2 Independent variables

Demographic covariates included three measures. For gender, all individuals were

classified as a man or a woman in B&B:08/12, and men are the omitted reference group for

analyses. Based on each bachelor's recipient's self-identification, B&B used a hierarchy to

classify each student in a unique race/ethnicity category, with all students of Hispanic ethnicity

(which hereafter I refer to using Latinx terminology) identified by their ethnicity rather than a

racial group. The final race/ethnicity categories for this analysis include White, Black, Latinx,

and Asian; estimates for Native American and bi-/multi-racial students are unreliable due to

small sample sizes. Three age group categories distinguish between individuals who were less

than 24 years old midway through the 2007-08 academic year, 24-29 at that time, or over 30.

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[5] STEM fields included 2-digit Classification of Instructional Programs (CIP) codes for agriculture and related sciences, natural resources and conservation, computer and information sciences, engineering, engineering technologies/technicians, biological and biomedical sciences, mathematics and statistics, physical sciences, and science technologies/technicians.
[6] Social science fields included 2-digit CIP codes for area, ethnic, and gender studies; family, consumer, and human sciences; psychology; anthropology; criminology; economics; geography; international relations and affairs; political science and government; sociology; and social sciences, other.

Traditional human capital measures identified several types of academic and financial resources (or constraints). As one broad representation of academic performance, I include the bachelor's recipient's undergraduate grade point average quartile among all bachelor's recipients. The undergraduate major, drawn from transcript data, is an indicator of earnings potential (e.g., Monaghan & Jang, 2017), typicality of graduate enrollment (e.g., Zhang, 2005), and can contextualize the grade point average. I also include a student's college admissions test score (converted to the SAT scale) as a rough proxy of academic performance, particularly on standardized tests often required for admission to graduate programs, although it worth noting that a rising number of undergraduate and graduate programs have shifted to test-optional admissions (Bennett, 2021; Langin, 2019). The number of hours a student spent on schoolwork in the final year of the bachelor's degree program, expressed in quartiles, may be viewed as a measure of the time investment a particular student made in their education, as well as a rough proxy for the volume of academic knowledge accumulated. The amount of undergraduate federal loans a student borrowed includes five categories, $0 as the reference and quartiles among students who borrowed. The measure of undergraduate loans represents one type of financial obligation that might affect a student's decision about enrollment in additional education, as prior research has often demonstrated (Baker, 2016; Malcolm & Dowd, 2012; Millett, 2003; Zhang, 2013), though occasional work has found otherwise (e.g., Chen & Bahr, 2020). Finally, a student's marital status in 2007-08 could have financial implications, though it may operate in either a direction that promotes (higher household income because of partner's earnings) or inhibits (less flexibility to move for school) graduate enrollment.

Another set of variables attempts to capture elements of cultural capital. Consistent with Perna (2004), one of the main proxies of cultural capital in this study is the highest level of

education achieved by any parent or guardian. I distinguish between five categories: high school or below (or unknown), some college (which includes any postsecondary enrollment that did not result in a bachelor's degree), bachelor's degree, master's degree, or professional/doctoral degree. Family income, expressed in quartiles among bachelor's recipients, is another indicator of family resources and opportunities that may have helped shape an individual's tastes and preferences (Kalil & Ryan, 2020). As another gauge of factors that may have shaped the bachelor's recipient's cultural resources, I also use a binary indicator of whether English was the first language they learned to speak (Malik & Mohamed, 2014). Finally, the student's immigrant generation status (first-generation immigrant, second-generation immigrant, or third-generation or higher) serves as another possible influence on one's cultural capital (e.g., Perreira, Harris, & Lee, 2006).

The final group of variables reflect an individual's relative social capital. The type of high school attended (public, private, or international) is included to represent one mechanism through which social connections were forged prior to college (Teachman, Paasch, & Carver, 1997). The social capital variables also include whether an individual began their undergraduate education at a community college, since such students likely spent less time at their bachelor's-granting institution and therefore had a smaller window in which to develop connections to fellow students, faculty, and administrators at that institution. Another measure related to social capital includes the response to the survey question about whether the student expected assistance repaying any loans from anyone else (e.g., friends, family). Recipients of such assistance may also benefit from access to funding in other aspects of their life through their social relationships in a way that may not be true for students who expect to repay their loans entirely on their own. This study also includes several variables related to the bachelor's-granting

institution itself. Among these institution variables is whether the student received a degree from an institution in their home state, since a degree earned outside their home state may reflect a broadened social network. The control (public, private, for-profit), selectivity, and Carnegie classification of the bachelor's-granting institution are also informative about social capital because they suggest the reputational benefits an individual may have accrued by virtue of earning the degree, along with being informative about the demographic composition of the student body with whom they had a chance to interact while in college. Indeed, prior research has shown variation in graduate enrollment rates by various attributes of a student's bachelor's-granting institution (e.g., Eide, Brewer, & Ehrenberg, 1998; Perna, 2004; Schapiro, O'Malley, & Litten, 1991).

Using a model that accounts for these demographic factors, academic and financial resources, cultural capital, and social capital, this study seeks to address three primary research questions based on data from B&B:08/12:

1) How did the odds of enrolling in graduate education programs vary by four dimensions of historic underrepresentation in graduate education (gender, race/ethnicity, parental education, and family income status)?

2) Within master's and professional degree programs, in what ways did the odds of enrollment vary by field?

3) Were there differential odds of enrolling in graduate education programs at for-profit institutions in particular?

2.4 Sample overview

As an indication of broad trends in graduate enrollment among recent bachelor's recipients, Table 2.1 provides the highest post-baccalaureate enrollment for students in the 1992-93, 1999-2000, and 2007-08 cohorts of B&B. The first three columns of numbers represent the 1-year follow-up for each B&B cohort, followed by the 4-year and 10-year follow-ups, when available. The overall proportion of bachelor's recipients who continued any postsecondary enrollment within 1 year of their degree has increased with each successive wave, from 21.8 percent in B&B:93/94 to 30.2 percent in B&B:08/09. The difference at the 4-year mark was less pronounced between the two waves, with 40.0 percent post-bachelor's enrollment in B&B:93/97 and 44.1 percent in B&B:08/12. As shown in Table 2.1, however, the highest post-bachelor's enrollment for a relatively large proportion (8.6 percent) of the bachelor's recipients in B&B:93/97 was at the sub-master's level (i.e., an undergraduate or technical certificate, associate's degree, or additional bachelor's degree). Looking specifically at post-baccalaureate enrollment above the bachelor's level, the B&B:08/12 graduates enrolled in programs above the bachelor's degree level at a rate 7.3 percentage points higher than their counterparts from B&B:93/97 (38.7 percent versus 31.4 percent, respectively). Table 2.1 also demonstrates that master's degrees and professional degrees accounted for the vast majority of enrollment above the bachelor's level (e.g., 84% of such students from B&B:08/12).

To provide context for the variation in post-bachelor's enrollment by degree program, Table 2.2 includes descriptive characteristics of all students in the analytic sample, students who had no postgraduate enrollment, as well as various categories of postgraduate enrollment.[7] Several differences are evidence between the bachelor's recipients who did not enroll in

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[7] For all comparisons of descriptive statistics, χ^2 and *t*-tests are available upon request.

postgraduate study and those who did. For instance, compared to students who did not enroll in postgraduate study within 4 years, a higher share of postgraduate enrollees were women, a lower share were first-generation college students, and a higher share attended institutions that were very selective or had a Research I Carnegie classification. Students who enrolled in postgraduate programs also had higher undergraduate grade point averages and standardized test scores than their peers who did not enroll again within 4 years of their bachelor's degree. Among students who enrolled in postgraduate programs, there was still further variation in attributes by graduate program type, as shown in the rightmost four columns of Table 2.2. Along a variety of dimensions, students with sub-master's and master's enrollments differed from students with professional or research doctorate enrollment. For example, a higher share of students in sub-master's and master's programs were women (65 percent and 64 percent, respectively) than were students in professional and research doctorate programs (51 percent and 49 percent, respectively). Asian students accounted for a higher share of professional students (12 percent) than sub-master's, master's, and research doctorate students (5 percent, 4 percent, and 5 percent, respectively). Compared to professional and research doctorate students, students in sub-master's and master's programs also tended to be older, more commonly had parents without a bachelor's degree, had lower undergraduate GPAs and standardized test scores, more often started at community colleges, had lower family income percentiles, and borrowed a greater amount in federal loans for their undergraduate education.

Just as the composition of students across different postgraduate degree programs differed on observable dimensions, so too did the characteristics of students who enrolled in master's degrees in various fields. Table 2.3 provides descriptive statistics for students who enrolled in any master's degree program, along with breakouts for the most common fields for

master's programs among the analytic sample: education; health; business; science, technology, engineering, and mathematics (STEM); and social science. Based on this summary, variation along dimensions of gender and race/ethnicity is evident in master's degree enrollment by field. In particular, in the B&B:08/12 sample, women accounted for the vast majority of master's students in education, health, and the social sciences (77 percent, 83 percent, and 70 percent, respectively), while just 37 percent of STEM master's students were women. In terms of race/ethnicity, the share of White students was higher in STEM master's programs (80 percent) and education master's programs (77 percent) than overall (71 percent), while Black students accounted for a higher-than-average share of master's students in business (18 percent versus 12 percent overall) and Latinx students accounted for a higher-than-average share of master's students in social sciences (15 percent vs. 9 percent overall). Among other noteworthy differences, master's students in education less commonly attended Research I or Research II institutions for their bachelor's degree (28 percent) than did master's students overall (39 percent). Students in STEM master's programs were somewhat younger than master's students as a whole, worked a greater number of hours on schoolwork in their senior year, had higher standardized test scores, and more commonly attended a very selective institution for their bachelor's degree. Finally, social science master's students tended to be somewhat younger than master's students overall, had an above-average amount of time spent on schoolwork in their senior year, more commonly graduated from a public bachelor's institution (70% versus 63%), and had a lower family income than did other master's students (49th percentile versus 56th percentile).

2.5 Methods

This study uses a binomial logistic regression model to examine the relationship between the predictor variables and each binary educational outcome measure (e.g., whether a student's highest enrollment by 2012 was a sub-master's degree, a master's degree, a professional doctoral degree, or a research doctorate).[8] The following summarizes the primary binary logistic regression model:

$$logit(Y_i) = \beta_0 + \beta_1 \chi_i + \beta_2 \theta_i + \beta_3 \gamma_i + \beta_4 \phi_i + \epsilon_i$$

where Y_i is a binary indicator of whether individual i had a particular outcome (e.g., highest enrollment was in a master's program) by 2012. The model also includes four vectors of covariates. Specifically, χ_i represents a vector of demographic characteristics (gender, race/ethnicity, age), θ_i represents academic and financial resources (undergraduate major, undergraduate GPA, undergraduate loans, hours spent on senior-year schoolwork, and senior-year marital status), γ_i identifies proxies for cultural capital (parental education, family income in 2006, native English-speaking status, and immigrant generation status), and ϕ_i represents proxies for social capital (high school type; whether the student initially attended a community college; Carnegie classification, control, selectivity, and location of bachelor's-granting institution; and whether the student expects assistance repaying loans).

To facilitate interpretation, I transform the results to odds ratios by exponentiating the log odds results from the logit models (i.e., e^{β}). In the case of the binary dependent variables examined in this study, the odds ratios represent the change in the odds of enrolling in a specific graduate program (e.g., master's degree) that are associated with a one-unit change in a predictor

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[8] To supplement the binomial logistic regression analyses, I originally intended to add multinomial logistic regression analyses. Due to the COVID-19 pandemic, however, I was unable to supplement these analyses with multinomial logistic regression analyses using the restricted-use data.

variable (e.g., undergraduate GPA), controlling for other attributes included in the model. An

odds ratio of 1 represents parity (i.e., no change in the odds of enrollment associated with the

predictor variable), while odds ratios higher (or lower) than 1 by a statistically significant

amount would represent factors associated with higher (or lower) odds of enrollment.[9] The

majority of the variables included in this model have no missing data among the analytic sample;

for variables with missingness, I will assign all cases with missing values to a unique category to

ensure their inclusion in the model.

Odds reflect the probability an event occurs divided by the probability that the event does

not occur: $\frac{\Pr(X)}{1-\Pr(X)}$. For instance, an event with a 75 percent probability of occurring would have

odds of 3.000 (i.e., 75%/25%). Consequently, odds ratios are informative about the comparative

odds for two different scenarios, but do not directly convey the likelihood than an event would

occur. For example, an odds ratio of 2.500 could reflect either a set of relatively common events

(e.g., odds of 5.000 divided by odds of 2.000) or a set of relatively uncommon events (e.g., odds

of 0.075 divided by odds of 0.030). As a result, odds ratios can be informative about a variety of

graduate enrollment behaviors, from somewhat common activities such as master's enrollment to

less common activities such as research doctorate enrollment.

2.6 Results

Tables 4-8 present results based on the binomial logistic regression models, with the four

historic dimensions of underrepresentation (gender, race/ethnicity, parental education, family

income) shown at the top of the tables. For categorical variables, the excluded reference category

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[9] Due to the large number of comparisons made in this paper, I use a more stringent standard of $p < .01$
(rather than $p < .05$) to identify statistically significant differences.

represents the most common classification among the analytic sample (e.g., White students). In the case of variables broken into quartiles, the reference category is the quartile that is most likely to provide advantages in the graduate application process (e.g., highest GPA quartile). In each table, an odds ratio of 1.000 would indicate that the odds of the outcome are equivalent for the group described in the row (e.g., Black students) and the reference group (e.g., White students), after controlling for all other measures in the model. Odds ratios significantly above 1.000 reflect higher odds for the row group than the reference group, while odds ratios significantly below 1.000 reflect lower odds for the row group.

2.6.1 Degree type

The results in Table 2.4 illustrate the variation in the relationship between various attributes and the odds of enrolling in different types of degree programs following attainment of a bachelor's degree. Gender was a salient characteristic across all degree programs, with women having higher odds of enrolling in a sub-master's or master's program (odds ratios of 1.422 and 1.228, respectively) and lower odds of enrolling in a professional or research doctorate program (odds ratios of 0.655 and 0.716, respectively), even after controlling for other factors in the model. Black students had higher odds of enrollment at the master's and professional degree level (odds ratios of 1.706 and 1.958, respectively), while Asian students had higher odds of professional degree enrollment (odds ratio of 1.749), relative to otherwise observationally similar White students. In terms of parental education, students whose parents earned a professional or research doctorate had higher odds of professional degree enrollment themselves (odds ratio of 1.632), relative to students whose parents had bachelor's degrees but were equivalent on other measured dimensions. Family income prior to graduation was a significant predictor of lower

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odds of enrollment in master's degree programs for the lowest income quartile, but this analysis did not detect any significant differences in enrollment by income for sub-master's, professional, or research doctorate programs.

In addition to the four primary categories of interest in this analysis, Table 2.4 depicts significant roles for several other attributes. Students who earned a bachelor's after age 24 had decreased odds of professional degree enrollment relative to their younger counterparts, though enrollment in other types of degrees did not vary by age at a statistically significant level. Students who began their undergraduate careers at community colleges had lower odds of entering a professional degree program (odds ratio 0.696), even after controlling for other factors. In terms of undergraduate GPA, the logistic regression results indicate that students in the bottom two GPA quartiles generally had lower odds of entering graduate-level programs, though students in the lowest GPA quartile had elevated odds of entering sub-master's programs. Several characteristics of a student's bachelor's-granting institution were also associated with significant differences in odds of post-bachelor's enrollment. For instance, students who attended a for-profit bachelor's institution had lower odds of enrolling in a master's program than students who attended a public institution (odds ratio of 0.634), even after controlling for other elements of the model. Finally, students who attended a Research I or Research II institution had higher odds of enrolling in a professional degree program (odds ratios of 1.669 and 1.477, respectively) than their peers who graduated from an institution with a master's-granting Carnegie classification.

2.6.2 Comparison between B&B:93/97 and B&B:08/12 samples, by gender and race/ethnicity

Given the prominence of the B&B:93 cohort on prior research into graduate enrollment predictors, a comparison between Perna (2004) and the present study is instructive. Based on the overlap in attributes examined in the two studies, such a comparison focuses on odds of enrolling in sub-master's, master's, or professional degree programs by gender and race/ethnicity. Since log odds follow a standard normal distribution with a mean of 0 and a standard deviation of 1 (i.e., a z-distribution), a two-sample z-test can determine whether the results of two independent samples are statistically significant (Hailpern & Visintainer, 2003). Table 2.5 provides the results of such a comparison, with several significant results. For the B&B:08/12 students, women's odds of enrolling in a professional degree program were marginally higher than their odds had been in B&B:93/97. Despite such progress, women continued to have lower odds of enrolling in professional degree programs than men within 4 years of their bachelor's (odds ratio of 0.655), as shown in Table 2.4. At the sub-master's level, the odds of enrolling in a sub-master's program for Asian students were significantly lower in B&B:08/12 than B&B:93/97. Finally, Table 2.5 also reveals that the odds of enrolling in a professional degree program were lower for Latinx students in the current study than in Perna's (2004) work, after controlling for all other factors in the model. Thus, even though the current study did not identify significantly different odds of enrolling in a professional degree program for White and Latinx students (see Table 2.4), the odds represent a relative decline when compared to Latinx bachelor's recipients from 15 years earlier.

2.6.3 Master's degree by field

Table 2.6 focuses on potential areas of variation within master's degree enrollment predictors based on the field of enrollment. Among the fields of master's enrollment examined,

most showed variation in enrollment odds by at least one of the four primary types of underrepresentation examined in this study (gender, race/ethnicity, parental education, family income). In terms of gender, women had higher odds of enrollment in education and health master's programs (odds ratios of 1.605 and 2.340, respectively). Several findings also emerge for differences in master's enrollment by race/ethnicity, even after controlling for all other factors in the model. Compared to White students, Black students had higher odds of enrolling in master's programs in business and health (odds ratios of 2.117 and 1.808, respectively), and Latinx students had higher odds of enrolling in social science master's programs (odds ratio of 2.056). This analysis did not identify any statistically significant differences in field-specific master's enrollment by parental education status or family income background.

Field-specific master's enrollment also differed by other attributes beyond the four historic dimensions of underrepresentation. For instance, in several cases, a student's immigrant generation status was associated with master's enrollment, with second-generation immigrants having higher odds of enrolling in education and health master's programs (odds ratios of 1.453 and 1.496, respectively). Some evidence suggests that students in the bottom quartile of schoolwork hours had higher odds of enrollment in education master's programs (odds ratio of 1.386), compared to students in the top quartile. In contrast, for STEM master's programs, odds of enrollment were significantly lower for students in the bottom three quartiles of schoolwork (odds ratios of 0.532, 0.673, and 0.497, respectively) than for students in the top quartile, controlling for other factors. Notably, few characteristics of the student's bachelor's-granting institution were associated with differential odds of enrollment in a master's program by field. Graduation from a Research II institution had a positive association with odds of enrolling in a master's in business program (odds ratio of 1.492).

2.6.4 Professional degrees by field

   Table 2.7 presents the odds ratios for professional degree enrollment among 2007-08

bachelor's degree recipients within 4 years of graduation, with separate estimates for law and

health professions (e.g., medicine, dentistry, veterinary medicine).[10] Similar patterns emerged for

both law and health professions degrees on several of the key predictor variables. These

estimates indicate that women had lower odds of enrolling in law and health professions degrees

than men (odds ratios of 0.463 and 0.806, respectively), even after controlling for other variables

in the model, with findings for health professions more tentative. In terms of race/ethnicity,

Black students had higher odds of enrollment in both law and health professions degrees relative

to White students (odds ratios of 1.903 and 1.938, respectively) net of other variables, although

only the findings for health professions was significant at the .01 level. Parental education also

emerged as a significant predictor of professional degree enrollment, with children of doctorate-

holding parents having elevated odds of enrollment in law and health professions degree

programs (odds ratios of 1.619 and 1.643, respectively) relative to similarly situated counterparts

with parents who had a bachelor's degree as their highest credential. Despite a number of broad

similarities between predictors of enrollment in law and health professions, these regression

results suggest several dimensions along which enrollment patterns varied between the two types

of professional programs. First, relative to White students, Asian students had higher odds of

enrollment for health professions degrees (odds ratio of 1.865) but not law degrees, even after

controlling for all other variables included in the analysis. For law degrees, the odds of

enrollment were significantly lower for students from the second income quartile (odds ratio of

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[10] It was not feasible to provide estimates for theology, the only professional degree outside of law and
health professions, due to the limited number of respondents who pursued a degree in theology.

0.553) than their peers in the top income quartile, while this study did not detect significant

differences in enrollment odds for health professions programs by family income quartile.

In addition to the relationships between enrollment and the four dimensions of emphasis,

several other relationships merit attention. Students who received a bachelor's degree at age 30

or older had lower odds of enrolling in law and health professions degrees than similarly situated

graduates who were under age 24 (odds ratios of 0.261 and 0.219, respectively). Consistent with

admissions requirements for professional degree programs, students with an undergraduate GPA

in the lowest quartile had decreased odds of enrollment in such programs relative to students in

the highest quartile. The Carnegie classification of a student's bachelor's-granting institution was

also associated with the odds of professional degree enrollment. Specifically, for both law and

health professions programs, having graduated from a Research I (i.e., very high research)

undergraduate institution was linked to elevated odds of law and health professions program

enrollment (odds ratios of 2.643 and 1.358, respectively), although the finding was marginal for

health professions programs. Enrollment odds also varied between the two programs on two

financial metrics. Compared to students who did not take out federal loans for their

undergraduate education, students in the two highest quartiles of federal loan borrowing had

lower odds of enrolling in a health professions program (odds ratios of 0.693 and 0.615,

respectively) but not of enrolling in a law program, even after accounting for all other measures

in the study.

