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Institutional Logics in the Global Higher Education Landscape: Differences in Organizational Characteristics by Sector and Founding Era

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Abstract This article examines patterns in the global higher education landscape associated with sector (i.e., public or private) and founding era. Using data on the formal and academic structure of 15,133 higher education institutions (ISCED 6+) from 183 countries and territories, we examine factors associated with the student body size, number of degree-granting programs, doctorate degrees, and curricular offerings. We find that only sector and age are associated with an institution's student body size, while sector, age, and founding era are all associated with degree and curricular offerings. Private universities tend to be smaller and are more likely to offer business degrees, while public universities offer more degree programs on average, and are more likely to offer programs in science and technology and doctoral degrees. Meanwhile, in both sectors, universities founded after 1990 are less likely to offer doctoral degrees and more likely to offer degrees in business, science, and technology. Despite some regional variation, these trends are found worldwide. To interpret these findings, we argue that both sector- and era-specific institutional logics link higher education to knowledge production and the labor market in distinct and path-dependent ways. Notably, the expansion of higher education post-1990 has been accomplished by establishing new teaching-focused institutions and orienting academic programs to the labor market in both sectors.

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Introduction

The massification of higher education is one of the great social transformations of the modern era (Altbach 2001; Trow 1999; Baker 2014). In industrialized countries, much of this expansion was absorbed within public institutions during the post-World War II era (Brint and Karabel 1991; Huisman and van Vught 2009; Schofer and Meyer 2005). Starting in the late-1980s, however, with the end of the Cold War and the spread of neoliberal policies, many countries expanded access to higher education through privatization, often in the form of new demand-absorbing and for-profit private institutions (Buckner 2017a; Levy 2015).

An extensive body of international scholarship has examined the worldwide growth of this burgeoning private sector (e.g., Levy 2006; Kinser et al. 2010). Empirically, drawing on mostly case studies, scholars point to clear patterns: private universities[1] tend to be younger, smaller, more tuition-dependent and more applied. Many view these trends as the result of market forces and functional logics: new private universities have not had time to grow and establish reputations and degree programs, implying that age explains their smaller size and more limited curricular offerings. Similarly, lacking public funding, private universities' tuition-dependence typically means they must focus on teaching in-demand programs.

In contrast, neo-institutional scholars argue that differences between sectors may not be determined entirely by the demands of the market. Rather, they suggest that organizational differences in higher education also stem from specific norms or 'institutional logics' dominant in sector-specific or field-specific environments (DiMaggio and Powell 1983; Ramirez and Christensen 2013). According to this perspective, institutional logics, once imprinted in the formative phase, will continue to influence actors' behavior, resulting in persistent differences in norms and practices within organizations, even as environmental pressures change (Oertel 2018; Raynard, Lounsbury and Greenwood 2013; Stinchcombe 1965; Waeger and Weber 2019).

Applying the concepts of institutional logics and organizational imprinting to higher education, we hypothesize that both sector-specific *and* era-specific logics will affect universities' organizational and academic structures. Using data on the formal and academic structure of 15,133 HEIs (ISCED 2011 6+) from 183 countries and territories, compiled from the 2017 International Association of Universities' (IAU) World Higher Education Database (WHED) and European Tertiary Register (ETER), we carry out descriptive analyses and multi-level regression models to examine factors associated with four key characteristics: student body size, number

[1] We recognize that in some countries the term "university" usually denotes PhD-granting institutions. In this paper, we use the term in a more general sense including 3 and 4-year Bachelor's Degree-granting institutions, corresponding to ISCED (2011) levels 6, 7 and 8.

of degree-granting programs, doctoral training, and curricular offerings, i.e., science, technology, engineering and mathematics (STEM) and business degrees.

We find that both sector and founding era are strong predictors of an institution's number of degree programs, research mandate, and curricular offerings, while only sector and age are associated with student body size. To make sense of this pattern, we argue that although the private sector is regulated differently cross-nationally, both sector- and era-specific institutional logics link higher education to knowledge production and the labor market in distinct ways. Regarding sectoral logics, public universities have supported broad access in the name of equity and opportunity, while private higher education has been governed by a logic of competitiveness and niche-seeking, resulting in more and smaller private institutions and those specialized in teaching.

In terms of founding era, we distinguish between an elite-educating early period prior to World War II, a post-WWII period marked by massification through expansion of public higher education and a more recent neoliberal period. We find that the neoliberal era is associated with an orientation to the labor market, which has occurred through the proliferation of teaching-focused institutions in both sectors and the rise of degree programs in science, technology, engineering and mathematics (STEM) and business.

This article makes two important contributions to our understanding of how opportunities for higher learning are organized worldwide. First, the article advances theorization of the "higher education sector" to better explain sector-based differences. Specifically, it shows how the idea of "sector" can be fruitfully theorized as an organizational field, which moves beyond heuristics centered on national governance and directs analysis to cross-national sector-specific and time-varying, yet persistent, institutional logics. Second, empirically, the article brings large-*N*, cross-national data to the question of sectoral distinctiveness. Through a near-census of universities worldwide, it provides a snapshot of contemporary global higher education, opening up possibilities for a range of future studies.

Global Trends in Higher Education

Massification and privatization have shaped the global landscape of higher education over the past six decades. Since the 1960s, countries have been expanding access to higher education, a phenomenon known as massification (Trow 1999). As countries transition from an elite (<15% of the age cohort) attending university to mass higher education (i.e., 15-50%), new institutions emerge and serve different types of students. While this expansion has occurred earlier in industrialized countries, similar trends can be observed for most world regions since 1990, with countries in Africa or Asia now enrolling more students than did England and Germany 30 years ago (Schofer and Meyer 2005; UIS 2018). Now, many countries are reaching universalization, reaching upwards of 80% of the age cohort (Marginson 2016).

Such universalization has been accompanied by differentiation and privatization (Carnoy et al. 2013; Levy 2006). While some countries have always had a considerable share of their higher education system provided by non-state institutions, the

past three decades have witnessed an "unanticipated explosion" (Levy 2006) of private postsecondary education, with a third of all students worldwide enrolling in the private sector (Kinser et al. 2010). This body of work has consistently found that private and public institutions tend to vary along a number of dimensions, including missions, financing, and governance (Geiger 1986, 1988; Teixeira and Amaral 2001; Bernasconi 2006). Scholars in comparative education have found that the majority of newly established private institutions are demand-absorbing, meaning that their goal is one of access, helping expand opportunities for students who cannot gain admission to the subsidized public sector (Levy 2006, 2015).

