

Do Elite Universities Monopolize Elite Positions in Society? —Evidence from 170 Million Cross-Sector Career Histories Worldwide over Four Decades

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Abstract

Theories of social stratification have long examined the intergenerational transmission of elite status, yet discussions of the role of education in this process have largely focused on equality of access to higher education. A more consequential but rarely investigated question is whether elite universities have effectively assumed the power to credential and screen candidates for elite positions, thereby becoming a new institutionalized channel of class reproduction. Drawing on 170 million cross-sector career histories worldwide from 1985 to 2024, this study provides the first large-scale, longitudinal assessment of the proportions of elite-university graduates among academic elites (45.70%–78.49%), corporate executives (33.77%–42.98%), and governmental and political elites (31.98%–40.48%). Measures of monopoly indicate that this concentration remained persistently high over the past four decades and intensified further in certain sectors. After controlling for demographic characteristics, period, country, discipline or industry, and career starting point, elite-university graduates exhibit significant advantages in gaining access to elite positions across academia, business, and government. Career-trajectory analyses further show that they advance more rapidly, generating cumulative advantages that extend from entry into elite positions to subsequent career advancement. These findings suggest that elite universities now do more than select talent and increasingly function as structured channels for the intergenerational transmission of class advantage. Expanding access to higher education alone is therefore insufficient to address educational inequality. Policy interventions must also target monopolistic effects at the educational-output stage, including correcting preferences for elite educational backgrounds in recruitment for elite positions, diversifying pathways for career advancement, and conducting more rigorous equity audits of admissions policies at elite universities.

Introduction

Power over knowledge production, economic management, and politics is increasingly concentrated among graduates of a small number of elite universities. This concentration of power speaks directly to the normative promise of modern meritocracy. Modern societies proclaim that social status should be determined by individual ability, effort, and open competition rather than by lineage, wealth, or inherited privilege. Elite universities are central to this institutional ideal because they identify talent through rigorous selection, develop individual capabilities through highly qualified faculty, academic resources, and organizational training, and channel their graduates into key positions in knowledge production, economic management, and public governance. According to this meritocratic logic, the overrepresentation of elite-university graduates in senior positions is regarded as a natural outcome of competition for talent and the efficient allocation of resources. Yet educational competition, originally intended to break inherited status, may over time evolve into a new system of inheritance organized around institutional hierarchy. Family background and early educational advantages first shape individuals' opportunities to enter elite universities[1–5]; elite credentials are then converted into signals of ability that organizations can readily recognize[6–8]; and alumni networks, mentoring relationships, and professional circles continually amplify the value of these signals[9–12]. Elite universities may

therefore function not only as providers of high-quality education but also as institutional gateways controlling access to social power.

This study defines the monopolization of elite positions by elite universities as a condition in which a small number of universities persistently and disproportionately dominate the educational origins of position holders, while their graduates maintain enduring advantages in both access and subsequent career advancement. This monopolization manifests itself both in the concentration of educational origins at the macro level and in disparities in opportunity at the individual level. It shapes not only who is more likely to enter elite positions but also who can advance more rapidly to the top of occupational hierarchies. Determining whether elite universities exercise a systemic monopoly therefore requires more than observing the proportion of positions held by their graduates. It also requires examining whether this concentration extends across different social sectors, how it evolves over time, and whether it translates into advantages in career advancement.

Previous studies have documented substantial advantages for graduates of elite universities across multiple sectors. In the academic labor market, faculty recruitment follows a highly hierarchical structure, with a small number of prestigious universities training a disproportionate share of faculty employed at research universities[13–16]. The prestige of one's doctoral institution continues to shape faculty appointment, the status of the employing institution, and subsequent career development[17–20]. In corporate labor markets, institutional prestige is widely used to screen applicants and identify ability, making elite credentials an important gateway into finance, consulting, law, and senior management in large corporations[6, 9, 11, 21–23]. In politics, graduates of elite universities have also long been concentrated in legislatures, senior civil services, and national leadership positions[24–26]. Collectively, these studies demonstrate that educational stratification does not remain confined within higher education but is continually converted into occupational rank, organizational power, and political influence[5, 27–29].

Existing research, however, remains insufficient to determine whether these dispersed advantages associated with elite universities amount to a global, cross-sector monopoly over elite positions. First, academic appointments, corporate executive positions, and elite government positions belong to distinct research traditions and have rarely been compared systematically using common criteria. It therefore remains unclear whether the advantages conferred by elite education arise from particular occupational institutions or represent a general mechanism through which modern societies allocate scarce positions of power. Second, most previous studies focus on a small number of countries, particularly the United States, and rely primarily on cross-sectional data or samples covering relatively short periods. Consequently, they cannot establish whether the monopolization of elite positions by elite universities is a broadly cross-national phenomenon or reveal its long-term evolution amid the expansion of higher education. Third, existing research often examines the macro-level structure of educational origins separately from individual-level access to elite positions. A concentrated pattern of educational origins does not necessarily mean that elite education increases an individual's probability of entry, just as an individual-level advantage associated with attending an elite university does not necessarily constitute a

structural monopoly across the occupational system. Only by connecting the concentration of educational origins, access to elite positions, temporal trends, and career advancement can the full chain through which elite universities control opportunities at the top of society be identified.

To address these questions, this study integrates more than 170 million career histories and public records, defines the top 500 universities in global comprehensive rankings as elite universities, and systematically examines the distribution, entry advantages, and long-term trajectories of their graduates across elite positions in academia, business, and government. The academic analysis combines data from OpenAlex, ORCID, and global faculty CVs. The corporate analysis uses global LinkedIn-derived career histories and data on executives of Chinese listed companies. The government analysis draws on LinkedIn-derived records of senior government officials, Chinese officials at full department/director-general rank or above, and records of US political figures from 1789 to 2026. The study further combines measures of the concentration of educational origins with individual-level multivariable regression, matching and weighting methods, period-specific models, and survival analysis. These analyses sequentially examine which universities supply the occupants of elite positions, whether elite education increases the probability of entering such positions, how this advantage has evolved over time, and whether it subsequently translates into faster career advancement. Finally, drawing on data concerning article retractions, publicly disclosed cases of official corruption, and publicly reported cases of premature death among university faculty, the study explores the broader occupational consequences associated with elite educational advantage.

The results show that although the top 500 elite universities account for only approximately 2% of universities worldwide, they dominate the most consequential positions of power in modern society to a striking and persistent degree. Over the past four decades, doctoral graduates of this 2% of universities have occupied as much as nearly 80% of academic positions at the world's leading universities, while their bachelor's graduates have similarly held approximately one-third of corporate executive positions worldwide and elite political positions in China and the United States. Meanwhile, global higher education has undergone an unprecedented expansion, yet educational pathways to the top of society have not opened at a comparable pace. Rather than diminishing, the dominance of elite universities has persisted and, in several sectors, intensified. Modern society therefore faces the question of whether elite universities are identifying and cultivating the most talented individuals or have come to monopolize the principal channels through which social elites are produced.

The findings identify a common structure of monopolization across knowledge production, economic management, and public governance. Graduates of elite universities are substantially overrepresented in academic positions, corporate executive roles, and senior government positions worldwide, and this monopolization is not confined to individual countries or particular occupational sectors. Even after accounting for individual characteristics, elite education remains significantly associated with a higher probability of entering all three categories of elite positions. Period-specific analyses further show that this entry advantage has continued to widen in academia, remained broadly stable while strengthening during certain periods in business, and persisted over time in government. Moreover, the influence of

elite education extends beyond entry into elite positions and translates into faster career advancement. Supplementary analyses of retractions, corruption, and publicly reported premature deaths further indicate that the occupational advantages enjoyed by elite-university graduates are not accompanied by consistently superior ethical conduct or greater career sustainability.

This study therefore advances research on elite education from asking whether elite credentials yield higher returns to asking who controls the production and reproduction of social elites in modern society. By connecting the concentration of educational origins, individual entry advantages, long-term change, and career advancement, it demonstrates that elite universities are not merely the leading institutions within higher education; they are institutional hubs deeply embedded in the allocation of knowledge, economic, and political power. What they monopolize is not only access to high-quality educational resources, but also the principal pathways into society's elite strata.

