The Master's Degree Boom: How Universities Expanded Supply as Employers Reduced Demand

Tyler Horan[1]

[1] Department of Data Analytics & Computational Social Science, University of Massachusetts Amherst, Amherst, MA, USA

Correspondence: Tyler Horan, Department of Data Analytics & Computational Social Science, University of Massachusetts Amherst, Amherst, MA 01003, USA. E-mail: thoran@umass.edu

Received: March 14, 2026 Accepted: April 18, 2026 Online Published: April 21, 2026

doi:10.5430/ijhe.v15n2p80 URL: https://doi.org/10.5430/ijhe.v15n2p80

Abstract

This article examines the growing disconnect between master's degree production and employer demand in the United States. Using IPEDS Completions Survey data on degree conferrals (2010–2022) and LinkedIn profile data (N=10,247,832) as a demand-side indicator, the analysis reveals a supply-demand mismatch: master's degree production grew 27.0% (706,304 to 897,161), yet the master's degree "drawbridge gap" is -6.0 percentage points (95% CI [-6.7, -5.3]), indicating that recent occupational entrants hold master's degrees at lower rates than incumbents. The decline is sharpest in fields targeted by new programs, including data science (-20.9pp), marketing (-11.2pp), and software engineering (-9.8pp). Drawing on theories of academic capitalism, credential inflation, and institutional isomorphism, the article argues that this mismatch is driven by institutional revenue incentives, mimetic program expansion, information asymmetry, and moral hazard. The article concludes with policy recommendations for outcome transparency, institutional risk-sharing, and consumer protection in graduate education.

Keywords: master's degrees, credential inflation, higher education finance, supply-demand mismatch, IPEDS, institutional isomorphism

1. Introduction

The master's degree has become the fastest-growing credential in American higher education. Between 2010 and 2022, U.S. institutions conferred 27.0% more master's degrees, rising from 706,304 to 897,161 annually, a pace that outstripped even the substantial 21.7% growth in bachelor's degree production over the same period (National Center for Education Statistics, 2023). Growth has concentrated in professional master's programs targeting knowledge-work sectors: business, data science, marketing analytics, cybersecurity, and related fields. Universities have invested heavily in these programs, launching new offerings, expanding cohort sizes, and developing online delivery, often through partnerships with Online Program Managers (OPMs), to reach national and global markets. For students, the master's degree represents a major financial commitment, typically costing $40,000 to $120,000 or more and often financed through debt that will shape their financial lives for years (Zaloom, 2019).

This expansion would be unremarkable if it tracked labor market demand. But evidence suggests the opposite. Across the knowledge-work occupations that professional master's programs target, employer requirements for master's degrees have softened. Using a "drawbridge gap" methodology that compares the credential profiles of incumbents (five or more years in their occupation) with recent entrants (less than two years), this study finds an overall master's degree gap of -6.0 percentage points (95% CI [-6.7, -5.3]). Recent entrants hold master's degrees at lower rates than incumbents, indicating that employers are hiring successfully without requiring advanced credentials. The decline is sharpest in data science (-20.9pp), marketing (-11.2pp), software engineering (-9.8pp), and consulting (-9.1pp), precisely the fields where university program creation has accelerated most dramatically. The result is a supply-demand mismatch: universities are producing credentials into weakening demand. Institutions capture tuition revenue regardless of graduate outcomes, creating a moral hazard at the center of American graduate education. These dynamic parallels what McMillan Cottom (2017) documented in the for-profit sector, but now characterizes segments of nonprofit graduate education as well.

This article documents and explains this mismatch by combining two data sources that have not previously been juxtaposed in this way. The Integrated Postsecondary Education Data System (IPEDS) Completions Survey provides universe data on degree conferrals at all Title IV institutions, capturing the supply side. LinkedIn profile data from 10.2 million U.S.-based professionals provides demand-side evidence through revealed employer preferences for credentials. Together, these data sources address a question that neither can answer alone: is the expansion of master's degree programs aligned with employer demand? The analysis proceeds in four stages: first, documenting supply-side trends using IPEDS data; second, measuring demand-side shifts through the drawbridge gap methodology applied to LinkedIn profiles; third, examining the supply-demand mismatch across fields; and fourth, analyzing how institutional prestige stratifies credential returns. These findings are situated within literatures on academic capitalism (Slaughter & Rhoades, 2004), credential inflation (Collins, 1979), institutional isomorphism (DiMaggio & Powell, 1983), and the emerging skills-based hiring movement (Burning Glass Institute, 2022). The article concludes with policy recommendations for outcome transparency, institutional risk-sharing, and consumer protection standards that could begin to realign incentives.

2. Literature Review

2.1 The Political Economy of Graduate Education

Master's programs occupy a distinctive position in the political economy of American higher education. Unlike doctoral programs, which universities subsidize through tuition waivers and stipends as an investment in research capacity, master's programs typically charge full tuition and generate net revenue for their institutions. This revenue structure makes master's programs attractive profit centers: they require less faculty investment than doctoral programs (larger cohorts, more adjunct instruction, less individualized mentorship), produce graduates faster (typically one to two years versus five to seven for doctoral programs), and can be expanded with relatively modest marginal costs, particularly when delivered online.

Slaughter & Rhoades (2004) describe the rise of "academic capitalism," the increasing orientation of universities toward market-like behaviors, including the commodification of education and the pursuit of revenue through entrepreneurial activity. Master's programs exemplify this dynamic. Institutions launch programs not primarily because labor markets demand their graduates, but because the programs generate revenue that cross-subsidizes other institutional priorities: doctoral programs, faculty research, administrative overhead, and campus infrastructure. Ehrenberg (2002) documented how cost pressures and declining public support pushed institutions toward revenue-generating activities, with tuition-paying professional master's students filling gaps left by state disinvestment (Newfield, 2016). The revenue incentive operates independently of, and sometimes contrary to, labor market signals.

Brint et al. (2005) traced the broader curricular shift from liberal to practical arts in American higher education, documenting how universities increasingly oriented programs toward occupational preparation rather than general education. The professional master's degree (the MBA, the Master of Public Policy, the Master of Science in various applied fields) became the vehicle through which universities captured demand from working professionals seeking career advancement. This expansion was facilitated by the federal student loan system, which provided financing that made demand highly elastic: students could borrow to pay tuition regardless of whether the credential would generate sufficient returns to justify the investment (Looney & Yannelis, 2015).

A critical structural development has been the rise of Online Program Managers (OPMs), for-profit companies that partner with universities to launch and operate online master's programs, typically in exchange for 40–60% of tuition revenue. Under the OPM model, universities provide accreditation, brand, and faculty, while OPMs provide technology platforms, marketing, enrollment management, and student recruitment. OPMs are compensated based on enrollment, creating incentives to maximize recruitment regardless of student fit or likely outcomes. OPM contracts typically run 10–15 years, meaning the OPM's incentive is to maximize enrollment during the contract period while long-term credential value is someone else's problem. The OPM model has accelerated program proliferation by enabling institutions to enter online markets without upfront investment, but it has also introduced additional moral hazard into a system already misaligned between institutional incentives and student outcomes.

The result is an incentive structure in which universities capture benefits (tuition revenue) while students bear risks (debt without guaranteed returns). McMillan Cottom (2017) identified parallel dynamics in the for-profit sector, where institutional revenue incentives systematically diverged from student interests. This article argues that similar dynamics now characterize segments of the nonprofit graduate education sector, particularly in rapidly expanded professional master's programs delivered through OPM partnerships.

2.2 Credential Inflation and Labor Market Signals

The concept of credential inflation—the progressive escalation of educational requirements for occupations whose actual skill demands have not changed proportionally—has a long history in the sociology of education. Collins (1979) argued that credentialism reflects status competition rather than genuine skill requirements: as more people obtain a given credential, its distinctiveness erodes, driving demand for the next level. Berg (1970) demonstrated empirically that many occupations requiring college degrees could be performed effectively by workers without them, suggesting that credential requirements reflect screening preferences rather than job demands. Bills (2003) provided a comprehensive review of the mechanisms through which credentials, signals, and screens operate in labor markets, distinguishing human capital, signaling, and credentialist explanations for the education-employment relationship.