Related to such sectoral and structural differentiation are changes in the knowledge basis of universities. Scholars have documented striking changes in postsecondary curricular offerings over the past century including the rise of the social sciences, the decline of the humanities and the proliferation of new and applied labor market related programs (Frank and Gabler 2006; Baker 2014; Ramirez 2002). Such curricular changes coincide with the growing share of private institutions in global higher education. Levy (2016), for example, holds that private universities tend to offer programs that "are usually market-oriented, and inexpensive to offer" (p. 19). He finds private higher education focusing on business, tourism, and administration, with the humanities falling behind and resource-intensive programs such as engineering, medicine and natural sciences rarely offered. We argue that these trends profoundly reshape higher education worldwide and show, in the following section, how institutional diversity, sectoral differentiation, and institutional inertia and change in higher education can be theorized via neo-institutional concepts of organizational fields and imprinted logics.

Higher Education Sectors, Organizational Fields and Imprinted Institutional Logics

In comparative higher education, scholars use the terms sector and sub-sector to refer to a particular category or subdivision of the broader system. Clark et al. (2009) define a sector as a group of institutions that "share similar mandates and that operate within similar administrative and financial frameworks" (p. 141). According to this definition, public and private institutions are typically classified as different sectors, given their distinct governance and financial frameworks. A useful definition for the private sector comes from Bjarnason et al. (2009) who explain that private institutions constitute "the non-state sector in higher education […that] does not rely on state funding for its growth and expansion" (p. 55). Clarifying differences in mandates between the two sectors is more difficult. Examining the legal codes for public and private universities in Latin America, Bernasconi (2011) finds that even while private universities, particularly the newly-established ones, are treated as distinct for the purposes of governance, both public and private universities throughout the region are imbued with the same mission and functions of teaching, research, and service.

In the sociological literature, other terms have been used to conceptualize organizational types and their aggregations, notably the concept of the organizational field

(see Marquis, Lounsbury and Greenwood (2011) and Wooten and Hoffman (2016) for reviews). In this article, we conceptualize the 'sector' in comparative higher education as an organizational field, in which universities operate "with knowledge of one another under a set of common understandings about the purposes of the field" (Fligstein and McAdam 2011: 3; also DiMaggio and Powell 1983). Applying the concept of an organizational field to the "sector" helps to overcome the reliance on national typologies that obscure global trends (Marginson and Rhoades 2002). While national particularities and regulations certainly matter, the global rise of the private sector requires us to extend our analytical tools. In fact, more recently, the field concept has been modified in the context of higher education where universities are seen as operating in nested organizational fields with local, national, regional and global levels interlocking, each with a different set of environmental forces (Krücken and Meier 2006; Hüther and Krücken 2016). An important contribution of this nested view is that universities are profoundly shaped by global factors including specific institutional logics located above and beyond the nation-state.

Within organizational sociology, the concept of institutional logics has proven useful in explaining similarities in organizational structure and behavior within and across fields (Thornton, Ocasio and Lounsbury 2012). While there is no agreed-upon definition of institutional logics, the term is typically used to describe the common understandings of identities, purposes, and legitimate action within an organizational field, which regularizes structures and behaviors. That said, the concept of institutional logics also recognizes that within the same organizational field, there can be diverse or contending institutional logics that lead to heterogeneity (Thornton and Ocasio 2008). We apply the term of institutional logic to conceptualize dominant understandings of the university's mandate and social role. Some constructions of institutional logics that affect universities include understandings of their identities as: sectarian or secular, nation-serving or globally competitive, broad access or niche-filling, state or market serving, and teaching or research-oriented.

In recent contributions, the institutional logics perspective has been extended to explain temporal dynamics and striking persistence in structural and behavioral patterns despite environmental change. While ideas of 'organizational imprinting' and 'path dependence' are not new (Stinchcombe 1965; Sydow, Schreyögg and Koch 2009), traditionally, the link was seen between an organization's formative phase and its formal structure. The key tenet is that past events and decisions remain important for current and future decision-making and that formal structure reflects the environmental pressures of the initial phase. More recently, organizational scholars have also extended the imprinting concept to institutional logics, combining the crucial role of inceptive phases with the importance of ideational and cognitive forces motivating organizational behavior (Waeger and Weber 2019). Here, logics have been found to have strong legacies. For example, analyzing corporate social responsibility activities in a large sample of Chinese companies, Raynard, Lounsbury and Greenwood (2013) find that cognitive frames reflect a state logic that was more dominant in an earlier era, and argue that the earlier frame, once imprinted, remained salient. Such imprinted logics shield organizations from abrupt external pressures. When institutional change does occur, it typically does so gradually and selectively. For example, European

universities founded in the pre-World War II era are more likely to preserve their foundational curriculum portfolio (e.g., a strong humanities profile) and are likely to be slower in adopting new programs. Thus, even when creating new programs, they do not jettison established offerings (Frank and Gabler 2006).

The concepts of institutional logics and imprinting have remained marginal in higher education research with only a few exceptions (see Cai and Mehari (2015) for a review). Bastedo (2009), for example, applies institutional logics to higher education policymaking. Similarly, Blaschke, Frost and Haattke (2014) use institutional logics to make sense of sector-based differences in communication strategies of university governing bodies. In a recent study on organizational imprinting, Oertel (2018) finds that institutional founding conditions affect the adoption of diversity management in universities with younger universities being more attuned to such new demands as inclusion and equality. In line with this growing scholarship, we use the concept of imprinted institutional logics to articulate similarities and differences between universities worldwide.

To identify era-specific logics, we draw on scholars of comparative higher education to identify three phases in higher education expansion and their associated logics. A first phase, prior to World War II, describes a selective and elitist higher education system populated by small sectarian institutions (Ben-David 1972). In this early phase, universities shifted from quasi-monastic institutions protected by feudal lords and clerical leaders to secular research-oriented institutions supporting emerging nations and industries (Ramirez and Christensen 2013; Wittrock 1993). Fueled by the enlightenment spirit, universities went from "the age of philosophy to the age of science," (Rüegg 2004: 16) undergoing a first wave of disciplinary differentiation and specialization.