Results

Elite-university PhD graduates substantially monopolize academic positions worldwide

This study constructed a list of the top 500 universities in global comprehensive rankings using a composite approach (see Methods) and used this list to define elite universities. The results show that elite-university PhD graduates substantially dominate academic positions at both elite and non-elite universities. An analysis of the career histories of 2,717,915 university faculty members in the OpenAlex (OA) database found that 64.93% had earned their PhDs from elite universities, far exceeding the proportion of elite universities among all identifiable universities worldwide (N = 25,032; 2.00%; Nature Index). Among faculty employed at elite universities, the proportion of elite-university PhD graduates was 2.10 times that of non-elite-university PhD graduates (67.70% vs. 32.30%). Even among faculty employed at non-elite universities, the corresponding ratio was 1.41 (58.59% vs. 41.41%). An analysis of the career histories of 1,011,278 university faculty members in the ORCID database found that 42.70% had earned their PhDs from elite universities, again far exceeding the proportion of elite universities among universities worldwide (2.00%). Among faculty employed at elite universities, the proportion of elite-university PhD graduates was 3.65 times that of non-elite-university PhD graduates (78.49% vs. 21.51%). Among faculty employed at non-elite universities, the corresponding ratio was 0.47 (32.15% vs. 67.85%). An analysis of 4.54 million global faculty CVs collected by our research team found that 18.98% of faculty members had earned their PhDs from elite universities. Although this proportion was lower than those observed in the other two datasets, it remained substantially higher than the share of elite universities among universities worldwide (2.00%). The proportions of elite-university PhD graduates among faculty employed at elite and non-elite universities were 45.70% and 12.45%, respectively, both far exceeding the worldwide share of elite universities (2.00%; Fig. 1 and Appendix Fig. 1).

We further used the Gini coefficient and Theil index to measure the degree to which elite-university PhD graduates monopolize academic positions (see Appendix, Supplementary Methods 12). The results

show that this pattern of monopolization persisted worldwide throughout the past four decades (1985–2024), with its overall intensity increasing and remaining at a high level (Fig. 2 and Appendix Figs. 2–3). Although the number of doctoral-source universities represented among faculty at elite universities increased over this period, academic positions became increasingly concentrated among leading universities (Fig. 3 and Appendix Fig. 4), indicating that the expansion in the range of source universities did not weaken the dominance of those at the top. Across the three databases, Stanford (US), UC Berkeley (US), Harvard (US), MIT (US), Cambridge (UK), Oxford (UK), UW–Madison (US), UMN (US), Penn (US), Columbia (US), Cornell (US), Toronto (Canada), Washington (US), UT Austin (US), Yale (US), Ohio State (US), UChicago (US), UCLA (US), UBC (Canada), and São Paulo (Brazil) exhibited particularly high levels of monopolization. By country, the proportion of faculty with elite-university doctoral backgrounds was relatively high in the United States, the United Kingdom, Australia, Canada, Germany, Spain, and Italy, and somewhat lower in France, China, India, Japan, and Brazil. Across disciplines, the monopolization of academic positions by elite-university PhD graduates was particularly pronounced in STEM fields, especially engineering and the natural sciences. Among non-STEM fields, the humanities and social sciences also exhibited relatively high levels of monopolization (Appendix Table 1).

Elite-university bachelor’s graduates substantially monopolize corporate executive positions worldwide

Elite-university graduates were also substantially overrepresented in corporate executive positions. Because most corporate executives do not hold doctoral degrees, this part of the study uses bachelor’s education as the relevant measure. Among 829,530 corporate executive profiles identified from 160 million LinkedIn-derived career histories worldwide, 33.77% of executives had graduated from elite universities, far exceeding the proportion of elite universities among universities worldwide (2.00%). An analysis of 184,860 executive records from Chinese listed companies produced a similar finding. Graduates of elite universities occupied 42.98% of executive positions, far exceeding the share of elite universities among Chinese universities (2.16%). Measures based on the Gini coefficient and Theil index further show that the degree to which elite universities monopolized corporate executive positions increased overall both during the four decades covered by the LinkedIn-derived data and between 2008 and 2023 in the data on Chinese listed companies (Appendix Table 2b).

Further analysis shows that although the number of bachelor’s-degree institutions represented among corporate executives increased steadily, the share of executive positions remained concentrated among a group of leading universities. A small number of major bachelor’s-degree source universities supplied a substantial proportion of corporate executives (Appendix Fig. 5). Graduates of Florida (US), NYU (US), Columbia (US), Penn (US), UC Berkeley (US), Minnesota (US), Purdue (US), UW–Madison (US), Indiana (US), Cornell (US), Michigan State (US), Wesleyan (US), Western (Canada), Boston University (US), Ohio (US), Stanford (US), Miami (US), Arizona State (US), BYU (US), and UWA (Australia) exhibited particularly high levels of monopolization in corporate executive positions worldwide. Tsinghua (CN), Peking (CN), Renmin (CN), Zhejiang (CN), Xiamen (CN), Fudan (CN), Sun Yat-sen (CN), Wuhan (CN), SJTU (CN), SUFE

(CN), Xi'an Jiaotong (CN), Nanjing (CN), HUST (CN), Nankai (CN), ZUEL (CN), SCUT (CN), Jilin (CN), HIT (CN), and SWUFE (CN) exhibited particularly high levels of monopolization in executive positions at Chinese listed companies. By country, the proportion of corporate executives with elite-university bachelor's backgrounds was relatively high in Australia, Canada, China, and the United Kingdom, intermediate in the United States, the Netherlands, Italy, Egypt, and Spain, and relatively low in Germany, France, India, the United Arab Emirates, Brazil, Indonesia, Mexico, the Philippines, and Pakistan. Across industries, monopolization was generally more pronounced in utilities and in knowledge-intensive industries such as culture, sports and entertainment, finance, information technology, and scientific research and technical services. It was comparatively less pronounced in traditional service or labor-intensive industries, including accommodation and food services, transportation and warehousing, wholesale and retail trade, construction and manufacturing, and household services (Appendix Table 2a).

Elite-university graduates substantially monopolize senior government positions, with consistent patterns across authoritarian and democratic countries

Senior government positions likewise exhibit a high degree of monopolization by elite-university graduates. Using completion of a bachelor's degree at an elite university as the indicator, we identified 67,039 senior government officials from the LinkedIn-derived data, 31.98% of whom had earned their bachelor's degrees from elite universities. This proportion far exceeds elite universities' worldwide shares of both institutions and graduates. The bachelor's-degree origins of senior government officials were also highly concentrated among a small number of leading universities. Maryland (US), Florida (US), American University (US), NYU (US), Columbia (US), Embry–Riddle (US), Penn (US), Western (Canada), Wesleyan (US), Ohio (US), Indiana (US), Queensland (Australia), UW–Madison (US), Purdue (US), UC Berkeley (US), Southern Illinois (US), Michigan State (US), ANU (Australia), Minnesota (US), and Oklahoma (US) exhibited the highest levels of monopolization. Both the Gini coefficient and the Theil index indicate that the distribution of bachelor's-degree origins among senior government officials has long been characterized by substantial inequality and concentration among leading universities. Moreover, the proportion of officials with elite bachelor's backgrounds increased steadily from 29.08% to 38.54% between 1985 and 2023 (Appendix Table 2b and Appendix Fig. 5). By gender, the level of monopolization among women was significantly higher than that among men, by a factor of 1.27. Across countries, the proportion of senior government officials with elite-university bachelor's backgrounds was highest in Australia, followed by Canada, the Netherlands, and the United Kingdom, and was generally lower in Germany, Italy, Spain, and India.

Elite-university graduates also exhibit a pronounced monopoly over senior government positions in authoritarian countries. In China, for example, this study collected the career histories of 5,051 officials at full department/director-general rank or above—a rank broadly comparable to that of the mayor of a city with approximately five million residents. Elite-university graduates occupied 32.85% of these

positions, far exceeding elite universities' shares of both institutions and graduates. Moreover, the prevalence of elite educational backgrounds increased markedly with political rank. The proportions of officials with elite bachelor's degrees were 30.64%, 43.41%, and 53.13% at the municipal, provincial, and national levels, respectively. The analysis also reveals a highly homogeneous gender structure among senior Chinese government officials, with women consistently accounting for approximately 5%. Among officials with STEM backgrounds, 40.63% had earned bachelor's degrees from elite universities, substantially higher than the corresponding proportion among officials with non-STEM backgrounds (33.74%).