Spence (1973) formalized credential signaling in economic theory: education serves as a signal of unobservable worker quality, and its value depends on the signal's informativeness. A credential signals effectively when it distinguishes holders from non-holders on dimensions employers value. But as a credential becomes ubiquitous, its signal degrades. If nearly all applicants hold a bachelor's degree, the degree no longer discriminates among candidates, and employers either escalate requirements to the master's level or develop alternative screening mechanisms.

This dynamic creates a collective action problem. For any individual student, acquiring an additional credential is rational: it maintains competitive position relative to other applicants. But when many students simultaneously invest in the same credential, the collective result is credential devaluation—the credential equivalent of an arms race (Hirsch, 1976). Individual rationality produces collective irrationality, a dynamic that Fuller & Raman (2017) documented in hiring practices across multiple sectors.

Recent developments suggest that employers may be finding exits from this arms race. The skills-based hiring movement, promoted by organizations such as the Burning Glass Institute and Opportunity@Work and adopted by several state governments that have removed degree requirements for public-sector positions, represents an explicit effort to decouple hiring from credential proxies (Burning Glass Institute, 2022). If employers can assess competence through technical evaluations, portfolio review, or demonstrated experience rather than credential signals, the master's degree loses it signaling monopoly. The drawbridge gap documented in this study may reflect the early stages of this decoupling.

2.3 Information Asymmetry in Higher Education

Students making enrollment decisions face substantial information asymmetry. Universities know their own placement rates, salary outcomes, and program quality; prospective students typically do not. This asymmetry distorts enrollment decisions in ways that favor institutions.

Outcome reporting by graduate programs is selective along multiple dimensions. Programs commonly report mean rather than median salaries, inflating apparent outcomes when distributions are right-skewed. They exclude non-respondents from placement surveys, introducing bias if unsuccessful graduates are less likely to respond. They report outcomes at short time horizons (six months post-graduation), which may capture initial placements but not long-term career trajectories. And they report at the institutional level rather than the program level, allowing strong programs to mask weak ones within aggregate statistics.

The result is that prospective students systematically overestimate returns to graduate credentials. They compare marketed salary projections against their current earnings without adequately accounting for opportunity costs (foregone earnings during enrollment), debt service, the counterfactual of continued work experience without the credential, or the difference between mean and median outcomes. The decision to enroll is made under conditions of genuine uncertainty, at moments of career vulnerability (dissatisfaction, stagnation, fear of falling behind) and under time pressure imposed by application deadlines and financial aid cycles. Once enrolled, students discover that program quality varies enormously: some receive intensive mentorship and meaningful skill development, while others receive mass-produced content with minimal faculty contact (Arum & Roksa, 2011). The financial and psychological burdens of graduate student debt compound these uncertainties (Walsemann et al., 2015).

Federal gainful employment regulations have attempted to address this asymmetry by requiring outcome disclosure, but these regulations have been politically contested, rescinded, and only partially reinstated. Cappelli (2012) argued that the "skills gap" narrative promoted by both universities and employers' obscures the degree to which credential requirements exceed actual job demands, further distorting student decisions. McMillan Cottom (2017) showed how

for-profit institutions systematically exploited information asymmetry; similar dynamics operate whenever institutions benefit from enrollment regardless of outcomes.

2.4 Institutional Isomorphism in Program Expansion

DiMaggio & Powell (1983) identified three mechanisms through which organizations within a field become structurally similar: coercive isomorphism (driven by regulatory and political pressure), mimetic isomorphism (driven by uncertainty and imitation), and normative isomorphism (driven by professionalization). All three operate in the expansion of master's programs.

Mimetic isomorphism is particularly evident. When one university launches a successful data science master's program, competitors observe the enrollment numbers and revenue and launch their own. This imitation occurs regardless of whether local labor markets can absorb additional graduates, because the decision is driven by competitive positioning rather than demand analysis. The result is rapid proliferation: data science master's programs grew from a handful in 2012 to hundreds by 2020, far outpacing employer demand for data science master's degree holders. Similar proliferation occurred in analytics, cybersecurity, UX design, and digital marketing—each wave triggered by perceived market opportunity and sustained by competitive imitation.

Coercive pressures also contribute. Accreditation standards and ranking systems create incentives to expand graduate offerings. Universities that lack master's programs may be perceived as less research-intensive, less prestigious, or less comprehensive. Administrative pressure to grow revenue pushes academic units to propose new programs, and institutional approval processes rarely include rigorous labor market demand analysis.

Normative isomorphism operates through faculty hiring patterns and professional networks. Faculty trained at research universities carry assumptions about graduate education into their roles at teaching-focused institutions, advocating for graduate programs that replicate their own training environments. Professional associations promote credential expectations that favor graduate degrees, reinforcing demand for programs regardless of empirical evidence about returns.

The interaction of these isomorphic pressures produces what the IPEDS data document: rapid, parallel program expansion across institutions and fields, with limited coordination and minimal demand-side discipline.

3. Data and Methods

3.1 IPEDS Completions Survey

The primary supply-side data source is the Integrated Postsecondary Education Data System (IPEDS) Completions Survey, administered by the National Center for Education Statistics (NCES). IPEDS provides universe data on degree conferrals at all Title IV institutions in the United States—approximately 6,000 institutions reporting annually. This study uses completions data from 2010 to 2022, encompassing degree conferrals by level (associate, bachelor's, master's, doctoral research, and doctoral professional), field of study (using the Classification of Instructional Programs, CIP codes), and institution type (public, private nonprofit, private for-profit).

IPEDS offers several advantages for this analysis. Because it is universe data rather than a sample, it is not subject to sampling error. It is publicly available and fully replicable. And it captures all degree conferrals at accredited institutions, providing the most comprehensive measure of credential supply in U.S. higher education. Aggregate trends are reported using CIP code 99.0000 (grand total); field-level patterns are drawn from published NCES tabulations by two-digit CIP code (National Center for Education Statistics, 2023).

IPEDS also has limitations relevant to this analysis. Completions measure degrees conferred, not enrollment, applications, or labor market demand. IPEDS contains no outcome data: no employment rates, salary information, or student debt levels at the program level. It cannot indicate whether graduates found employment commensurate with their credentials. For demand-side evidence, a complementary data source is needed.

3.2 LinkedIn Profile Data

To measure demand-side credential trends, this study analyzes a dataset of N=10,247,832 U.S.-based professional profiles collected from LinkedIn in 2023. This dataset provides information on educational credentials, career trajectories, occupational classifications, and network characteristics for a large cross-section of knowledge workers.

Employer demand for master's degrees is operationalized through a "drawbridge gap" methodology. For each occupation, the master's degree holding rates of two groups are compared: incumbents who entered their current occupation five or more years ago ($N_{incumbents}$=1,117,161), and recent entrants who entered within the past two years (N_{recent}=26,146). The logic is that incumbents' credential profiles reflect hiring norms at the time of their entry, while

recent entrants' profiles reflect current hiring norms. A negative gap (recent entrants hold master's degrees at lower rates than incumbents) indicates declining employer demand for the credential; a positive gap indicates increasing demand.

3.3 Validity Considerations

The drawbridge gap methodology captures real differences in credential profiles across cohorts, but several alternative explanations must be considered. First, occupational composition change: if occupations have expanded to include roles that historically did not require master's degrees (e.g., "data scientist" broadening from a research-oriented role to include more junior analyst positions), the gap could reflect changing occupational boundaries rather than changing employer preferences. This concern is partially addressed by examining the gap across multiple occupations with varying boundary stability; the finding that the gap is negative across all twelve occupations studied, including those with relatively stable definitions (finance, consulting, engineering), suggests that compositional change alone cannot explain the pattern.

Second, cohort timing effects: recent entrants may not yet have completed master's degrees that they will eventually pursue. This concern is mitigated by the operationalization: the analysis compares credential profiles at time of occupational entry, not current profiles, reducing (though not eliminating) the influence of post-entry credential acquisition.

Third, survivor bias among incumbents: if master's degree holders are more likely to remain in an occupation (lower turnover), the incumbent pool would be enriched for master's degrees relative to the original entry cohort. This bias would inflate the incumbent rate, making the gap appear more negative than the true change in hiring norms. The direction of this bias is acknowledged; the gap should be interpreted as an upper bound on the demand decline.