A second phase is marked by post-WWII massification consolidating the national welfare state in many Western countries and emerging nation-states in many post-colonial countries (Clark 1983; Trow 1999). In the post-World War II era, the public university was conceptualized as a nation-serving institution, training a national labor force and, as opposed to earlier times, the masses in general instead of merely a political elite (Brint and Karabel 1991; Douglass, King and Feller 2009; Schofer and Meyer 2005). In this era, higher education served a growing proportion of students and the public university became a highly legitimated model for how nations should pursue national development through education, research, and training (Drori et al. 2003; Riddle 1993). As a nation-serving institution, the public university is understood as deserving of public subsidies to support national goals of broadening access and conducting research. In contrast, the private sector is often restricted to a teaching and training mandate mostly at lower levels of the academic trajectory, notably the Bachelor's level (Levy 2016; Mizikaci 2011; Bjarnason et al. 2009).

A third phase and its related institutional logic is associated with the rise of neoliberal economic policy and the knowledge economy that diffused worldwide after the fall of the USSR (Deem 2001; Enders and Jongbloed 2007; Neave and Van Vught 1991, 1994). In this era, neoliberal logics emerged and spread, emphasizing the efficiency of the market, global capital and competitiveness. This broad shift in the discourse led to a more favorable regulatory framework for private institutions to emerge (Buckner 2017a; Kinser et al. 2010). At the same time,

discourses of the knowledge economy characterized post-secondary education as essential for developing skilled labor needed for globally competitive labor markets.

These temporal dimensions layer onto sectoral differences. In earlier eras, private universities were primarily religious, whereas they have more recently been viewed as operating in competitive markets for students. Scholars writing on the cases as diverse as Central and Eastern Europe, Italy, China, Turkey, Kenya, Nigeria, Portugal, Vietnam and the United States, for example, all find that newly established private institutions tend to focus on programs such as business, accounting, information technology and new media, which are seen as highly marketable and do not require costlier laboratories or other special facilities (Cai and Yan 2015; Fain and Lederman 2015; Goyette 2012; Huong and Fry 2002; Mahlubi, Levy and Otieno 2007; Mizikaci 2011; Oketch 2003; Slantcheva 2007; Tamrat 2017; Teixeira and Amaral 2001; Tomusk 2003). At the same time, the late 1980s and early 1990s also saw the introduction of private sector principles of efficiency into public higher education, transforming universities into 'managerial' and 'entrepreneurial' universities subject to professional management, performance evaluation and competitive resource allocation (Clark 1998; Deem 2001; Enders and Jongbloed 2007; Neave and Van Vught 1991, 1994; Musselin 2009; Paradeise et al. 2009; Slaughter and Leslie 1997; Sporn 2003).

Hypotheses. Drawing on the concepts of institutional logics and organizational imprinting, we hypothesize that the sectoral and temporal differences discussed above have created a diversified global higher education field, where distinct institutional logics find expression in institutions' formal and academic structures. We formulate hypotheses in line with the above propositions, as follows:

Sectoral Institutional Logics

Because private sector institutions are typically tuition-dependent, we hypothesize that, in line with a market logic, they will be less likely to offer resource-intensive programs, and will be niche-filling, concentrating their programming in specializations where there is high demand. In contrast, public universities will embrace a broad access and research mandate in line with their nation-serving role. This leads to the following hypotheses:

H1 Private universities will have fewer students than their public counterparts regardless of when they were founded.

H2 Private universities will have fewer degree programs than their public counterparts regardless of when they were founded.

H3 Private universities will be less likely to offer resource-intensive degrees and programs.

H4 Private universities will be more likely to offer degree programs that are demanded by the labor market.

Era-Specific Institutional Logics

Secondly, based on the assumption that different eras have influenced logics in higher education in distinct ways, we map institutional logics in global higher education onto three eras: elite higher education prior to World War II, post-war massification, and neoliberal globalization starting in 1990. For our analysis, the differences between the nation-building era and the global era are important: the end of the Cold War in the 1990s ushered in a new interest in expanded access to higher education in the name of preparing young people for changing labor markets. Therefore, we hypothesize that institutions founded after 1990, regardless of sector, will focus more on teaching than on research training. Moreover, they will focus on offering degree programs that have labor market relevance. That said, they will not necessarily be smaller, as broad access is the mandate of the knowledge economy. This leads to the following hypotheses:

H5 Founding era, regardless of sector, will not be associated with student body size after accounting for institutional age.

H6 Universities founded after 1990, regardless of sector, will offer fewer overall degree programs.

H7 Universities founded after 1990, regardless of sector, will be less likely to offer doctoral degrees.

H8 Universities founded after 1990, regardless of sector, will be more likely to offer degree programs that are demanded by the labor market.

Data and Methods

Data

Our analyses draw on the two largest higher education databases worldwide. First, we draw on the World Higher Education Database (WHED) from the International Associations of Universities (IAU), which has information on the organizational characteristics of 15,133 institutions in 183 countries and independent territories for the year 2017 (WHED 2017; see Zapp & Lerch (2020) for details).[2] Information comprises the full titles, founding dates, sector, and number and type of academic programs. Institutions included offer a 3-4 years first terminal degree or above, typically known as a Bachelor's degree or equivalent (ISCED 2011 6+). The WHED definition of a private institution refers to those institutions legally categorized as private by national authorities. We are aware of country-specific particularities and complementary ways to distinguish academic

[2] The database is property of the Department of Social Sciences, University of Luxembourg.

sectors (e.g., Marginson 2007) yet use legal status because it is the most reliable and most widely used definition in the literature. We also draw on the European Tertiary Education Register (ETER), the most comprehensive database on European higher education institutions, to complement missing data from the WHED, namely, student enrolment data (ETER 2017). The 2016 edition of ETER includes 2,764 institutions from 37 countries. We compared both datasets to ensure cross-data reliability.

Data on institutional characteristics, including sector, founding date, student enrolment and programs offered is based on information provided to the IAU and the ETER by official public sources and complemented by these projects' research staff through direct contact with institutions; however, we cannot ascertain to what extent the self-reported data is accurate. Additionally, public institutions may be overrepresented as many countries require public institutions to collect and publish data that private institutions do not have to make public. Another limitation with our data is the fact that we cannot ascertain to what extent the dataset is exhaustive. Even while the IAU and ETER consortia offer the most comprehensive dataset to date on key aspects of higher education around the world, there is also an unknown number of missing institutions and missing data on reported institutions, and we believe missing data is more likely in countries where public records for the burgeoning private sector are patchy.