2.6.5 Destination institution type

As a final exploration of variation in post-bachelor's enrollment, Table 2.8 focuses

specifically on enrollment at a for-profit institution. This analysis can help illuminate which

characteristics are associated with for-profit enrollment, which may be very consequential if the returns to a graduate degree from a for-profit institution differ from those at public and not-for-profit institutions, as has been shown at the undergraduate level (e.g., Cellini & Chaudhary, 2014; Deming et al., 2016). Overall, Table 2.8 indicates that students with elevated odds of enrolling in a for-profit post-bachelor's program include women (odds ratio of 1.627, marginally significant), Black students (odds ratio of 2.595), and other-race students (odds ratio of 2.940). The increased odds for Black students' enrollment in for-profit institutions was especially high at the master's level (odds ratio of 2.888) and the research doctorate level (odds ratio of 32.894), although research doctorate results should be interpreted with caution in light of the low sample size (i.e., only 90 students had enrolled in a for-profit institution for a research doctorate).

Beyond findings related to the four dimensions of underrepresentation, several other notable findings emerged. Students with slower odds of enrolling in sub-master's programs at for-profit institutions included students in the second quartile of hours spent on schoolwork (odds ratio of 0.308 relative to the highest quartile), while those with higher odds included those who attended a for-profit undergraduate institution (odds ratio of 7.477). Additionally, older students had much higher odds of enrolling in a for-profit professional degree program (odds ratio of 11.914), even after controlling for all other factors in the model.

2.7 Discussion

This study updates a substantial body of literature on determinants of graduate school enrollment, the vast majority of which is rooted in the experiences of bachelor's recipients from 1992-93 or earlier (e.g., Ekstrom, 1991; Mullen, Goyette, & Soares, 2003; Perna, 2004). Several broad findings emerged from the current work, which emphasized four key attributes that

represent historic areas of underrepresentation among graduate students: gender, race/ethnicity, parental education, and family income background. Consistent with prior work (Mullen, Goyette, & Soares, 2003; Perna, 2004), the relationship between gender and graduate enrollment varied by program type, with women more likely to enroll in sub-master's and master's programs and men more likely to enroll in professional and research doctorate programs, even after accounting for an array of other demographic, academic, financial, and social and cultural capital attributes. Despite still having lower odds of professional degree enrollment than men, however, women's odds of enrolling in professional degree programs were marginally higher in B&B:08/12 than in B&B:93/97, as shown in Table 2.5. This finding suggests that while women are still not equally represented in professional degree programs as men, they are increasingly enrolling in these programs over time—important progress on the path to gender equality in professional degree enrollment.

Several additional findings emerged from the investigation of enrollment by race/ethnicity. After controlling for the suite of attributes in this study, for example, Black students had higher odds of overall graduate enrollment compared to White students, apparently driven by elevated odds of master's and professional degree enrollment. These elevated odds would be consistent with several possible explanations, including a motivation to obtain higher credentials as a buffer against likely labor market discrimination or a preference for career paths in which such credentials are valued or required. Although Asian students had similar odds of any graduate enrollment to White students, the overall value masked notable variation by program, since Asian students had lower odds of entering a master's or research doctorate program than White students (at marginally significant levels) but higher odds of entering a professional degree program. As with the findings for Black students, such varying graduate

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enrollment rates may in part reflect the career paths Asian students pursue after controlling for the various measures in the model, among other explanations. As prior research has noted (e.g., Hurtado et al., 1997; Perna, 2004), however, it is important to contextualize these findings by emphasizing that the resources and background characteristics included in the model are not evenly distributed across racial/ethnic groups. As a result, while these findings represent enrollment odds for individuals who are similarly situated on the measures included in the analysis (apart from race/ethnicity), they do not represent the observed enrollment patterns.

In terms of parental education, the main results suggest that students whose parents had earned a graduate degree were themselves more likely to enroll in graduate school, especially for the offspring of professional and research doctorate recipients. If maintained, this relationship would continue to magnify stratification and inequality based on educational attainment. Several explanations may account for such a pattern, including improved awareness of the "hidden curriculum" for college and the graduate school application process for the children of graduate-educated parents (Calarco, 2020). Having a parent who can provide insight into the "hidden curriculum" of graduate school may be particularly beneficial in highly competitive fields with distinctive cultures, such as law school and Ph.D. programs. Especially when coupled with other privileges that accompany having a parent with such degrees (e.g., higher incomes, on average), access to specialized knowledge about the desired qualifications for these programs can help the children of graduate degree recipients stand out in the graduate application process (e.g., by taking an unpaid internship at a law firm), further solidifying their educational and class advantages. Such findings related to parental education offer additional insight for a measure that has previously found inconsistent results across studies (Ethington & Smart, 1986; Ekstrom, 1991; Mullen, Goyette, & Soares, 2003). Fourth, in line with previous findings (e.g., Ethington

& Smart, 1986; English & Umbach, 2016), this study found no overall differences in enrollment rates by income quartile after controlling for all other measures. Thus, despite the overall correlation between parental education level and family income background, the two factors exhibit a distinct relationship with a student's likelihood of graduate enrollment.

In addition to measures of graduate enrollment overall and by degree type, which have been the outcomes of interest in prior studies, this analysis also examined several outcomes that prior studies have seldom, if ever, examined: master's enrollment within five primary fields, professional degree enrollment within two fields, and graduate enrollment at for-profit institutions. These additional analyses illustrate the underlying variation within different types of degree programs. At the master's level (Table 2.6), field-specific analyses revealed several distinct patterns. Women generally had higher odds of master's enrollment than men, primarily driven by elevated odds of enrollment in education and health master's programs, with more tentative evidence for social science master's programs. Relative to White students, Black students had higher odds of master's enrollment, primarily owing to higher odds of enrollment in business and health master's programs. While Latinx students overall did not have meaningfully different odds of master's enrollment than White students, they did have higher odds of enrollment in a social science master's program. For parental education and family income, few field-specific results departed substantially from the overall odds for master's enrollment. When turning to professional degree enrollment (Table 2.7), however, the influence of family income differed notably between law programs and health professions programs. Specifically, students from lower income quartiles had diminished odds of enrolling for law programs. In contrast, the analyses identified no differences in health professions enrollment by family income background. Such distinctions illustrate the value in separately examining law and health

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professions programs, rather than solely looking at enrollment for all professional degrees combined. Finally, when looking at for-profit enrollment (Table 2.8), this study identified that women and Black students had elevated odds of enrolling in for-profit institutions for their post-bachelor's program after controlling for other contextual factors. In this case, such findings mirror the observed enrollment patterns of the for-profit sector.

For a number of factors, underrepresented students actually have higher odds of a particular type of graduate enrollment than students from an overrepresented reference group. Such is the case with Black students, whose odds of professional degree enrollment are substantially higher than similarly situated White peers. This type of finding emphasizes that the differential enrollment patterns are not purely a result of self-selection, but instead can also be tied to the uneven distribution of attributes (e.g., family income background and parental education) across various populations of interest. Especially in the case of degree programs that serve as entry points to occupations with significant social ramifications, identifying and addressing such obstacles is critical.

Beyond the findings related to overall post-bachelor's enrollment and enrollment by program type, the field- and control-specific results also inspire questions that merit further investigation. For instance, at the professional degree level, this study finds lower odds for women's enrollment in law programs. Such estimates imply that women systematically choose different paths from men in terms of whether to enroll in law school, above and beyond the influence of any other measured factor. Efforts to increase representation of women in the legal profession are therefore likely to require methods of shifting preferences, a process that is likely to require substantial effort occurring well in advance of a student's college graduation. Lastly, the results of the for-profit analysis suggest that the students most likely to pursue graduate

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enrollment at a for-profit institution are some historically underrepresented students, including women and Black students, along with students with relatively low undergraduate grade point averages. Additional research on the effects of for-profit graduate enrollment on labor market outcomes is necessary to better gauge the level of concern such patterns should warrant.

2.7.1 Limitations

It is important to be mindful of several limitations for this study. First, the data focus exclusively on U.S. citizens and permanent residents who earned their first bachelor's degree in the 2007-08 academic year. As a result, the analyses apply to a particular group of students, nearly all of whom graduated into the Great Recession. Consequently, some of the enrollment patterns may be unique to decisions that bachelor's recipients make during recessions, when they are known to experience sustained earnings declines (Oreopoulos, Von Wachter, & Heisz, 2012) and when men in particular may enroll at differential rates (Bedard & Herman, 2008). The study is also not designed to address the enrollment behaviors of international students, who comprise a prominent share of graduate school students. Second, based on the data available in B&B:08/12, this study provides extensive information about correlations between attributes and enrollment behaviors, but the findings do not isolate causal effects. Findings from this study therefore are primarily efforts to highlight relationships that may be worthy of additional study. Third, as others have expressed (e.g., Perna, 2004; English & Umbach, 2016), there are limited measures of social and cultural capital available in B&B. Therefore, this analysis relies on an array of proxy variables to represent the capital of a bachelor's enrollee, though such measures are imperfect. Fourth, the demographic measures available in B&B constrain the types of analyses that are feasible. For instance, during the period studied, B&B only collected gender

data using a man/woman binary and did not provide a mechanism by which students could report a transgender or other gender-expansive identity. Finally, important work also remains in order to improve our ability to model graduate enrollment behaviors. As Perna (2004) and English and Umbach (2016) have noted, improved measures of social and cultural capital may increase confidence that the model measures the desired constructs, which in turn will enable more targeted solutions for students and better advice to policymakers.

2.8 Conclusion

With a rising share of the population obtaining a bachelor's degree, it becomes increasingly important to understand which students move on to graduate education. Horowitz (2018) has found, for instance, that as educational attainment has increased and the availability of traditional middle-class jobs has decreased, an increasing share of college-educated workers have been shifted into jobs for which they are over-credentialed. To buttress against such outcomes, a rising share of bachelor's recipients pursue graduate credentials, leading to a positive feedback loop that further exacerbates concerns about degree inflation. Against this backdrop, the stakes for understanding graduate enrollment patterns and associated outcomes are clearly high.

Indeed, at both an individual level and for broader communities, the composition of participants in graduate education can have significant implications. For instance, at an individual level, those with graduate degrees have lower unemployment rates and higher median earnings, on average, than individuals with only a bachelor's degree (U.S. Bureau of Labor Statistics, 2019c). Yet such averages can mask considerable variation. Further, the nature of graduate education has shifted substantially, with master's programs in particular becoming more

expensive and more frequently conducted as distance education over time (Blagg, 2018). The mix of individuals with graduate training can also have bearing on community-level experiences. For example, an extensive literature has articulated that increased representation of individuals from marginalized groups can lead to improved service delivery and role model effects in fields such as academia, medicine, K-12 teaching, and law (e.g., Grissom, Kern, & Rodriguez, 2015; King, 2008; LaVeist, Nuru-Jeter, & Jones, 2003; Tuitt, 2012; Verdugo, 1995). Various forms of graduate education help facilitate access to and development within such fields, and therefore serve as a key link to the broader societal outcomes in which such professions play pivotal roles.

The findings from this study help highlight individual attributes that remain strongly predictive of enrollment in certain degrees and fields. For policy and practice, these relationships must be evaluated in the context of related research about the associated outcomes. For example, women's lower odds of enrollment in professional and research doctorate degree programs represent longstanding challenges that have received considerable attention (e.g., Melaku, 2019; NSF, 2020). In other instances, the effects of participating in a particular form of graduate education may be unclear, leaving it an open question whether promoting enrollment is a desirable end. For instance, while prior research has expressed concerns about for-profit enrollment at the undergraduate level, the value of for-profit graduate degrees is an underexamined issue that I partially explore in the second paper of this dissertation. For such cases, prescriptions about practical advice for students hinge on the value such degrees provide and the functions they serve for participating students. If particular degree programs offer little in the way of human capital development, positive signaling to employers, or personal growth, areas for concern would include student attributes associated with elevated—rather than diminished—odds of participation.

Table 2.1. Distribution of bachelor's recipients by highest post-bachelor's enrollment in a degree/certificate program

| | Years since bachelor's | | | | | | | | |
| | 1 Year | | | 4 Years | | | 10 Years | | |
Highest post-bachelor's enrollment	B&B:93/94	B&B:00/01	B&B:08/09	B&B:93/97	-	B&B:08/12	B&B:93/03	-	-
Enrollment after bachelor's	21.8	27.4	30.2	40.0	-	44.1	48.3	-	-
Sub-master's	4.7	5.0	3.1	8.6	-	5.5	4.9	-	-
Undergraduate/technical certificate	2.7	3.4	1.3	5.2	-	2.7	1.3	-	-
Associate's	0.7	0.4	0.9	0.8	-	1.2	1.1	-	-
Additional bachelor's	1.3	1.3	1.0	2.6	-	1.6	2.6	-	-
Advanced degree	17.1	22.5	27.1	31.4	-	38.7	43.4	-	-
Master's	12.1	16.0	19.1	22.2	-	27.3	29.8	-	-
First-professional	2.6	3.8	4.1	4.1	-	5.2	5.0	-	-
Research/other doctorate	1.4	1.3	1.7	3.0	-	2.5	4.5	-	-
Post-bachelor's/master's certificate	0.9	0.6	2.2	1.8	-	3.7	3.3	-	-
Missing/unknown	0.1	0.8	0.0	0.3	-	0.0	0.8	-	-
No additional enrollment	78.3	72.6	69.8	60.0	-	55.9	51.7	-	-
N	12,480	10,030	17,160	10,090	-	14,600	8,970	-	-

SOURCE: U.S. Department of Education, National Center for Education Statistics, Baccalaureate & Beyond Longitudinal Study (B&B), B&B:93/94, B&B: 93/97, B&B:93/03, B&B:2000/01, B&B:08/09, and B&B:08/12 waves.
NOTES: "First-professional" includes degrees in one of ten fields: chiropractic (D.C. or D.C.M.), dentistry (D.D.S. or D.M.D.), law (L.L.B., J.D.), medicine (M.D.), optometry (O.D.), osteopathic medicine (D.O.), pharmacy (Pharm.D.), podiatry (D.P.M., D.P., or Pod.D.), theology (M.Div., M.H.L., B.D., or Ordination), or veterinary medicine (D.V.M.).

Table 2.2. Characteristics of 2007-08 bachelor's recipients, by highest post-bachelor's enrollment status

	All bachelor's recipients in 2007-08	No postgraduate enrollment by 2012	Any postgraduate enrollment by 2012	Sub-master's enrollment by 2012	Master's enrollment by 2012	Professional enrollment by 2012	Research doctorate enroll. by 2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	0.58	0.55	0.62	0.65	0.64	0.51	0.49
	(0.49)	(0.50)	(0.49)	(0.48)	(0.48)	(0.50)	(0.50)
White	0.73	0.76	0.71	0.70	0.71	0.73	0.73
	(0.44)	(0.43)	(0.45)	(0.46)	(0.45)	(0.45)	(0.44)
Black	0.08	0.07	0.10	0.08	0.12	0.06	0.10
	(0.28)	(0.26)	(0.30)	(0.28)	(0.32)	(0.23)	(0.30)
Latinx	0.09	0.09	0.09	0.12	0.09	0.06	0.08
	(0.29)	(0.29)	(0.29)	(0.32)	(0.29)	(0.24)	(0.27)
Asian	0.05	0.05	0.05	0.05	0.04	0.12	0.05
	(0.23)	(0.23)	(0.23)	(0.21)	(0.20)	(0.33)	(0.21)
Age as of 2007	24.76	25.36	23.97	24.33	24.35	21.82	23.20
	(6.59)	(7.11)	(5.73)	(5.82)	(6.16)	(2.13)	(4.92)
First-generation	0.45	0.47	0.42	0.44	0.46	0.24	0.26
	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)	(0.43)	(0.44)
Immigrant	0.08	0.08	0.08	0.07	0.07	0.11	0.11
	(0.27)	(0.27)	(0.27)	(0.26)	(0.26)	(0.32)	(0.31)
Native English	0.93	0.93	0.93	0.91	0.94	0.90	0.90
	(0.26)	(0.26)	(0.26)	(0.28)	(0.23)	(0.30)	(0.30)
Married in 2007-08	0.16	0.18	0.12	0.12	0.13	0.06	0.11
	(0.36)	(0.39)	(0.32)	(0.33)	(0.34)	(0.23)	(0.31)
Attended a public high school	0.83	0.84	0.82	0.80	0.83	0.80	0.73

Table 2.2. Characteristics of 2007-08 bachelor's recipients, by highest post-bachelor's enrollment status

	All bachelor's recipients in 2007-08	No postgraduate enrollment by 2012	Any postgraduate enrollment by 2012	Sub-master's enrollment by 2012	Master's enrollment by 2012	Professional enrollment by 2012	Research doctorate enroll. by 2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.38)	(0.37)	(0.39)	(0.40)	(0.38)	(0.40)	(0.44)
Hours of schoolwork per week in 2007-08	15.11	14.88	15.41	14.57	14.97	16.41	21.29
	(9.93)	(9.92)	(9.92)	(9.38)	(9.79)	(10.08)	(11.25)
Undergraduate GPA	3.26	3.20	3.32	3.14	3.33	3.50	3.55
	(0.48)	(0.49)	(0.46)	(0.49)	(0.45)	(0.37)	(0.45)
SAT score (derived)	1084	1066	1106	1055	1087	1226	1214
	(187)	(180)	(193)	(184)	(185)	(177)	(197)
Began at community college	0.20	0.21	0.18	0.20	0.19	0.08	0.07
	(0.40)	(0.41)	(0.38)	(0.40)	(0.40)	(0.27)	(0.26)
Attended public bachelor's inst.	0.63	0.62	0.64	0.68	0.63	0.64	0.57
	(0.48)	(0.49)	(0.48)	(0.47)	(0.48)	(0.48)	(0.50)
Attended very selective inst.	0.30	0.27	0.35	0.28	0.32	0.55	0.48
	(0.46)	(0.44)	(0.48)	(0.45)	(0.47)	(0.50)	(0.50)
Attended very high research inst.	0.22	0.19	0.26	0.23	0.22	0.48	0.40
	(0.42)	(0.39)	(0.44)	(0.42)	(0.41)	(0.50)	(0.49)
Attended high research inst.	0.16	0.15	0.17	0.16	0.17	0.18	0.14
	(0.36)	(0.36)	(0.37)	(0.36)	(0.38)	(0.38)	(0.35)
Family income percentile	56.40	55.95	56.99	53.29	56.27	65.75	59.93
	(28.83)	(28.73)	(28.95)	(28.83)	(28.91)	(28.48)	(26.93)
Cumulative federal loans in U.S. dollars	11,346	11,572	11,049	11,354	11,974	6,921	8,771
	(12,248)	(12,303)	(12,170)	(12,235)	(12,568)	(9,348)	(10,950)
Expect loan help	0.15	0.15	0.16	0.15	0.16	0.21	0.19

Table 2.2. Characteristics of 2007-08 bachelor's recipients, by highest post-bachelor's enrollment status

	All bachelor's recipients in 2007-08	No postgraduate enrollment by 2012	Any postgraduate enrollment by 2012	Sub-master's enrollment by 2012	Master's enrollment by 2012	Professional enrollment by 2012	Research doctorate enroll. by 2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.36)	(0.35)	(0.37)	(0.35)	(0.36)	(0.41)	(0.39)
Earned bachelor's degree in home state	0.82	0.82	0.82	0.85	0.83	0.74	0.72
	(0.38)	(0.38)	(0.39)	(0.36)	(0.37)	(0.44)	(0.45)
N	15,120	8,420	6,700	1,180	3,710	1,200	480

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).
NOTES: Standard deviation in parentheses.