The monopolization of senior government positions by elite universities is also evident in democratic countries. For the United States, our research team integrated publicly available information from the Biographical Directory of the United States Congress (Bioguide), Wikidata, and other sources to construct career histories for 12,794 political figures serving between 1789 and 2026. Among those whose bachelor's institutions could be identified, 40.48% had graduated from elite universities, far exceeding elite universities' share of all institutions. Elite educational backgrounds were more prevalent among holders of higher political office. The corresponding proportions were 38.89% among members of the House of Representatives, 47.52% among senators, 45.83% among vice presidents, and 47.83% among presidents. The gender composition was similarly homogeneous, with women accounting for only 6.12%. Educational attainment among political elites also rose substantially over time. The proportion with postgraduate or professional education increased from 10.04% before 1900 to 72.18% during 2010–2019.

Overall assessment of elite-university graduates' monopolization of the three categories of elite positions

Regression models that further controlled for gender, country, discipline or industry, time, and other background characteristics show that an elite educational background remained significantly associated with a higher probability of attaining elite positions in academia, business, and government. In academia, analyses of the OA, ORCID, and global faculty CV data indicate that the odds of employment at an elite university for elite-university PhD graduates were 1.32–5.05 times those for non-elite-university PhD graduates (Appendix Tables 3–5), with average marginal effects ranging from 6.43 to 23.90 percentage points. Elite doctoral education also contributed more to the models than elite bachelor's education, indicating that the institutional tier of doctoral training plays a more important role in the monopolization of academic positions. This advantage was particularly pronounced in medicine and health-related fields.

In the corporate sector, the odds of attaining a corporate executive position for elite-university bachelor's graduates were 1.12 times those for non-elite-university bachelor's graduates, with an average marginal effect of 0.21 percentage points. The odds of entering the core management team of a Chinese listed company for elite-university bachelor's graduates were 1.10 times those for non-elite-university

bachelor's graduates, with an average marginal effect of 2.03 percentage points; this association was particularly pronounced among women (Appendix Tables 6–7).

In government, the odds of attaining a senior government position for elite-university bachelor's graduates were 1.04 times those for non-elite-university bachelor's graduates, with an average marginal effect of 0.05 percentage points. In China, the odds of attaining a senior government position for elite-university bachelor's graduates were 1.74 times those for non-elite-university bachelor's graduates, with an average marginal effect of 1.27 percentage points. In the United States, the odds of reaching the rank of senator or above for elite-university bachelor's graduates were 1.41 times those for individuals with non-elite bachelor's backgrounds, with an average marginal effect of 5.29 percentage points (Appendix Tables 8–9).

Overall trends in elite-university graduates' monopolization of the three categories of elite positions

Period-specific analyses further show that over the past four decades, the advantage associated with elite education has continued to widen in academia, remained broadly stable or strengthened modestly in business, and remained stable in government. In academia, the ORCID, OA, and global faculty CV data all show that between 1985 and 2024, the proportion of elite-university PhD graduates among faculty employed at elite universities remained consistently high, whereas the corresponding proportion among faculty at non-elite universities declined markedly. The gaps between these groups widened from 21.25, 6.48, and 34.06 percentage points to 45.47, 9.51, and 39.82 percentage points, respectively. The corresponding period-specific odds ratios increased from 2.07, 1.22, and 2.65 to 4.64, 1.34, and 3.50, while differences in predicted probabilities widened from 12.98, 4.60, and 17.80 percentage points to 25.51, 6.77, and 20.84 percentage points. Period-specific average marginal effects and tests of differences across periods show that the elite doctoral advantage in the ORCID data increased significantly across all three adjacent-period comparisons. The increase was smaller but persisted across all periods in the OA data. In the global faculty CV data, the expansion occurred primarily during the earlier periods and stabilized over the two most recent periods (Appendix Tables 10–12).

In the corporate sector, the advantage remained broadly stable, with modest strengthening during certain periods. In the LinkedIn-derived corporate data, the period-specific odds ratio for elite-university bachelor's graduates entering executive positions increased from 1.04 to 1.14, with most of the increase occurring after 2005. When the sample was divided into cohorts based on the year of first employment, the odds ratio for promotion to an executive position within the subsequent ten years rose slightly from 1.11 to 1.14 (Appendix Table 13). In the data on executives of Chinese listed companies, the average marginal effect of an elite bachelor's background on holding a core executive position ranged from 1.80 to 2.98 percentage points between 2008 and 2023. However, the period interaction terms were not jointly significant, and the results remained unchanged when the sample was restricted to a balanced panel, indicating that this advantage was broadly stable over time (Appendix Table 14).

No comparable strengthening was observed in government. In the LinkedIn-derived government data, the interaction between elite bachelor's education and period was not significant. Across career-entry cohorts, the odds ratio for elite-university bachelor's graduates attaining senior government positions declined from 1.31 for the 1985–1994 cohort to 1.10 for the 1995–2004 cohort and 1.07 for the 2005–2014 cohort. However, the period interaction terms were not significant, providing no evidence of a systematic decline in this advantage (Appendix Table 15). Robust Poisson analyses of the Chinese government-official data and joint tests using the US political-figure data likewise found no systematic strengthening or weakening of the relative advantage over time, indicating that it remained broadly stable throughout the respective observation periods.

Elite educational backgrounds not only confer advantages in access to elite positions but are also associated with faster career advancement

In academia, an elite doctoral background was consistently and positively associated with career advancement among university faculty. After balancing observed background characteristics, the predicted probability of attaining a full professorship was 44.70% for faculty with elite doctoral backgrounds, 4.01 percentage points higher than that for faculty with non-elite doctoral backgrounds (40.69%); the difference remained 3.07 percentage points after inverse-probability weighting. In terms of promotion speed, the rate of advancement from junior to senior academic rank among faculty with elite doctoral backgrounds was 1.35 times that among faculty with non-elite doctoral backgrounds, and their expected time to promotion was 13.3% shorter. Among faculty who completed this transition, those with elite doctoral backgrounds took an average of 0.808 fewer years to advance, with the weighted difference remaining 0.664 years. Stage-specific analyses show that the rate of promotion from junior to mid-level rank among faculty with elite doctoral backgrounds was 1.33 times that among faculty with non-elite doctoral backgrounds, their expected time to promotion was 18.5% shorter, and, among those who completed the transition, they took an average of 0.776 fewer years. For promotion from mid-level to senior rank, faculty with elite doctoral backgrounds had a promotion rate 1.23 times that of faculty with non-elite doctoral backgrounds, an expected promotion time that was 14.2% shorter, and an observed promotion duration that was 0.216 years shorter. By institutional tier, the advantage in the predicted probability of attaining senior rank among faculty with elite doctoral backgrounds was 3.96 percentage points at non-elite universities and 1.20 percentage points at elite universities. However, the advantage in promotion speed did not differ significantly between the two types of institution (Appendix Table 16).

In the corporate sector, the LinkedIn-derived data likewise show a consistent positive association between an elite bachelor's background and promotion to an executive position. The predicted probability of promotion to an executive position within ten years was 8.04% among individuals with elite bachelor's backgrounds, 1.23 percentage points higher than that among individuals with non-elite bachelor's backgrounds (6.82%); the weighted difference remained 0.98 percentage points. Survival analysis shows that the rate of first promotion to an executive position among individuals with elite bachelor's backgrounds was 1.17 times that among individuals with non-elite bachelor's backgrounds,

and their expected time to promotion was 6.0% shorter. Discrete-time models produced consistent results. Among those who were promoted, individuals with elite bachelor's backgrounds took an average of 0.181 fewer years to reach an executive position, with the weighted difference remaining 0.146 years. These results were largely unchanged after further controlling for job level at the beginning of the risk period. By contrast, the sample of executives at Chinese listed companies provided no evidence that an elite bachelor's background significantly accelerated promotion from a non-core executive position to the core management team (Appendix Tables 17 and 19).

An advantage in career advancement was also evident in government. The adjusted predicted probability of promotion to a senior government position within ten years was 6.50% among individuals with elite bachelor's backgrounds, 0.43 percentage points higher than that among individuals with non-elite bachelor's backgrounds (6.07%); the weighted difference was 0.46 percentage points. Cox models show that the rate of first promotion to a senior government position among individuals with elite bachelor's backgrounds was 1.10 times that among individuals with non-elite bachelor's backgrounds. Weibull models indicate that their expected time to promotion was approximately 5.0% shorter, while discrete-time models yielded significant results in the same direction. Among those who attained senior government positions, individuals with elite bachelor's backgrounds took an average of 0.192 fewer years to do so, with the weighted difference increasing to 0.235 years. The estimates were slightly attenuated but remained significant after accounting for job level at the beginning of the risk period (Appendix Tables 18 and 19).