Finally, because our sample is cross-sectional, we cannot gauge whether the current sectoral specificities we point to are only a recent phenomenon or to the extent that they may be changing. That said, we believe this dataset represents the most comprehensive and up-to-date data on the global higher education landscape and offers important insights.

Dependent Variables

Our analyses focus on the organizational characteristics of institutions that we hypothesize will vary between sector and era, namely: 1) overall size of the student body; 2) total number of degree-programs offered; 3) research orientation, operationalized as whether the institution offers a doctoral degree; and, 4) curricular offerings, specifically business and STEM offerings, operationalized as whether the institution offers at least one degree program in each field.

Overall Student Body Size: We measure the overall size of an institution as its total student body size, reported by the institution. Given the fact that the WHED and ETER data is self-reported, we do not know precisely how institutions calculate this variable but assume it generally refers to all enrollments, including both full and part-time students.

Degree-Programs: The WHED contains self-reported data on all degree programs offered by a university. Using this data, we count the number of separate degrees (Bachelor of Arts, Bachelor of Science, Master of Arts) that an institution confers. There is a wide range in the number of programs at a university, as some higher education systems create more specialized degrees, while others tend to offer concentrations within the same degree. Because programs tend to be defined and regulated by jurisdiction, our regression models include a country-specific intercept term to account for national variations in norms.

Research Orientation: We operationalize research orientation as a binary variable, indicating whether the university offers a doctoral degree, as defined by 2011 ISCED Level 8.

Curricular Offerings: We operationalize curricular offerings as a set of binary variables indicating whether an institution offers at least one program in a given group of disciplines. Disciplinary groups were defined by IAU and overlap with Frank and Gabler's (2006) three branches of learning, i.e., humanities, social sciences and STEM (science, technology, engineering and mathematics). Based on the literature on the growth of business degrees (e.g., Fourcade 2006), we also single out business programs as a distinct group.

Predictor Variables

Our analysis focuses on two key predictor variables, institutional sector (i.e., public or private) and founding era.

Sector: The key predictor variable is institutional sector, defined as either public or private, which includes both non-profit and for-profit private. Sector is defined as legal ownership, as self-reported by institutions.

Founding Era: Our second predictor variable is a categorical variable for the era in which a university was founded, which includes three categories: before 1945, 1946-1989 and 1990-2017.

Organizational Controls

Age (Sq. Root): We calculate institutional age in 2017, when our dataset was compiled. Because more universities have been founded in the recent era, institutional age is not normally distributed and has a long right tail. Moreover, logged age is highly correlated with era. To account for the significant skew in the distribution of the data, we take the square root of age in years, which is less correlated with founding era than logged years. In robustness checks, we ensure results are similar to logged age.

World Region: We use World Bank world regions, but separate Central and Eastern Europe and Central Asia from Western Europe as its own region, given its distinctive history.

Table 1 provides an overview of all variables.

Analysis Methods

In descriptive analyses, we calculate mean values for each dependent variable by sector and founding era, globally and disaggregated by world region. We also graph the distribution of the total number of students and degree programs to visualize sectoral differences.

We then carry out a series of multi-level multivariate linear, negative binomial, and logistic regression models for each dependent variable, as appropriate. Because universities are grouped within countries, all models include a random-intercept that accounts for unobserved nation-specific factors.

All regression models also include the square root of age in years as a control variable. Although age and era have a high correlation, they operationalize different underlying phenomena, namely, a specific institution's age, as compared

Table 1 Overview of Variables

	Mean	St. Dev	Min	Max
Key Predictors				
Private	0.54	0.50	0	1
Era: 1900-1945	0.24	0.43	0	1
Era: 1946-1990	0.39	0.49	0	1
Era: Post-1990	0.37	0.48	0	1
Organizational Controls				
Age (Sq. Root)	6.92	3.21	1.41	35.83
PhD Degree (0/1)	0.37	0.48	0	1
Total Programs (Logged)	2.77	1.15	0	6.49
World Region				
East Asia	0.27	0.44	0	1
CEE & Central Asia	0.10	0.30	0	1
Western Europe	0.11	0.31	0	1
Latin America	0.22	0.42	0	1
MENA	0.05	0.22	0	1
North America	0.14	0.35	0	1
South Asia	0.06	0.23	0	1
Sub-Saharan Africa	0.06	0.24	0	1

to the dominant norms of the broader world cultural environment in which the institution was founded, respectively. We run diagnostic tests for multicollinearity and find no concerns with our models.

Given the descriptive analysis found that private institutions offer substantially fewer degree programs, and are less likely to offer PhD programs, we also include controls for both when modeling degree offerings. In addition, regression models with size-related dependent variables (i.e., students and programs) include a binary control variable for whether the institution offers a doctoral degree (i.e., PhD), which is positively associated with overall size and more likely in the public sector. Finally, we also include a set of regional controls to account for the widely-noted fact that organizational structures, histories, system factors, and capacity vary systematically across world regions. In the Appendix (online supplementary material), we report a number of robustness checks and region-specific analyses.

In each set of models, Model 1 is a null model that includes only the dependent variable and country random-intercepts. Model 2 adds in basic controls for size, programs and world region, with East Asia as the reference group. Subsequent models include key predictor variables to test hypotheses: Model 3 includes a binary variable for private; Model 4 includes a categorical variable of founding era, and Model 5 adds in both sector and era. Model 6 includes an interaction term to test whether sector trends vary by era. In each model, we also report the Bayesian Information Criterion (BIC) to assess model fit.

Table 2 Overview of Higher Education Institutions Worldwide, by Sector and Era

Type	Number of HEIs (N=15,133)	Percent Total (%)	Mean Students (N=11,236)
Public Pre-1990	5117	34%	13484
Public 1990-2017	1873	12%	9649
Public Total	6990	46%	12614
Private Pre-1990	4396	29%	6030
Private 1990-2017	3747	25%	6433
Private Total	8143	54%	6186

Notes: Mean students excludes institutions in the top two percentiles

Findings

Descriptive Analyses

In this section, we describe the systematic differences in the public and private sector globally. Table 2 shows the percentage of universities in our dataset founded in each era, by sector. We find that a large number of new private institutions were founded in the post-1990 era, and our dataset captures this proliferation. Roughly three-fourths of public universities (73%) were founded before 1990, while only about half (54%) of private universities were. These findings align to other studies on the growth of higher education globally, which point to a dramatic change in the global higher education landscape (Levy 2006; Buckner 2017a).