These validity considerations mean that the drawbridge gap is best interpreted as a descriptive indicator of shifting credential profiles across cohorts, not as a precise causal estimate of changing employer demand. The convergence of the pattern across occupations, combined with corroborating evidence from the skills-based hiring movement (Burning Glass Institute, 2022) and employer surveys (Fuller & Raman, 2017), strengthens the interpretation that the gap reflects genuine demand-side softening.

3.4 Supply-Demand Comparison

The core analytic contribution is the juxtaposition of supply-side trends (IPEDS) with demand-side signals (LinkedIn drawbridge gaps). The analysis compares fields where master's degree conferrals have grown most rapidly with fields where the drawbridge gap is most negative, assessing alignment. A supply-demand mismatch index—the rank-order correlation between supply growth and demand decline across fields—provides a summary measure. This comparison is descriptive rather than causal: the article documents the mismatch without claiming that supply growth caused demand decline or vice versa.

4. Results

4.1 The Master's Degree Boom: Supply-Side Trends

Table 1 presents degree conferrals by level from 2010 to 2022. Master's degree production grew 27.0%, from 706,304 in 2010 to 897,161 in 2022. This growth outpaced bachelor's degree production, which grew 21.7% over the same period (1,756,771 to 2,138,492). Research doctoral degrees grew 39.7% (57,678 to 80,578) from a much smaller base, while professional doctoral degrees grew 22.4% (101,050 to 123,652). Associate degree conferrals grew 16.0%.

Table 1. Degree production by level, 2010–2022 (IPEDS)

Degree Level	2010	2015	2020	2022
Associate	876,681	1,026,602	1,027,676	1,016,930
Bachelor's	1,756,771	2,014,990	2,164,406	2,138,492
Master's	706,304	773,556	858,323	897,161
Doctoral (Research)	57,678	69,422	74,431	80,578
Doctoral (Prof.)	101,050	109,110	115,458	123,652

Source: IPEDS Completions Survey, validated against NCES using CIP 99.0000 grand totals.

Published NCES tabulations (Digest of Education Statistics, Table 323.10) reveal that master's degree growth was concentrated in specific fields. All figures below are approximate, drawn from published NCES rounded tabulations rather than original CIP-code-level analysis. Computer and information sciences master's degrees (CIP 11) more than doubled, growing from approximately 24,000 to over 57,000 conferrals annually. Health professions master's degrees (CIP 51) nearly doubled, from approximately 65,000 to over 125,000. Business master's degrees (CIP 52), already the largest category, grew from approximately 178,000 to 198,000. Education master's degrees (CIP 13), historically the largest category, declined from approximately 182,000 to 146,000, a notable counter-trend driven partly by the shift toward doctoral-level preparation in education. The fastest growth occurred in precisely the applied professional fields where, as the demand-side analysis below demonstrates, employer requirements were simultaneously softening.

The trajectory of master's degree growth, shown in Figure 1, reveals sustained expansion across the twelve-year period, with growth accelerating after 2015 as institutions launched new programs in data science, analytics, cybersecurity, and related fields. The expansion was concentrated in professional master's programs (applied programs targeting specific career outcomes) rather than research-oriented master's degrees, which remained relatively stable.

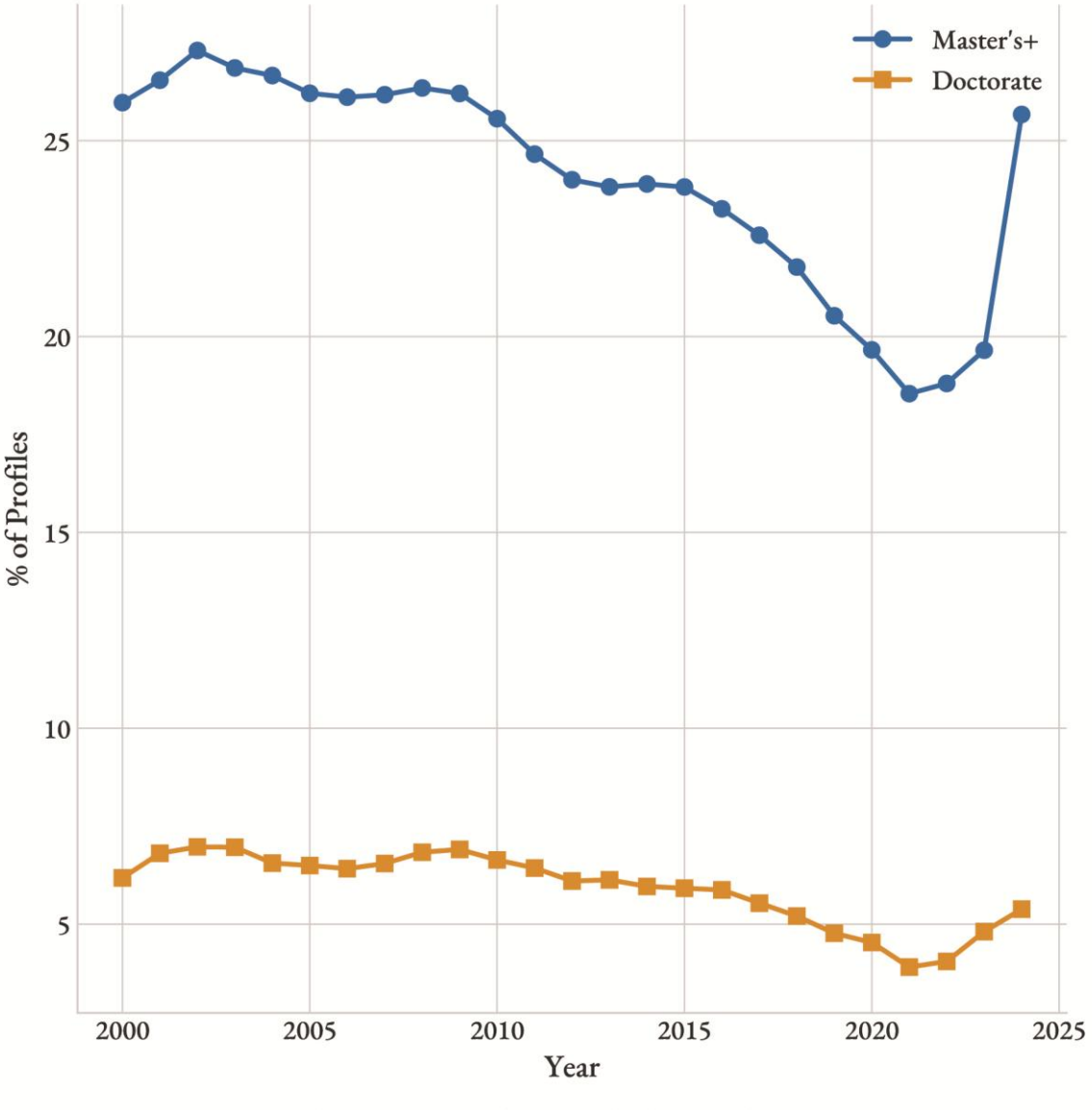

Figure 1. Master's degree production over time

Universities expanded credential supply by 27% from 2010–2022, precisely as employer requirements softened in growth sectors.

4.2 Declining Employer Demand: The Drawbridge Gap

Against this backdrop of expanding supply, the demand side tells a different story. Table 2 presents master's degree drawbridge gaps by occupation. The overall gap is -6.0 percentage points (95% CI [-6.7, -5.3]): across knowledge-work occupations, incumbents hold master's degrees at a rate of 27.9%, while recent entrants hold them at 20.7%. Employers are hiring recent cohorts with fewer master's degrees, not more.

The decline is sharpest in precisely the fields universities have targeted for expansion. Data science shows the largest gap (-20.9pp), followed by marketing (-11.2pp), software engineering (-9.8pp), and consulting (-9.1pp). These fields have seen rapid program proliferation—hundreds of new data science and analytics master's programs since 2012—yet employer demand for master's-level credentials has moved in the opposite direction. Employers in these fields have developed alternative screening mechanisms: technical assessments, coding challenges, portfolio review, and demonstrated work experience that provide skill verification without the time and cost of a master's program.