Robustness checks indicate that these core findings do not depend on particular model specifications, sample-matching procedures, or definitions of elite universities. After propensity-score weighting and exact matching were used to balance observed characteristics across educational-background groups, elite education remained significantly and positively associated with entry into elite positions in academia, business, and government. When the threshold for defining elite universities was changed from the global top 500 to either the top 100 or top 1,000, the results for academia remained consistent in direction with those obtained using the baseline top-500 definition (Appendix Tables 20–23).

Despite monopolizing elite positions, elite-university graduates do not exhibit stronger ethical conduct or greater career sustainability

The monopolization of elite positions by elite-university graduates may appear reasonable to some extent because admission to elite universities itself involves multiple stages of highly competitive selection. Those who succeed in this process enter elite universities and subsequently occupy a disproportionate share of elite positions, representing a form of Darwinian selection within higher education. Yet beyond ability, do graduates selected primarily through meritocratic and excellence-oriented criteria also demonstrate a stronger sense of responsibility and greater ethical restraint after entering elite positions? We therefore examined whether these occupational advantages were accompanied by differences in ethical conduct and career sustainability.

We selected two types of indicators related to ethical conduct. The first concerns academic misconduct, measured using publicly documented article retractions. The second concerns corruption in government, examined by matching career histories to publicly disclosed lists of Chinese officials implicated in corruption. For academic misconduct, we analyzed the career histories of authors associated with 41,134 articles retracted between 1952 and 2025 and identified 93,669 individuals involved in these retractions. Among authors employed at elite universities, the retraction rate was 1.57% for those with elite doctoral backgrounds, compared with 0.63% for those with non-elite doctoral backgrounds. Among authors employed at non-elite universities, the corresponding rates were 2.63% and 0.86%. After controlling for publication output, country, discipline, gender, academic age, and other variables, these differences decreased to 0.06 and 0.08 percentage points, respectively, but remained significant (Appendix Table 24). These results indicate that research output accounted for most of the differences. Nevertheless, individuals with elite doctoral backgrounds did not exhibit a lower risk of retraction, suggesting that elite-university PhD graduates do not demonstrate higher standards of ethical conduct in academia.

For corruption among government officials, we identified 2,000 Chinese political elites implicated in corruption whose educational histories could be clearly established. Of these officials, 29.40% had attended elite universities, whereas 70.60% had no elite-university experience. The proportion of implicated officials with elite-university backgrounds (29.40%) was broadly comparable to the corresponding proportion among senior officials overall (32.85%) (Appendix Table 25). Because the data do not include a complete population of officials at risk, they cannot establish whether educational background is associated with the risk of corruption. Educational-background patterns differed across official ranks. After adjustment, the odds that an implicated official from a central government institution had an elite-university background were 2.33 times those for an implicated local official.

We additionally assessed career sustainability using publicly reported cases of premature death among Chinese university faculty. We identified 295 faculty members at Chinese universities who had died suddenly in recent years at or before the age of 50 and systematically collected their career histories. Among these cases, 66.06% had elite doctoral backgrounds. When the analysis was restricted to faculty employed at elite universities, this proportion rose to 77.88%, 1.52 times the corresponding proportion in the comparison group drawn from global faculty CVs (51.33%). Logit analysis further showed that individuals with elite doctoral backgrounds were disproportionately represented among publicly reported cases of premature death (OR = 3.34). This pattern may be associated with the greater research-output pressures, more intense competition for promotion, and more demanding academic evaluation standards encountered by elite-university PhD graduates during their careers. Persistently heavy workloads and sustained psychological strain may substantially increase health risks, and the pattern may also reflect a professional environment in which elite-university graduates continually pursue “merit” at the expense of work–life balance.

Discussion

Previous studies have documented separate advantages associated with prestigious universities, whereas our findings show that these advantages form part of a broader structure through which modern elites are produced. Earlier studies have separately identified the influence of doctoral-institution prestige on academic hiring, the returns to elite credentials in high-status labor markets, and the overrepresentation of graduates from a small number of universities among political elites[6, 9, 13, 14, 22–27]. However, these studies have largely focused on particular countries, occupations, or individual outcomes. Our findings demonstrate that these phenomena are not isolated from one another but collectively constitute a cross-sector structure of elite production. A small number of elite universities not only continually shape the educational origins of those occupying key positions in academia, business, and government; the advantages enjoyed by their graduates also extend beyond entry into these positions to subsequent career advancement.

This structure is jointly shaped by talent selection, educational development, credential signaling, and social networks. Human-capital research emphasizes the training and resources provided by elite universities[17, 19], while signaling theory highlights how institutional prestige reduces the costs organizations incur in identifying talent[7, 8]. Research on credentialism and social closure, in turn, draws attention to the additional returns generated by educational labels, cultural fit, and relational networks[6, 9, 11, 22]. Within academia, collaborative networks, mentoring relationships, author reputation, and institutional resources further influence research output, scholarly visibility, and evaluation outcomes[18, 30–33]. A broader body of research also demonstrates that connections across socioeconomic groups are closely associated with upward mobility[10, 12]. Together, these mechanisms may reinforce one another and stabilize institutional hierarchies through repeated network recognition and organizational selection[34]. Elite universities select and concentrate students who already possess substantial advantages, then amplify their opportunities for entry and advancement through educational training, credentialing, and social networks. Elite credentials therefore represent not only knowledge and skills but also an institutionalized identity that can yield returns throughout a career, continually converting educational hierarchy into disparities in occupational position and power.

This study also reframes the relationship between the expansion of higher education and the opening of opportunity. Previous research has long debated whether mass higher education reduces educational inequality or instead prompts advantaged groups to pursue more prestigious and scarce educational positions in order to preserve their relative status[2, 35–38]. Our findings offer stronger support for the latter interpretation and extend this debate to positions at the top of society[1, 5, 23, 27–29]. Over the past four decades, the number of universities supplying graduates to elite positions has steadily increased, yet the dominance of leading universities has not diminished. Their advantage has strengthened further in academia and has remained broadly stable or increased modestly in business and government. We describe this pattern as expansionary closure, whereby higher education expands in scale and participation while the principal pathways to the top of society remain concentrated among a small number of leading universities. Unlike the direct exclusion imposed through inherited status or property in traditional societies, graduates of non-elite universities are not formally excluded from competition, but their educational backgrounds remain less likely to be converted into senior positions.

The massification of higher education has therefore expanded the right to participate in competition without necessarily expanding opportunities to reach the top of society. Educational equity cannot consequently be assessed solely by the number of people entering university; it must also consider the social positions into which educational experiences at different universities can ultimately be converted.

Comparisons across the three occupational fields show that the strength of elite educational advantage depends on how each field is organized. In academia, doctoral training, peer evaluation, and faculty recruitment are all embedded within the same system of institutional prestige. Doctoral-institution background therefore shapes not only entry into academic positions but also subsequent advancement, helping to explain why elite advantage is strongest and continues to widen in this sector. Corporate and government careers, by contrast, are influenced by a broader range of factors, including work experience, organizational performance, and occupational mobility. The independent role of elite education is therefore comparatively smaller, and its long-term trajectory is more stable. Nevertheless, corporate executive and senior political positions are themselves extremely scarce. Even modest advantages in career starting points, organizational trust, and promotion opportunities can accumulate over time and generate substantial concentration in the educational origins of position holders. The monopolization of elite positions by elite universities therefore does not reflect the repetition of a single mechanism across sectors, but rather the interaction between educational hierarchy and the distinct selection systems of different occupations.

The analyses of article retractions, publicly disclosed cases of official corruption, and publicly reported cases of premature death among university faculty extend previous research beyond access to elite positions to the normative legitimacy of the outcomes associated with elite educational advantage. We found no evidence that an elite educational background consistently translated into lower levels of retraction or corruption, indicating that rigorous selection, elite education, and occupational success cannot automatically be equated with stronger ethical conduct. The overrepresentation of individuals with elite doctoral backgrounds among publicly reported cases of premature death also suggests that highly rewarding elite career pathways may entail costs related to competitive pressure and career sustainability. These findings, however, should not be interpreted as evidence that elite-university graduates have lower ethical standards or that elite education directly harms health. Retractions, corruption, and publicly reported premature deaths are all shaped by measurement, disclosure, and sample-selection processes. Their principal significance lies in challenging the untested assumption that elite-university graduates who occupy a disproportionate share of positions of power necessarily possess corresponding advantages in ethical conduct and career sustainability.