The table also shows the average student body size of institutions, by sector and era. To account for the influence of outliers, we exclude outliers. Our data shows that private institutions have fewer students on average. The average size of public institutions is 12,614 globally and 6,186 in the private sector. Supplementary analyses (not shown) indicate that the difference in median size is even more stark: median student body size in private institutions is 2,279 compared to 8,307 in public institutions. This finding is in line with and helps to further refine and generalize many prior case studies from around the world that show private sector institutions are smaller on average (e.g., Levy 2015). Interestingly, Table 2 also shows that particularly in the public sector, newer institutions tend to be smaller, suggesting that institutional age is also an important factor in overall student size. This supports the idea that institutional growth occurs with time, as new institutions establish themselves, their reputations, and degree offerings, at least in the public sector. In contrast, it is possible that many older private universities remain small, indicating their tendency to be niche-filling, and suggesting some initial descriptive support for the lasting importance of a founding-era logics.

To examine trends between sectors and eras in degree offerings, Table 3 shows the mean number of program offerings and the percent of institutions that offer at least one doctoral degree, STEM degree and business degree, respectively. In line with Hypothesis 2, Table 3 shows that public institutions offer considerably more degree programs overall: public universities offer an average of 37 different

Table 3 Degree Offerings, by Sector and Era

Type	Mean Degree Programs (N)	Doctoral (%)	STEM (%)	Business (%)
Public Pre-1990	43	59%	84%	71%
Public 1990-2017	21	29%	79%	70%
Public Total	37	51%	82%	70%
Private Pre-1990	27	32%	70%	74%
Private 1990-2017	15	17%	61%	76%
Private Total	21	25%	66%	75%

Notes: N=15,133

degree programs, while private universities offer 22 programs on average. Similarly, we find support for Hypothesis 3, which predicts that public universities will be more likely to confer doctoral degrees as part of their research training mandate. While there is practically no difference in the percent of public and private institutions that offer undergraduate degrees, the percent offering graduate degrees diverges significantly between the two sectors. Only 25% of private universities offer doctoral degrees, compared to 51% of public universities. Doctoral programs are where the training of young researchers has traditionally taken place, and Table 3 suggests that this remains a primarily public domain.

Previous research suggests that the curriculum in the private higher education sector is narrow and more market-oriented (e.g., Levy 2012). In line with Hypothesis 4, Table 3 also shows that public universities are substantially more likely to offer programs in STEM fields. In contrast, the only area where private universities are more likely to offer degree programs is business administration, by a slight margin. This finding aligns to an understanding of science and research as important for national development, and thereby, an important domain for public universities where the funds for these sometimes cost-intensive fields are more easily mobilized. In contrast, private institutions are more likely to offer degrees that have direct applicability to the labor-market and are less costly, namely, business administration degrees.

To visualize differences between sectors, Figure 1 plots the distribution of student body size and Figure 2 plots total programs, by sector. The figures show that private universities are more concentrated at the low end of both distributions, with most private institutions having both fewer students and less than 20 programs. In contrast, public institutions are more likely to have larger student bodies and to have between 20-60 programs, in line with a more comprehensive mandate.

Although Table 3 also offers support for Hypotheses 6-8, in showing that universities founded after 1990 tend to offer fewer degrees and less likely to offer doctoral programs, these findings could also be related to these universities younger age. Therefore, in the next set of analyses, we control for institutional age to better understand how sector and founding era are related to organizational and curricular characteristics.

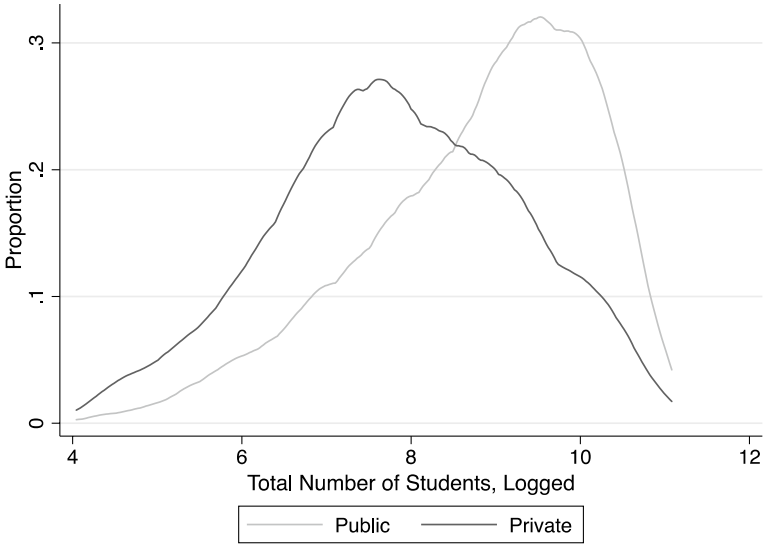

Figure 1 Distribution of Student Body Size, by Sector

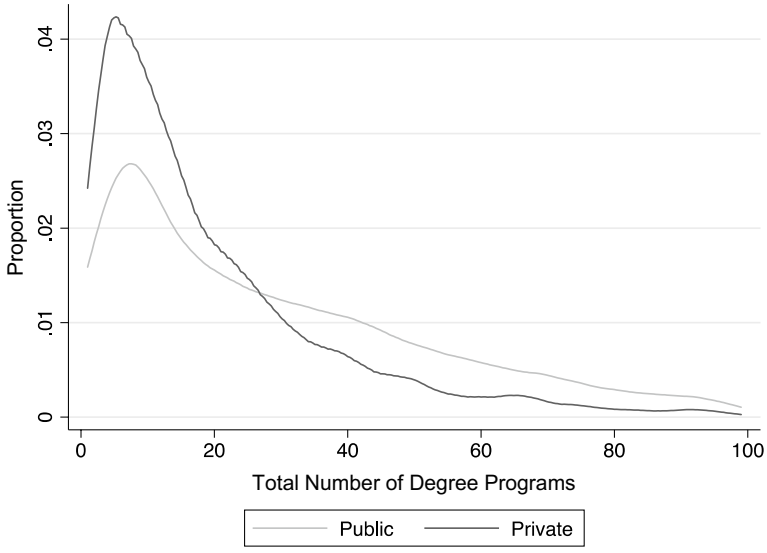

Figure 2 Distribution of Total Number of Degree Programs, by Sector

Regression Analyses

In this section, we carry out a series of multilevel regression models to examine how institutional age, sector, and era are related to key organizational characteristics. By controlling for institutional age, the regression models allow us to examine which characteristics are associated primarily with age and which are related to sector or founding era.