Table 2. Master's degree drawbridge gaps by occupation

Occupation	N	MA Gap (pp)	95% CI
Data Scientist	2,468	-20.9	[-22.4, -19.4]
Marketing	17,722	-11.2	[-12.8, -9.6]
Software Engineer	9,264	-9.8	[-10.9, -8.7]
Consulting	23,164	-9.1	[-10.6, -7.6]
Finance	9,904	-7.0	[-8.3, -5.7]
Engineering	28,448	-6.6	[-7.9, -5.3]
Designer	27,940	-5.0	[-6.5, -3.5]
Sales	42,824	-2.4	[-3.5, -1.3]
HR	6,228	-1.9	[-3.0, -0.8]
Product Manager	18,008	-1.8	[-3.1, -0.5]
Overall	186,307	-6.0	[-6.7, -5.3]

Note: Gap = (Recent entrant MA rate) − (Incumbent entry MA rate). Negative values indicate that recent entrants hold master's degrees at lower rates than incumbents. N includes both incumbents and recent entrants per occupation. Source: LinkedIn analysis, 2023 cross-section.

Figure 2 visualizes the drawbridge gap across occupations. The pattern is consistent: every knowledge-work occupation in the data shows a negative master's degree gap, though the magnitude varies. Fields where skills are more readily verifiable through direct assessment (software engineering, data science) show larger gaps, consistent with the prediction that alternative screening mechanisms reduce credential dependence. Fields where credentials carry more weight as social signals or where professional licensing requires advanced degrees (HR, product management) show smaller gaps.

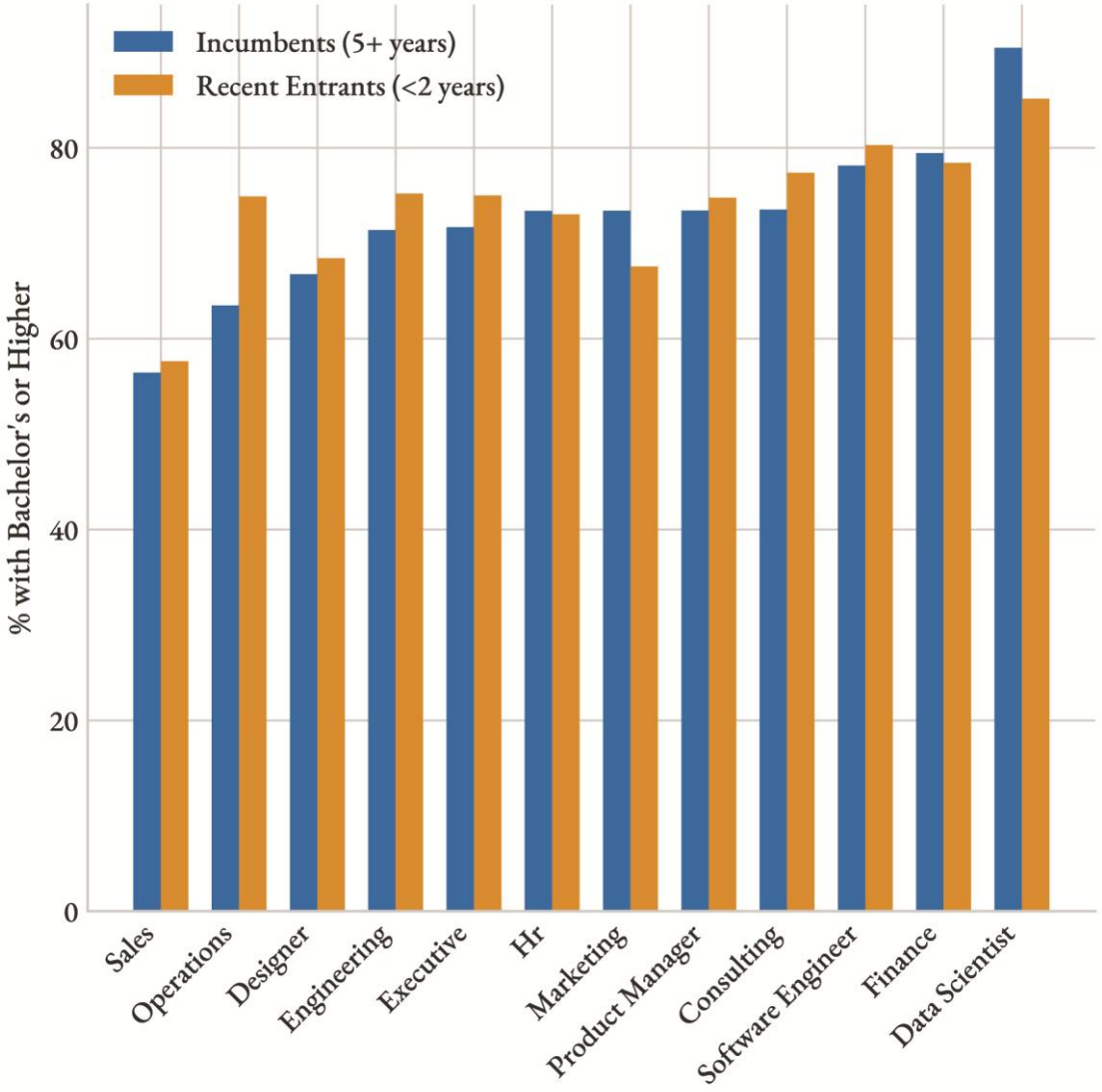

Figure 2. The drawbridge gap: credential gaps between incumbents and recent entrants

Master's requirements fell across most knowledge-work occupations even as universities expanded supply.

4.3 The Supply-Demand Mismatch

Table 3 presents the demand-side trend in finer detail, showing master's degree holding rates among early-career professionals (those who entered pre-2015) compared with recent entrants (post-2020). Both columns are measured from the LinkedIn data and thus represent demand-side credential profiles at different time points—not a direct supply-demand juxtaposition. The supply side is documented through the IPEDS aggregate trends (Table 1) and published NCES field-level tabulations discussed above. The mismatch between these two data sources—expanding IPEDS conferrals in applied fields alongside declining LinkedIn credential holding rates among recent entrants—constitutes the article's central finding.

To quantify the alignment between supply expansion and demand decline, a supply-demand mismatch index was computed as the rank-order correlation (r_s) between IPEDS conferral growth by broad field (using two-digit CIP codes mapped to LinkedIn occupational categories) and the change in master's degree holding rates shown in Table 3. This mapping is imperfect: IPEDS CIP codes classify programs by academic discipline (e.g., CIP 11: Computer and Information Sciences), while LinkedIn categories classify individuals by occupation (e.g., Software Engineer, Data Scientist). The two taxonomies overlap but do not align precisely. With this caveat, the mismatch index is

r_s=0.57, indicating moderate positive alignment between fields where universities expanded supply and fields where credential demand declined.

Table 3. Demand-side credential trends by occupation: master's degree holding rates among early-career versus recent entrants

Occupation	N	Early MA Rate	Recent MA Rate	Change (pp)
Consulting	26,090	29.4%	6.0%	-23.4
Software Eng.	13,166	24.9%	3.2%	-21.7
Executive	173,462	28.7%	7.8%	-20.9
Engineering	37,777	22.8%	2.4%	-20.4
Finance	12,801	30.1%	12.8%	-17.2
Designer	35,829	25.1%	8.0%	-17.0
Operations	23,288	18.6%	1.7%	-16.9
Sales	57,564	20.1%	4.4%	-15.8
Marketing	22,026	19.5%	6.9%	-12.6
Product Mgr.	20,096	15.7%	7.5%	-8.2
HR	7,213	13.9%	15.6%	+1.7

Note: Early MA Rate = master's degree holding rate among professionals who entered the field pre-2015. Recent MA Rate = rate among those who entered post-2020. Both columns measure demand-side credential profiles from LinkedIn data. HR is the only established field showing increased master's demand. Source: LinkedIn analysis.

The decline is particularly stark in consulting, where the early-career master's rate of 29.4% has collapsed to 6.0% among recent entrants (-23.4pp), and in software engineering, where the rate fell from 24.9% to 3.2% (-21.7pp). These are fields where IPEDS data show substantial program expansion over the same period. HR is the sole established occupation showing increased master's demand (+1.7pp), consistent with the growth of specialized human resource management master's programs that align with professional certification requirements.