Table 2.3. Characteristics of 2007-08 bachelor's recipients whose highest enrollment was in a master's degree program as of 2012

	Any master's enrollment by 2012	Education master's enrollment by 2012	Health master's enrollment by 2012	Business master's enrollment by 2012	STEM master's enrollment by 2012	Social science master's enrollment by 2012
	(1)	(2)	(3)	(4)	(5)	(6)
Women	0.64	0.77	0.83	0.52	0.37	0.70
	(0.48)	(0.42)	(0.37)	(0.50)	(0.48)	(0.46)
White	0.71	0.77	0.72	0.64	0.80	0.62
	(0.45)	(0.42)	(0.45)	(0.48)	(0.40)	(0.49)
Black	0.12	0.09	0.13	0.18	0.08	0.10
	(0.32)	(0.29)	(0.34)	(0.38)	(0.26)	(0.30)
Latinx	0.09	0.11	0.06	0.09	0.04	0.15
	(0.29)	(0.31)	(0.23)	(0.28)	(0.21)	(0.36)
Asian	0.04	0.02	0.04	0.05	0.07	0.06
	(0.20)	(0.12)	(0.21)	(0.22)	(0.26)	(0.24)
Age as of 2007	24.35	24.06	25.04	24.95	23.01	23.31
	(6.16)	(5.85)	(7.43)	(6.11)	(3.39)	(4.77)
First-generation	0.46	0.50	0.48	0.52	0.36	0.44
	(0.50)	(0.50)	(0.50)	(0.50)	(0.48)	(0.50)
Immigrant	0.07	0.03	0.09	0.09	0.09	0.09
	(0.26)	(0.17)	(0.29)	(0.29)	(0.28)	(0.28)
Native English speaker	0.94	0.97	0.94	0.93	0.94	0.89
	(0.23)	(0.17)	(0.25)	(0.25)	(0.24)	(0.32)
Married in 2007-08	0.13	0.12	0.16	0.18	0.12	0.09
	(0.34)	(0.33)	(0.37)	(0.38)	(0.33)	(0.29)
Attended public high school	0.83	0.84	0.81	0.83	0.83	0.85
	(0.38)	(0.36)	(0.39)	(0.38)	(0.38)	(0.35)
Hours of schoolwork per week in 2007-08	14.97	13.93	14.42	13.87	18.68	15.70
	(9.79)	(8.82)	(9.55)	(9.24)	(10.44)	(10.50)
Undergraduate GPA	3.33	3.32	3.38	3.28	3.30	3.35

Table 2.3. Characteristics of 2007-08 bachelor's recipients whose highest enrollment was in a master's degree program as of 2012

	Any master's enrollment by 2012	Education master's enrollment by 2012	Health master's enrollment by 2012	Business master's enrollment by 2012	STEM master's enrollment by 2012	Social science master's enrollment by 2012
	(1)	(2)	(3)	(4)	(5)	(6)
	(0.45)	(0.43)	(0.44)	(0.47)	(0.45)	(0.42)
SAT (derived)	1087	1045	1058	1078	1182	1083
	(185)	(170)	(147)	(189)	(161)	(208)
Began at community college	0.19	0.21	0.20	0.20	0.15	0.23
	(0.40)	(0.41)	(0.40)	(0.40)	(0.36)	(0.42)
Attended a public bachelor's inst.	0.63	0.67	0.65	0.57	0.64	0.70
	(0.48)	(0.47)	(0.48)	(0.50)	(0.48)	(0.46)
Attended a very selective inst.	0.32	0.27	0.29	0.32	0.40	0.36
	(0.47)	(0.44)	(0.46)	(0.47)	(0.49)	(0.48)
Attended a very high research inst.	0.22	0.16	0.24	0.19	0.28	0.24
	(0.41)	(0.37)	(0.43)	(0.39)	(0.45)	(0.43)
Attended a high research inst.	0.17	0.12	0.15	0.21	0.21	0.15
	(0.38)	(0.33)	(0.36)	(0.41)	(0.41)	(0.36)
Family income percentile	56.27	54.63	58.61	58.98	58.14	49.20
	(28.91)	(27.17)	(28.88)	(30.55)	(29.24)	(28.21)
Cumulative federal loans in U.S. dollars	11,974	13,235	11,662	12,166	10,879	11,839
	(12,568)	(12,610)	(12,880)	(13,530)	(11,546)	(11,080)
Expect loan help	0.16	0.19	0.11	0.15	0.12	0.18
	(0.36)	(0.39)	(0.32)	(0.36)	(0.32)	(0.39)
Earned bachelor's degree in home state	0.83	0.84	0.89	0.81	0.89	0.83
	(0.37)	(0.37)	(0.31)	(0.40)	(0.32)	(0.37)
N	3,710	880	620	630	560	250

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).
NOTE: In addition to the fields listed in columns 2-6, "any master's" includes 770 students enrolled in miscellaneous other fields (e.g., divinity, communication, and history).

Table 2.4. Odds ratios for highest additional enrollment of 2007-08 bachelor's recipient within 4 years after bachelor's

	Any enrollment in graduate education by 2012	Sub-master's enrollment by 2012	Master's enrollment by 2012	Professional enrollment by 2012	Research doctorate enrollment by 2012
	(1)	(2)	(3)	(4)	(5)
Women	1.113[+]	1.422[**]	1.228[**]	0.655[**]	0.716[*]
Race/ethnicity (ref. = white)					
Black	1.995[**]	0.884	1.706[**]	1.958[**]	1.442
Latinx	1.142	0.953	1.142	1.123	0.906
Asian	1.036	0.938	0.785[+]	1.749[**]	0.545[+]
Parental education (ref. = bachelor's)					
High school or lower	0.967	0.979	1.101	0.810	0.610[*]
Some college	1.006	1.007	1.040	0.938	0.991
Master's degree	1.192[*]	0.961	1.127	1.185	1.193
Doctoral/professional degree	1.287[**]	1.053	0.943	1.632[**]	1.537[+]
Family income in 2006 (ref. = top quartile)					
Lowest income quartile	0.906	1.070	0.826[*]	0.929	1.356
Second income quartile	0.949	1.092	0.850[+]	0.942	1.278
Third income quartile	0.979	1.010	0.987	0.742[+]	1.140
Age (ref. = under 24)					
24-29	0.837[*]	0.950	0.898	0.675[*]	0.816
30 or older	0.795[*]	0.831	1.053	0.281[**]	0.621
Immigrant status (ref. = third+ generation)					
First-generation immigrant	0.905	1.040	0.896	1.001	0.832
Second-generation immigrant	1.196[*]	1.200	1.169[+]	1.079	0.949
Native English speaker	0.822[+]	0.744	1.117	0.760	0.733
High school (ref. = public)					
Private	1.032	1.132	0.916	1.157	1.239
Foreign	0.820	0.658	1.132	0.738	0.984
Hours of schoolwork per week (ref. = top quartile)					
Lowest quartile of schoolwork	0.832[*]	0.954	0.999	0.861	0.417[**]
Second quartile	0.905	1.034	1.025	0.913	0.568[**]
Third quartile	0.870[+]	1.045	0.904	0.979	0.770
First institution was a public 2-year	0.947	1.197[+]	0.990	0.696[*]	0.727
Married as of 2007-08	0.850[+]	0.914	0.801[*]	1.341[+]	0.810

Table 2.4. Odds ratios for highest additional enrollment of 2007-08 bachelor's recipient within 4 years after bachelor's

	Any enrollment in graduate education by 2012	Sub-master's enrollment by 2012	Master's enrollment by 2012	Professional enrollment by 2012	Research doctorate enrollment by 2012
	(1)	(2)	(3)	(4)	(5)
College GPA (ref. = top quartile)					
Lowest GPA quartile	0.448**	1.875**	0.638**	0.141**	0.177**
Second GPA quartile	0.605**	1.265^{+}	0.920	0.416**	0.344**
Third GPA quartile	0.822**	1.113	0.979	0.842	0.603**
Bachelor's institution type (ref. = public)					
Private nonprofit	1.066	0.805^{+}	1.066	1.081	1.058
For-profit	0.766^{+}	1.753^{+}	0.634*	0.722	0.285
Bachelor's institution selectivity (ref. = very)					
Moderately selective	0.931	1.108	0.882	0.951	0.796
Minimally selective	1.065	1.487^{+}	0.926	0.967	0.749
Open admission	1.116^{+}	0.779*	1.068	1.118	1.464*
Bachelor's institution Carnegie (ref. = master's)					
Research I	1.190*	1.140	0.893	1.669**	1.081
Research II	1.254**	0.937	1.113	1.477*	1.181
Research/doctoral	0.969	0.857	1.018	1.033	0.704
Baccalaureate	0.911	0.912	0.931	1.146	0.838
Other (special-focus, associate's, tribal)	0.825	1.106	0.818	0.226^{+}	1.081
Federal loans borrowed (ref. = $0)					
Bottom quartile of borrowers	0.931	0.929	0.993	0.871	0.992
Second quartile of borrowers	0.943	1.016	1.035	0.826	0.808
Third quartile of borrowers	0.979	0.971	1.128	0.752^{+}	0.878
Top quartile of borrowers	0.986	0.893	1.146	0.667*	0.997
Bachelor's earned in home state	0.944	0.950	1.026	0.927	0.747^{+}
Additional controls (e.g., major)	X	X	X	X	X
N	12,410	12,410	12,410	12,410	12,410

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).

NOTE: Exponentiated coefficients. $^{+}p < 0.05$, $^{*}p < 0.01$, $^{**}p < 0.001$

Table 2.5. Comparison of Log Odds, B&B:08/12 vs. B&B:93/97

Characteristic	Log odds		z-score
	Perna (2004)	Current Paper	
Sub-master's degree			
Women	0.214	0.352	1.575
Race/Ethnicity			
Black	-0.036	-0.123	-0.471
Latinx	0.313	-0.048	-1.725
Asian	0.569	-0.064	-2.833*
Other	0.201	0.098	-0.411
Master's degree			
Women	0.183	0.205	0.251
Race/Ethnicity			
Black	0.468	0.534	0.374
Latinx	0.367	0.133	-1.112
Asian	-0.041	-0.242	-0.769
Other	0.535	0.205	-1.558
Professional degree			
Women	-0.691	-0.423	1.995+
Race/Ethnicity			
Black	0.901	0.672	-0.798
Latinx	0.765	-0.099	-2.776*
Asian	0.873	0.559	-1.104
Other	0.481	0.497	0.051

SOURCE: Perna (2004) analysis of U.S. Department of Education, National Center for Education Statistics, 1993/97 Baccalaureate & Beyond Longitudinal Study (B&B:93/97); U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).

NOTES: Table displays z-scores from a comparison of log odds by gender and race/ethnicity for the B&B:08/12 sample (Table 2.4) to comparable estimates from Perna (2004) for the B&B:93/97 sample. Both logistic regressions include a suite of other control variables related to academic and financial resources, cultural and social capital, and demographic characteristics. Standard errors not shown. $^+ p < .05$, $^* p < .01$, $^{**} p < .001$.

Table 2.6. Odds ratios for master's enrollment of 2007-08 bachelor's recipient within 4 years after bachelor's

	Any master's enrollment by 2012	Education master's enrollment by 2012	Business master's enrollment by 2012	Health master's enrollment by 2012	STEM master's enrollment by 2012	Social science master's enrollment by 2012
	(1)	(2)	(3)	(4)	(5)	(6)
Women	1.228^{**}	1.605^{**}	0.946	2.340^{**}	0.765^{+}	1.552^{+}
Race/ethnicity (ref. = white)						
Black	1.706^{**}	1.196	2.117^{**}	1.808^{**}	0.965	1.585
Latinx	1.142	0.953	1.204	0.894	1.170	2.056^{*}
Asian	0.785^{+}	0.474^{+}	0.725	0.584^{+}	1.392	1.123
Other	1.227	0.492^{+}	1.528	1.384	0.843	2.346^{*}
Parental education (ref. = bachelor's)						
High school or lower	1.101	1.220	0.899	1.026	1.256	1.024
Some college	1.040	1.221	1.072	0.949	1.030	0.801
Master's degree	1.127	1.114	0.993	1.036	1.292	1.266
Doctoral/professional degree	0.943	0.937	0.925	0.797	1.185	1.023
Family income in 2006 (ref. = top)						
Lowest income quartile	0.826^{*}	0.835	0.796	0.731^{+}	1.026	1.474
Second income quartile	0.850^{+}	0.947	0.692^{+}	0.740^{+}	1.049	1.485
Third income quartile	0.987	1.158	0.826	0.846	1.050	1.555^{+}
Age (ref. = under 24)						
24-29	0.898	0.804	0.876	0.976	0.957	0.633
30 or older	1.053	0.987	1.095	1.082	0.726	0.945
Immigrant status (ref. = third+ generation)						
First-generation immigrant	0.896	0.950	1.015	0.925	0.763	0.423^{+}
Second-generation immigrant	1.169^{+}	1.453^{*}	1.292	1.496^{*}	0.847	0.668
Native English speaker	1.117	1.421	1.101	0.901	1.128	0.589
High school (ref. = public)						
Private	0.916	0.986	1.016	1.026	0.712	1.183
Foreign	1.132	0.166	1.389	1.122	1.297	1.920
Hours of schoolwork per week (ref. = top)						
Lowest quartile of schoolwork	0.999	1.386^{*}	1.340^{+}	1.132	0.532^{**}	0.897

Second quartile	1.025	1.220	1.243	1.295[+]	0.673[*]	1.169
Third quartile	0.904	1.210	1.041	1.041	0.497[**]	1.012
First institution was a public 2-year	0.990	1.023	1.169	0.949	1.202	1.225
Married as of 2007-08	0.801[*]	0.760[+]	0.922	0.760	0.997	0.691
College GPA (ref. = top quartile)						
Lowest GPA quartile	0.638[**]	0.851	0.931	0.646[*]	0.504[**]	0.526[*]
Second GPA quartile	0.920	1.042	1.039	0.970	0.871	0.970
Third GPA quartile	0.979	0.983	1.043	1.130	0.899	0.815
Bachelor's institution type (ref. = public)						
Private nonprofit	1.066	0.968	1.117	1.132	1.133	0.780
For-profit	0.634[*]	0.570	0.701	0.560	1.042	0.858
Bachelor's institution selectivity (ref. = very)						
Moderately selective	0.882	0.938	1.274	1.003	0.624	0.787
Minimally selective	0.926	0.571[+]	1.282	1.238	0.803	1.220
Open admission	1.068	0.956	1.191	1.069	1.034	0.937
Bachelor's institution Carnegie (ref. = master's)						
Research I	0.893	0.785	0.963	1.201	0.826	0.698
Research II	1.113	0.809	1.492[*]	1.022	1.241	0.679
Research/doctoral	1.018	1.072	0.834	1.145	1.217	0.867
Baccalaureate	0.931	1.212	0.743	1.187	0.869	0.608
Other (special-focus, associate's, tribal)	0.818	0.688	1.276	0.854	0.992	0.406
Federal loans borrowed (ref. = $0)						
Bottom quartile of borrowers	0.993	1.023	1.024	1.010	0.831	0.661
Second quartile of borrowers	1.035	0.957	1.002	1.123	1.091	1.061
Third quartile of borrowers	1.128	1.215	0.903	1.005	1.353	0.927
Top quartile of borrowers	1.146	1.097	1.258	0.942	1.166	1.309
Bachelor's earned in home state	1.026	1.005	0.916	1.140	1.166	0.809
Additional controls (e.g., major)	X	X	X	X	X	X
N	12,410	12,410	12,410	12,410	12,410	12,410

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).

NOTES: Exponentiated coefficients. [+] $p < 0.05$, [*] $p < 0.01$, [**] $p < 0.001$.

Table 2.7. Odds ratios for professional degree enrollment of 2007-08 bachelor's recipients within 4 years after bachelor's

	Any professional degree enrollment by 2012 (1)	Law degree enrollment by 2012 (2)	Health professions degree enrollment by 2012 (3)
Women	0.655**	0.463**	0.806+
Race/ethnicity (ref. = white)			
Black	1.958**	1.903+	1.938**
Latinx	1.123	1.389	1.011
Asian	1.749**	1.060	1.865**
Other	1.644*	1.912+	1.690+
Parental education (ref. = bachelor's)			
High school or lower	0.810	0.879	0.757+
Some college	0.938	0.968	0.940
Master's degree	1.185	1.123	1.229
Doctoral/professional degree	1.632**	1.619+	1.643**
Family income in 2006 (ref. = top quartile)			
Lowest income quartile	0.929	0.694	1.126
Second income quartile	0.942	0.553*	1.261
Third income quartile	0.742+	0.688+	0.863
Age (ref. = under 24)			
24-29	0.675*	0.518+	0.786
30 or older	0.281**	0.261*	0.219**
Immigrant status (ref. = third+ generation)			
First-generation immigrant	1.001	0.958	1.058
Second-generation immigrant	1.079	0.881	1.163
Native English speaker	0.760	0.747	0.805
High school (ref. = public)			
Private	1.157	1.046	1.159
Foreign	0.738	0.277	0.876
Hours of schoolwork per week (ref. = top quartile)			
Lowest quartile of schoolwork	0.861	1.414	0.701*
Second quartile	0.913	1.253	0.828
Third quartile	0.979	1.292	0.924
First institution was a public 2-year	0.696*	0.823	0.671*
Married as of 2007-08	1.341+	1.039	1.432+
College GPA (ref. = top quartile)			
Lowest GPA quartile	0.141**	0.280**	0.095**
Second GPA quartile	0.416**	0.747	0.361**
Third GPA quartile	0.842	0.910	0.871
Bachelor's institution type (ref. = public)			
Private nonprofit	1.081	1.172	1.093
For-profit	0.722	0.869	1.000
Bachelor's institution selectivity (ref. = very)			
Moderately selective	0.951	1.342	0.799
Minimally selective	0.967	0.213	1.346
Open admission	1.118	1.217	1.030
Bachelor's institution Carnegie (ref. = master's)			
Research I	1.669**	2.643**	1.358+
Research II	1.477*	2.383**	1.198
Research/doctoral	1.033	1.283	0.890

Table 2.7. Odds ratios for professional degree enrollment of 2007-08 bachelor's recipients within 4 years after bachelor's

	Any professional degree enrollment by 2012 (1)	Law degree enrollment by 2012 (2)	Health professions degree enrollment by 2012 (3)
Baccalaureate	1.146	1.504	1.021
Other (special-focus, associate's, tribal)	0.226[+]	0.264	0.294
Federal loans borrowed (ref. = $0)			
Bottom quartile of borrowers	0.871	0.915	0.802
Second quartile of borrowers	0.826	0.972	0.780
Third quartile of borrowers	0.752[+]	0.845	0.693[*]
Top quartile of borrowers	0.667[*]	0.840	0.615[*]
Bachelor's earned in home state	0.927	0.726	1.133
Expect assistance repaying loans	1.171	1.127	1.228
Additional controls (e.g., major)	X	X	X
N	12,410	12,410	12,410

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).
NOTES: Exponentiated coefficients. [+] $p < 0.05$, [*] $p < 0.01$, [**] $p < 0.001$

Table 2.8. Odds ratios of for-profit graduate enrollment of 2007-08 bachelor's recipients within 4 years after bachelor's

	Any for-profit graduate enrollment by 2012	For-profit sub-master's enrollment by 2012	For-profit master's enrollment by 2012	For-profit professional enrollment by 2012	For-profit research doctorate enrollment by 2012
	(1)	(2)	(3)	(4)	(5)
Women	1.627[+]	2.374[+]	1.650	0.411	0.686
Race/ethnicity (ref. = white)					
Black	2.595[**]	1.652	2.888[**]	0.134	32.894[*]
Latinx	0.774	1.520	0.580	1.450	1.000
Asian	0.997	0.840	0.378	2.709	1.000
Other	2.940[*]	3.744[+]	3.058[*]	1.000	1.423
Parental education (ref. = some college)					
Less than HS	0.979	0.569	1.238	0.099[+]	
Bachelor's degree	0.560[+]	0.930	0.419[*]	0.903	
Master's degree	0.520[+]	0.473	0.629	0.409	
Doctoral/professional degree	1.013	1.130	0.944	1.526	
Family income in 2006 (ref. = top quartile)					
Lowest income quartile	0.828	0.527	1.243	0.321	
Second income quartile	0.744	0.538	0.846	0.452	
Third income quartile	0.959	0.751	1.299	0.085[**]	
Age (ref. = under 24)					
24-29	1.379	1.791	1.139	3.460	0.484
30 or older	1.392	1.518	1.321	11.914[+]	0.251
Immigrant status (ref. = third+ generation)					
First-generation immigrant	0.861	0.537	1.058	1.489	1.000
Second-generation immigrant	1.338	0.861	1.760	2.084	1.198
Native English speaker	2.064	12.513[*]	1.946	0.494	1.000
High school (ref. = public)					
Private	1.025	1.376	0.870	3.212	1.000
Foreign	1.024	2.968	0.969	1.000	1.000
Hours of schoolwork per week (ref. = top quartile)					
Lowest quartile of schoolwork	0.937	0.714	1.200	1.236	0.368
Second quartile	1.061	0.308[*]	1.694	1.456	0.905
Third quartile	1.265	1.833	1.120	2.034	0.152
First institution was a public 2-year	1.197	0.537	1.629	0.162[+]	1.296
Married as of 2007-08	0.776	0.316[+]	1.068	0.231	3.417
College GPA (ref. = top quartile)					

Table 2.8. Odds ratios of for-profit graduate enrollment of 2007-08 bachelor's recipients within 4 years after bachelor's

	Any for-profit graduate enrollment by 2012	For-profit sub-master's enrollment by 2012	For-profit master's enrollment by 2012	For-profit professional enrollment by 2012	For-profit research doctorate enrollment by 2012
	(1)	(2)	(3)	(4)	(5)
Lowest GPA quartile	1.638^+	2.578^+	1.399	1.138	0.024^*
Second GPA quartile	1.434	1.272	1.414	3.769	0.461
Third GPA quartile	1.291	2.068	1.109	4.288	1.000
Bachelor's institution type (ref. = public)					
Private nonprofit	0.661	1.102	0.436^*	0.277	0.795
For-profit	2.573^+	7.477^*	1.730	0.087	1.597
Bachelor's institution selectivity (ref. = very)					
Moderately selective	1.039	0.999	1.225	1.000	0.116
Minimally selective	1.523	1.055	1.880	0.265	1.000
Open admission	0.867	1.201	0.659	1.179	0.200
Bachelor's institution Carnegie (ref. = master's)					
Research I	0.673	0.177^*	0.920	0.383	0.460
Research II	0.555^+	0.559	0.573	0.480	1.000
Research/doctoral	0.948	0.672	1.185	1.253	1.000
Baccalaureate	1.020	0.553	1.176	0.397	2.136
Other (special-focus, associate's, tribal)	1.220	0.265	2.103	1.000	4.696
Federal loans borrowed (ref. = $0)					
Bottom quartile of borrowers	1.023	1.138	0.945	0.809	1.000
Second quartile of borrowers	1.326	1.444	1.495	1.123	0.034^+
Third quartile of borrowers	1.169	0.820	1.351	0.306	4.201
Top quartile of borrowers	1.308	0.795	1.746	1.128	2.217
Bachelor's earned in home state	0.950	1.164	0.717	2.506	11.553
Expect assistance repaying loans	1.093	0.633	1.185	2.844^+	0.049
Additional controls (e.g., major)	X	X	X	X	X
N	11,150	11,150	11,150	7,360	3,050

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate & Beyond Longitudinal Study (B&B:08/12).
NOTES: Exponentiated coefficients. The number of observations differs from prior tables because of cases dropped due to collinearity that stems from the comparatively low rate of enrollment at for-profit institutions. $^+ p < 0.05$, $^* p < 0.01$, $^{**} p < 0.001$

CHAPTER 3

Master's for hire: Experimental evidence on employers' perceptions of master's degrees from for-profit institutions

3.1 Introduction

One of the major sources of graduate enrollment growth has been the for-profit sector, where graduate enrollment–almost exclusively in the form of master's degree programs–rose more than eight-fold between 1998 and 2018 (U.S. Department of Education, 2020e). In fact, for-profit institutions account for almost 1 in 10 master's students nationwide, including 1 in 4 Black master's students (Baum & Steele, 2017). Despite the notable market share of for-profit institutions within graduate education, there is scant evidence about the job application outcomes of master's degree recipients from these institutions. Research at the undergraduate level, however, has sometimes 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), or fare no better despite higher prices (Darolia et al., 2015). Whether such findings hold at the graduate level is a heretofore unresolved question.