Table 4 Regression Models for Student Body Size (Logged)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age (Sq. Rt.)		0.07***	0.06***	0.07***	0.06***	0.06***
PhD (0/1)		0.79***	0.69***	0.77***	0.69***	0.69***
Private (0/1)			−0.54**		−0.54**	
Era: Pre-1945				0.00	0.00	
Era: 1946-1990				0.13	0.12	
Era: Post-1990				0.01	0.08	
Public X Pre-1945						0.00
Public X 1946-1990						0.09
Public X Post-1990						0.01
Private X Pre-1945						−0.61*
Private X 1946-1990						−0.45
Private X Post-1990						−0.47*
East Asia		0.00	0.00	0.00	0.00	0.00
CEE & Central Asia		−0.14	−0.20	−0.10	−0.18	−0.18
Western Europe		−0.27	−0.34+	−0.25	−0.33+	−0.33+
Latin America		0.43*	0.50*	0.43*	0.50*	0.50*
MENA		0.37+	0.35+	0.39+	0.36+	0.36+
North America		−0.38	−0.36	−0.37	−0.35	−0.35
South Asia		−0.1	−0.18	−0.08	−0.17	−0.16
Sub-Saharan Africa		−0.14	−0.17	−0.13	−0.17	−0.17
Constant	8.48***	7.70***	8.07***	7.62***	7.93***	7.96***
Variance in Country Intercept	0.30***	0.28***	0.21***	0.19***	0.20***	0.19***
N	11353	11353	11353	11353	11353	11353
BIC	41139.99	40087.6	39807.95	40086.08	39818.17	39833.66

Notes: +p<0.10 *p < 0.05 **p < 0.01 ***p < 0.001;

All models exclude outliers (i.e., total enrollments in top 0.002%)

Tables 4 and 5 present a series of multilevel multivariate regression models with two dependent variables: student size (logged) and total number of degree programs offered (count). To model factors associated with student body size, we use multivariate linear regression. To model the number of degree programs, which is a count variable, we use a negative binomial regression. For both dependent variables, the findings tell a straightforward story: private universities have fewer students and programs, and institutional age is positively associated with both variables. This finding is in line with much of the literature on private higher education, and supports Hypotheses 1 and 2. It also suggests there is a bidirectional relationship between universities' degree offerings and the number of students they attract (Levy 2012).

In Table 4, the BIC shows that the best fit for student body size is Model 5, which includes both sector and era, and indicates that both private universities and universities founded after 1990, across both sectors, are smaller on average. This finding supports Hypothesis 5. In contrast, the best fit for total programs is Model 6, which

Table 5 Negative-Binomial Regression Models for Total Number of Programs (Total Count)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age (Sq. Rt.)		0.08***	0.08***	0.07***	0.06***	0.07***
PhD (0/1)		0.77***	0.71***	0.75***	0.70***	0.70***
Private (0/1)			−0.29***		−0.27***	
Era: Pre-1945				0.00	0.00	
Era: 1946-1990				0.03	0.02	
Era: Post-1990				−0.16*	−0.13+	
Public X Pre-1945						0.00
Public X 1946-1990						0.09
Public X Post-1990						−0.05
Private X Pre-1945						−0.15**
Private X 1946-1990						−0.22**
Private X Post-1990						−0.36***
East Asia		0.00	0.00	0.00	0.00	0.00
CEE & Central Asia		−0.08	−0.09	−0.04	−0.06	−0.05
Western Europe		−0.14	−0.16	−0.11	−0.14	−0.13
Latin America		0.05	0.11	0.06	0.11	0.12
MENA		0.14	0.15	0.16	0.17	0.17
North America		0.60	0.62	0.61	0.63	0.62
South Asia		0.04	0.02	0.08	0.05	0.04
Sub-Saharan Africa		0.22+	0.22	0.25+	0.24+	0.24+
Constant	3.28***	2.31***	2.48***	2.46***	2.59***	2.53***
Variance of Country Intercept	0.20***	0.12***	0.13***	0.12***	0.13***	0.13***
N	15133	15133	15133	15133	15133	15133
BIC	129166.77	124664.32	124342.47	124587.77	124300.77	124292.75

Notes: +p<0.10 * p < 0.05 ** p < 0.01 *** p < 0.001

includes an interaction between sector and era, indicating that sector plays a different role across eras. Specifically, Model 6 in Table 5 shows that while private universities have always offered fewer programs, the differences are actually growing over time. Private universities founded after 1990 are offering fewer programs than those founded in earlier eras, while public universities founded after 1990 are not. As such, Table 5 offers only partial support for Hypothesis 6, and leads to a different interpretation: private universities founded after 1990 specialize degree offerings in line with a demand-absorbing and applied training mandate. Meanwhile, even new public universities continue to have diversified programmatic offerings.

To examine where different types of knowledge are concentrated, we then examine degree offerings. Table 6 presents a series of multilevel logistic regressions that models the likelihood a given institution offers at least one doctoral degree. As expected, institutional age is positively associated with offering a doctoral degree. That said, even after controlling for age, the table points to both