The institutional implication of this study is not that elite positions should be distributed evenly across universities, nor does it deny the contributions of elite universities to talent development and knowledge innovation. What requires scrutiny is whether organizations rely excessively on institutional prestige as a substitute for evaluating individuals' demonstrated capabilities. If the expansion of higher education is to promote social mobility in a meaningful sense, it cannot stop at increasing enrollment. It must also reduce the cumulative influence of institutional labels in recruitment and promotion and create

institutional pathways through which individuals from diverse educational backgrounds can make their abilities visible and verifiable.

This study has several limitations. The datasets differ in coverage, information completeness, and sample-selection mechanisms. The consistency of the findings across multiple datasets strengthens their credibility but cannot fully eliminate biases arising from platform coverage and missing information. Defining elite universities uniformly as the top 500 institutions worldwide facilitates cross-national comparison but may understate the importance of universities with substantial prestige within particular national contexts. Future research could incorporate national rankings, disciplinary rankings, historical rankings, and data on university admissions and graduate numbers to distinguish more clearly whether the concentration of elite positions arises from differences in training scale, educational value added, or organizational selection. In addition, this study relies primarily on observational career-history data. Multivariable regression, matching, weighting, and survival analysis can reduce differences in observed characteristics but cannot fully eliminate the influence of family background, pre-entry ability, personal aspirations, or social networks. Future studies could exploit admissions cutoffs, changes in admissions policies, shocks to institutional prestige, and data on recruitment processes to identify more precisely the relative roles of talent selection, educational development, credential signaling, and social networks. The analyses of retractions, corruption, and publicly reported premature deaths also require validation using more complete populations at risk and longitudinal follow-up data.

Across the three occupational sectors, educational hierarchy is consistently converted into differences in knowledge, economic, and political power. The massification of higher education has broadened participation in competition for elite positions but has not automatically dismantled the institutional hierarchy governing access to the top of society. The central question confronting modern meritocracy is therefore not merely whether elites emerge through competition, but whether that competition remains persistently dependent on the same small group of universities to identify talent, certify qualifications, and allocate opportunities.

Methods

Study design

This study uses a multi-source, cross-sector observational design to examine the concentration of educational origins, differences in access to elite positions, long-term trends, and career advancement among elite-university graduates across academia, business, and government. Because the datasets differ in coverage, unit of analysis, and data-generating process, they are not combined into a single analytical sample, except where cross-source record linkage is necessary to construct variables such as educational background, discipline, and institutional affiliation. Nor are estimates from different sectors aggregated into a single effect size. Multiple datasets within the same sector are instead used to assess whether the observed patterns recur across different data sources and institutional contexts.

The academic analyses use OpenAlex, ORCID, and global faculty CV data compiled by the research team. The corporate analyses use LinkedIn-derived career-history data and data on executives of Chinese listed companies. The government analyses use LinkedIn-derived government career histories, data on senior Chinese officials, and data on US federal political figures. In addition, the study conducts exploratory supplementary analyses using article-retraction records, publicly available records of Chinese officials implicated in corruption, and publicly reported cases of premature death among Chinese university faculty.

This study reports conditional associations between elite educational backgrounds and occupational outcomes. Covariate adjustment, matching, and weighting are used to reduce differences in observed characteristics but cannot eliminate unobserved confounding or selection processes. The results are therefore not interpreted as causal effects of elite education.

Definition of elite universities and elite positions

This study combines the annual rankings published between 2015 and 2024 by the QS World University Rankings, Times Higher Education World University Rankings, Academic Ranking of World Universities, and U.S. News Best Global Universities Rankings to construct a long-term measure of institutional prestige. After standardizing university names, country or territory names, and identifiable historical name variants, we first calculate each university's mean raw rank across the years in which it was actually included in each ranking system. We then calculate an equally weighted mean across its available ranking-specific averages. Exact ranks retain their original values, while rank intervals with clearly defined lower and upper bounds are assigned their midpoints. Years in which a university was unranked and open-ended rank intervals are treated as missing rather than assigned a fixed low rank. Under the baseline classification, a university must have appeared in at least two of the four ranking systems during the observation period, and the top 500 universities in the resulting composite ranking are defined as elite universities. The complete list is provided in Supplementary Data 1.

Elite educational backgrounds are identified according to whether the institution attended at the relevant educational level belongs to this set of elite universities. The academic analyses primarily use doctoral education, whereas the corporate and government analyses primarily use bachelor's education. For individuals with multiple formal educational records at the same level, all identifiable institutions are retained. An individual is coded as having the relevant elite educational background if at least one of these institutions is an elite university. If at least one institution can be identified but none is an elite university, the individual is coded as having a non-elite educational background. Individuals without any identifiable formal educational record at the relevant level are coded as missing. Honorary degrees, short-term visits, and records for which the educational level cannot be determined are excluded from the corresponding educational-background classification.

Position outcomes are defined separately according to the structure of each dataset. In academia, the global faculty CV data are used to determine whether a faculty member's current employing institution is

an elite university. The OpenAlex and ORCID data are used to determine whether a researcher's primary observable institutional affiliation is an elite university. In OpenAlex, the institutional variable represents the author's most recently observable primary affiliation in the publication records and does not necessarily correspond to the individual's current employment relationship at the time of data extraction. In the LinkedIn-derived corporate and government career-history data, seniority levels 6–7 are classified as senior positions, corresponding respectively to senior corporate positions and senior government positions. Because the sample of Chinese listed companies consists entirely of executives, the analysis further distinguishes core executives from other executives. The samples of Chinese officials and US political figures likewise consist entirely of political elites; the corresponding models therefore examine whether individuals attained higher administrative or political ranks. For China, the analysis compares administrative ranks within the political elite. For the United States, it distinguishes individuals whose highest office was membership in the House of Representatives from those who served as senator, vice president, or president.

Academic datasets

OpenAlex provides large-scale relational data linking authors, scholarly works, and institutions. We extracted the data through the OpenAlex API on 31 May 2025 and used authors' publication records to construct measures of publication output, primary research field, and institutional affiliation. An author's primary institution was identified using the most recent publication record and affiliation histories from the preceding five years. Records for which a unique institutional affiliation could not be established were coded as missing. Detailed rules are provided in Supplementary Methods 2. Institutional entities were standardized primarily using ROR identifiers. To construct the OpenAlex sample of university faculty, we retained only authors whose primary institutions were higher education institutions and whose identifiable positions involved faculty or research roles. Individuals primarily employed by hospitals, companies, government agencies, or independent research institutions were excluded. Because OpenAlex does not systematically record educational histories, we linked its author records to publicly available ORCID profiles to identify formal doctoral education. Linkage was conducted primarily using the unique ORCID identifier shared across the two data sources. For records without a valid identifier, candidate matches were generated using standardized names and institutional information; only records with a unique correspondence and no evident conflicts were retained. After author-level processing and sample-scope restrictions, the OpenAlex dataset comprised 4,000,385 university-based faculty and researchers, of whom 2,717,915 had identifiable doctoral institutions that could be linked to the university-ranking database. Analyses involving doctoral education, institutional affiliation, or other covariates were further restricted to records for which the relevant variables could be identified.

We obtained the ORCID Public Data File on 31 May 2025 and converted the original XML records into structured data on researchers' basic information, educational histories, employment histories, and scholarly works. The ORCID data were used primarily to identify researchers' formal doctoral education and publicly reported employment histories. Because education and employment records contained

numerous abbreviations, multilingual expressions, spelling variants, and entries combining information on degrees, disciplines, and positions, we used standardized dictionaries, rule-based matching, and text-classification procedures to identify educational levels and employment roles consistently. Records for which the educational level, employment role, or institutional affiliation could not be determined reliably were coded as missing. The detailed procedures are described in Supplementary Methods 3. After institutional names were standardized, formal doctoral records and degree-granting institutions were linked to the ROR registry and the harmonized university-ranking database. Researchers' institutional affiliations were identified from their publicly available employment histories. Because ORCID does not provide a standardized disciplinary variable suitable for this study, researchers' primary research fields were obtained through reliable linkage to OpenAlex author records. Following career-history processing, role identification, institutional standardization, and filtering for the variables required by the study, the final sample comprised 1,011,278 researchers with identifiable educational and employment information. Specific analyses involving doctoral education, institutional affiliation, discipline, or other covariates were further restricted to records for which the relevant variables could be identified.