Especially given that for-profit institutions account for 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 by sector has important implications for students who have been historically underrepresented in graduate education. The potential economic payoff for a master's degree from a for-profit institution is also important to investigate because master's students at for-profit institutions borrow more in graduate student

loans than master's students in other sectors (Baum & Steele, 2018). For instance, among graduate students in 2015-16, 73 percent of students at for-profits borrowed more than $20,000 for their graduate program, compared to only 51 percent at public institutions and 57 percent at private not-for-profit institutions (National Postsecondary Student Aid Study, 2021b). Information regarding likely outcomes for master's students from various institution types has the potential to help students as they 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.

This study builds on prior literature by examining labor market outcomes for master's degree recipients across a variety of institution types. To do so, I use a correspondence study that examines the extent to which employers distinguish between applicants based on the type of institution from which they earned their master's degree. In particular, this paper compares employers' responses to fictitious applicants with a master's from a for-profit institution to those who pursued one of three prominent broad-access alternatives. The first alternative is a master's from some other primarily online institution, which offers the same convenience of the instructional format that predominates at for-profit institutions. The second is a master's from a regional institution, which is geographically proximate and frequently offers master's degree programs designed around the needs of individuals who are already employed full-time. As a reference point for the decision to not pursue a master's degree, the third alternative is no master's enrollment, represented by a résumé that lists a bachelor's degree as the highest credential.

The field experiment focuses on master's degrees in business, which represents one-third of all master's degrees from for-profit institutions and one-quarter of all master's degrees.

Accordingly, the experiment features 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.[11] Seeking to maximize relevance for working adults, who comprise the majority of students enrolled in master's programs at for-profits, this correspondence study lists 5-7 years of work experience for the fictitious applicants, including the duration of their master's program. In light of the potential for discrimination along the dimensions of race and gender, I randomly assigned the applicants names that are likely to be strongly associated with certain race/gender combinations (Black women, Black men, white women, white men).

For the field experiment, I submitted 9,480 fictitious applications to real job openings listed in 14 U.S. cities between April 2020 and November 2020 on two online job boards.[12] Descriptively, 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.

Strikingly, I find no evidence that employers had higher rates of positive response for any of the three master's treatment groups, relative to candidates with only a bachelor's degree. That is, regardless of whether the fictitious applicant's résumé listed a master's degree from a for-profit institution, some other primarily online institution, or a regional institution, the master's-holding candidates fared no better in terms of employer responses than their counterparts who

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[11] 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.
[12] This timeline means that all data collection took place during the coronavirus pandemic, which I address in greater detail in later sections.

did not have a master's degree. The null results are fairly precise, with 95% confidence intervals that rule out even comparatively small positive effects (i.e., no more than 9 percent, 15 percent, or 16 percent of the baseline mean for the regional master's, online master's, and for-profit master's groups, respectively). Thus, even at the most conspicuous level–whether or not a job candidate had a master's degree–employers' choices overall did not appear to differ across treatment groups. These results suggest that employers are not especially responsive in their initial application decisions to master's degrees in business from for-profit, online, and regional institutions, despite the investment of time and financial resources such degrees entail.

3.2 Literature

This study of the perceived labor market value of master's degrees from various sectors builds on three strands of prior research. First, several studies have calculated the wage premium for master's degrees using a variety of quasi-experimental and regression-based techniques. In those studies, estimated economic returns across a range of master's degrees have frequently been positive and on the order of 5-17 percent (Altonji & Zhong, 2020; Gándara & Toutkoushian, 2017; Grove & Hussey, 2011; Jaeger & Page, 1996). There is some evidence that such estimates reflect especially high returns in individual fields, such as health sciences (Stevenson, 2016). However, such studies have not assessed the actual or perceived labor market value for earning a master's degree in the for-profit sector in particular, a limitation the current study seeks to overcome. In addition, this literature base frequently relies on data from over a decade ago, when many online master's programs at for-profit institutions were still in their infancy or not yet developed. Further, an emphasis on earnings may not distinguish between prescribed salary increases at one's current employer (e.g., teacher salary scales that guarantee

increases in salary for a master's degree) and the job market experiences of individuals seeking to find a new employer. By focusing on employers' responses to job candidates seeking a position with a new employer, this study is intended to highlight expected outcomes for individuals seeking employment with a new firm.

Second, recent work from résumé audit studies has focused on employer callback rates for fictitious job applicants who attended various types of undergraduate institutions. One such study found that employers had no clear preferences between candidates who received sub-baccalaureate credentials from for-profit institutions and community colleges, even though the for-profit programs were considerably more expensive (Darolia et al., 2015). A second audit study involving applicants with associate's credentials from either a for-profit, nonprofit, or fictional college also found no difference among the three groups, which the authors interpreted as evidence that employers respond more to degree level than institutional attributes (Deterding & Pedulla, 2016). However, results from Deming and colleagues (2016) showed that employers typically penalized for-profit bachelor's degrees for positions in business, and likewise penalized for-profit credentials for jobs in the health sector, except when the position also required an occupational license. Although such high-quality résumé audit studies have offered compelling evidence regarding the circumstances under which employers distinguish between candidates who attended different types of institutions, these studies have only focused on undergraduate education.

A third and final related strand of research focuses on stated perceptions of non-traditional master's degrees. In this literature, employers have reported a lower willingness to hire individuals who earned their master's degree online or from for-profit institutions (e.g., Adams & DeFleur, 2006; Kim & Kusack, 2005; Kinneer, 2014; Metrejean & Noland, 2011).

However, such research is not experimental, and therefore the accuracy of the findings depends on the extent to which individuals accurately report their preferred master's credentials. Another constraint of this literature base is that it frequently relies on data from over a decade ago, when for-profit and other online master's programs were less common. As for-profit and other online master's education has become increasingly common, it is possible that perceptions of those credentials may have shifted.

In this paper, I explore two primary research questions:

1) Do employers offer interview callbacks and other positive responses to job applicants at different rates depending on whether the applicant has a master's from a for-profit institution, a master's from some other institution primarily known for online master's degrees, a master's from a regional institution, or only a bachelor's degree?

2) Does this relationship vary depending on the perceived gender and race of the applicant?

3.3 Theoretical framework

There are several rationales why employers might differentiate between job applicants on the basis of their master's education background. First, in accordance with human capital theory, employers may believe the four treatment arms provide applicants with varying levels of economically productive knowledge and skills (Becker, 1964). For example, if the master's treatment groups help students develop skills valued in the workplace, a higher callback rate for those groups should be evident relative to the bachelor's-only group. As an alternative (or supplement) to human capital theory, job market signaling theory suggests that prospective employees 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, with employers likely assigning greater weight to credentials that are more resource-intensive to obtain. Although this study cannot precisely distinguish between human capital and signaling effects, it is able to determine their combined effect, which is highly relevant to the job search prospects of master's students.

3.4 Experimental design

I conducted a correspondence study that 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 master's degree (if any). In the experiment, I separately submitted matched sets of four résumés to real job openings across 14 metropolitan areas in the United States.[13] I applied to job openings in business, the most common field for master's recipients.[14] Similar to previous audit 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 of real résumés. Through this randomization process, the fictitious applicant's master's-granting institution is orthogonal to other résumé attributes. To separately assess potential subgroup differences, I blocked by race and gender (i.e., all four applicants in a matched set are intended to have names suggesting they have 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

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[13] 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.

[14] 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.

response to certain candidates but not others, thereby conveying a preference. 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.

3.4.1 Target occupations

Business degrees represent fully one-third of master's degrees awarded at for-profit institutions, and nearly one-quarter of all master's degrees (Table 3.1). Under the rationale that master's degree recipients are typically expecting to enter or continue careers in their field of study, I focus on job openings in business-related occupations. Specifically, within this field, I am primarily interested in 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 (U.S. Bureau of Labor Statistics, 2019a; U.S. Bureau of Labor Statistics, 2019b). For consideration, I identified Standard Occupational Classification (SOC) codes in the "Business Management and Administration," "Marketing," and "Finance" O*NET career 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 master's recipients are likely to seek and receive upon graduation. The final set of target occupations includes general and operations managers, management analysts, market research analysts and marketing specialists, wholesale and manufacturing sales representatives, first-line supervisors of office and administrative support workers, sales managers, marketing managers, and first-line supervisors of non-retail sales workers.

3.4.2 Educational treatment groups

Within every set of résumés, one corresponded to each of four distinct master's enrollment scenarios.[15] First, one résumé listed a master's degree from a for-profit institution ("for-profit group"). As shown in Table 3.1, for-profit institutions represented 8% of all master's degrees awarded in 2017-18, and they granted 11% of the master's degrees nationwide for business. To represent institutions in the for-profit sector, I randomly assigned the name of one of the nine for-profit institutions that awarded the most master's degrees in 2017-18 (roughly in proportion to their share of master's degrees within the for-profit sector).[16] 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 3.2); all offer degree programs primarily online.

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 degree from one of the most selective business school programs, I excluded public flagships and other institutions in the Research I Carnegie Classification (i.e., "Doctoral Universities: Very

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[15] 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.

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 3.2). 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 is now Purdue University Global), since it is unclear how employers might conceptualize such institutions.

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"). 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 public flagships and other Research I 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 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 University of St. Thomas (for the full list, see Appendix Table 3.2). With the inclusion of this comparison group, the experiment involves a direct comparison between individuals with master's degrees from for-profit institutions, institutions known for

primarily online master's programs, and regionally recognized institutions associated with 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. By including 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 even 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 3.3).

3.4.3 Conveying applicant race and gender

Additionally, in order 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 is 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, 2020), although such findings are not universal (e.g., Darolia et al., 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 are present in the context of this study. To do so, I use applicant names to signal race and gender, a common approach used in prior correspondence and audit 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; Logan, Cook, & Parman, 2020), 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 2016 (U.S. Department of Education, 2017b).

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 their mother's education level. By emphasizing first names given in families with similar educational histories, I sought to avoid using racially distinct names that simultaneously convey differential information about socioeconomic background, a challenge identified in previous research (Fryer & Levitt, 2004). First names for White men included Dustin, Hunter, Scott, and Seth, and first names for Black men included DeAndre, Jerome, Terrell, and Tyrone. First names for White women included Amy, Heidi, Kristen, and Stephanie, and first names for Black women included Ebony, Monique, Shanice, and Tanisha.

All such first names were relatively common for babies born in the early 1990s and are almost exclusively identified with a single gender (Social Security Administration, 2019).

For surnames, résumés for White applicants listed Hansen, Olson, Snyder, and Wagner, while résumés for Black applicants listed Banks, Dorsey, Jackson, and Mosley. In the 2010 Census, these surnames for White applicants corresponded to White individuals more than 90 percent of the time, and these surnames for Black applicants corresponded to Black individuals more than 50 percent of the time (U.S. Census Bureau, 2019b). Rather than using all 64 possible permutations of names by race and gender, I used the 16 combinations shown in Appendix Table 3.1. 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 selected and at least 80 percent of the time for the distinctly Black names).

3.4.4 Other résumé attributes

In addition to the applicant's name, the résumés included five primary sections. First, 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.[17] 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.

The second section listed 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 3.2. 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 market

research analyst or 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.[18]

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 3.3 for the full list of

undergraduate institutions by region. To produce findings applicable to master's recipients with a

modest amount of work experience, applicants were randomly assigned undergraduate

graduation years of 2013-2015 (i.e., 5-7 years since undergraduate degree). The use of multiple

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[17] 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.
[18] 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.

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, none of the résumés listed grade point averages.

A third 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 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 5-7 years following receipt of their bachelor's degree, including the time during which they earned their master's degree. 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.

A fourth section offered 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 when listing work experiences and skills. Without such variation, the similarity in résumé layouts might be especially conspicuous to prospective employers.

3.4.5 Application procedures

I used two 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 aforementioned U.S. metropolitan areas.

After searching exclusively in Dallas during a pilot that lasted from April 17 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 job postings that corresponded to the target occupations and specifically mentioned phrases such as "master's degree," "master's preferred," "M.B.A.," or "advanced degree."

To illustrate trends in the number of potentially eligible job postings, Figure 3.1 depicts the number of job listings on one of the online job boards that matched these qualifying job titles between the weeks of March 8-14, 2020, and November 8-14, 2020. Figure 3.1 includes counts for the three most common occupations used in the experiment (i.e., general and operations managers, sales managers, and marketing managers) as well as counts for registered nurses, which serve as a proxy for healthcare demand. From Figure 3.1, it is evident that job postings generally increased slightly over time in all four occupations shown. Spikes in postings for general and operations managers in June coincided with business re-openings, and spikes in postings for registered nurses coincided with regional COVID-19 outbreaks (e.g., dramatic increases in COVID-19 cases in the South and West during the summer). In short, Figure 3.1 conveys that while online postings for job openings did largely halt for the first 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.

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

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considered job openings that would permit a successful applicant to work full-time and 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. After formatting the résumés based on the randomly assigned overall résumé template (i.e., font selection and distinctive use of bolding, underlining, and bulleting), I converted each résumé to PDF in preparation for submission. 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.[19] For job openings that requested demographic details (e.g., race, gender, veteran status, disability status), I elected to not provide the information in an effort to minimize disruption to employers' demographic records of genuine applicants. For each job opening, I submitted résumés over two to three business days, minimizing the likelihood they were associated with one another.

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[19] 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.

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.

Table 3.2 provides an overview of the applications submitted across the eight occupations of interest. For each occupation, Table 3.2 provides 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 were nearly 2,000 applications submitted. As a result, those three occupations accounted for the majority of all applications. The fourth column of Table 3.2 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 one-third of 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. Minimum salaries across occupation categories were relatively tightly clustered, with all occupations reporting an average minimum salary between $55,533 and $72,010.

Summary statistics for résumé attributes, both overall and by experimental condition, are shown in Table 3.3. In particular, this table focuses on four sets of attributes that differed within applications to the same job opening: the race/gender suggested by each applicant's name, the work history version listed, 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. For example, 25.2 percent of résumés showed a name that suggested the applicant was a Black woman, and 25.1 percent of those résumés listed a master's degree from a primarily online institution. The final column presents the results of chi-squared tests that jointly assess whether the listed attributes and experimental conditions are independent. For all four sets of attributes, the results of these chi-squared tests help affirm that the randomization process worked as intended.

3.4.6 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 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.[20] For each

instance of an interview callback or other positive response, I recorded the date, type of response

(i.e., whether a direct interview callback), and mode of contact. In the case of email responses, I

also saved the text of the message. In all cases, 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 for the position.[21]

     Table 3.4 displays the descriptive results for employer responses. Overall, 5.6 percent of

applications received some form of positive response. Of those, more than three-quarters

involved a clear request to schedule an interview, resulting in an interview callback rate of 4.3

percent. Across the four treatment groups, the unadjusted rate of positive responses ranged from

5.2 percent to 5.7 percent, with no group measurably different from the others. In contrast, the

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[20] 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 job opening.
[21] 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.

rate of positive responses showed strong variation based on the race and gender suggested by the applicant's name. As also shown in Figure 3.2, 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). Thus, résumés with names corresponding to Black men received positive responses from employers at a rate that was approximately 30 percent lower than those of résumés with names corresponding to White applicants. The positive response rate for candidates with names suggesting they were Black women (5.7 percent) was not significantly different from the rate for each of the other three individual race/gender groups at conventional levels. Pooling the submissions by suggested race, though, the results demonstrate that the positive response rate for Black applicants was roughly 20 percent lower than employers' positive rate to White applicants (5.0 percent vs. 6.2 percent, respectively).

Table 3.4 also provides an overview of variation in positive response rates by occupation, metropolitan area, and the minimum salary listed. 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, which accounted for the majority of job openings, the positive response rate was 4.7 percent.

3.5 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 for the parameters of interest. In the main analysis, I use logistic regression to compare each master's treatment group to the bachelor's-only group. Due to the comparatively low rates of positive responses, logistic regression may be better-suited to the data than a linear probability model (Long, 1997). The primary model of interest is outlined in equation 1, as follows:

$$\ln \left(\frac{Y_{ijm}}{1 - Y_{ijm}} \right) = \beta_0 + \beta_1 forprofit_i + \beta_2 online_i + \beta_3 regional_i + X_{ijm}\beta + \epsilon_{ijm} \quad (1)$$

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 of $forprofit_i$, $online_i$, 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 years of work experience (based on bachelor's graduation year), 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, within which there is no variation by suggested race, suggested gender, metropolitan area, or occupation type. For instance, as a result of blocking by race and gender, all applicants to a single job opening have the same suggested race and gender as one another.

For subgroup analyses, I use equation 1 after restricting the sample to groups of interest (e.g., job postings that explicitly list a preference for candidates with master's degrees). I cluster standard errors at the level of the job opening.

As a robustness check to determine the salience of functional form for the estimates, I also ran the regression using a linear probability model. The specification for the linear probability model is listed in equation 2:

$$Y_{ijm} = \beta_0 + \beta_1 forprofit_i + \beta_2 online_i + \beta_3 regional_i + X_{ijm}\beta + \epsilon_{ijm} \qquad (2)$$

The measures in equation 2 align with the description provided for equation 1.

3.6 Results

3.6.1 Main regression estimates

Table 3.5 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. This table presents marginal effects from the logistic regression model described in equation 1. I control for four primary sets of attributes that differ within résumés submitted to a particular job opening: the order submitted, the undergraduate graduation year (and, correspondingly, years of work experience), the résumé template used, and the undergraduate institution listed. Elements of the résumé such as the applicant's suggested race/gender, metropolitan area, and occupation did not vary among applications to a particular job opening, and are therefore absorbed through the clustering at the level of the job opening.

Relative to the bachelor's-only group, which serves as the omitted reference group, the results in Table 3.5 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 0.4-0.5 percentage points for the regional master's group (8-9 percent of

the baseline mean), 0.6-0.8 percentage points for the online master's group (14-15 percent of the

baseline mean), and 0.7 percentage points for the for-profit master's group (11-16 percent of the

baseline mean).

3.6.2 Robustness checks for the main regression estimates

I also explore several checks to determine the robustness of the results in Table 3.5 to

various alternative specifications and restrictions. The first set of these checks is presented in

Appendix Table 3.4. As an initial check, for the first set of estimates in Appendix Table 3.4, I re-

ran the logistic regression model without clustering at the level of the job opening. Instead, I

explicitly control for additional attributes, including the metropolitan area, occupation, precise

work history listed, race and gender associated with the applicant's name, and the application

month. As shown in the first column of results, these steps result in virtually no change in the

point estimates, with the most noticeable shift being an increase in the standard errors (from 0.5

to 0.9 percentage points).

As a second check, the middle columns restrict 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 is 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 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 3.5, 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 3.4 examines the robustness of the results to the exclusion of cases in which all four applications received a positive response from the employer. 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 3.4 displays estimates that closely resemble the primary regression estimates.

As a final check, Appendix Table 3.5 depicts the results from a linear probability model rather than a logistic regression. In alignment with the main findings, the linear probability model yields no estimates that are significant at conventional levels. Further, all point estimates are negative, with roughly similar magnitudes to those shown in Table 3.5. Much like the primary estimates based on logistic regression, the results from the linear probability model rule out effects as small as 0.4-0.5 percentage points for the regional master's group, 0.6-0.9 percentage points for the online master's group, and 0.7-1.0 percentage points for the for-profit master's group (8-9 percent, 14-15 percent, and 16-17 percent of the bachelor's-only mean, respectively).

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.

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

To examine potential heterogeneity in effects, Table 3.6 provides marginal effects estimates for four subgroups. The first set of results separately analyzes effects for the four race/gender groups in 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 a regional master's degree were 2.3 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 decrease of 37 percent in terms of 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 3.6 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. In fact, for positions that preferred a master's degree, résumés listing an online master's received a positive response rate that was 1.3 percentage points (28 percent) below that of their counterparts in the bachelor's-only group. While no other findings based on education requirements are statistically significant, it is not possible to rule out modest positive effects, as noted for the race/gender subgroup analysis.

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 3.6, 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 third and 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 3.6 distinguishes between job openings that listed minimum salaries up to or above the median value of $65,000. Lower-paying positions

offered positive responses at a substantially higher rate (9.5 percent) than higher-paying positions (4.4 percent). Notably, positions with starting salaries above $65,000 offered positive response rates that were 2.4 percentage points higher (54 percent of the baseline) to applications listing regional master's degrees. The for-profit and online master's groups also have positive point estimates for the higher-paying jobs, though they do not reach conventional levels of statistical significance.