Table 6 Logistic Regression Models for Doctoral-Degrees (Odds Ratio)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age (Sq. Rt.)		1.18**	1.17**	1.09*	1.08*	1.08*
PhD (0/1)		2.63***	2.49***	2.58***	2.47***	2.47***
Private (0/1)			0.50***		0.54***	
Era: Pre-1945				1.00	1.00	
Era: 1946-1990				1.04	1.04	
Era: Post-1990				0.42***	0.46***	
Public X Pre-1945						1.00
Public X 1946-1990						1.05
Public X Post-1990						0.38***
Private X Pre-1945						0.49***
Private X 1946-1990						0.50***
Private X Post-1990						0.26***
East Asia		1.00	1.00	1.00	1.00	1.00
CEE & Central Asia		1.52	1.47	1.86+	1.77+	1.76+
Western Europe		1.13	1.06	1.26	1.18	1.19
Latin America		0.32***	0.36**	0.33**	0.36**	0.36**
MENA		0.45*	0.43*	0.48*	0.46*	0.46*
North America		0.19***	0.20**	0.20***	0.21**	0.21**
South Asia		0.83	0.73	0.93	0.83	0.84
Sub-Saharan Africa		0.39***	0.37***	0.43**	0.41**	0.41**
Constant	0.57***	0.02***	0.03***	0.04***	0.06***	0.07***
Variance of Country Intercept	4.25***	2.70***	2.93***	2.93***	3.17***	3.15***
N	15133	15133	15133	15133	15133	15133
BIC	17686.78	14725.92	14536.79	14548.49	14401.29	14406.86

Notes: +p<0.10 * p < 0.05 ** p < 0.01 *** p < 0.001

sector and era differences. Doctoral degrees are more common in public and older universities. Models not shown here indicate this finding is robust to inclusion or exclusion of total number of programs. Model 3 in Table 6 shows that the odds of a private university having a doctoral program is half that of a public university. The findings suggest that research training is still conducted primarily in public institutions, and supports the idea that research training is funded and endorsed by governments as part of their national development efforts. Moreover, due to both its strategic significance and expense, doctoral training remains concentrated in the public sector. Model 4 in Table 6 shows that even after accounting for age, founding era is associated with doctoral training in both sectors, and universities founded after 1990 are particularly less likely to offer doctoral degrees. Using the BIC, the best model is Model 5, which includes an indicator for both sector and era. This finding, in line with Hypothesis 7, suggests that newly established universities, in both sectors, are more likely to focus on teaching than research. In short, the post-1990s era has seen the proliferation of teaching-focused

Table 7 Logistic Regression Models for STEM Degrees (Odds Ratio)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age (Sq. Rt.)		0.97	0.95*	1.00	1.00	1.00
Total Programs (Log)		5.85***	5.76***	5.89***	5.81***	5.80***
Private (0/1)			0.46**		0.44**	
Era: Pre-1945				1.00	1.00	
Era: 1946-1990				1.00	1.03	
Era: Post-1990				1.29	1.48+	
Public X Pre-1945						1.00
Public X 1946-1990						1.02
Public X Post-1990						1.52
Private X Pre-1945						0.45***
Private X 1946-1990						0.46***
Private X Post-1990						0.66
East Asia		1.00	1.00	1.00	1.00	1.00
CEE & Central Asia		0.65	0.60+	0.62	0.56*	0.56*
Western Europe		0.6	0.54*	0.58+	0.51*	0.51*
Latin America		1.49	1.64+	1.46	1.62+	1.61
MENA		2.00*	2.09*	1.94*	2.00*	2.00*
North America		0.99	1.17	0.98	1.18	1.17
South Asia		3.13***	2.93**	3.04***	2.80**	2.80**
Sub-Saharan Africa		1.06	1.08	1.02	1.03	1.03
Constant	3.21***	0.04***	0.07***	0.03***	0.05***	0.05***
Variance of Country Intercept	1.85***	1.53***	1.49***	1.53***	1.49***	1.49***
N	15133	15133	15133	15133	15133	15133
BIC	16367.22	11301.69	11138.9	11307.36	11132.58	11151.65

Notes: +p<0.10 * p < 0.05 ** p < 0.01 *** p < 0.001

institutions that specialize in applied and market-oriented skills, rather than research training.

Finally, Tables 7 and 8 present odds ratios from logistic regression models examining a university's likelihood of offering at least one STEM (Table 7) or business degrees (Table 8). Model 3 in Table 7 shows that private universities are much less likely to offer STEM programs across all eras. Meanwhile, Model 5 indicates that those universities founded after 1990 are actually more likely to offer STEM degrees in comparison to those founded in earlier eras, which is statistically significant at an alpha of 0.10. As with other dependent variables, the BIC indicates that the best model fit is Model 5, pointing to the role that both sector and founding era play.

Table 8 shows models for business programs. Model 3 shows that – in contrast to STEM degrees – the odds of a private university offering business degrees is more than twice that of a public university. Similarly, Model 4 indicates that universities founded in more recent eras are more likely to offer business degrees than those founded before 1945, and this finding is statistically significant. These relationships

Table 8 Logistic Regression Models for Business Degrees (Odds Ratio)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age (Sq. Rt.)		0.87***	0.88***	0.94***	0.94***	0.94***
Total Programs (Log)		4.03***	4.39***	4.10***	4.44***	4.45***
Private (0/1)			2.36***		2.27***	
Era: Pre-1945				1.00	1.00	
Era: 1946-1990				1.35	1.33+	
Era: Post-1990				2.36**	2.11**	
Public X Pre-1945						1.00
Public X 1946-1990						1.26
Public X Post-1990						2.19*
Private X Pre-1945						2.19*
Private X 1946-1990						3.14**
Private X Post-1990						4.63***
East Asia		1.00	1.00	1.00	1.00	1.00
CEE & Central Asia		0.95	1.05	0.88	0.99	0.99
Western Europe		1.07	1.22	0.99	1.13	1.13
Latin America		2.39**	2.23**	2.29**	2.16**	2.15**
MENA		1.44	1.43	1.34	1.35	1.36
North America		1.90*	1.69+	2.00*	1.78*	1.78*
South Asia		0.93	1.06	0.87	0.99	1.00
Sub-Saharan Africa		1.78+	1.84*	1.64	1.71+	1.71+
Constant	3.11***	0.15***	0.07***	0.05***	0.03***	0.03***
Variance of Country Intercept	2.02***	1.68***	1.49***	1.64***	1.48***	1.47***
N	15133	15133	15133	15133	15133	15133
BIC	16738.51	13124.93	12889.52	13063.57	12853.51	12870.23

Notes: +p<0.10 * p < 0.05 ** p < 0.01 *** p < 0.001

remain consistent even when controlling for institutional age, which is statistically significant and negatively correlated with business degrees. In Table 8, the BIC indicates that Model 5 is the best fit, suggesting that both sector and era are important factors in curricular offerings. This finding supports Hypothesis 8 and suggests that the neoliberal logics that have circulated post-1990 have affected both public and private institutions. Similarly, the institutional imprinting of founding era seems consistent across both sectors, suggesting the growth of business degrees is not only a private-sector phenomenon, and is likely better explained by the diffusion of neoliberal logics in higher education worldwide.