The global faculty CV dataset was constructed by the research team using publicly accessible university websites, departmental webpages, faculty profiles, and publicly available CV materials collected between March 2025 and February 2026. The list of candidate institutions was derived from the directory of universities and research institutions covered by the Nature Index, from which the research team further identified higher education institutions. Universities were not included on the basis of whether they met this study's definition of an elite university. Instead, inclusion required that an institution could be verified as a higher education institution, maintained a publicly accessible official website, and provided public webpages sufficient to identify faculty status, current institutional affiliation, and career-history information. Following webpage parsing, person-level deduplication, extraction of educational and employment histories, and institutional-name standardization, the final analytical dataset comprised 4,545,214 university faculty members. Faculty members with non-missing information on the country of their current employment were distributed across 202 countries and territories. Among the full sample, 4,417,869 faculty members could be linked to the ROR ID of their current institution, representing 97.20% of all records. These successfully matched records covered 20,108 ROR-standardized universities. This dataset is a large-scale, cross-national database of faculty career histories shaped by the institutional coverage of the Nature Index and the availability of public webpages, rather than a probability sample of university faculty worldwide. All faculty members were included in the procedures for identifying and coding doctoral education, while individual analyses were restricted to records for which the relevant variables could be identified.

For OpenAlex authors, the primary research field was defined as the Field containing the Topic with the highest cumulative score across all of the author's works. ORCID researchers obtained the corresponding field information through linkage to OpenAlex author records. The 26 OpenAlex Fields were further consolidated into seven categories: Applied Sciences, Engineering, Humanities, Mathematics and Computing, Medicine and Health, Natural Sciences, and Social Sciences. Disciplines in the global faculty CV data were identified from each faculty member's formal departmental or other

academic-unit affiliation and standardized to the same seven-category classification. Detailed procedures are provided in Supplementary Methods 5. Depending on the data source, gender information in the three academic datasets was identified either directly from publicly available webpages or through name-based inference and was harmonized as a binary control variable. Detailed procedures are described in Supplementary Methods 6.

Corporate datasets

The global corporate analysis uses LinkedIn-derived career-history data extracted in 2024. The database was constructed by integrating and standardizing large-scale publicly available career-history information, including data derived from LinkedIn. It covers approximately 162 million individuals, while the complete local position-record table contains 529,834,419 employment records. The database includes information on individuals' educational histories, employers, job titles, employment start and end dates, its internally provided industry classifications, and relevant employer attributes. We used the industry-classification variable to distinguish the corporate and government career samples. The corporate analysis uses employment records from all industries other than government administration.

The original data are structured at the person–employment-record level. The baseline position-entry models use individual position records as the unit of analysis and classify each position as a senior corporate position if its seniority level is 6–7. For the descriptive analysis of educational origins, matching analyses, and career-advancement analyses, consecutive employment records belonging to the same individual were organized into career trajectories and aggregated to the person level. A senior-position indicator was then constructed according to whether the individual had ever attained seniority level 6–7. The descriptive analysis of educational origins includes 829,530 individuals who had reached this level and whose bachelor's institutions could be identified. Bachelor's institutions were identified from formal bachelor's education records and linked to the harmonized university-ranking database. The common procedures used to process the LinkedIn-derived career-history data and the rules used to define the corporate sample are described in Supplementary Methods 8.

The analysis of the Chinese corporate sector uses 184,860 executive records from Chinese listed companies in the CSMAR database between 2008 and 2023. Because this sample consists entirely of executives, the analysis does not examine whether an individual became an executive. Instead, core executives are distinguished from other executives based on job titles and managerial responsibilities, and entry into a more central level of management is used as the position outcome. Bachelor's institutions were identified according to the harmonized educational-background coding rules and linked to the university-ranking database.

Government datasets

The global government analysis uses the government-administration subsample of the LinkedIn-derived career-history database described above. Government employment records were identified using the database's industry-classification variable and processed using the same procedures as the corporate

records for cleaning employment spells, identifying individuals, constructing career trajectories, cleaning educational histories, and standardizing institutional names. The baseline position-entry models use government position records as the unit of analysis and include 4,522,784 valid government position records. Records at seniority levels 6–7 were coded as senior government positions, while other government position records with valid seniority information were coded as non-senior government positions. Descriptive analyses of educational origins, matching analyses, and career-advancement analyses were conducted at the person level. The descriptive analysis of the educational origins of senior government officials includes 67,039 individuals who had attained seniority level 6–7 and whose bachelor's institutions could be identified.

The Chinese political-elite sample was drawn from the CSMAR databases of national- and ministerial-level, provincial-level, and municipal-level officials and comprises 5,051 principal Party and government leaders serving at the prefecture-level city or above. Because the sample already represents individuals occupying relatively senior positions within the political system, the corresponding models use the highest administrative rank attained as the position outcome and examine whether an elite bachelor's background is associated with attaining a higher position within the political elite.

The database of US federal political figures was constructed primarily from biographical records of members of the US Congress and supplemented with information on former presidents and vice presidents and educational records from Wikidata. It covers 12,794 members of the House of Representatives, senators, vice presidents, and presidents between 1789 and the point of data collection in 2026. Following the parsing of educational records, person-level deduplication, and standardization of institutional names, 6,025 individuals had identifiable bachelor's institutions. The position outcome distinguishes individuals whose highest office was membership in the House of Representatives from those who had served as senator, vice president, or president.

Measures and statistical analysis

This study measures the monopolization of elite positions by examining both the concentration of educational origins and individual occupational outcomes. The analysis of educational-origin concentration is based on holders of elite positions whose educational institutions can be identified. Position counts are aggregated by source university, after which we calculate the Gini coefficient, standardized Theil index, the shares accounted for by the top 10, top 20, and top 50 source universities, and the shares accounted for by the top 1%, top 5%, and top 10% of source universities. Fixed-number measures capture absolute concentration among a small number of leading universities, whereas fixed-percentage measures facilitate comparisons of relative concentration as the number of source universities changes. Detailed calculation procedures are provided in Supplementary Methods 12.

The primary analyses examine adjusted associations between elite educational backgrounds and either entry into elite positions or attained position level. The unit of analysis is determined by the structure of each dataset and the corresponding research question. The baseline position-entry models for the LinkedIn-derived corporate and government data use individual position records as the unit of analysis

and examine whether each position reached seniority level 6–7. The corresponding descriptive analyses of educational origins, matching analyses, and career-advancement analyses are aggregated to the person level. Other datasets use units appropriate to their structures, including faculty members, individuals, and executive–firm records. Binary outcomes are analyzed using logit models, with odds ratios, 95% confidence intervals, and average marginal effects reported. Outcomes with an ordered hierarchical structure are analyzed using ordered logit models. Depending on the data structure, the models adjust for gender, educational or career period, country or territory, discipline or industry, and other relevant observed characteristics. The specific units of analysis, model specifications, covariates, and treatment of standard errors are described in the corresponding results tables in the Appendix and in Supplementary Methods 13.

Long-term changes are examined using period-specific estimates and interactions between elite educational background and period. Career-advancement analyses compare the adjusted predicted probabilities of attaining a target position within a fixed career window across groups with different educational backgrounds. Matching or weighting methods are used, as appropriate to the data structure, to reduce differences in the distributions of observed characteristics. For datasets with clearly defined career starting points, promotion events, and observation periods, we additionally estimate Cox proportional-hazards models and assess sensitivity to model specification using Weibull and discrete-time event-history models.

Supplementary analyses use matched or weighted samples, alternative models, different career-observation windows, and thresholds defining elite universities as the top 100 or top 1,000 institutions based on the same composite ranking. Each model uses records for which the required variables are observed; missing covariates are not statistically imputed. The resulting sample sizes are reported in the corresponding tables. All statistical tests are two-sided, and 95% confidence intervals are reported.

Exploratory analyses

This study conducts three additional exploratory analyses. First, we link 41,134 retracted articles and their 93,669 authors identified from OA to researchers' career histories and examine the relationship between an elite doctoral background and having experienced at least one retraction. Second, we compile educational and employment information for 2,000 Chinese officials publicly investigated for disciplinary or legal violations and compare the composition of educational backgrounds across position levels. Because a complete population at risk comprising contemporaneous officials who were not publicly investigated is unavailable, this analysis is not used to estimate the relationship between educational background and the probability of disciplinary violations, legal violations, or corruption. Third, we collect publicly reported cases of 295 Chinese university faculty members who died at or before the age of 50 and compare them with faculty employed at Chinese universities in the global faculty CV data. This analysis measures the relative representation of elite doctoral backgrounds among publicly reported cases of premature death rather than the effect of an elite doctoral background on an individual's risk of premature death.