Data science warrants separate discussion. Because the occupation barely existed before 2015, the early-career cohort is too small to establish a reliable baseline for comparison. Among recent entrants, 11.1% hold master's degrees—a rate that, while substantial, is well below what the rapid proliferation of data science master's programs might lead one to expect. Data science is thus excluded from the mismatch index calculation and from Table 3 because the absence of a baseline makes the change metric non-comparable to other occupations.

4.4 Prestige Stratification in Returns

The aggregate supply-demand mismatch masks critical heterogeneity by institutional prestige. Figure 3 reveals that credential returns concentrate at the top of the prestige hierarchy. Graduates of Ivy Plus institutions reach director-level positions at a rate of 14.7%, compared with 12.9% for Top 50 institutions—a 1.8 percentage point gap. This comparison is descriptive and does not control for field, cohort, or individual characteristics; students who attend Ivy Plus programs differ systematically from those at Top 50 institutions on multiple dimensions (family background, prior academic record, field distribution), so some portion of this gap likely reflects selection rather than institutional value-added. Nevertheless, the pattern is consistent with broader evidence that credential returns are prestige-stratified (Chetty et al., 2020). Recent analysis confirms the extent of this heterogeneity: Cooper (2024) estimated that nearly half of master's degree programs yield negative return on investment, while Webber et al. (2024) found that average returns to master's degrees mask substantial variation by field, with some programs delivering strong earnings gains and others providing negligible or negative returns.

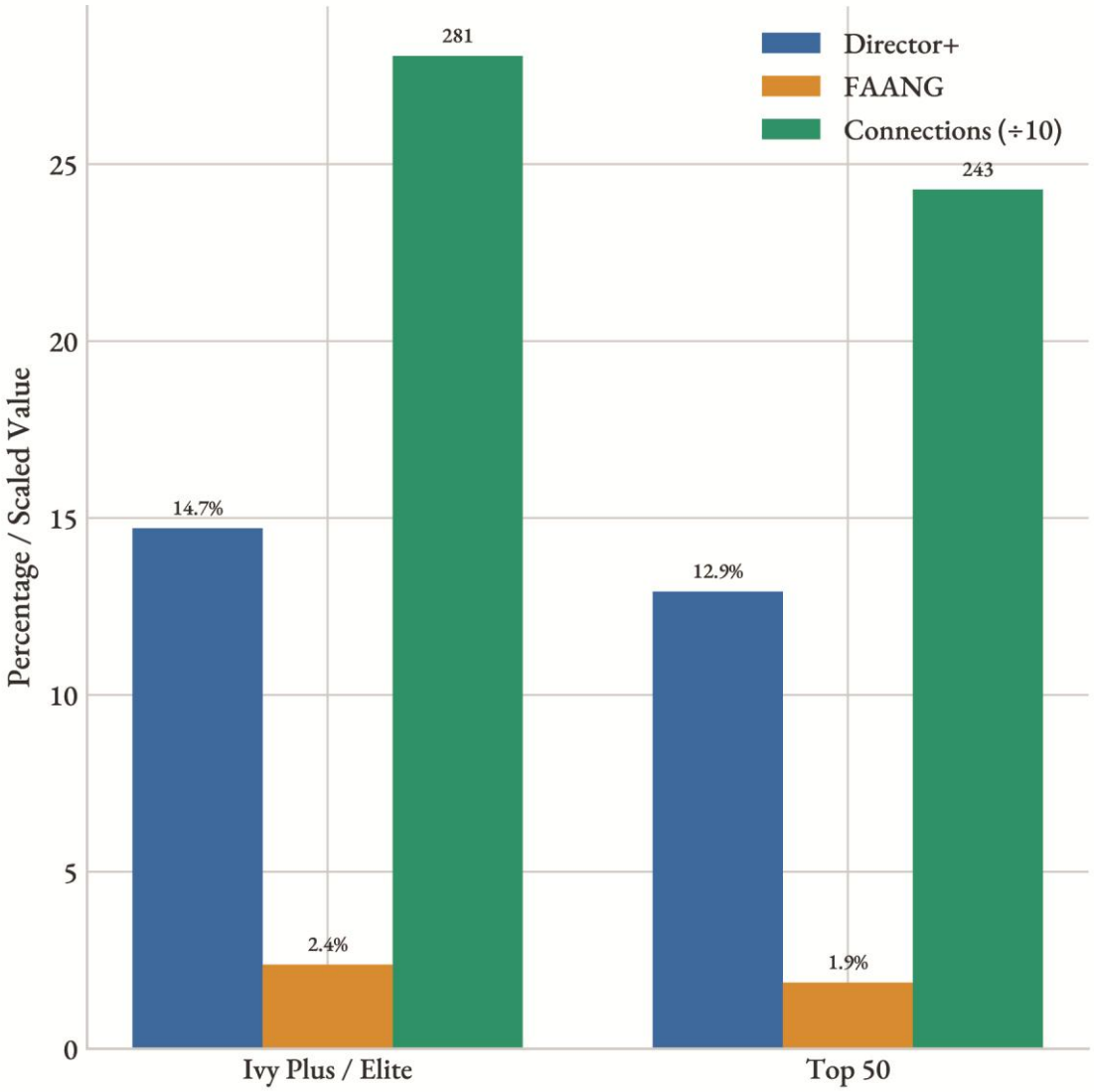

Figure 3. Credential ROI varies by institution prestige

Elite program graduates see higher returns, while non-elite program graduates face diminishing returns on their credential investment.

This stratification has distributional consequences. The programs most accessible to working-class and first-generation students—non-elite programs, online programs, programs at institutions without strong employer networks—are precisely the programs with weakest returns (Chetty et al., 2020; Stephens et al., 2012). The credential hierarchy that structures undergraduate education replicates in graduate education, channeling less-advantaged students toward programs that extract tuition without delivering proportionate career value. The master's degree boom thus compounds rather than alleviates educational inequality: aggregate expansion benefits elite programs that retain selectivity while diluting the signal for everyone else.

4.5 Outcome Reporting and Information Asymmetry

The gap between marketed and actual credential returns is illustrated by a hypothetical composite, constructed from patterns in the quantitative data and published accounts of graduate education outcomes. "Emily" enrolled in a Master of Science in Marketing Analytics at a private university, paying $72,000 in tuition financed largely through federal loans. The program's marketing materials cited a mean starting salary of $95,000 for graduates. After completing the program, Emily secured a position paying $58,000—substantially below the marketed figure and only modestly above what she might have earned without the credential. Her monthly loan payments consume a significant portion of her take-home pay.

This composite reflects systematic patterns in outcome reporting documented in the quantitative data. Marketing's drawbridge gap of -11.2pp indicates that employers are hiring marketing professionals with fewer master's degrees than in prior cohorts. The $95,000 marketed figure would be a mean, inflated by a small number of graduates who secured high-paying positions at technology companies; the median would be substantially lower but was not disclosed. Non-respondents to the placement survey—disproportionately graduates who were unemployed or underemployed—were excluded. The survey was administered six months post-graduation, before many graduates had found permanent positions.

This information asymmetry is structural. Universities that report unflattering outcomes risk losing prospective students to competitors whose reporting is more selective. Without mandatory, standardized outcome reporting at the program level, prospective students lack the information necessary to make informed enrollment decisions.

5. Discussion

Before interpreting the supply-demand mismatch, a caveat is warranted. This article focuses on the labor market signaling value of master's degrees, but education serves purposes beyond employment. Graduate study cultivates specialized knowledge, analytical reasoning, and intellectual depth that hold value independent of their market returns. Many students pursue master's degrees for genuine intellectual curiosity, professional identity, or personal fulfillment, and these motivations are legitimate on their own terms. The argument presented here is not that master's degrees lack educational value, but that students investing $40,000 to $120,000 deserve accurate information about the labor market conditions they will enter upon graduation. When institutions market programs primarily on career outcomes while the credential's market signal is weakening, the resulting information gap harms the students these programs claim to serve.

5.1 Explaining the Mismatch

The central finding is a supply-demand mismatch in the master's degree market: universities expanded credential supply by 27.0% between 2010 and 2022, while employer demand for master's degrees declined across knowledge-work occupations (overall drawbridge gap of -6.0pp; mismatch index r_s=0.57 across imperfectly matched IPEDS and LinkedIn field categories). Five reinforcing mechanisms explain this divergence.

