Are national university systems becoming more alike? Long-term developments in staff composition across five countries

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Abstract
National university systems have traditionally been characterized by major differences in both internal structures and external conditions. However, recent comparative studies show that the global rise of the knowledge economy has made the external conditions of universities change in similar ways. This paper investigates to what extent this convergence has been mirrored *within* the universities by systematically comparing staff changes over more than a decade in five countries: The United States, the United Kingdom, Germany, Norway, and Denmark. Measures of staff changes are partial but tangible indicators, which are reasonably comparable across countries and over time. The empirical analysis isolates and examines two parallel staff trends, which the higher education literature currently highlights as crucial for ongoing university transformations: Proliferation of temporary academic staff and professionalization of administrative/managerial staff. In doing so, the analysis provides a tangible empirical basis for assessing the impact of global trends on historically distinct university systems. Staff compositions have changed in the same direction, but from different starting points and with different intensity. Staff changes have been larger in Europe than in the US, but not in ways erasing major historical differences. The directional similarity rather suggests that dissimilar universities have added a similar layer of certain types of human resources.

Keywords: Staff composition, Organizational change, National university systems, Convergence, Universities as organizations, World Society Theory

7.1. Introduction

National university systems have developed from different historical starting points, but to what extent are they developing in the same direction, and how similar have they become over time? This paper examines these questions by exploring changing patterns of staff composition in five university systems with distinctly different historical legacies: The United States, the United Kingdom, Germany, Norway, and Denmark. It provides a new empirical basis for grounding conceptual claims of long-term university transformation.

Burton Clark' seminal analysis of university systems (1986) clearly established that universities in different countries and over many decades have developed dissimilar *internal structures* as a result of dissimilar *external conditions*. He found the largest variation to be between state- and market-coordinated university systems. Universities were organized more flexibly and with stronger central management when the market-coordinated most external conditions. On the other hand, the universities were organized more rigidly and seemed more internally fragmented in systems mainly coordinated by the state.

In the face of the rising knowledge economy, Clark (1998, 1986) simultaneously observed and endorsed a general shift toward the market-coordinated model of universities: 'The state-led pathway is clearly not one appropriate for change in complex universities in the fast-moving environments of the twenty-first century. System-wide changes are notoriously slow in formation and blunt in application' (Clark 2004, p. 182).

Clark's view resonated with – but also fuelled – a transnational reform movement of university systems initiated in the early 1990s, especially in Europe (Rhoades and Stensaker 2017). Three interrelated developments have been particularly significant globally: Firstly, an "modernization" agenda linked to the development of New Public Management (NPM), demanding a more cost-efficient production of public sector services (Brunsson and Sahlin-Andersson 2000). Secondly, devolution of responsibilities to universities in a 'steering from a distance' governance approach, demanding increased accountability and managerial control at the organizational level (Paradeise et al. 2009). Thirdly, a proliferation of quasi-market solutions compelling universities to compete with one another and participate more directly in the expanding knowledge economy (Slaughter and Rhoades 2004).

Comparative research has rather convincingly shown that these interrelated developments – at a general level – characterize recent changes in the *external conditions* of universities across countries, moving them jointly toward greater market-coordination. This move has been observed both in

countries with a long tradition of market-coordination and state-coordination (Dobbins and Knill 2014; Paradeise et al. 2009; Shattock 2014).

It is a prevalent assumption in the higher education literature that universities across countries become more alike because they face similar pressures, for instance, Leisyte and Dee (2012, p. 124) writes, "[g]iven the isomorphic pressures that research universities face in increasingly competitive institutional environments, we argue that the changes in academic work conditions may be converging in European and US universities, although to various degrees". Focusing on the Australian case, Marginson and Considine (2000) claim that the diffusion of market-coordination makes universities converge on an enterprise model of organization. The general storyline portrays the change as a move away from predominantly collegial institutions toward more professionalized and hierarchically managed organizations. This change is frequently assumed to enable senior staff to take strategic decisions and to be held accountable for general performance (Krücken and Meier 2006; Ramirez 2013; Whitley and Gläser 2014).

It is, however, obvious that several of the major dissimilarities that have set national universities apart historically, as highlighted by Clark (1986), continue to this day to be defining features of each national university system (e.g., the chair system in Germany, huge endowment funds in the US, or elaborate welfare states in the Nordic countries). Therefore, scholars stress that the apparently similar move toward greater market-coordination affects the national university systems differently due to an interplay with dissimilar deep-rooted structures at both the system and organizational level. Hence, universities may develop less uniformly across countries than portrayed by the general storyline (Michelsen and Bleiklie 2013; Musselin 2007; Paradeise and Thoenig 2013; Whitley 2012).

A nuanced understanding of university convergence/divergence across countries requires knowledge about changes in both *external conditions* and *internal structures* (Ramirez and Christensen 2013). Currently, there exists far more longitudinal and cross-country evidence about changing *external conditions* (e.g., national policy regulation, funding mechanisms, and public discourse) than about changing *internal structures* (Rhoades 2017; Seeber et al. 2015). It remains uncertain what the apparently joint move toward a marked-coordinated university model entails in practice within universities. To counterbalance the extensive evidence on external conditions, Dobbins, Knill, and Vögtle (2011, p. 665) posit, 'there is a need for more specific empirically observable indicators'.