3.7 Discussion

Master's degrees have become increasingly common in recent decades, with more than one-fourth of 2007-08 bachelor's recipients earning such credentials (Cominole et al., 2021). As more people pursue master's degrees and take on the debt frequently associated with such degrees, it becomes increasingly important to understand the labor market implications of these credentials. A primary mechanism by which these master's degrees could confer benefits on their recipients is through improved employment prospects. To examine the extent to which employers view master's credentials as markers or signals of economically productive skills, this correspondence study evaluated employer responses to 9,480 applications for positions in business-related occupations that required a bachelor's degree or higher. I focused in particular on three comparatively broad-access types of institutions, which collectively account for two-thirds of all master's degrees. These institutions included for-profits, which are able to attract students with their considerable marketing budgets and convenient online formats; other primarily online institutions; and primarily on-campus regional institutions. For reference, a fourth comparison group listed only a bachelor's degree.

Overall, employers offered positive responses to applicants 5.6 percent of the time, equivalent to approximately 1 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 comparatively lower rate of positive responses observed in this study. First, 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. Additionally, due to the considerable uncertainty about operations in the pandemic, a higher proportion of posted job searches may have been halted than in a typical year, further diminishing the positive response rate. Second, whereas prior studies have often focused on entry-level positions that sought candidates with no more than a bachelor's degree, nearly 40% of positions in this study explicitly listed a preference for master's degrees. In the competitive market for candidates with master's degrees, employers may have a greater propensity to fill positions through internal promotions or through networking than in the context of other correspondence studies. Finally, because this study 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 personalized positive responses.

These positive response rates 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

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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 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.

In addition to these descriptive findings, 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 master's degree 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 (i.e.,

for-profit, online, and regional institutions) received a higher rate of positive response than the

others. Even 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 not

appear to differentially prefer certain types of broad-access master's degrees over others, but

they also did not significantly differentiate between candidates with only a bachelor's and those

with broad-access master's degrees. The main findings therefore indicate that, far from providing

applicants with a boost in the hiring process, the master's degrees 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 broad-access master's degrees imparted additional information that encouraged employers to differentially pursue candidates with those credentials. Under this explanation, employers may not have perceived the master's degree programs examined as developing students' human capital or signaling desired skills and qualities. Assuming such a scenario, employers would have made decisions based on the remainder of the randomly assigned attributes, yielding no difference in positive responses by education background.

Alternatively, a second explanation could be that employers perceived differences in applicant qualifications based on their master's degree background, but other factors resulted in equivalent responses to applicants. For example, while employers may have viewed certain candidates as better-qualified than others, assumptions about likely employment duration or applicants' salary requirements may have offset the skills advantage. 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 A6, which shows that real-world earnings in the first year after receiving a master's in business differed substantially across the institutions listed in the experiment, ranging from $58,900 for those who earned a master's at for-profits to $86,300 for those who earned a master's at a regional institution. Concerns about meeting salary expectations may also help explain the negative effect of regional master's degrees 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 3.6, which show that job openings listing a starting salary above $65,000 had elevated rates of positive response for regional master's degrees (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 master's credentials for higher-salary jobs.

A third explanation is that employers have preferences based on applicants' master's degree backgrounds, but that they were not familiar with the specific institutions mentioned in the experiment. I took several steps to minimize this possibility. The graduate institutions included the 9 for-profit and 10 online institutions that grant the most master's degrees nationwide, and the regional institutions for each metropolitan area included 2 large institutions that were likely to significant regional name recognition. This means that the results are based on a variety of institutions that reflect each sector, rather than being contingent on a single arbitrary example. To confirm that the breadth of institutions does not itself introduce challenges, one of the robustness checks restricts the for-profit and online institutions to only the four institutions with the largest enrollments nationwide. Even after restricting the sample to these four most conspicuous institutions in the for-profit and online groups, the results in Appendix Table A4 substantially reaffirm the main findings. 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 3.6, 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

master's treatment groups were not preferred—and, in fact, candidates with online master's

degrees received a lower rate of positive responses than bachelor's-only candidates. 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 master's degrees

from R1 institutions, but not any of the broad-access institutions included in the study.

3.7.1 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. This outcome is common among correspondence

audit studies, but may present challenges for interpretation. For instance, in this approach, it is

not possible to track a fictitious applicant through to the point of an official job offer. While it

would be useful to be able to directly observe eventual employment offers, Bertrand and

Mullainathan (2004) have emphasized that employer callback rates are informative about such

later-stage outcomes. If anything, recent research from Quillian, Lee, and Oliver (2020) suggests

that additional racial discrimination tends to be evident at later stages of the hiring process. Even

if this study were able to track through to the point of job offers, though, it might not cover the

most salient outcomes for some individuals who pursue master's degrees. For example, rather

than seeking to obtain a new position, some students enroll in master's programs to improve their

prospects for raises or promotions within their current role, and others pursue the degree 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 that individuals seek to achieve through their pursuit of a master's degree. For

individuals who pursue a master's degree for other reasons, such as a desire to advance within

their current organization or because of an intrinsic interest in learning, a different outcome may

be of greater relevance.

Second, there are generalizability constraints for this study based on the degrees,

occupations, and regions studied, as well as the application format and method of signaling race

and gender. For instance, employers may respond differently to master's degrees in health and

education than they do to the master's degrees in business that this study examines. Given that

the field of business accounts for one-quarter of all master's degrees (including one-third of

master's degrees from for-profits), the emphasis on business degrees nevertheless covers a

substantial portion of degrees earned. Similarly, while not all individuals with a master's degree

in business pursue a career in one of the business-related occupations examined in this study, this

experiment covers job openings that represent a major subset of career options for master's

recipients. Additionally, the study setting focuses on metropolitan areas, and there is the

possibility that employers in other segments of the country might have different responses. For

example, in more rural areas, such as Montana, there may be a more favorable reception to

master's degrees earned online than one might detect in major urban centers. Despite this, the

fourteen metropolitan areas examined cover a vast pool of the nation's workforce, and include

locations that vary in terms of major industries, demographic characteristics, and population

growth rates. 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 online master's degree programs, who may not experience the type of sustained, in-person interaction with faculty and peers that is conducive to professional networking. Finally, as detailed earlier, this study signals applicants' race and gender through their names. Because of this approach, the findings are most generalizable to individuals whose names are distinctive in terms of race and gender. In future research, it would be worthwhile to explore alternative methods for signaling race and gender, particularly if the racial or gender distinctiveness of names becomes less common over time. However, such efforts should take care to avoid signaling additional attributes simultaneously (e.g., listing membership in the African Methodist Episcopal Church would convey racial identity but also religiosity).

Third, this type of résumé correspondence study does not enable one to discern whether the observed effects are more aligned with human capital theory or signaling theory. Under human capital theory, it may be the case that some institutions provide fewer labor market skills, which employers observe over time and to which they respond accordingly. Alternatively, in accordance with signaling theory, employers may be using institutional characteristics to infer differential underlying ability. This study's design cannot differentiate between the relative roles of human capital formation and signaling in generating any differences in observed outcomes.

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[22] Although there are no definitive data on the share of positions filled through employee referrals, a study of 1000 employers found that referrals accounted for about one-third of hires in 2016 (SilkRoad, 2017).

Finally, it is important to acknowledge that 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 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, Shoag, & Balance, 2020). As a result, these conditions, while unique, may represent the kind of scenario for which individuals imagine their master's degree will prove useful in terms of their employment prospects. That the findings frequently suggest no advantage for the master's degrees examined relative to a bachelor's degree is therefore all the more striking.

3.8 Conclusion

The academic institutions examined in this study account for more than two-thirds of all master's degrees granted in the United States (see Table 3.1), 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 a master's degrees in business 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 broad-access master's degrees in business are an effective means of increasing a new employer's interest in a job candidate. Overall, candidates with master's degrees from for-profit, online, and regional institutions fared no better than otherwise comparable applicants who only had a bachelor's degree.

By focusing on a suite of options that may represent the substantial choice set for a large number of prospective master's applicants (i.e., master's enrollment at broad-access institutions or no master's enrollment at all), 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 master's degrees in business at the institutions examined (see Appendix Table A6) in addition to other financial and time costs, the finding that new employers did not reward the master's degrees early in the hiring process may diminish their enthusiasm for the credentials. In future work, it could be valuable to examine to what extent awareness of this outcome influences the graduate school decision-making of prospective master's 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.

Another notable finding for employers was that even for positions that explicitly mentioned a preference for master's degrees, employers did not demonstrate a preference for master's-degreed candidates (and, in fact, significantly disfavored online master's degrees). 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 R1 institutions, which were not included in this study? Alternatively, if employers do not exhibit a preference for master's degrees from any type of 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 master's-granting institutions, 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), this study does not find meaningful differences in employers' responses to applicants with master's degrees from for-profit, online, and regional institutions. Further, with none of the master's degrees 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 master's degrees in business 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 master's 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 discrimination detected against applicants in the experiment who were likely to be perceived as Black men. This finding 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. Second, the finding that employers responded to candidates similarly regardless of their master's degree background may raise concerns about the debt burdens students take on as they pursue broad-access master's degrees. 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 master's programs and ensure master's students can successfully repay the amounts they do borrow. Absent such steps, the broad-access master's degrees examined in this study appear to run the risk of contributing to students' debt load without substantially altering their employment prospects.

Table 3.1. Master's degrees awarded in 2017-18, 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), 2017-18 Completions.
Note: R1 = 2018 Carnegie Classification "Doctoral Universities: Very High Research." 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 3.2. Details on selected occupations of interest

Occupation category	Example job titles	Applications submitted	Share of applications submitted to positions listing master's degree as preferred	Average minimum salary listed
General and operations managers	General manager, business 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, product 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, salesperson	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, demographic 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

Note: Salary information is based on 3,128 applications to job postings that provided a salary range. Applications were submitted between April and November 2020.

Table 3.3. 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 history						
Work history #1	0.250	0.245	0.253	0.261	0.240	
Work history #2	0.250	0.249	0.240	0.238	0.273	
Work history #3	0.250	0.257	0.260	0.252	0.231	
Work history #4	0.251	0.247	0.247	0.248	0.257	> 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	

Note: 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 1 due to rounding.

Table 3.4. 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 3.5. Effect of master's degree background on probability of positive response and interview callback

	Outcome: Positive response		Outcome: Interview callback	
	Estimates	Percent of sample mean	Estimates	Percent of sample mean
Treatment group				
For-profit master's	-0.0003 (0.0051) [0.9467]	-0.5	-0.0018 (0.0046) [0.6868]	-4.0
Online master's	-0.0015 (0.0052) [0.7676]	-2.6	-0.0029 (0.0046) [0.5297]	-6.4
Regional master's	-0.0053 (0.0053) [0.3128]	-9.2	-0.0054 (0.0046) [0.2416]	-11.9
Résumé order	X		X	
Undergraduate institution	X		X	
Undergraduate year	X		X	
Template version	X		X	
Race/gender suggested	X		X	
Mean for bachelor's-only group	0.0574		0.0452	
Applications	9,480		9,480	

Notes: Table reports marginal effects from a logistic regression 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. *** < .01; ** < .05; * < .10

Table 3.6. Effects of master's degree background on probability of positive response, by subgroup

	Observations	Positive response for bachelor's-only	Marginal effect (standard error)		
			For-profit master's	Online master's	Regional master's
Race/gender					
Black women	2,388	0.0565	0.0000	-0.0092	-0.0112
			(0.0092)	(0.0108)	(0.0104)
Black men	2,438	0.0431	0.0097	0.0032	0.0052
			(0.0087)	(0.0104)	(0.0103)
White women	2,333	0.0609	-0.0036	-0.0177	0.0006
			(0.0105)	(0.0115)	(0.0105)
White men	2,321	0.0625	-0.0144	0.0098	-0.0227*
			(0.0126)	(0.0099)	(0.0125)
Education requirement listed					
Bachelor's only	5,745	0.0632	-0.0004	0.0046	-0.0034
			(0.0069)	(0.0070)	(0.0074)
Master's preferred	3,735	0.0439	-0.0010	-0.0125*	-0.0078
			(0.0068)	(0.0075)	(0.0075)
Applications					
Up to 65	2,140	0.0706	-0.0003	-0.0057	-0.0084
			(0.0110)	(0.0118)	(0.0125)
More than 65	2,111	0.0531	-0.0076	-0.0088	0.0098
			(0.0115)	(0.0117)	(0.0102)
Salary range (starting point)					
Up to $65,000	1,781	0.0949	-0.0047	-0.0197	-0.0006
			(0.0147)	(0.0157)	(0.0146)
More than $65,000	1,347	0.0438	0.0129	0.0082	0.0235*
			(0.0110)	(0.0137)	(0.0123)

Notes: Table reports marginal effects from a logistic regression model. 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

Figure 3.1. Weekly job openings posted, by region and occupation
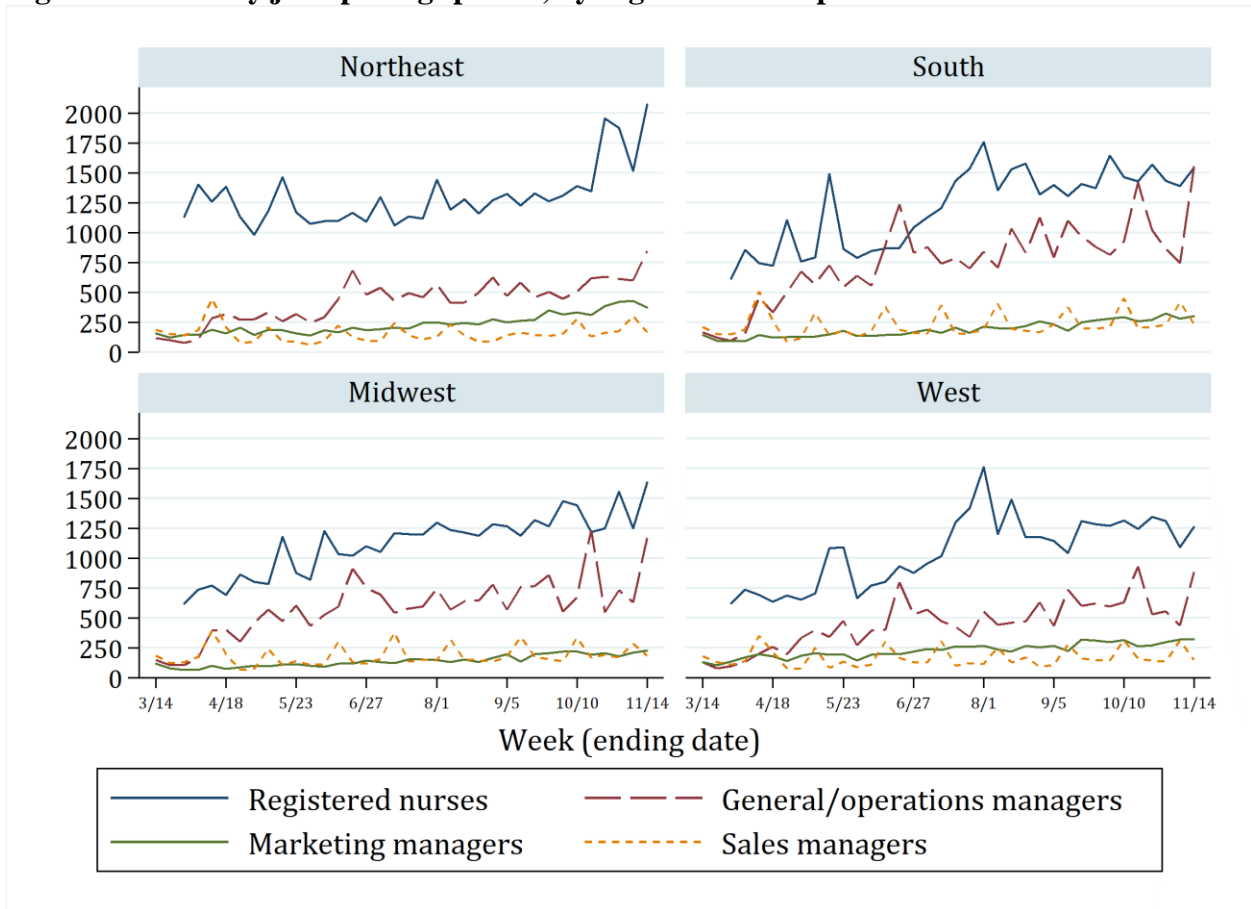
Figure 3.2. Positive response rates, by race/gender suggested through the applicant's name
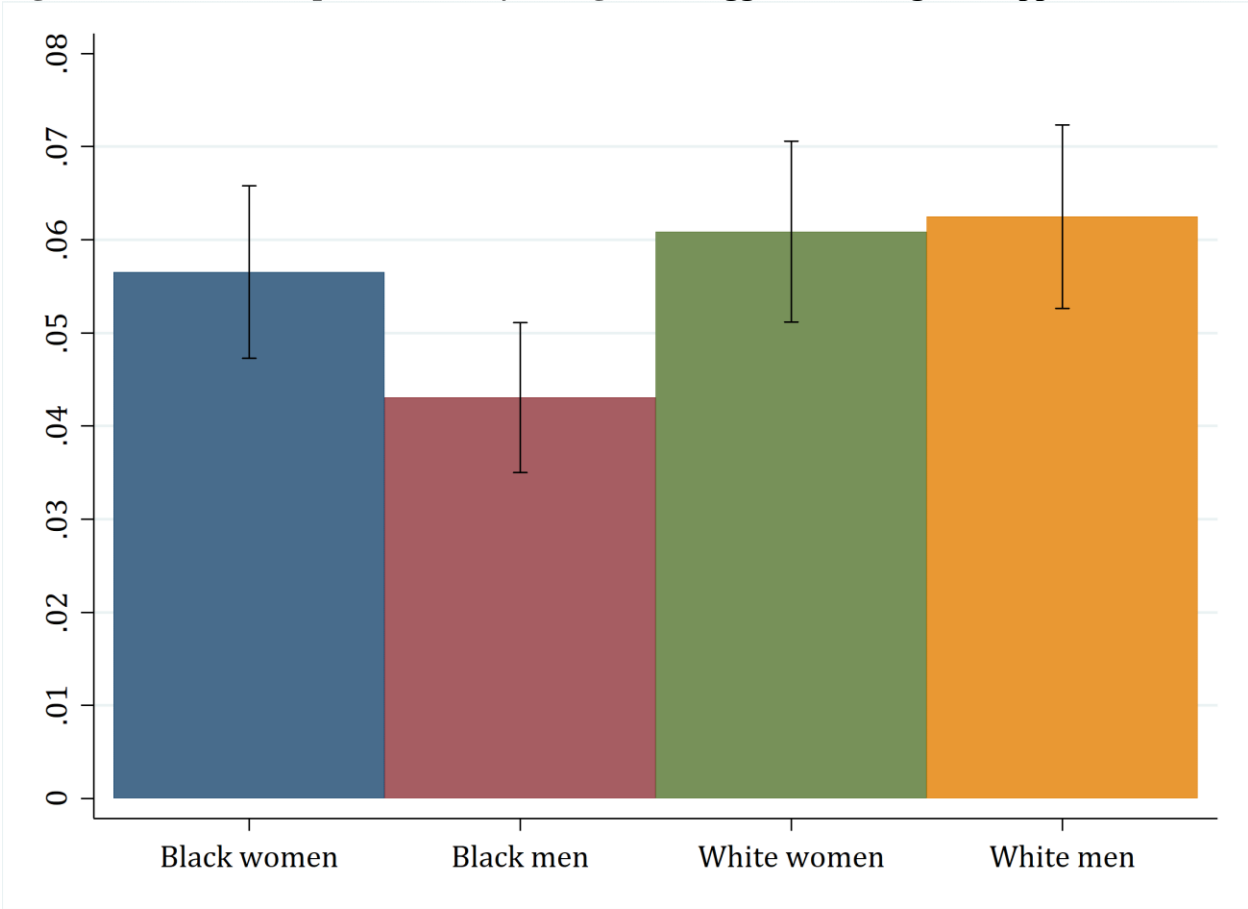
Appendix Table 3.1. Names used in experiment for applicants to convey race and gender

	Gender	
Race	Women	Men
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

Appendix Table 3.2. Institution names used for graduate degrees

Online not-for-profit institutions

Western Governors University

Southern New Hampshire University

University of Maryland Global Campus

Liberty University

Wilmington University

Brandman University

National University

Colorado State University-Global Campus

Indiana Wesleyan University

Saint Leo University

For-profit institutions

University of Phoenix

DeVry University

Strayer University

Grand Canyon University

Ashford University

Walden University

South University

Capella University

American Public 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.