First, institutional revenue incentives drive supply expansion independently of demand. Master's programs generate substantial net revenue. Illustratively, a 60-student cohort at $60,000 tuition generates $3.6 million annually, with instruction and overhead costs well below that figure, particularly for online programs using adjunct faculty. This revenue cross-subsidizes doctoral programs, faculty research, and institutional operations. The incentive to expand enrollment operates regardless of labor market conditions because universities capture benefits (tuition) while externalizing costs (student debt, credential devaluation) onto graduates and the broader labor market. The OPM model amplifies this dynamic: OPMs invest in marketing and recruitment infrastructure that generates enrollment at scale, with contracts structured around revenue sharing rather than graduate outcomes (Hamilton et al., 2024).

Second, mimetic isomorphism produces parallel program expansion across institutions (DiMaggio & Powell, 1983). When one university launches a successful program, competitors follow. Data science master's programs proliferated from a handful to hundreds within a decade, without coordination or demand analysis. Each institution's decision was individually rational (competitors were growing, and standing still meant losing market share), but the collective result was oversupply.

Third, information asymmetry between institutions and prospective students distorts enrollment decisions. Students lack accurate, program-level outcome data; institutions have limited incentive to provide it. The gap between marketed outcomes and actual returns reflects systematic selection in what is reported, not random error.

Fourth, individual rationality producing collective irrationality: each student's decision to acquire a master's degree is individually rational (maintaining competitive position), but when many students simultaneously invest in the same credential, the collective result is credential devaluation (Collins, 1979; Hirsch, 1976). The credential arms race escalates costs without improving collective outcomes, a positional goods problem in which educational investment yields diminishing social returns.

Fifth, moral hazard: institutions profit from enrollment regardless of graduate outcomes. There is no mechanism through which poor outcomes discipline institutional behavior. Programs with low placement rates, low salary outcomes, and high debt burdens continue operating because they continue generating revenue. The costs of credential oversupply are borne by graduates; the benefits accrue to institutions.

5.2 The Skills-Based Hiring Alternative

The demand-side decline documented in this study coincides with, and may be partly explained by, the emerging skills-based hiring movement. Multiple state governments have removed bachelor's degree requirements for public-sector positions. Major employers including Google, Apple, and IBM have publicly dropped degree requirements for certain roles. The Burning Glass Institute documented a broader "degree reset" in which employers increasingly specify skills rather than credentials in job postings (Burning Glass Institute, 2022), though subsequent research found the gap between stated intentions and actual hiring practices remains wide (Sigelman et al., 2024).

This movement provides an alternative explanation for part of the drawbridge gap: employers may not be lowering standards but rather replacing credential proxies with direct skill assessment. Technical interviews, coding challenges, portfolio review, and bootcamp credentials offer skill verification that does not require two years and $80,000 of investment. Figure 4 shows that bootcamp graduates, while reaching director-level positions at lower rates than traditional degree holders (6.2% versus 11.7%), build comparable professional networks (mean 285.5 versus 211.7 connections), suggesting viable professional integration through non-traditional pathways. Figure 5 documents the temporal trend: bootcamp credentials appear on 0.32% of profiles among post-2015 entrants, up from 0.10% among pre-2010 entrants, a threefold increase that, while small in absolute terms, signals growing employer acceptance of alternative credentials.

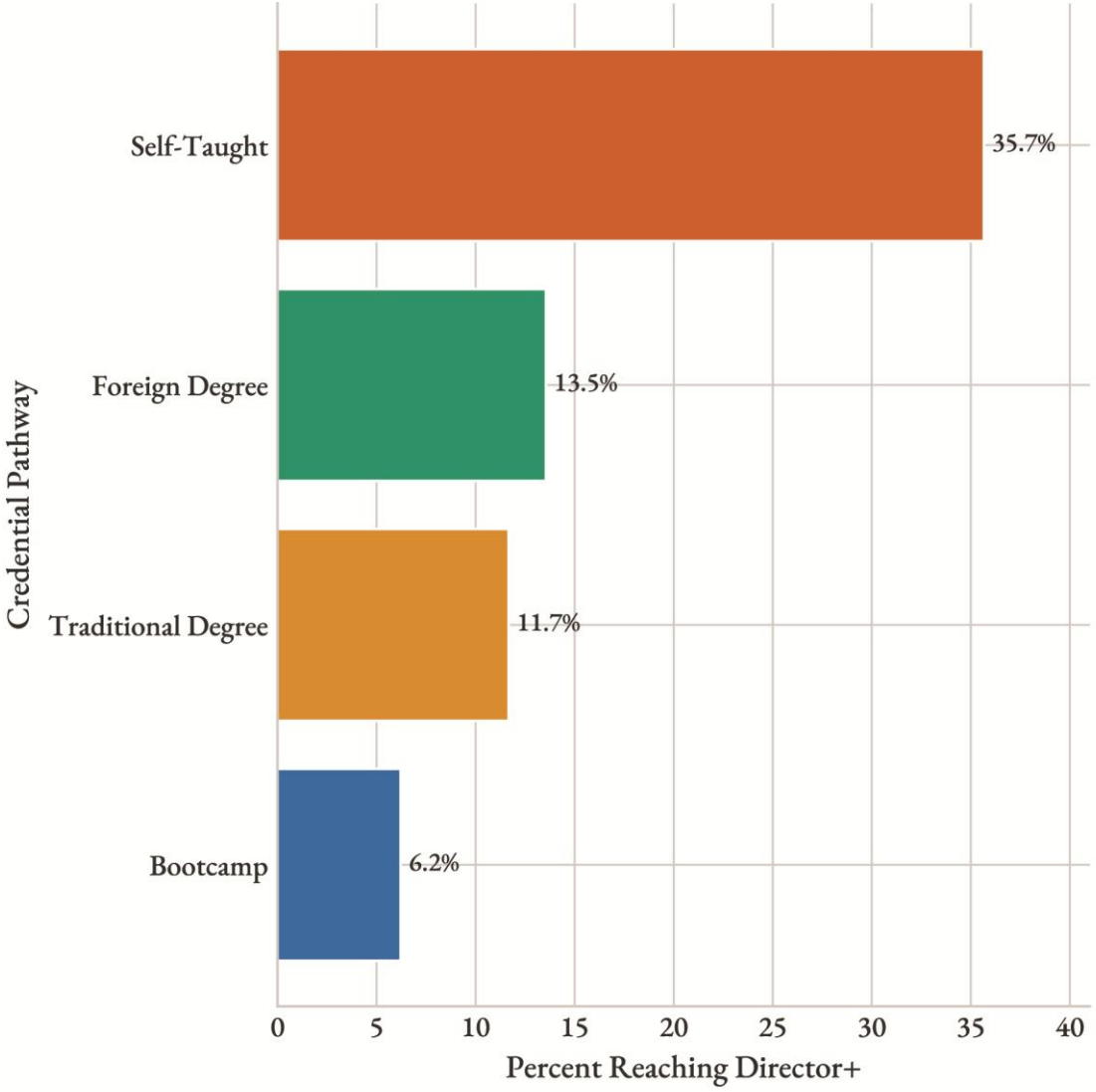

Figure 4. Alternative pathway outcomes

Bootcamp and certification pathways show viability in some sectors. Director-plus rates reflect both credential effects and cohort composition (bootcamp holders skew early-career).