7.1.1. Approach: Staff changes as an indicator

This paper proposes staff changes as one such indicator, which targets the internal structures of the universities. Change in the proportional size of staff categories is a tangible indicator, which is reasonably comparable across countries and over time. Although only a partial indicator of organizational change, a division of labor between different role categories is at the heart of the very idea of an 'organization' (Brunsson and Sahlin-Andersson 2000). Hence, this approach provides a tangible empirical basis for assessing the extent to which the five historically distinct university systems move toward a shared organizational model. From this outset, the paper examines whether signs of convergence can be detected when developments in time series of staff composition (covering more than a decade) are compared systematically across five countries: The US, the UK, Germany, Norway, and Denmark.

Many higher education scholars highlight broad patterns of staff changes as a consequence of changing external conditions (e.g., Ginsberg 2011; Krücken and Meier 2006; Maassen and Olsen 2007; Paradeise et al. 2009; Shattock 2014; Slaughter and Rhoades 2004), and the move toward a market-coordinated model of universities (Clark 1998; Marginson and Considine 2000) is generally seen to entail 'a fundamental restructuring of professional employment' (Rhoades and Stensaker 2017, p. 130). The literature highlights, in particular, two parallel staff trends (Fumasoli et al. 2015; Gordon and Whitchurch 2010; Rhoades 2017): Firstly, an expansion of temporary and diverse positions within the bottom strata of the academic hierarchy (Hurlburt and McGarrah 2016; Milojevic et al. 2019) and secondly, a professionalization of the administrative and managerial staff within an extended hierarchy of specialised offices (Kehm 2015a; Krücken et al. 2013).

Although one can infer staff changes by various methods, most scholars evoke at some point a quantitative notion of change in the proportional size of specific staff categories over time. Such claims most often rely rather passively on crude figures produced by national data agencies; surprisingly few researchers work actively with longitudinal staff data (for recent exceptions, see Baltaru 2018; Baltaru and Soysal 2017; Stage and Aagaard 2019). Staff figures are therefore often used and compared as they are without much context when setting the scene for a broader argument. No thorough comparative analysis of proportional staff changes exists (see Fumasoli et al. 2015, for a comprehensive interview- and survey-based study on the changing academic profession; and see Schneijderberg and Merkator 2013, for a broad review of studies on non-academic professional staff).

This paper improves comparison of five national staff datasets a) by outlining their technical differences, b) by presenting them in an 'as-comparable-

as-possible' format, and c) by interpreting them in context by taking national traditions into consideration. The empirical contribution is twofold: An analysis of the databases themselves and a comparative analysis of their content.

A central empirical challenge is to isolate and examine the two parallel staff trends in a comparable way. They represent a restructuring *within* each side of the traditional academic/non-academic divide; however, the possibility to disaggregate these two overarching categories varies between the five countries. Existing single-country staff studies have provided guidance about data possibilities, limitations, and interpretations. This paper draws on the same data sources and the same elementary staff categories as those existing national studies but unpacks, combines, and presents the datasets in a new format and with updated data series. The ambition is to make the relevant cross-country staff trends stand out more clearly when populations are aligned, data details are listed, and figures are formatted as similarly as possible.

This paper is organized as follows: The second section describes how partial convergence in external conditions is presumed to be followed by partial convergence in internal structures. The third section contains an analysis of the five datasets, outlining the possibilities of comparing them. The fourth section subsequently offers an analysis of each national university system, while the fifth section provides a comparative cross-country analysis. The sixth and last section discusses the extent to which convergence has actually occurred *within* the universities across the five countries.

7.2. Dual convergence: External conditions and internal structures

World Society Theory has previously been used to explain a level of convergence between national university systems (Dobbins and Knill 2009, 2014) and broad university patterns such as expanded access, rationalised governance structures, and increased emphasis on social usefulness (Baltaru and Soysal 2017; Logue 2014; Ramirez 2006, 2010, 2013).

According to the World Society Theory, external conditions and internal structures are expected to converge when globalization intensifies (Meyer et al. 1997). The central argument for convergence is that legitimacy, rather than functional efficiency, is the primary determinant for formal structures. It asserts a close link between external conditions and internal structures. Instead of gambling with risky idiosyncratic arrangements, national systems and organizations are presumed to embrace solutions that are already widely valued by their environment (DiMaggio and Powell 1983; Meyer and Rowan 1977).

The claim is that a globalized system impinges on national universities, 'influencing their development by invoking the "best practices" of "world-class" universities [and university systems]' (Ramirez and Christensen 2013, p. 697). Thus, the theory predicts that partial convergence of external conditions will be followed by a partial convergence of internal structures.