Appendix Table 3.3. 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

Appendix Table 3.4. Robustness checks for effect of master's degree background on probability of positive response

	Not clustered at the job level		Restricted to four most common for-profit/online institutions		Dropping cases with four callbacks	
	Estimates	Percent of sample mean	Estimates	Percent of sample mean	Estimates	Percent of sample mean
Treatment group						
For-profit master's	-0.0007	-1.2	-0.0002	-0.3	-0.0004	-0.3
	(0.0091)		(0.0059)		(0.0051)	
	[0.9370]		[0.9740]		[0.9441]	
Online master's	-0.0015	-2.6	-0.0028	-4.9	-0.0015	-3.1
	(0.0091)		(0.0058)		(0.0053)	
	[0.8706]		[0.6322]		[0.7753]	
Regional master's	-0.0059	-10.3	-0.0054	-9.4	-0.0054	-11.3
	(0.0089)		(0.0053)		(0.0053)	
	[0.5032]		[0.3051]		[0.3050]	
Résumé order	X		X		X	
Undergraduate year	X		X		X	
Template version	X		X		X	
Undergraduate institution	X		X		X	
Race/gender suggested	X		X		X	
Occupation indicator	X					
Skills indicator	X					
City indicator	X					
Application month	X					
Bachelor's-only group mean	0.0574		0.0574		0.0478	
Applications	9,480		8,298		9,384	

Notes: Table reports marginal effects from a logistic regression model. In the middle columns, the four for-profit institutions were the University of Phoenix, DeVry University, Strayer University, and Grand Canyon University; online institutions were Western Governors University, Southern New Hampshire University, the University of Maryland Global Campus, and Liberty University. Standard errors are clustered at the level of the job opening, except as noted. Standard errors are shown in parentheses, and p-values are shown in brackets. The bachelor's-only group serves as the omitted reference group. *** < .01; ** < .05; * < .10

Appendix Table 3.5. Linear probability model results for effect of master's degree background on probability of positive response and interview callback

	Outcome: Positive response	Outcome: Interview callback
Treatment group		
For-profit master's	-0.0004	-0.0019
	(0.0051)	(0.0046)
	[0.9341]	[0.6804]
Online master's	-0.0016	-0.0028
	(0.0052)	(0.0046)
	[0.7636]	[0.5361]
Regional master's	-0.0053	-0.0054
	(0.0053)	(0.0047)
	[0.3099]	[0.2381]
Résumé order	X	X
Undergraduate institution	X	X
Undergraduate year	X	X
Template version	X	X
Race/gender suggested	X	X
Overall sample mean for bachelor's-only group	0.0574	0.0452
Applications	9,480	9,480

Notes: Columns report results 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. Bachelor's-only group serves as the omitted reference group. *** < .01; ** < .05; * < .10

Appendix Table 3.6. Stafford and Grad PLUS Loan debt and earnings of master's recipients in business, by graduate institution type

Sector	Mean loan debt	Post-master's earnings
For-profit treatment group institutions	$45,773	$58,929
Online treatment group institutions	$39,210	$67,230
Regional treatment group institutions	$46,468	$86,309
R1 institutions	$54,016	$100,919

Notes: R1 = 2018 Carnegie Classification "Doctoral Universities: Very High Research." Data come from the College Scorecard for cohorts in academic years 2016-17 and 2017-18 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.

CHAPTER 4

On the tenuous track: Contingent faculty unionization at 4-year private, nonprofit institutions

4.1 Introduction

While there has been a 26 percent decline in the number of tenure-track job openings over the past four decades (AAUP, 2016), academia still represents a common employment sector for graduate degree recipients, especially those who earn a doctorate. Roughly half of recent doctorate degree recipients secure a position in academia (NSF, 2019a), and two-fifths of science and engineering doctorates at all career stages work in academia (NSF, 2019b). This third paper examines a burgeoning movement that affects a subset of such graduate degree recipients in academia.

In recent decades, the composition of the U.S. academic workforce has undergone a stark shift in terms of the proportion of faculty potentially eligible for tenure protections (Kezar & Maxey, 2012). Contingent faculty, a collective term used to describe an array of non-tenure-eligible faculty, accounted for just 34 percent of the academic workforce in 1975, but they came to represent 57 percent by 2015 (Shulman et al., 2017). In recognition of the increasingly large role of such contingent faculty in the higher education system, members of one prominent advocacy group for contingent faculty named their organization the New Faculty Majority. Contingent faculty hold a variety of titles (e.g., adjunct, instructor, lecturer), may work on a full-or part-time basis, and have contracts of varying lengths. Across all institution types, however,

the plurality of contingent faculty members work on contracts of one year or less (Hurlburt &

McGarrah, 2016).

Prior research has identified a number of potential explanations for this shift towards

contingent positions as the predominant faculty classification. From the individual agency

perspective, Gappa and Leslie (1993) suggested that contingent faculty have one of four primary

motivations for holding such positions. For "professionalists, specialists, or experts," the

contingent faculty role is secondary to their primary employment outside of academia (e.g., as a

statistician, lawyer, or business executive) and a way to share their technical knowledge. Another

group of contingent faculty members are "career enders," who are working part-time while

transitioning to retirement. Gappa and Leslie (1993) suggest that a third faction includes

"freelancers," which they use to describe individuals who prefer to work in a part-time role in

order to increase their flexibility (e.g., because of family responsibilities). The final category,

"aspiring academics," include individuals who work in contingent faculty roles but would prefer

to have tenure-track positions. Gappa and Leslie (1993) identified that "aspiring academics"

comprised only 16 percent of contingent faculty in the early 1990s. However, by 2012, more

than 70 percent of part-time faculty indicated that they would prefer a full-time role, suggesting

that the "aspiring academics" group has grown to constitute the majority of contingent faculty

(Coalition on the Academic Workforce, 2012).

At the same time, multiple factors have contributed to the structural rationale for colleges

and universities to hire contingent faculty. Among the most commonly cited reasons for

expansion of the contingent workforce are long-term decreases in state funding, overall increases

in enrollment, and a desire for flexibility in staffing for courses (Gappa, 2000; McNaughtan,

García, & Nehls, 2017). Perhaps no motivation for increased hiring of contingent faculty appears

to be stronger than the financial incentive, with institutions incurring lower costs for contingent faculty than tenure-track faculty members on several dimensions (Ehrenberg & Zhang, 2004; Zhang, Ehrenberg, & Liu, 2015). For instance, in 2010, the median pay per semester-long course for part-time faculty was $2700, amounting to $90 per student for a 30-student course; even at 4-year doctoral/research institutions, the median pay per course was just $3400 (Coalition on the Academic Workforce, 2012). After controlling for individual and institutional characteristics, full-time and part-time contingent faculty members receive 26% and 64% less per hour than their tenure-track counterparts, respectively (Monks, 2007). Contingent faculty members also typically receive few, if any, health or other benefits from the institutions at which they work, leading to a series of new reports in recent years about adjunct faculty who receive food stamps and other means-tested benefits (Brennan & Magness, 2016; Hurlburt & McGarrah, 2016; Patton, 2012).

Against this backdrop of rising representation among faculty but relatively low compensation, contingent faculty members have initiated efforts to engage in collective bargaining with the institutions at which they work. Despite widespread changes in the number of contingent faculty members, however, such unionization efforts are the exception, rather than the rule. While a substantial body of research has examined the functions and governance of faculty unions (e.g., Dobbie & Robinson, 2008; Kezar & Sam, 2014; Myers, 2011), little prior research has examined institutional factors associated with the decision to form a contingent faculty union. This gap is particularly acute for 4-year private, nonprofit institutions, where the contingent faculty unionization movement has only recently expanded, in part through concerted campaigns among national unions, such as SEIU's Faculty Forward initiative (SEIU, 2019). At these 4-year private, nonprofit institutions, approximately two-thirds of faculty members—over a

quarter of a million faculty—are not in positions where they have the potential to earn tenure (Chronicle of Higher Education, 2019). To examine the role of institutional context in contingent faculty union formation, this study therefore focuses on the 4-year private, nonprofit sector of higher education. Specifically, this study seeks to address two primary research questions:

1) How many 4-year private, nonprofit institutions held a union certification election for a contingent faculty union between 2001 and 2018, and how do the characteristics of those institutions compare to institutions that did not hold a vote?

2) How did the likelihood of holding a certification election for a contingent faculty union vary according to institutional attributes and organizational context?

In exploring these questions, I draw on two strands of literature from sociology and organizational theory: isomorphic pressures and institutional logics. These theories suggest several contextual factors that may differentiate institutions where unionization votes occurred from those where votes did not occur. Using an event history analysis based on data from the National Labor Relations Board (NLRB), which certifies union elections for private organizations, and other institution- and state-level sources, this study examines the relationship between organizational attributes and the propensity to hold a contingent faculty unionization election. Findings from this effort provide additional context for the burgeoning movement towards unionization of contingent faculty members at private colleges and universities, suggesting the types of institutions where such unionization efforts are more or less likely to occur.

4.2 Literature review and background

4.2.1 Unionization among tenure-track/tenured faculty

There is extensive evidence on the motivations that tenure-track and tenured faculty members express for seeking to participate in collective bargaining. In early work, Brown and Stone (1977) identified several potential motivations for collective bargaining in academia. These motivations included increased salary and compensation levels overall, as well as a desire for greater equity in salary and compensation between faculty at different ranks and in different fields. Bargaining goals for faculty extend beyond salary and compensation, as well. Using a survey of faculty at eight Canadian universities, Ponak, Thompson, and Zerbe (1992) sought to identify faculty members' preferences for bargaining on three broad types of issues: traditional bargaining goals (e.g., salaries and job security), academic bargaining goals (e.g., promotion and tenure decisions), and policy bargaining goals (e.g., availability of facilities). Overall, they found the vast majority of faculty surveyed were in favor of traditional bargaining goals for topics such as salaries and benefits (80 percent), whereas a minority were in favor of using collective bargaining procedures for academic issues such as the design and use of teaching evaluations (31 percent) and policy goals such as the use of office facilities (27 percent). The perceptions of the utility of collective bargaining in the study from Ponak, Thompson, and Zerbe (1992) were from individuals who had worked in a context that enabled them to observe the results of years of negotiations.

There may be reason to believe that contingent faculty in the United States would have different initial preferences of topics for bargaining, though, since they generally have no long-term legacy of such prior bargaining efforts. In a study of faculty members at an institution where union membership was optional, researchers found that faculty were more likely to join a union if they were dissatisfied with their position, identified themselves as liberal, and perceived the union to have a high degree of efficacy (Goldey, Swank, Hardesty, & Swainn, 2010). Such

rationales for faculty union membership align closely with more general theories of support for unionization, which posit that factors increasing one's motivation to join a union include deprivation (i.e., a gap between experiences and expectations in workplace conditions), anger (i.e., intense animosity towards the employer as a result of the deprivation), the perceived utility and efficacy of the union, and feelings of solidarity and shared identity with fellow employees (McClendon, Wheeler, & Weikle, 1998).

Work examining the impacts of unionization for faculty members as a whole has revealed mixed findings. In a study of 4-year public institutions in the U.S. that had unionized by 1975-76, Brown and Stone (1977) found no significant change in faculty salary and compensation following unionization (after accounting for national trends), no reduction in the difference between the salary and compensation of different faculty ranks, and no change in the growth rate in the number of upper-rank faculty members (used as a proxy for promotion potential). In contrast, looking at a range of domains over which faculty may exert some degree of decision-making authority, Porter (2013) found that the causal effect of faculty unions was, in fact, largest on setting faculty salary scales. Porter also found strong positive impacts on faculty unions in a range of domains beyond compensation, including their role in tenure and promotion processes, determining the curriculum and types of degrees offered, setting teaching loads, and making decisions about faculty governance. One notable constraint of Porter's work, however, is that it relies on administrators' perceptions of faculty decision-making authority rather than objective measures that indicate the level of control faculty exert on these domains.

4.2.2 Unionization among contingent faculty

A narrower range of studies have looked at the potential motivations that contingent faculty members in particular have for seeking to bargain collectively. Some of the most common goals of unionization for contingent faculty include receiving higher pay, greater job security, health benefits, family and medical leave, administrative support, and office space (Gehrke & Kezar, 2015). Gehrke and Kezar (2015) found that academic deans generally express that they are supportive of policies and supports that align with these goals for contingent faculty, but most commonly cite budgetary reasons for not offering the benefits mentioned. Prior research has identified the absence of job security as a particularly acute concern, given the short-term nature of employment contracts for contingent faculty (Waltman et al., 2012). Through focus groups with contingent faculty members, researchers have noted the act of taking on additional, uncompensated responsibilities in the department (e.g., serving on committees, advising students) as a strategy contingent faculty use to convey their commitment to an institution as part of an effort to combat the lack of job security (Waltman et al., 2012). Consistent with this finding, separate research has shown that at institutions with higher proportions of contingent faculty (relative to tenure-track faculty), the contingent faculty take on a greater share of work on committees, for which they usually do not receive additional compensation (Gehrke & Kezar, 2015).

Faculty governance is another area in which contingent faculty members have expressed dissatisfaction (Waltman et al., 2012). Contingent faculty members typically lack a vote in decisions related to faculty governance, leading to potential concerns that the experiences and viewpoints of contingent faculty members are not adequately represented in university decision-making processes (Dobbie & Robinson, 2008). In some cases, contingent faculty members are not even permitted to attend departmental or institution-wide faculty meetings, further

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reinforcing feelings of exclusion from the university decision-making processes (Waltman et al., 2012). Based on interviews with faculty at universities with some of the most extensive policy supports in place for contingent faculty, researchers found inclusion in faculty governance to be a key mechanism for implementing policies to benefit contingent faculty (Kezar & Sam, 2013). The mechanisms required to institutionalize the policy supports for contingent faculty members included such steps as developing awareness of obstacles that contingent faculty faced, creating networks including tenure-track faculty, and promoting visibility through data that changed the reference points of key decision-makers, including administrators and others in faculty governance (Kezar & Sam, 2013). There is some evidence that faculty senates and faculty unions tend to operate under a "dual track" model in which the two bodies have different levels of influence over different issue domains (Kezar & Sam, 2013). For instance, Kemerer and Baldridge (1981) observed that over time, university presidents viewed faculty senate to exert greater influence over academic domains (e.g., degree requirements, admissions standards), while unions gradually exerted greater influence on matters related to faculty compensation and working conditions.

Even when contingent faculty members are included in unions, prior work has found variation in outcomes based on whether a union consists of contingent faculty only or both tenure-track and contingent faculty. Contingent faculty members may receive short notice–sometimes just several days or weeks–about whether they will teach a course in the upcoming semester (a model known as "just-in-time" employment), which results in limited preparation time and high degrees of uncertainty (Rhoades & Rhoads, 2003). Examining language in collective bargaining agreements related to such "just-in-time" employment of contingent faculty members, Rhoades (2017) found that 39 percent of contingent-only unions' agreements included

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clauses that require some compensation in the event of class cancellation, compared to just 20 percent of joint contingent/tenure-track unions' agreements. This finding suggests that issues of interest to contingent faculty may be underrepresented in unions where there are multiple employee classifications. Even when contracts include provisions that require advance notice of a course cancellation and compensation in the event of a course cancellation, the number of days' notice required may be minimal and the compensation can be nominal (e.g., $30) (Rhoades, 2017).

Additional work has also focused on the patterns and outcomes of unionization for contingent faculty members in particular. On unionized campuses (primarily at public institutions), Gehrke and Kezar (2015) found that contingent faculty are more likely to receive medical benefits, medical leave, and multi-year contracts, and less likely to serve on committees than contingent faculty elsewhere; there were no clear patterns regarding the relationship between unionization and administrative support and availability of office space for contingent faculty. In terms of compensation, there is some evidence that part-time contingent faculty members at unionized institutions experienced a significant wage premium relative to their non-unionized counterparts, while full-time contingent faculty members did not (Monks, 2007). Dobbie and Robinson (2008) observed that in Canada, which has a higher level of unionization among contingent faculty than the United States, there has not been a decreased reliance on contingent faculty in the wake of unionization efforts. Notably, Dobbie and Robinson also found substantial variation in reliance on non-tenure-track faculty members by province. This finding regarding province-level variation emphasizes the importance of accounting for geography in the present study.

4.3 Theoretical framework

Despite such prior work that examines the motivations individuals have for unionizing within academia and the outcomes of such unionization, I am not aware of published work regarding the environmental factors associated with unionization efforts at private institutions. In seeking to better understand this phenomenon, I apply two frameworks in my examination of factors associated with contingent faculty unionization. First, the institutional logics approach offers insight into the link between macro-level norms and the demonstrated micro-level behavior of organizations and individuals (Friedland & Alford, 1991). Through a consideration of institutional logics, it may be possible to discern expectations about the role of individual agency in shaping responses to the conditions contingent faculty members face across institutions with various attributes. Second, the neo-institutional concept of isomorphism contends that institutional structures arise not merely through rational-bureaucratic attempts at efficiency, but also through cultural components such as myth and ceremony (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). Incorporating the role of isomorphism may therefore offer additional insight into the expansion of unionization efforts across the 4-year private, not-for-profit university sector.

4.3.1 Institutional logics

Institutional logics comprise the norms and modes of interpretation that underly an institution's basis of authority (Haveman & Rao, 1997). For instance, Skelcher & Smith (2015) offer seven examples of institutional orders, each with their own unique systems of logic: family, community, religion, state, market, profession, and corporation. Depending on the institutional order to which an organization belongs, the organization will tend to derive legitimacy, authority,

and identity in systematically different manners. For example, whereas an institution within the religious order may derive its legitimacy through faith and sacred texts, an institution under the professional order will tend to derive legitimacy from its expertise in a content area (Skelcher & Smith, 2015). Yet modern universities frequently defy easy categorization into a single institutional order. For religiously affiliated institutions, some domains of the university may operate under logics associated with religion, while still other components of the private universities may exhibit logics more typical of a profession or a corporation. Under such conditions, it may be most fruitful to consider private universities as hybrid organizations. Prior research suggests that hybrid organizations may strategically deploy aspects of their competing institutional logics in a bid to increase legitimacy within the field (Pache & Santos, 2013).

Importantly, the institutional logics approach envisions a strong role for individual agency in interpreting and interacting with the competing logics present within an organization. In aggregate, such agency helps shape the prevailing institutional logics within the organization. Consistent with this notion of individual agency, then, particular institutional attributes may be more or less conducive to responses that include unionization efforts. Additionally, this study proposes that private universities may convey various institutional logics internally to shape the perceived legitimacy of contingent faculty unions, thereby minimizing the likelihood of union formation.

4.3.2 Isomorphism

Meyer & Rowan (1977) contend that the formal rules and structures of organizations are often decoupled from the primary activities the organizations undertake. Relying on myths and a "logic of confidence," organizations within a field tend towards conformity with other

organizations, even when the prevailing structures and rules are not the most efficient means for achieving the technical goals of the organization (Meyer & Rowan, 1977). Extending this argument, DiMaggio & Powell (1983) identify three types of isomorphic pressures: coercive, which primarily arise from political and cultural influence; mimetic, which concern attempts to navigate uncertainty within the environment; and normative, which reflect professionalism. Coercive isomorphism can reflect both formal and informal pressures within an organization's environment, with political and legal contexts serving as prototypical examples of coercive forces. Under conditions of uncertain goals and objectives, mimetic isomorphic pressures can promote organizational adaptation towards conformity with existing organizations in the field, particularly the organizations deemed most prominent. Finally, normative isomorphism results from a shared sense of professional identity for members within an occupation, which spread through professional associations and inter-organizational movement of employees. As explained below, I suggest that all three isomorphic forces may promote a tendency towards unionization under certain conditions.

4.3.3 Hypotheses

Together, the institutional logics approach and isomorphism offer several hypotheses for the anticipated predictors of union certification elections for contingent faculty members. I propose eight specific, testable hypotheses regarding these relationships at private, nonprofit 4-year colleges.

Hypothesis 1: *Controlling for the number of faculty members, an increase in the number of full-time-equivalent students will be associated with an increased likelihood of holding a vote for contingent faculty unionization.* This supposition relies on the tendency of organizations to

adopt increasingly bureaucratic structures as they increase in size and complexity (Mintzberg, 1980). With such a shift towards increased bureaucratization, institutional logics based on the market and corporation are more likely to prevail. Under such institutional logics, contingent faculty may view union formation as the approach most likely to secure compensation, benefits, and improved working conditions.

Hypothesis 2: *The likelihood of holding a contingent faculty unionization vote will increase with greater organizational complexity, as measured through a proxy based on the university's Carnegie Classification.* Special-focus institutions, which primarily focus on one discipline (e.g., art institutes), would represent the least complex structure, with gradually higher levels of complexity (and unionization efforts) at bachelor's-granting, master's-granting, and doctoral/research institutions. This hypothesis is rooted in the dominant institutional logic of the institution. At institutions that only serve undergraduates, for instance, the institutional logic of a profession, family, or religion may seem tenable as the primary logic within the organization. In increasingly complex institutions, however, contingent faculty may feel that logics of the market and corporation predominate, leading to a desire for more formalized agreements that could be secured through collective bargaining.

Hypothesis 3: *As the proportion of part-time faculty members increases, so will the likelihood of holding a contingent faculty union certification election.* This increased pool of part-time faculty will likely include an increasing number of faculty who simultaneously or previously worked at institutions with contingent faculty unions. Through normative isomorphic pressures, with such an increased share of contingent faculty for whom unionized work environments are the norm, there may be a greater tendency to seek a contingent faculty union at the institution. Likewise, as part-time faculty make up a larger share of the faculty at an

institution, there may be diminished concern about being perceived as not conforming to the professional norms of one's tenure-track peers.

Hypothesis 4: *The presence of a religious affiliation will be associated with a lower likelihood of holding a contingent faculty unionization vote.* The logic for this expected outcome is that such universities will be able to draw on institutional logics of religion and family, thereby encouraging loyalty and suggesting alternative means of dispute resolution than collective bargaining. Additionally, through more well-defined norms and obligations (e.g., requirements to sign "statements of faith"), there may be a decreased potential for misalignments between expected and experienced working conditions.