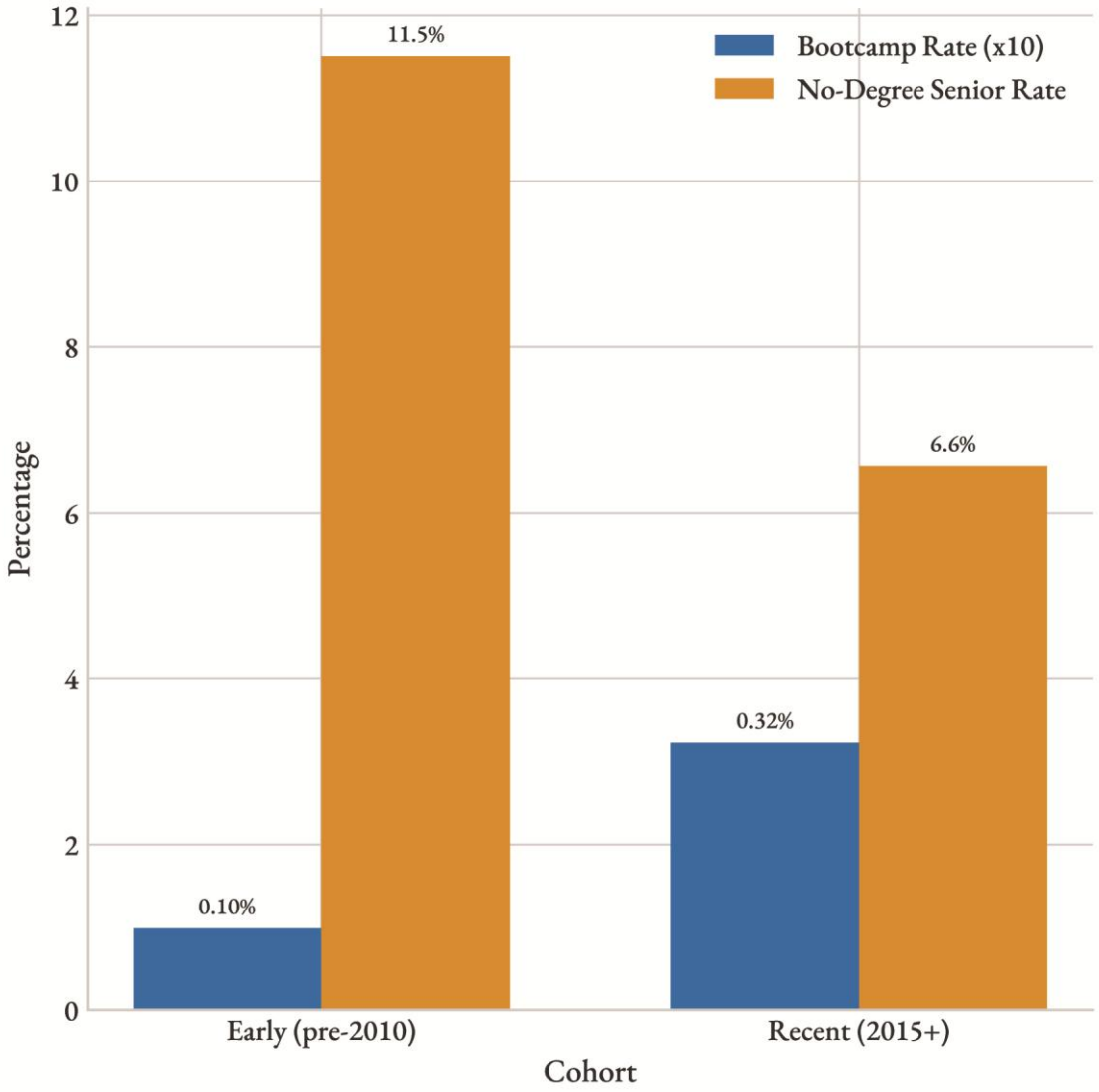

Figure 5. Temporal trends in alternative credential acceptance

Employer openness to non-traditional pathways has increased, particularly in technology sectors.

Whether the skills-based hiring movement represents a durable structural shift or a rhetorical trend remains to be seen. But its emergence provides important context for interpreting the supply-demand mismatch: universities expanded master's degree production precisely as the labor market began developing alternatives to credential-based hiring.

5.3 Policy Implications

Realigning incentives requires policy intervention at multiple levels.

Outcome transparency is the minimum necessary reform. Federal regulation should require mandatory, standardized reporting of program-level (not institution-level) outcomes: median earnings at one, three, and five years post-graduation; debt-to-income ratios; completion rates; and comparison to a counterfactual benchmark (e.g., earnings of bachelor's degree holders in the same field). Reporting should use medians, not means, and should account for non-response. The reinstated gainful employment regulations represent a step in this direction but apply

primarily to for-profit institutions; extending similar requirements to all master's programs would provide the information students need to make informed decisions.

Institutional risk-sharing would create direct financial consequences for poor outcomes. If institutions bore some portion of student loan default costs, they would have incentive to improve outcomes, constrain enrollment in weak programs, and honestly represent labor market prospects. Risk-sharing proposals have faced political resistance from institutions and their allies, but the principle is sound: institutions that profit from enrollment should share the risk when enrollment does not produce returns.

Consumer protection standards should apply to the marketing of graduate programs. Salary projections, placement rates, and career outcome claims should be subject to truth-in-advertising standards. Programs that market specific salary outcomes should be required to document the basis for those claims using standardized methodology.

OPM regulation should address the incentive misalignment created by enrollment-based revenue sharing. The Department of Education has proposed regulations clarifying OPM oversight; stronger standards would require outcome-linked contracts rather than pure enrollment-based compensation, and would subject OPM marketing claims to the same standards as institutional marketing.

Support for alternative credentials would provide competitive discipline on traditional master's programs. Stackable certificates, micro-credentials, and competency-based assessments offer cheaper, faster alternatives that employers increasingly accept. Federal financial aid policy that supports these alternatives alongside traditional degrees would expand student choice and create market pressure on programs that charge premium tuition for uncertain returns.

6. Limitations

Several limitations qualify these findings. First, IPEDS measures degree conferrals, not enrollment, applications, or labor market demand. Conferrals are a lagging indicator that reflects decisions made one to three years earlier and may not capture very recent shifts in supply. The field-level supply patterns referenced in this article draw on published NCES tabulations rather than original analysis of detailed CIP-code-level data, limiting the precision of field-level supply-demand comparisons.

Second, LinkedIn data has known selection biases. The platform overrepresents knowledge-work professionals, urban workers, and higher earners. These findings apply to the knowledge-work sectors that professional master's programs target but may not generalize to occupations less represented on LinkedIn (healthcare, skilled trades, public sector). Importantly, LinkedIn's overrepresentation of successful graduates makes the demand-decline findings conservative: the true gap may be larger than observed. Additionally, LinkedIn education data contains school names but not always degree types; master's degree detection via name patterns likely undercounts master's holders, which could inflate or deflate the gap depending on whether undercounting is differential across cohorts.

Third, the design is cross-sectional and observational. The drawbridge gap compares cohorts at a single point in time (2023 cross-section); it does not track individuals over time or establish causal relationships. As discussed in the methods section, the gap may partly reflect occupational composition change, cohort timing effects, or survivor bias among incumbents, rather than pure demand-side shifts. The supply-demand mismatch is descriptive, not causal.

Fourth, the illustrative composite (Emily) is a hypothetical constructed from quantitative patterns and published accounts, not a case drawn from systematic qualitative research. It should be interpreted as an illustration of documented statistical patterns, not as independent evidence.

Fifth, specific programs cannot be linked to specific outcomes at the individual level. IPEDS data is institutional; LinkedIn data is individual. The analysis juxtaposes trends from two data sources but cannot directly match a graduate of a specific program to her career outcome. Program-level outcome analysis linking IPEDS to earnings data (e.g., through the College Scorecard) would strengthen this analysis.

Sixth, the analysis focuses on U.S. higher education. International comparison, particularly with European systems that maintain clearer distinctions between research and professional master's degrees and with East Asian systems that show even more intense credential competition, would illuminate the distinctiveness of the American dynamic.

7. Conclusion

The master's degree boom is a supply-side phenomenon. Between 2010 and 2022, U.S. universities expanded master's degree production by 27.0%, concentrated in professional programs targeting knowledge-work sectors. Yet across those same sectors, the master's degree drawbridge gap is negative: recent entrants hold master's degrees at rates 6.0 percentage points lower than incumbents, indicating that employers are hiring without requiring the credential universities are producing in ever-greater numbers. The supply-demand mismatch index of r_s=0.57

—computed across imperfectly matched IPEDS disciplinary categories and LinkedIn occupational categories—suggests that fields with the greatest supply expansion are also fields with the sharpest demand decline.

This mismatch is the predictable product of an incentive structure in which universities capture tuition revenue regardless of graduate outcomes, students bear the risks of credential investment through debt, and no coordinating mechanism aligns supply with demand. Revenue incentives, mimetic isomorphism, information asymmetry, the OPM model, and the moral hazard inherent in enrollment-based financing all contribute to a system that produces credentials into weakening markets.