In each of the regression tables, we also examined the size and significance of regional indicator variables. We find that regional differences seem more pronounced in models of curricular offerings, particularly doctoral degrees and STEM, than in size or program offerings. In fact, none of the regional indicator variables is significant for total program offerings. Although some might be more attuned to regional and national variation from global trends, in this article, we emphasize how

sector and era are affecting universities around the world. However, we also recognize that the ways in which global, regional, and national logics and legacies interact is an important area for future research.

Robustness Checks

We ran various robustness checks and the results are consistent across various specifications. First, to determine the extent to which the trends we observe are found at the regional level, we replicate the best fit models for each world region, and find that coefficients on key predictor variables are similar across most, or all, world regions (see Appendix/online supplementary material). In addition, we tried alternate specifications of the age variable, first with logged years and then with the inclusion of a squared age term, but these did not affect key findings or improve model fit. Finally, we also included only two eras (i.e., pre-1990 and post-1990), but found that the inclusion of three eras resulted in the best model fits.

Discussion: Toward Sectoral Differentiation in Global Higher Education?

The growth of the private sector has transformed higher education around the world over the past three decades. Our analysis adds new insights into and generalizations of the formal and academic structure of private universities in comparison to the public sector in a cross-national perspective. Our findings support prior research that finds private institutions are smaller on average (Levy 2012, 2016), and adds a numerical dimension: the median size of private sector institutions worldwide is roughly one fourth the median size of public sector institutions worldwide. Interestingly, while private institutions continue to be smaller than their public counterparts, more recently established private universities enroll more students on average than those founded before 1990 – indicative of the private sector's new mass-absorbing role in many countries (Bjarnason et al. 2009).

In the same vein, we consistently find that private universities offer fewer programs on average than public universities, and this finding is consistent across all world regions. We also find that both private universities and universities founded in or after 1990 are less likely to confer doctoral degrees, confirming earlier assessments that mass-absorbing institutions dominate in many countries and that research training is rarely a role of these private institutions. In general, the fact that private institutions offer fewer degrees supports the argument that the new private sector is often composed of more applied institutions. However, we expand on these findings by adding that the more recently established public institutions resemble their private counterparts in offering fewer doctoral training opportunities, suggesting the rise of a teaching-oriented logic among both sectors' youngest institutions.

Additionally, we examined the knowledge base of private HE, i.e., its *curriculum*. Previous research based on national cases stresses that private institutions specialize in market-oriented and inexpensive fields of study, with business administration being a prime example of these (e.g., Goyette 2012; Mahlubi, Levy and Otieno 2007; Mizikaci 2011; Levy 2016). Indeed, our global sample

shows that business degrees are more common in the private sector. At the same time, the neoliberal logic has entered the public sector, too, with public universities founded in the post-1990 era being more likely to offer business degrees than public institutions founded prior to the 1990s.

Our consistent finding is that the inclusion of an era variable, operationalized as three time periods, is significant and improves model fit for all of the outcomes we examine. Moreover, in most models, the effect of era is not sector specific, which supports the argument that institutional logics, including past logics, are affecting both sectors. The exception to this trend is in the total number of programs, where we find private universities are becoming more specialized over time relative to public universities. The findings suggest that imprinting during the formative phase endures and leaves a footprint across subsequent eras. While organizational imprinting is a well-established concept (Oertel 2018; Stinchcombe 1965; Waeger and Weber 2019), linking it to institutional logics, i.e., the ideational blueprints of organizations, turns out to be a fruitful extension.

In our case, the 'legacies of logics' (Raynard, Lounsbury and Greenwood 2013) are clearest in the aftermath of a major change in the global polity, i.e., the fall of the USSR, marked by large-scale privatization and universal access (Buckner 2017b). Public universities have traditionally been characterized by logics of national development that encompass government support, broad access, and basic science, beyond individual demand imperatives remain larger overall (Riddle 1993; Schofer and Meyer 2005). Yet in the post-1990 era, their private counterparts have closed the gap in overall size, in line with new imperatives demanding nations universalize access.

In addition, while doctoral training remains a public mandate, younger public and private institutions are both less likely to provide such advanced training, in line with a focus on teaching in the global era. Finally, while a focus on lower-level study programs, niche-seeking and specialization in line with labor market requirements remains a strong feature in the private sector, the diffusion of business degrees across both sectors in the youngest generation of universities points to general patterns of institutional change in accordance with dominant neoliberal logics and likely reflects the 'entrepreneurial' turn and the emergence of neoliberal rationales in the public sector (Deem 2001; Enders and Jongbloed 2007; Musselin 2009; Fumasoli and Huisman 2013; Paradeise et al. 2009).

Focusing on organizational characteristics that are primarily driven by imprinted logics directs our attention to global trends, which have thus far only been gleaned from national case studies. We argue that institutional logics reflect both sectoral mandates and era-specific ideologies, and that jointly help explain both stability and change in the global higher education landscape. However, we note that our findings fuel, rather than resolve, the debate about the cross-national distinctiveness of the private sector versus inter-sectoral isomorphism – a longstanding debate in organizational and higher education scholarship (Huisman et al. 2007; Levy 2006; DiMaggio and Powell 1991).

Conclusion

In this article, we conceptualize public-private differences in higher education worldwide as stemming from different institutional logics, yet couple such sectoral logics with shifting era-specific institutional logics imprinted on organizations during their formative phase. We find sectoral differences worldwide, yet also find imprinting effects consistent with prior literature and our expectations. Private and younger public universities are consistently smaller in student body and academic portfolio, more teaching-oriented, and more focused on market-relevant programs, particularly business administration degrees at the Bachelor's and Master's levels. However, these differences diminish in the more recent neoliberal era when private institutions become mass-absorbing while public institutions become less likely to offer doctoral training and more likely to incorporate market-relevant offerings compared to the established public sector.

Our analyses generate many possible avenues for future research. In particular, future studies should examine how and if these sectoral trends change over time. Other future studies should examine intra-sectoral differentiation within the private sector, including the role of semi-elite institutions and religious institutions, or differences between for-profit and non-profit sectors. We suggest that each of these sub-sectors could be usefully conceived of as its own field, characterized by particular institutional logics and imprinting mechanisms.

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