Hypothesis 5: *Institutions in states with "right-to-work" legislation (i.e., restrictions on requirements to join a union or pay union fees) will have a lower likelihood of holding a vote for a contingent faculty union.* With higher barriers to union operation (e.g., union membership cannot be mandatory) in such states, coercive isomorphic forces will constrain the ability of organizers to coordinate the unionization effort. With less potential to receive expertise and technical assistance from organizations within the state, organizing efforts will face additional impediments.

Hypothesis 6: *In states with a higher percentage of workers who belong to a union, there will be a greater likelihood of holding a union certification election, all other factors being equal.* Since the proportion of workers in a union includes tenure-track and contingent faculty at public institutions in the state, this increased tendency towards unionization may be the result of normative isomorphic pressures. Specifically, it may be the case that having elevated shares of the workforce in unions minimizes the stigma of such efforts and provides examples of peers within the contingent faculty members' networks who are engaged in collective bargaining.

Hypothesis 7: *In states with more liberal legislatures, there will be a higher propensity for institutions to hold an election for a contingent faculty union.* Primarily, this is based on the belief that the more liberal legislature is likely to represent a stronger underlying preference for collective action among the residents of the state. This broader pool of support among state residents may create an environment that is perceived as being more hospitable to unionization activity. Consequently, such states would likely present fewer coercive or normative isomorphic pressures discouraging unionization. However, it is also possible that a more liberal legislature would fund a government-supported social safety net that would benefit contingent faculty who receive low pay and few benefits from their work, thereby decreasing some of the motivation for collective bargaining among contingent faculty.

Hypothesis 8: *In states with a greater number of contingent faculty union elections, the odds of holding a contingent faculty union election will be higher*. In states that have held a previous contingent faculty union vote, I anticipate that there will be fewer normative isomorphic pressures against unionization. Similar to Hypothesis 6, in such environments there will be fewer normative isomorphic pressures discouraging unionization behavior, and in fact some contingent faculty at the institution may have participated in one of the previous union certification elections.

4.4 Data and measures

To address these research questions, this study draws on data from several sources. The final dataset has an institution-year format, with one row per year for each institution. Not all institutions held a contingent faculty union election by the final year of the dataset (2018), and

therefore the data will be right-censored. A summary of the data sources used, outlined in greater detail below, is available in Table 4.1.

4.4.1 Dependent variable

The primary outcome variable is a binary indicator of whether a 4-year, private, nonprofit college or university held a union certification election involving contingent faculty members in a particular calendar year. To create this dataset, I examined monthly and annual union certification election reports from the National Labor Relations Board (NLRB), which oversees all union elections at private organizations in the U.S., for January 2001 through December 2018 (NLRB, 2019a). I initially identified candidate institutions based on employer names that included "university," "college," "institute," or "school." I further narrowed the list of potential contingent faculty elections to cases in which the bargaining unit designation was "Professional or Technical" in order to exclude other common employee categories at colleges and universities (e.g., "Guards," which frequently identifies union elections for campus security officers). From this pool of potential union certification elections for contingent faculty members, I reviewed the description of the voting unit associated with the NLRB case number. When the voting unit description included "adjunct faculty," "part-time faculty," "non-tenure-track faculty," "contingent faculty," "instructors," "lecturers," or similar terminology, I designated the election as a contingent faculty union certification election and recorded the date of the election. For each case that I identified as a contingent faculty union certification election, I used the NLRB case number and vote date to search for contemporaneous coverage in regional and national media outlets to assist in verifying my interpretation. Similarly, I searched higher education media sources (e.g., *The Chronicle of Higher Education*, *Inside Higher Ed*) to attempt to identify

contingent faculty unionization votes that I had not identified in prior steps; this step yielded

additional votes at Pacific Lutheran University and the University of La Verne that were not

represented in the final election reports through 2016 (Flaherty, 2014; Jaschik, 2015). Table 4.2

provides the resulting list of private universities that held a contingent union certification

election between 2001 and 2018.

4.4.2 Institution-level variables

The source for several institution-level variables is the Integrated Postsecondary

Education Data System (IPEDS), a series of studies conducted through the U.S. Department of

Education's National Center for Education Statistics. IPEDS variables come from direct

downloads as well as standardized measures available through the Delta Cost Project and the

Urban Institute (Hurlburt, Peek, & Sun, 2017; Urban Institute, 2020). These publicly available

data offer insight into the composition of individual institutions and may help inform campaigns

designed to increase unionization among contingent faculty, such as SEIU's Faculty Forward

initiative.

One measure of interest from IPEDS is the number of students enrolled at the institution,

expressed as the number of full-time equivalent (FTE) students in order to improve

comparability between institutions that serve different proportions of full-time and part-time

students. Along with the FTE student count, the Carnegie Classification serves as a proxy for the

size and complexity of the institution.

In an effort to measure the representation of contingent faculty members among the

academic workforce at an institution, I also include the number of full-time and part-time faculty

members. Because the counts for full-time and part-time faculty members were only collected

every other year, I use the average of the preceding and succeeding years for each missing year. Another caveat in interpreting the outcomes for the variables representing the number of full-time and part-time faculty members is that some contingent faculty members have a full-time designation, and there may be conceptually meaningful differences between contingent faculty who work in full-time versus part-time roles.

I also incorporated the religious affiliation measure from IPEDS based on preliminary information suggesting coordinated organization efforts among contingent faculty at Roman Catholic institutions (Pashman, 2016). I consolidated the numerous religious affiliations available through IPEDS into three classifications: not religiously affiliated, Roman Catholic affiliation, and other religious affiliation. An additional variable used for the descriptive summary is salary information for full-time faculty members; IPEDS did not collect comparable information for part-time faculty members.

4.4.3 Right-to-work status of state

As a measure of the strength of unions in each state, I included an indicator of whether the state had passed "right-to-work" legislation by a given year. These "right-to-work" laws prevent unions from compelling workers to join as a condition of employment and prohibit arrangements through which employers automatically deduct union dues from an employee's paycheck (NCSL, 2020). While they do not prohibit union activity altogether, such restrictions do present barriers to union activity. According to the National Conference of State Legislatures (2020), there were 27 states with "right-to-work" legislation enacted by 2018, although most had passed such legislation prior to 2000. Only a handful of states passed "right-to-work" legislation

during the window examined: Oklahoma (2001), Indiana (2012), Michigan (2012), Wisconsin (2015), West Virginia (2016), and Kentucky (2017).

4.4.4 State union membership

In a related effort to measure how common union membership is among workers in a state, I added the percentage of workers in each state who were members of a union in a given year. Drawn from the Current Population Survey (CPS) of the U.S. Bureau of Labor Statistics (BLS), the value represents the percentage of wage and salary workers who were members of unions, among those who were at least 16 years old (U.S. BLS, 2020). The CPS also includes a measure for the percentage of workers who were represented by unions (including individuals who are not themselves members of a union), but in practice the two values are not substantially different from one another. In the time period observed, state-level union membership rates ranged from a low of 1.6% in South Carolina in 2016 to a high of 26.1% in New York in 2005.

4.4.5 Prior contingent faculty unionization efforts in the state

In addition, I use a variant of the dependent variable to help account for prior unionization efforts specifically for contingent faculty. To do so, I control for the number of contingent faculty unionization votes previously held at private, 4-year colleges within a given state. The state with the most votes was California, where 12 institutions held unionization votes.

4.4.6 Political ideology of state legislature

As a broader measure of the state context in which contingent faculty work, I relied on the NOMINATE measure of state government ideology from Berry and colleagues (2010), as

updated in 2018 (Fording, 2018). This measure of government ideology is based on observed

policy preferences rather than officials' self-identification. The rationale for using an ideological

measure for the state legislature is that political actors at the state level oversee a range of

policies that may affect contingent faculty members' propensity to unionize, such as means-

tested benefits provided through the state. Broadly, scores closer to 0 correspond to more

conservative legislative bodies, while scores closer to 100 correspond to more liberal legislative

bodies. Arizona in 2011 and 2012 had the most conservative government ideology in the time

period observed (with a value of 17.5), while Massachusetts in 2009 and 2010 had the most

liberal (with a value of 73.6).

4.5 Descriptive summary

Table 4.3 provides a descriptive summary of 4-year private, nonprofit institutions overall,

along with similar statistics for the institutions that had held a contingent faculty union vote

between 2001 and 2018. In total, only 64 of the 1568 institutions (4.1 percent) that were 4-year

private nonprofits held a union certification election for contingent faculty members during this

time period. Strikingly, although 4-year private, nonprofit institutions are located in all 50 states

and the District of Columbia, the institutions that held contingent faculty union certification

elections were located in just 14 states. In fact, four jurisdictions accounted for nearly 60 percent

of the institutions that held contingent faculty union votes: California (12 institutions), New York

(11 institutions), Massachusetts (8 institutions), and Illinois (6 institutions). This strong

concentration of unionization efforts in several states aligns with the Adjunct Action and,

subsequently, Faculty Forward campaigns of the SEIU, which targeted organizing efforts into a

limited number of metropolitan areas, including Washington, D.C., Boston, San Francisco, Los Angeles, St. Louis, and Seattle (SEIU, 2020).

Table 4.3 also includes details on several measures available from IPEDS for the 2017-18 academic year. In terms of the FTE student count, it is clear that the institutions that held a contingent faculty union vote were much larger than the typical peer institution, with a median student count (2,991) three times as large as the median for institutions that did not hold a vote (1,040). The compensation for full-time faculty members represents another area of departure from the rest of the sector. At the institutions that held a union certification election for contingent faculty, the median salary for full-time faculty was $81,847, significantly higher than the nearly $60,577 median for other institutions in the sector. Two caveats are worth bearing in mind regarding the salary information. First, as noted earlier, the full-time faculty salary information includes some contingent faculty members. Second, a high proportion of the institutions with the lowest salaries for full-time instructors are small, religiously affiliated institutions. As a result, the median based on unweighted institution-level data may differ from a median that takes into account the number of faculty at each institution.

Regarding the proportion of faculty members who worked part-time (a subset of contingent faculty members), there does not appear to be a difference between the institutions that held a contingent faculty unionization vote (50.4 percent part-time) and those that did not (50.0 percent part-time). In terms of religious affiliation, institutions at which a vote occurred had a nominally higher level of Roman Catholic affiliation (25.0 percent versus 13.4 percent), though the difference does not reach the level of statistical significance in a Student's t-test. Of the 64 institutions that held a contingent faculty union vote by 2018, only two were located in

states with "right-to-work" legislation (3.1 percent), compared to 42.6 percent of the institutions in the sector as a whole.

The 4-year private, nonprofit university sector encompasses a wide array of institutions. Overall, relatively few institutions that did not hold a contingent faculty union vote were classified in Carnegie classifications for research and doctoral universities (6.2 percent). Among the institutions that did hold a vote for contingent faculty unionization, however, research and doctoral universities (e.g., Georgetown University, University of Chicago) accounted for 33.3 percent of the institutions. In the rest of the sector, nearly one-quarter of institutions (24.6 percent) had a Carnegie classification indicating that they were master's-granting institutions. Within the group of institutions that held a union certification election for contingent faculty, master's-granting institutions accounted for nearly twice that share (41.3 percent). Nearly one-fifth (17.5 percent) of those that held a contingent faculty union vote were bachelor's-granting, compared to almost twice as large a share (34.9 percent) for other 4-year private, nonprofit institutions. In total, about one-third (33.1 percent) of institutions in this sector held a special focus Carnegie classification (e.g., theological seminaries and art institutes). Only five institutions that held a contingent faculty union vote were designated in such categories (7.9 percent), and all five were colleges of art and design.

4.6 Methods

To explore the longitudinal relationship between institution- and state-level characteristics and union certification elections for contingent faculty members, I rely on an event history analysis strategy, also known as hazard or survival analysis. This approach focuses on an event of interest, which in this case involves a 4-year private, nonprofit institution holding

a formal vote on whether to certify a contingent faculty union. In each distinct time period, a hazard rate measures the risk that the event will occur (i.e., the instantaneous risk), given that the institution has not previously experienced the event of interest (Chen, 2012). Here, the term "risk" is value-neutral and does not imply a negative or positive connotation for the event. As Doyle (2006) notes, the related concept of "survival" conveys the probability that an institution will reach the next period without reaching the event (i.e., the probability that an institution will reach the next year without holding a contingent faculty election).

Because I rely on measures taken at discrete intervals (e.g., yearly enrollment counts at institutions), I use a discrete-time approach (Jenkins, 2008). In order to implement this discrete-time approach, I structured the data to allow one observation for each institution at each time interval observed (i.e., an institution-year format). Thus, for institutions that existed from 2001 through 2018, there would be 18 observations for the institution, each corresponding to an individual year. To properly account for this data structure, I include binary indicator flags for each year in my models and cluster standard errors at the institution level. The data in this study are right-censored, meaning that not all institutions experience the event (i.e., a vote regarding a contingent faculty union) during the observed time period. Additionally, there is the potential for left-censoring of 4-year private, nonprofit institutions that held contingent faculty union certification elections prior to 2001. I have identified the University of San Francisco, which unionized in 1983, and Columbia College Chicago, in 1998, as known examples of private institutions with contingent faculty unions formed prior to 2001.

The following equation represents the binomial logistic regression model for this analysis (Singer & Willett, 2003):

$$logit\, h\big(vote_{ij}\big) = [\alpha_1 D_{2001} + \cdots \alpha_n D_n + \cdots + \alpha_{18} D_{2018}] + \boldsymbol{\chi}_{ij}\beta + \boldsymbol{\psi}_{ij}v$$

In this model, $h(vote_{ij})$ is the hazard of an institution holding a vote to certify a contingent faculty union, where $vote_{ij}$ is a binary indicator for institution i in year j. (As shown in Table 4.2, the vast majority elections during this period voted in favor of certification, so a separate analysis based on whether the election was successful is substantively similar.) The set of coefficients α_1 through α_{18} correspond to binary indicators for each year from 2001 through 2018. $\chi_{ij}\beta$ represents a vector of state-level covariates, including the percentage of wage and salary workers in the state who were members of unions in a given year j, the state government ideology in a given year j (on a scale in which higher values represent more liberal positions), and the number of previous contingent faculty unionization votes in the state. $\psi_{ij}\nu$, meanwhile, represents a vector of institution-level covariates. Among the controls used at the level of each institution i are the number of full-time equivalent students enrolled at the institution (transformed into units of 100 students), the number of part-time faculty members at the institution (transformed into units of 10 faculty members), the number of full-time faculty members at the institution (transformed into units of 10 faculty members), the religious affiliation of the institution (with three possible categories corresponding to no affiliation, a Roman Catholic affiliation, or some other religious affiliation), and the grouped Carnegie classification for the institution (doctoral/research university, master's-granting institution, bachelor's-granting institution, or special-focus institution).

4.7 Results

4.7.1 Event history analysis

Table 4 presents the results of the event history analysis, separated into three distinct models. The first model examines only the state-level variables ($\chi_{ij}\beta$), the second model

examines only the institution-level variables ($\boldsymbol{\psi}_{ij}\nu$), and the third model includes both state- and institution-level covariates. It is this third model that is the preferred model based on a smaller deviance value (i.e., -2 times the log likelihood) and a smaller value for the Akaike information criterion (AIC) than each of the other two models. All results are presented in odds ratios, calculated by exponentiating the log odds results from the binary logistic regression, where 1 represents parity and values greater than 1 represent higher odds.

In the version of the model with only state-level covariates (Model 1), two of the three covariates have a statistically significant relationship with the outcome of holding an election for a contingent faculty union. In this model, the state's unionization rate was not significantly associated with holding a vote on contingent faculty unionization. Meanwhile, the odds that an institution would hold a union certification election for a contingent faculty union are 1.055 times the odds of holding an election in a state one point lower on the 0-100 government ideology scale, with larger values representing more liberal positions. For reference, there is a roughly 40-point difference in the ideology scale between the states of Utah (20.1) and Massachusetts (61.2) in the year 2018. The number of prior contingent faculty unionization votes in a state was also a significant predictor, with the odds of holding an election 1.088 times that of a state with one fewer contingent faculty unionization vote in prior years.

Model 2, which includes only institution-level covariates, similarly finds strong associations between several variables observed and the odds of holding a union election for contingent faculty members. In terms of religious affiliation, the odds of holding a union vote at an institution with a religious affiliation are below the odds at an institution that is not religiously affiliated; specifically, the odds at a Roman Catholic affiliation are 0.503 times the odds of a union vote at an institution with no affiliation (marginally significant), and the odds at an

institution with some other religious affiliation are just 0.075 times that of an institution with no religious affiliation.[23] In terms of the Carnegie classification of the institution, the difference in odds of holding a contingent faculty unionization vote at a master's-granting institution were not measurably different than the odds at a doctoral/research institution. However, both bachelor's-granting and special-focus institutions had lower odds of holding a certification election for a contingent faculty union than did a doctoral/research institution. Holding constant other variables in the second model, I do not detect a significant relationship between the number of full-time-equivalent students, part-time faculty, or full-time faculty and the odds of holding a contingent faculty unionization vote.

The preferred model (Model 3) incorporates both state-level and institution-level covariates. Results from the first and second versions of the model are primarily sustained, with three measures changing significance but not substantially shifting in magnitude. In this final model, a one-point change on the government ideology scale (with higher values representing more liberal viewpoints) is associated with odds of holding a union vote that are 1.049 times higher, holding other factors constant; the observed range of government ideology scores is roughly 55 points. An additional contingent faculty unionization vote in a given state is linked to odds of holding a unionization vote that are 1.088 times higher. As in the first model, the share of the state workforce that is unionized does not have a significant association with contingent faculty unionization votes. In Model 3, the coefficient on the number of full-time equivalent students is marginally significant, suggesting slightly elevated odds of holding a unionization vote as the number of students increases. Comparing the number of part-time and full-time

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[23] Notably, five institutions from the District of Columbia are not included in the models since state ideology and percent of workforce unionized are only available for states; two of those excluded institutions are Roman Catholic, Georgetown University and Trinity Washington University.

faculty members, neither measure appears as a significant predictor of union certification elections, similar to Model 2. The relationship between religious affiliation and propensity to hold a contingent faculty union vote indicates that, relative to unaffiliated institutions, institutions that had non-Catholic religious affiliations had significantly lower odds of holding this vote. In terms of broad Carnegie classifications, special-focus institutions had lower odds of holding a contingent faculty unionization vote than did doctoral/research institutions.

4.8 Discussion

In modest support of Hypothesis 1, the results of the final model demonstrate a marginally higher likelihood of holding a vote to form a contingent faculty union at institutions with a greater number of full-time equivalent students. Although the relationship was not statistically significant in the model with institution-level covariates only (Model 2), the marginal significance was evident after the introduction of state-level covariates. The results partly bore out Hypothesis 2, which suggested that the likelihood of holding a vote would be higher at more complex institution types. While special-focus institutions and bachelor's-granting institutions did indeed represent the least likely and second-least likely institutions to hold contingent faculty union certification elections, master's-granting and doctoral/research institutions did not have statistically significant differences in their likelihood of holding such elections. These results suggest that institutional complexity may play a role in the potential for contingent faculty unionization efforts. Contrary to Hypothesis 3, the event history analysis indicates that an increase in part-time faculty members (controlling for the number of full-time faculty members, as well) is not associated with an elevated probability of holding a unionization vote for contingent faculty.

The results also confirm Hypothesis 4, with certain religiously affiliated institutions having a lower likelihood of holding a contingent faculty unionization vote than religiously unaffiliated institutions. Curiously, in contrast to the event history analysis results, the descriptive statistics showed Roman Catholic institutions to be overrepresented among the institutions that held a contingent faculty union vote, a divergent pattern that may warrant deeper investigation. Regarding Hypothesis 5, the largely time-invariant nature of "right-to-work" policies and the fact that only two institutions in "right-to-work" states held contingent faculty unionization votes precluded the use of measure in the event history analysis. Descriptively, though, the near-absence of institutions from "right-to-work" states comports with the expected finding. In contrast to Hypothesis 6, these results indicate that the likelihood of holding a unionization vote is no higher at institutions in states with higher percentages of the population in unions, net of other factors. The findings also provide evidence for Hypothesis 7, that institutions in states with more liberal ideologies would be more likely to hold contingent faculty unionization votes. Finally, the results of the event history analysis align with Hypothesis 8, which anticipated that the number of prior union certification elections for contingent faculty in a state would be linked to higher odds of such votes in future years.

More broadly, these findings suggest that institutional logics and isomorphism have the potential to anticipate the responses of contingent faculty members and institutions under certain circumstances. For instance, the findings are consistent with institutions strategically deploying market logics as they rise in size and complexity, or deploying family and religious logics in the case of certain religiously affiliated institutions. Likewise, isomorphism could help explain the elevated contingent faculty unionization efforts for institutions in states with more prior union certification elections and more liberal state legislatures. Yet the results also fail to affirm several

seemingly intuitive relationships. For instance, although one might imagine that a greater

presence of part-time faculty members would increase efforts for contingent faculty unionization,

I do not find a significant relationship on that measure. Such results highlight the value of

systematically analyzing the data rather than relying on intuition alone for understanding the

mechanisms through which such mobilization efforts occur.

Extensions of this work would benefit from more recent data and additional measures.

The number of contingent faculty unionization votes has increased in recent years, although it is

still a relatively rare event. For instance, only about 4 percent of 4-year private, nonprofit

institutions held such a vote by 2018. Figure 4.1 provides this information graphically by

displaying the Nelson-Aalen estimator, which represents the cumulative "hazard" of contingent

faculty members holding unionization votes over the course of the 18-year period observed. As a

result of the small number of events observed, each additional year of data may be especially

instructive. If possible, it would also be desirable to obtain some indicator for the types of

benefits that contingent faculty receive (or do not receive) at a particular institution, although

such information may not be available systematically. Additionally, building on past research

about political dimensions of the NLRB's (in)actions based on the composition of the board

(e.g., Aaron, 1985; Gould, 2014; Schmidt, 2002), in future work it may be valuable to

incorporate additional measures to control for the precise composition of the NLRB.