The consequences fall disproportionately on students who can least afford failed credential investments. Working-class and first-generation students, who lack the informal knowledge to distinguish valuable programs from oversupplied ones and who cannot absorb the financial consequences of credentials that fail to deliver expected returns, are channeled toward the programs with weakest outcomes (McMillan Cottom, 2017; Stephens et al., 2012). The master's degree boom compounds rather than alleviates educational inequality.

Without intervention—outcome transparency, institutional risk-sharing, OPM regulation, consumer protection, and support for alternative credentials—the mismatch will continue. Universities have no internal mechanism to limit expansion; each institution rationally maximizes enrollment while externalizing the costs of oversupply. The political economy favors institutional interests over student interests: universities are powerful lobbying interests with concentrated benefits, while students' interests are diffuse and temporary.

Future research should pursue three directions. First, program-level outcome analysis linking IPEDS conferral data to earnings records (through the College Scorecard or state longitudinal data systems) would allow direct assessment of which programs deliver returns and which do not. Second, qualitative research on student decision-making—how prospective students navigate information asymmetry, how they weigh credential investment against alternatives, and how class background shapes these decisions—would provide the individual-level perspective that quantitative analysis cannot. Third, international comparison—particularly with the United Kingdom's rapid expansion of taught master's programs and European Bologna Process reforms—would clarify whether the American supply-demand mismatch is distinctive or part of a broader pattern in credential economies.

7.1 IPEDS Data Details

IPEDS Completions Survey data were obtained from the National Center for Education Statistics for academic years 2009–10 through 2021–22. Degree conferrals were aggregated using CIP code 99.0000 (grand total) for overall trends. Field-level patterns referenced in the text draw on published NCES Digest of Education Statistics tabulations (Table 323.10: Master's degrees conferred by postsecondary institutions, by field of study), which report conferrals by two-digit CIP code. Institution types follow IPEDS classifications: public, private nonprofit, and private for-profit. Institutions that merged, closed, or changed classification during the observation period were handled by using the most recent institutional classification and aggregating historical data to the surviving entity. All IPEDS data are publicly available through the NCES IPEDS Data Center. The 27.0% master's degree growth figure (2010–2022) is consistent with but slightly larger than the NCES-reported 16% growth for 2011–12 to 2021–22, reflecting the different start year.

7.2 Drawbridge Gap Methodology

The drawbridge gap is computed for each occupation j as:

$$\text{Gap}_j = \bar{M}_{j,\text{recent}} - \bar{M}_{j,\text{incumbent}} \quad (1)$$

where $\bar{M}_{j,\text{recent}}$ is the master's degree holding rate among recent entrants (occupational tenure <2 years) and $\bar{M}_{j,\text{incumbent}}$ is the rate among incumbents (tenure ≥5 years). Confidence intervals are computed using bootstrap resampling (10,000 iterations) with bias-corrected and accelerated (BCa) adjustment. Occupations are classified using standardized LinkedIn occupational categories mapped to Bureau of Labor Statistics Standard Occupational Classification (SOC) codes.

Table 4 reports incumbent and recent entrant sample sizes by occupation. Sample sizes vary substantially, affecting the precision of occupation-specific estimates; confidence intervals in Table 2 reflect this variation.

Table 4. Sample sizes by occupation and cohort

Occupation	$N_{\text{incumbent}}$	N_{recent}	N_{total}
Executive	138,605	2,437	141,042
Sales	41,684	1,140	42,824
Engineering	27,185	1,263	28,448
Designer	27,243	697	27,940
Consulting	22,797	367	23,164
Product Manager	17,564	444	18,008
Marketing	17,096	626	17,722
Finance	9,612	292	9,904
Software Engineer	8,716	548	9,264
HR	6,050	178	6,228
Data Scientist	2,313	155	2,468
Total	318,865	8,147	327,012

Note: Incumbents = occupational tenure ≥5 years; Recent entrants = tenure <2 years. Professionals with 2–5 years tenure are excluded from the drawbridge gap analysis to create clear separation between cohorts.

References

Arum, R., & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226028576.001.0001

Berg, I. (1970). *Education and jobs: The great training robbery*. Praeger Publishers.

Bills, D. B. (2003). Credentials, signals, and screens: Explaining the relationship between schooling and job assignment. *Review of Educational Research, 73*(4), 441-469. https://doi.org/10.3102/00346543073004441

Brint, S., Riddle, M., Turk-Bicakci, L., & Levy, C. S. (2005). From the liberal to the practical arts in american colleges and universities: Organizational analysis and curricular change. *The Journal of Higher Education, 76*(2), 151-180. https://doi.org/10.1080/00221546.2005.11778909

Burning Glass Institute. (2022). *The emerging degree reset: How the shift to skills-based hiring holds the keys to growing the u.s. Workforce at a time of talent shortage*. Burning Glass Institute. https://www.burningglassinstitute.org/research/the-emerging-degree-reset

Cappelli, P. (2012). *Why good people can't get jobs: The skills gap and what companies can do about it*. Wharton Digital Press. https://doi.org/10.9783/9781613630136

Chetty, R., Friedman, J. N., Saez, E., Turner, N., & Yagan, D. (2020). Mobility report cards: The role of colleges in intergenerational mobility. *The Quarterly Journal of Economics, 135*(3), 1567-1633. https://doi.org/10.1093/qje/qjaa005

Collins, R. (1979). *The credential society: An historical sociology of education and stratification*. Academic Press.

Cooper, P. (2024). *Does college pay off? A comprehensive return on investment analysis*. Foundation for Research on Equal Opportunity (FREOPP). https://freopp.org/whitepapers/does-college-pay-off-a-comprehensive-return-on-investment-analysis/

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147-160. https://doi.org/10.2307/2095101

Ehrenberg, R. G. (2002). *Tuition rising: Why college costs so much*. Harvard University Press.

Fuller, J. B., & Raman, M. (2017). *Dismissed by degrees: How degree inflation is undermining u.s. Competitiveness and hurting america's middle class*. Harvard Business School Working Paper. https://www.hbs.edu/managing-the-future-of-work/Documents/dismissed-by-degrees.pdf

Hamilton, L. T., Daniels, H., Smith, C. M., & Eaton, C. (2024). The for-profit side of public U: University contracts with online program managers. *Socius, 10*. https://doi.org/10.1177/23780231231214952

Hirsch, F. (1976). *Social limits to growth*. Harvard University Press. https://doi.org/10.4159/harvard.9780674497900

Looney, A., & Yannelis, C. (2015). A crisis in student loans? How changes in the characteristics of borrowers and in the institutions they attended contributed to rising loan defaults. *Brookings Papers on Economic Activity*, 1-89. https://doi.org/10.1353/eca.2015.0003

McMillan Cottom, T. (2017). *Lower ed: The troubling rise of for-profit colleges in the new economy*. The New Press. https://doi.org/10.2307/jj.26193359

National Center for Education Statistics. (2023). *Digest of education statistics*. U.S. Department of Education. https://nces.ed.gov/programs/digest/2023menu_tables.asp

Newfield, C. (2016). *The great mistake: How we wrecked public universities and how we can fix them*. Johns Hopkins University Press.

Sigelman, M., Fuller, J. B., & Martin, A. (2024). *Skills-based hiring: The long road from pronouncements to practice*. Burning Glass Institute; Harvard Business School. https://www.burningglassinstitute.org/research/skills-based-hiring-2024

Slaughter, S., & Rhoades, G. (2004). *Academic capitalism and the new economy: Markets, state, and higher education*. Johns Hopkins University Press.

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics, 87*(3), 355-374. https://doi.org/10.2307/1882010

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R. (2012). Unseen disadvantage: How american universities' focus on independence undermines the academic performance of first-generation college students. *Journal of Personality and Social Psychology, 102*(6), 1178-1197. https://doi.org/10.1037/a0027143

Walsemann, K. M., Gee, G. C., & Gentile, D. (2015). Sick of our loans: Student borrowing and the mental health of young adults in the United States. *Social Science and Medicine, 124*, 85-93. https://doi.org/10.1016/j.socscimed.2014.11.027

Webber, D. A., Ehrenberg, R. G., & Dundar, H. (2024). Heterogeneity in labor market returns to master's degrees: Evidence from Ohio. *Research in Higher Education, 65*(5). https://doi.org/10.1007/s11162-024-09777-8

Zaloom, C. (2019). *Indebted: How families make college work at any cost*. Princeton University Press. https://doi.org/10.1515/9780691195421