Declarations

Ethics Statement

This study uses secondary career, educational, and academic-history data that were either publicly available or obtained with authorization. It did not involve the direct recruitment of research participants, interaction with individuals, or collection of new personal information. Because the study links individual-level educational and occupational information across multiple data sources, the research team has applied to the authors' institutional ethics committee for a formal determination of exemption from ethical review. At the time of manuscript resubmission, the application remains under review; the journal will be provided with the formal determination once it becomes available. During cross-source record linkage, only the information necessary to verify identity was used. After linkage was completed, direct identifiers were replaced with internal identifiers in the analytical data, and all results are reported only in aggregate form.

Data Availability

OpenAlex and ORCID data are publicly available from their respective repositories. The full Revelio Labs and CSMAR datasets are subject to third-party licence agreements and cannot be publicly redistributed by the authors. Subject to the relevant licensing terms, access for peer review can be facilitated through confidential review arrangements or the respective data providers. The global faculty CV and political career-history datasets constructed by the research team contain personally identifiable information compiled from public sources and will therefore not be publicly archived or released. Access to de-identified analytical versions of these datasets may be requested from the corresponding author, subject to institutional approval, execution of a signed data-use agreement, and restrictions prohibiting re-identification and onward distribution. Requests will be evaluated on the basis of the proposed research purpose, data-security arrangements, and compliance with applicable legal, ethical, and contractual requirements. De-identified demonstration datasets are provided for each dataset used in the main analyses. The demonstration datasets, variable dictionaries, and supporting documentation are available at <https://anonymous.4open.science/r/Do-Elite-Universities-Monopolize-the-Social-Elite-E1C2>. These datasets are reduced, stratified samples derived from the corresponding analytical datasets and retain the variables and data structures required to inspect and execute the main analytical workflows. Because they do not contain the complete analytical samples, exact numerical reproduction of the results reported in the manuscript and Supplementary Information requires access to the full analytical datasets under the conditions described above.

Code Availability

The code used for the main statistical analyses is available at <https://anonymous.4open.science/r/Do-Elite-Universities-Monopolize-the-Social-Elite-E1C2>. The repository includes a README, software and dependency information, data-input specifications, code-to-output documentation, execution logs, and de-identified demonstration datasets corresponding to the main analyses. The code implements the final

data structures, variable definitions, sample restrictions, and model specifications and has been validated against the principal results obtained from the full analytical datasets and reported in the manuscript and Supplementary Information. The demonstration datasets can be used to execute the corresponding analysis code. As reduced, stratified samples of the full analytical datasets, they are designed to verify code execution and the analytical workflow rather than to reproduce the reported numerical estimates exactly. The principal associations estimated using the demonstration datasets are directionally consistent with those obtained from the full analytical samples. Access to the full analytical datasets is governed by the data-source-specific conditions described in the Data Availability statement. Figures were prepared primarily in OriginPro, with R also used for the concentration and Sankey figures. The figures were based on results generated by the corresponding statistical analyses and were manually formatted; therefore, complete figure-generation code is not provided separately.

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Tables

Table 1 to 25 are available in the Supplementary Files section.

Figures

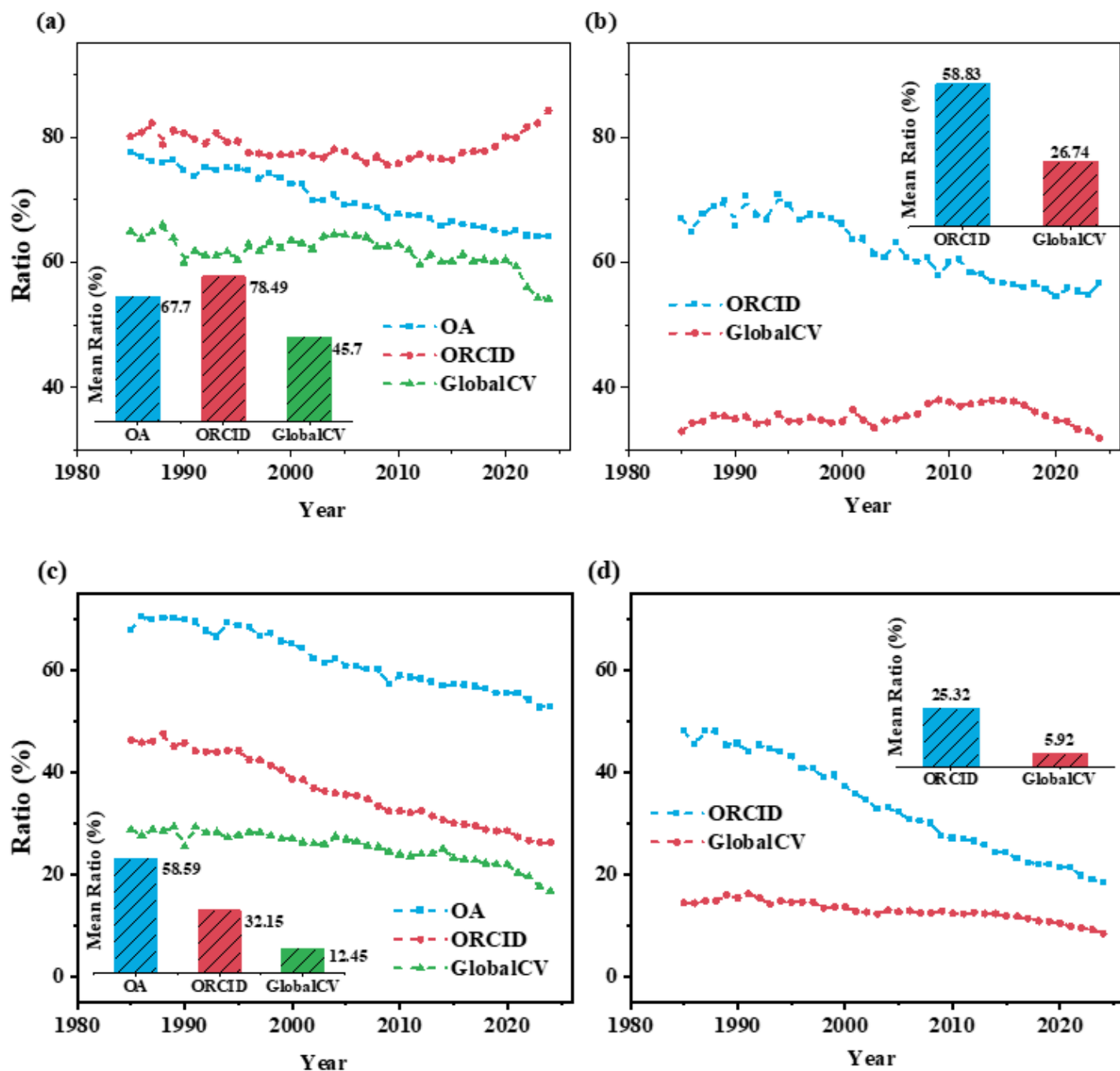


Figure 1

Overrepresentation of elite educational backgrounds in elite academic positions across educational stages and over time

Note. This figure presents trends in elite educational backgrounds among faculty members in the OpenAlex (OA), ORCID, and global faculty CV datasets. Panel (a) shows the annual share of elite doctoral backgrounds among faculty employed at elite universities, and Panel (b) shows the corresponding share of elite undergraduate backgrounds. Panel (c) shows the annual share of elite doctoral backgrounds among faculty employed at non-elite universities, and Panel (d) shows the corresponding share of elite undergraduate backgrounds. Lines represent annual percentages, while bars report the overall

percentage for each dataset. OpenAlex does not contain undergraduate education information and is therefore not included in Panels (b) and (d).