4.8.1 Limitations

While this analysis offers a number of potential insights into the emergence of

unionization efforts at private universities, there are several possible limitations worth

acknowledging. First, while this study offers the capacity to model the observed relationships

between various institutional attributes and NLRB union certification elections, the findings are purely descriptive and retrospective. In any particular case, this analysis cannot predict with certainty when or if an institution will hold a union certification election. Second, even on some measures for which there is a detected relationship with unionization efforts, the interpretation of such findings may not be self-evident. For instance, on the one hand, a lower rate of holding union certification elections among certain religiously affiliated institutions may suggest that the institutions take action to address concerns among contingent faculty members, thereby obviating the perceived need for a union. On the other hand, such a finding may instead point to the institution's efforts to deter faculty from forming a union without directly addressing the underlying concerns. For instance, in opposing unionization efforts for contingent faculty at Marquette University, the acting provost recently sought to dissuade contingent faculty from unionizing by arguing that the union "may not understand our university, our mission, or our guiding values" and emphasizing that "if the union succeeds, our faculty will be legally divided into two separate groups" (Pettit, 2019). Third, since the union certification election process requires a petition showing interest from at least 30% of employees, this study is unable to identify the extent of mobilization at institutions where fewer than 30% of contingent faculty sought to unionize (NLRB, 2019b). An examination of the characteristics of institutions that experienced such unsuccessful efforts would likely yield additional insight, particularly for cases that were slightly below the required 30% threshold. Finally, by focusing on the hazard rate from event history analysis, this study emphasizes the precise timing of contingent faculty unionization votes. However, it is clear from Table 4.2 that a large share of the contingent faculty unionization votes occurred within close succession, particularly between 2014 and 2016. Therefore, an alternative approach would be to conduct a cross-sectional analysis to explore the

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relationship between various factors and contingent faculty unionization efforts. Like the event history analysis, the cross-sectional analysis (available upon request) identifies the number of prior contingent faculty unionization votes in the state and an institution's religious affiliation (other than Roman Catholic) as significant predictors of unionization efforts, meaning these relationships are evident in both analytic approaches. The cross-sectional approach also finds a significant relationship between the percent of the state workforce that is unionized and an institution's likelihood of holding a contingent faculty union vote, a relationship not found in the event history analysis.

4.9 Conclusion

Contingent faculty unionization efforts have experienced considerable growth in recent years. Perhaps not coincidentally, such growth comes during a period when contingent faculty comprise an ever-increasing share of the academic workforce. This study offers the first opportunity to document the full extent of the contingent faculty unionization effort through 2018, and helps identify the conditions under which contingent faculty have previously mobilized to form unions. By identifying factors associated with the expansion of this movement, this study offers insight into the workplace dynamics for graduate degree recipients who work in contingent faculty positions. The relationship between contingent faculty and their employer(s) has considerable bearing on the composition of the current academic workforce, the extent to which undergraduates view graduate degrees as worthwhile pursuits, and the quality of instruction that students receive at all levels of postsecondary education.

Future work could also pay greater attention to the role of potential policy entrepreneurs, extensively networked actors who champion a policy cause. In the case of contingent faculty

unionization, perhaps most likely contender is SEIU, which has operated organizing campaigns in targeted metropolitan areas, most of which have been locations with multiple contingent faculty union votes (e.g., Boston, San Francisco, Los Angeles, and Washington, D.C.). Yet the idea of SEIU as a policy entrepreneur presents a "chicken or the egg" challenge, since it is unclear whether SEIU primarily served as a facilitator for unionization efforts already inspired and directed through other networks, such as the New Faculty Majority organization and the adj-l listerv. An extensive document analysis of materials from the SEIU's Adjunct Action and Faculty Forward campaigns, along with communications from the New Faculty Majority and campus unionization efforts, would provide more complete detail about the lineage of these efforts.

Table 4.1. Overview of Data Sources

Measure(s)	Source
Outcome	
Union Certification Elections at Private Institutions	National Labor Relations Board
State-level	
Right-to-work states	National Conference of State Legislatures
Union membership of workers, by state	Bureau of Labor Statistics
State government ideology	2018 update to Berry et al. (2010)
Institution-level	
Full-time equivalent students	Integrated Postsecondary Education Data System (IPEDS)
Part-time and full-time faculty members	IPEDS
Full-time faculty salary	IPEDS
Carnegie classification	IPEDS
Religious affiliation	IPEDS

Note: Data from all sources extend from 2001 through 2018.

Table 4.2. List of certification elections for contingent faculty unions, 2001-2018

UNITID	Institution Name	State	NLRB Case	Vote Date	Outcome
165662	Emerson College	MA	01-RC-21313	2001-06	PASS
190770	Dowling College	NY	29-RC-09859	2002-08	PASS
194310	Pace University	NY	02-RC-22795	2004-05	PASS
131469	George Washington University	DC	05-RC-15624	2004-06	PASS
168005	Suffolk University	MA	01-RC-21965	2006-02	PASS
144281	Columbia College Chicago	IL	13-RC-21249	2006-04	PASS
192864	Marymount Manhattan College	NY	02-RC-23102	2006-06	PASS
192323	Le Moyne College	NY	03-RC-11778	2007-12	PASS
195173	St. Francis College	NY	29-RC-11842	2010-03	PASS
148627	St. Xavier University	IL	13-RC-21897	2010-03	FAIL
192749	Manhattanville College	NY	02-RC-023568	2011-02	PASS
144883	East-West University	IL	13-RC-022017	2011-05	PASS
148627	St. Xavier University (2)	IL	13-RC-022025	2011-06	PASS
131159	American University	DC	05-RC-070027	2012-01	PASS
212106	Duquesne University	PA	06-RC-080933	2012-06	PASS
131496	Georgetown University	DC	05-RC-100905	2013-04	PASS
164739	Bentley University	MA	01-RC-104671	2013-09	FAIL
168148	Tufts University	MA	01-RC-109106	2013-09	PASS
236230	Pacific Lutheran University	WA	N/A	2013-10	WITHDREW
125763	Whittier College	CA	21-RC-115867	2013-12	PASS
166452	Lesley University	MA	01-RC-118179	2014-01	PASS
117140	University of La Verne	CA	21-RC-115880	2014-02	WITHDREW
131520	Howard University	DC	05-RC-123970	2014-04	PASS
163295	Maryland Institute College of Art	MD	05-RC-123986	2014-04	PASS
167358	Northeastern University	MA	01-RC-124413	2014-04	PASS
118888	Mills College	CA	32-RC-125058	2014-04	PASS
236595	Seattle University	WA	19-RC-122863	2014-05	PASS
122454	San Francisco Art Institute	CA	20-RC-126147	2014-05	PASS
173665	Hamline University	MN	18-RC-127335	2014-06	PASS
215442	Point Park University	PA	06-RC-127553	2014-06	PASS
174914	University of St. Thomas	MN	18-RC-129281	2014-07	FAIL
245883	Antioch University Seattle	WA	19-RC-128561	2014-07	PASS
117168	Laguna College of Art and Design	CA	21-RC-128268	2014-07	PASS
110370	California College of the Arts	CA	32-RC-134175	2014-09	PASS
195234	The College of Saint Rose	NY	03-RC-133447	2014-09	PASS
230825	Burlington College	VT	01-RC-138050	2014-11	PASS
230852	Champlain College	VT	01-RC-138052	2014-11	PASS
162654	Goucher College	MD	05-RC-139478	2014-11	PASS
231059	St. Michael's College	VT	01-RC-138466	2014-12	PASS
113698	Dominican University	CA	20-RC-140506	2014-12	PASS

123554	Saint Mary's College of California	CA	32-RC-139812	2014-12	PASS
179867	Washington University in St. Louis	MO	14-RC-141308	2014-12	PASS
120403	Otis College of Art and Design	CA	31-RC-139991	2014-12	PASS
164988	Boston University	MA	01-RC-139754	2015-01	PASS
168148	Tufts University (2)	MA	01-RC-142234	2015-01	PASS
164739	Bentley University (2)	MA	01-RC-141995	2015-02	PASS
215655	Robert Morris University	PA	06-RC-145392	2015-03	PASS
179894	Webster University	MO	14-RC-149541	2015-04	FAIL
191968	Ithaca College	NY	03-RC-150147	2015-05	PASS
131876	Trinity Washington University	DC	05-RC-151107	2015-05	PASS
195474	Siena College	NY	03-RC-150383	2015-06	PASS
195474	Siena College (2)	NY	03-RC-151213	2015-06	PASS
189097	Barnard College	NY	02-RC-154022	2015-09	PASS
144050	University of Chicago	IL	13-RC-162896	2015-11	PASS
165662	Emerson College	CA	31-RC-162979	2015-11	PASS
144050	University of Chicago (2)	IL	13-RC-164309	2015-12	PASS
165015	Brandeis University	MA	01-RC-163352	2015-12	PASS
123961	University of Southern California	CA	31-RC-164868	2016-01	PASS
123961	University of Southern California (2)	CA	31-RC-164871	2016-01	PASS
197230	Wells College	NY	03-RC-166366	2016-01	PASS
198419	Duke University	NC	10-RC-169472	2016-03	PASS
146719	Loyola University Chicago	IL	13-RC-168082	2016-03	PASS
115728	Holy Names University	CA	32-RC-170352	2016-04	PASS
164988	Boston University (2)	MA	01-RC-171016	2016-04	PASS
120184	Notre Dame de Namur	CA	20-RC-172076	2016-04	PASS
179159	St. Louis University	MO	14-RC-173981	2016-05	PASS
191968	Ithaca College (2)	NY	03-RC-173675	2016-05	PASS
164270	McDaniel College	MD	05-RC-175386	2016-05	PASS
147767	Northwestern University	IL	13-RC-177943	2016-06	FAIL
173045	Augsburg College	MN	18-RC-186094	2016-11	PASS
179867	Washington University in St. Louis (2)	MO	14-RC-196901	2017-05	FAIL
221999	Vanderbilt University	TN	10-RC-193205	2017-06	WITHDREW
129941	University of New Haven	CT	01-RC-197669	2017-06	FAIL
175005	St. Catherine University	MN	18-RC-199024	2017-06	FAIL
191241	Fordham University	NY	02-RC-207806	2017-11	PASS
131520	Howard University	DC	05-RC-208474	2017-11	PASS
193584	Nazareth College of Rochester	NY	03-RC-218093	2018-05	PASS

Notes: UNITID refers to the unique institution identifier in IPEDS. Some institutions held multiple elections for contingent faculty unions (e.g., separate elections by employee classification or school).

Table 4.3. Descriptive summary of institution characteristics (2018), by contingent faculty unionization vote status

| | All 4-year private, nonprofits | Held contingent faculty unionization vote? | |
		Yes	No
Number of institutions	1,568	64	1,504
States/districts	51	14	51
Students (median)	1,109	2,991	1,040
Full-time faculty salary (median)	$61,389	$81,847	$60,577
Share of faculty part-time	0.500	0.504	0.500
Roman Catholic affiliation	0.139	0.250	0.134
Located in right-to-work state	0.410	0.031	0.426
Carnegie classification			
Doctoral	0.075	0.333	0.062
Master's	0.253	0.413	0.246
Bachelor's	0.341	0.175	0.349
Special-focus	0.331	0.079	0.343

Sources: Integrated Postsecondary Education Data System and National Conference of State Legislatures.

Table 4.4. Survival analysis results – odds ratios

VARIABLES	Model 1 State	Model 2 Institution	Model 3 State & Inst.
Percent of state workforce unionized	1.005		0.977
	(0.036)		(0.039)
State government ideology (higher = more liberal)	1.055***		1.049***
	(0.013)		(0.014)
Prior unionization votes in state	1.088*		1.117*
	(0.035)		(0.040)
Full-time equivalent students (100s)		1.002	1.005^
		(0.002)	(0.002)
Part-time faculty members (10s)		1.003	1.001
		(0.003)	(0.004)
Full-time faculty members (10s)		1.000	0.999
		(0.002)	(0.002)
Religious affiliation *(ref. = no affiliation)*			
Roman Catholic		0.503^	0.664
		(0.196)	(0.268)
Other religious affiliation		0.075***	0.133**
		(0.043)	(0.079)
Carnegie group *(ref. = doctoral/research)*			
Master's-granting		0.827	0.977
		(0.226)	(0.509)
Bachelor's-granting		0.331*	0.411
		(0.182)	(0.235)
Special-focus institution		0.167*	0.161*
		(0.103)	(0.102)
Observations	19,522	19,522	19,522
Year FE	Yes	Yes	Yes
Years observed	2001-2018	2001-2018	2001-2018
Log likelihood	-1281	-1250	-1141

Note: Standard errors in parentheses. Model 1 controls for state-level factors, model 2 controls for institution-level factors, and model 3 controls for both state-level and institution-level factors. Sources: 2018 update to Berry et al. (2010), Integrated Postsecondary Education Data System, National Conference of State Legislatures, and National Labor Relations Board.
*** $p < .001$, ** $p < .01$, * $p < .05$, ^ $p < .10$

Figure 4.1. Cumulative hazard estimate for contingent faculty unionization vote
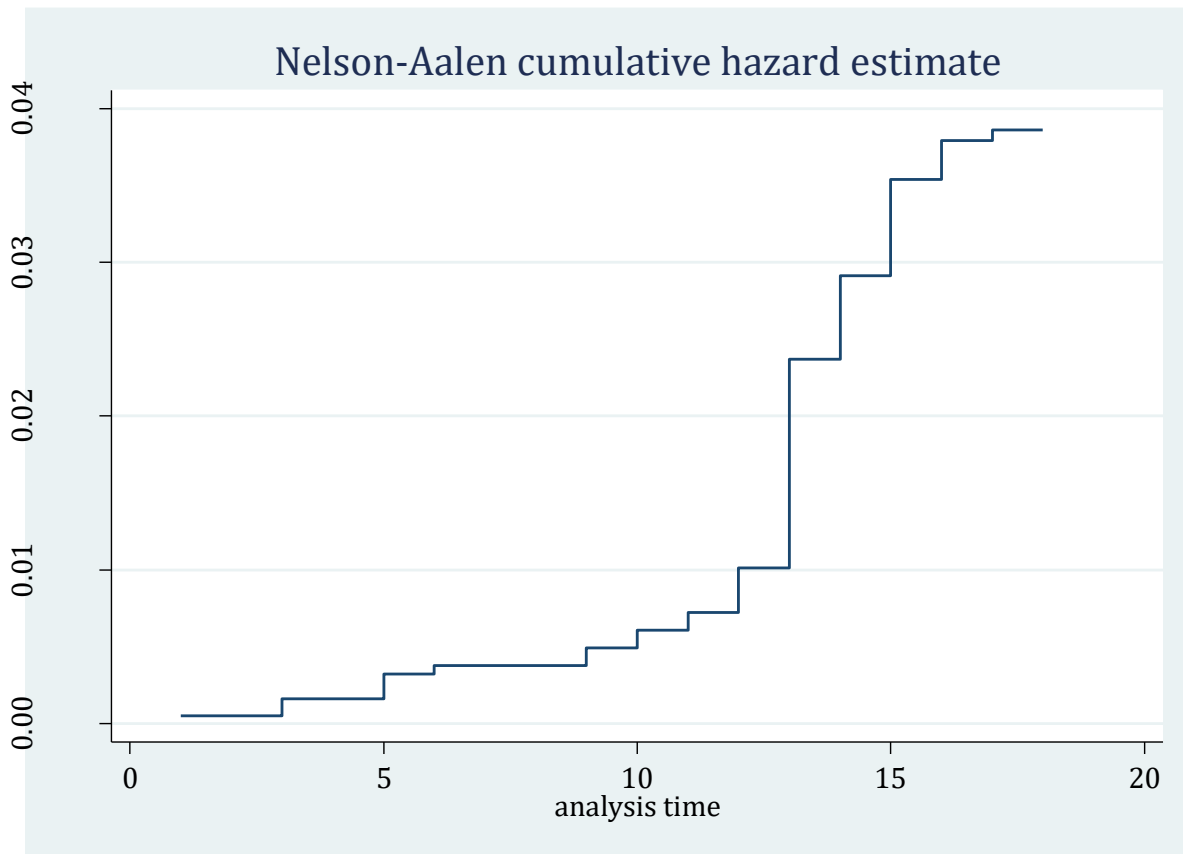
Note: The y-axis represents the proportion of 4-year private, not-for-profit institutions that have held a union certification election for contingent faculty members by a particular year.

CHAPTER 5

Conclusion

As graduate education takes on a larger role in the postsecondary education landscape, it becomes increasingly important to understand the transition to and from advanced degree programs. Towards that end, my three-essay dissertation contributes to the understanding of factors associated with graduate school enrollment, job prospects for master's recipients, and unionization within academia. In each case, I pay particular attention to groups that have historically been marginalized within graduate education and potential implications for public policy and socioeconomic stratification.

By examining graduate enrollment predictors related to gender, race/ethnicity, parental education, and family income background, my first paper not only updates prior literature, but also offer some of the earliest evidence on variation by master's degree field, professional discipline, and institutional sector. In doing so, this paper emphasizes the extent to which certain attributes are salient in their relationship to graduate enrollment for students who completed their bachelor's degrees around the time of the Great Recession. Such an examination is especially valuable in light of the expanding opportunities for graduate enrollment, particularly through online degree programs. I find continued evidence that women have lower odds of enrollment in professional and research doctorate programs than men, although women's odds of enrolling in professional degree programs improved between the 1992-93 and 2007-08 cohorts. The study also reveals a relationship between parental education and a student's odds of graduate enrollment that has not been found in prior cohorts. Students whose parents had earned

professional and research doctorate degrees displayed elevated odds of graduate enrollment (especially for doctoral degree programs), pointing to the potential for growing stratification by parental education levels.

Through the résumé correspondence study for my second paper, I produce the earliest experimental evidence on employers' perceptions of master's degrees from broad-access institutions, including for-profit institutions. Such information is especially valuable in light of employers' elevated educational requirements since the Great Recession, the disproportionate share of Black and low-income master's students who attend for-profit colleges, and the high debt burdens associated with for-profit graduate programs. The results of this experiment illuminate several key points. First, employers demonstrated a 20 percent lower positive response rate for applications with randomly assigned names that suggested they came from Black applicants, relative to those with names suggesting they came from White applicants. This contrast was even starker for applications that appeared to come from Black men, in which case the positive response rate was 30 percent lower than that for presumably White applicants. Second, in addition to reaffirming a broad literature demonstrating racial discrimination in hiring, this experiment provides new evidence on employers' perceptions of master's degrees in business from broad-access institutions. Overall, candidates with such master's credentials did not experience any boost in their responses from employers, instead receiving positive responses at the same rate as candidates with only a bachelor's degree. With master's students borrowing $39,000 to $46,000 for the graduate programs examined, on average, the absence of a favorable response from employers–even for job postings that indicated a preference for master's degrees– raises significant questions about the utility of these degrees from the broad-access institutions that serve most master's students.

Finally, the third paper's emphasis on potential antecedents of contingent faculty unionization addresses a growing phenomenon that affects the workplace context for tens of thousands of graduate degree recipients. Better understanding the collective action among contingent faculty members has significant implications because those roles both represent an ever-rising share of academic career prospects for graduate degree-holders and also provide substantial levels of graduate-level instruction. I find evidence supporting several hypotheses derived from institutional logics and isomorphism. For instance, consistent with the institutional logics of the market and corporation, I find that the likelihood of holding a vote for contingent faculty unionization increases with the size and complexity of the institution, as proxied by the Carnegie Classification and number of full-time equivalent students. Meanwhile, certain religiously affiliated institutions that are able to draw on the institutional logics of religion and family experience a lower likelihood of contingent faculty unionization efforts. In contrast, isomorphic forces suggested through higher numbers of prior contingent faculty union elections in the state and the presence of more liberal state legislatures are each linked to a higher likelihood of holding a contingent faculty union certification election. Equally tellingly, I find no relationship between certain other hypothesized factors, such as the share of the state's workforce that is unionized and the number of part-time and full-time faculty members, after controlling for other factors. These results demonstrate the nuanced relationships between institutional and state contexts and the likelihood of contingent faculty unionization efforts.

Collectively, these three papers address pivotal questions about the composition of graduate students, their job search experiences, and their working conditions. In the process, these studies reveal common themes of precarity and enduring inequality with undercurrents of hope and rising aspirations. The first paper helps advance our collective understanding of the

factors associated with graduate school attendance, a critical step required to isolate

opportunities for further improvements in the representation of marginalized groups in graduate

school–and, ultimately, positions in professional and civic life to which such credentials provide

access. The experiment in the second paper provides a unique glimpse of the job search

experiences that tens of thousands of master's recipients face annually, revealing null effects of

broad-access master's degrees in business on interview callbacks and other positive responses

from employers. For students who pursue such degrees in the hopes of elevating their job market

prospects with new employers, such findings may provide reason for pause, especially in light of

the substantial price tags that accompany the credentials. The experiment also catalogues the

forces of systemic racism that constrain opportunities for Black graduates. Finally, the third

paper identifies structural attributes that are linked to mobilization efforts for contingent faculty

unions. Throughout, these studies emphasize the importance of better understanding structural

forces that promote graduate school access, expand employment opportunities, and mobilize

collective action among faculty in tenuous positions.

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