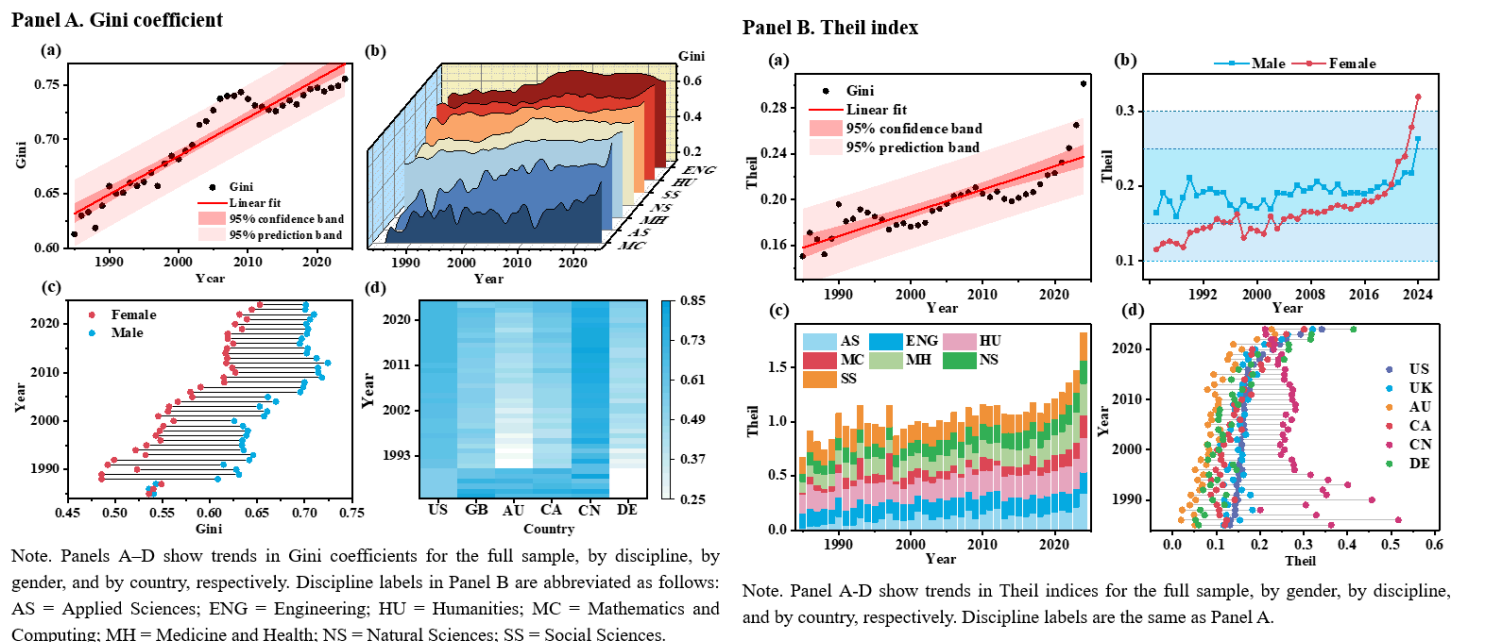


Figure 2

Trends in the Gini coefficient and Theil index of academic-position source concentration in the global faculty CV sample

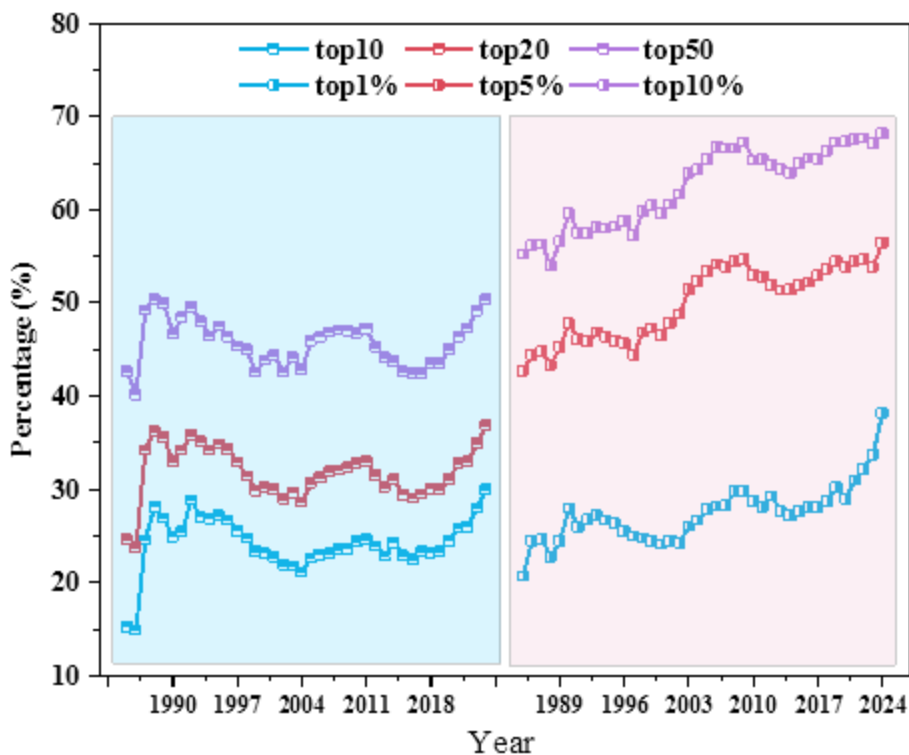


Figure 3

Trends in Top-N and Top-percentage measures of academic-position source concentration in the global faculty CV sample

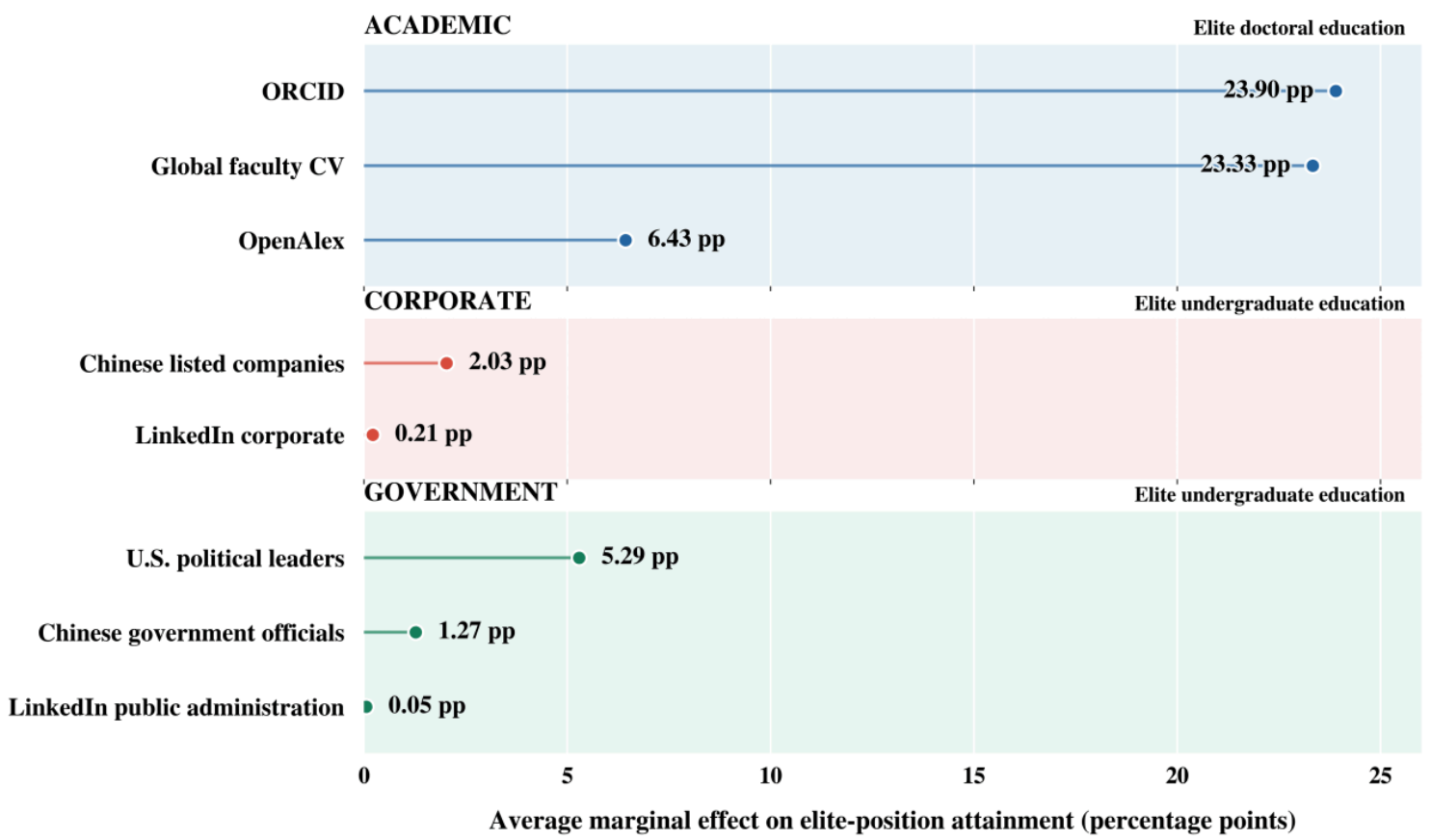


Figure 4

Elite-university education and attainment of elite positions

Note. Points reports AMEs from the main models. All estimates are statistically significant ($p < 0.001$)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Appendix.docx](#)
- [SupplementaryData1.xlsx](#)