However, the thesis of convergence has been contested with reference to local path dependency and decoupling (Hüther and Krücken 2016; Whitley 2012). It is claimed that national university systems differ so much historically that they will continue to follow different pathways of change behind the facade. This contestation does not refute the rise of world models but emphasizes that century-long variation impedes short-term convergence at both the system level and the organizational level. Instead, it is claimed that world models are pragmatically translated and edited on the basis of local traditions and pathways, and actors respond to formally similar conditions in diverse and half-hearted ways, resulting in the continuance of dissimilar structures across countries (Musselin 2007; Paradeise and Thoenig 2013; Whitley 2012).

Such contestations moderate the expectations for cross-country convergence, and from this perspective, a degree of persistent national variation is expected to be evident in conjunction with potential signs of convergence (Hüther and Krücken 2016).

7.2.1. Convergence of external conditions

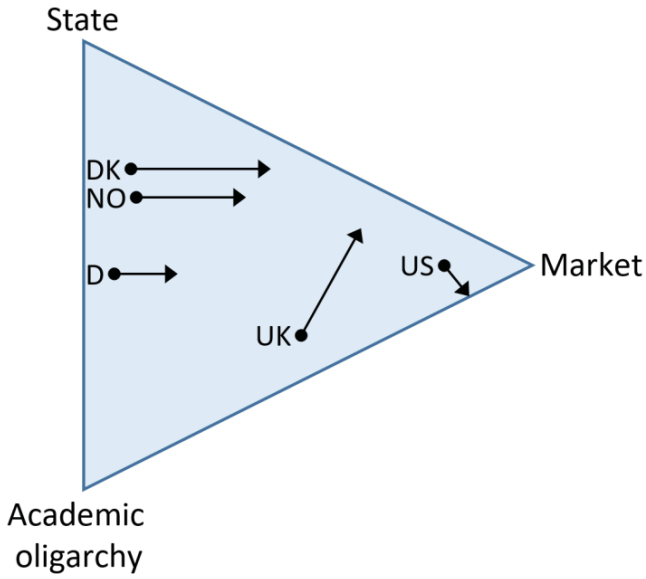
Claims about a convergent move toward market-coordination trace back to Burton Clark's studies of university systems (Clark 1986; Dobbins and Knill 2014). His 'triangle of coordination' captures both an emerging similarity and an enduring variation in the external conditions of national universities. It depicts the state authority, the market, and the academic oligarchy as the three main dimensions that determine, through their interaction, how a given national university system is coordinated. Countries are located in the triangle by the relative weighting assigned to each of the three dimensions (Clark 1986, 2004).

Scholars have elaborated on Clark's rather basic framework, adding important nuances to comparative university governance research (de Boer, Enders and Schimank 2007; Dobbins et al. 2011; Ferlie et al. 2008; Olsen 2007; Paradeise et al. 2009). However, it is beyond the scope of this paper to unfold these nuances, as its main purpose is to discern changes in university staffing across countries. Clark's well-established framework outlines the major historical differences in external conditions.

In updating Clark's triangle, Figure 1 shows an approximation of the five countries' different starting points and their direction of change over the last

few decades. Their respective location in the triangle is derived from three large comparative projects (Dobbins and Knill 2014; Paradeise et al. 2009; Shattock 2014). In general, it shows a convergent move toward the market-coordinated model. However, it also shows that the countries have had different starting points and intensity of change, and hence that a substantial degree of variation in national external conditions persists (Michelsen and Bleiklie 2013).

Figure 1. The different starting points and direction of change of the five university systems in terms of external conditions surrounding the universities



The analysis section will later present a brief description of each country's historical pathways and recent developments in more detail.

7.2.2. Convergence of internal structures

As with the convergence of *external* conditions, claims about converging structures *within* the universities also trace back to Clark (1986). Back in the 1980s, he observed that universities in state-coordinated systems had a different organizational structure than universities in market-coordinated systems. In state-coordinated systems, the central managerial and administrative level played a peripheral role, making the universities pluralistic and bottom-heavy organizations with low potency for collective action. The central level mainly consisted of clerks and local academics elected as temporary managers by their colleagues. The main actors influencing the activities in universities were the state and the academic oligarchies; the state decided on most financial and

administrative matters top-down, and the professor-dominated oligarchies decided on the academic activities bottom-up (Clark 1986).

Contrary to this, Clark observed (1986) that the central managerial and administrative level played a more central role in market-coordinated university systems. Here, the central level consisted of a professional management and a system of specialised offices. In addition to the academic oligarchies, managers and administrators were key actors setting goals, gathering information, formulating and executing plans, and evaluating progress on behalf of larger sub-units or the organization as a whole. Due to withdrawn state bureaucracies, the universities were here responsible for a broader range of operative and strategic decisions as individual organizations. They were mostly free to organize in ways that they deemed right in order to exploit various external quasi-markets. It gave an organizational flexibility that Clark praised (1998).

As the external condition of national university systems since then have moved in the same direction, it has repeatedly been suggested that the internal structures of universities also have moved in the same direction (Bleiklie and Kogan 2007; de Boer, Enders and Leisyte 2007; Krücken and Meier 2006; Marginson and Considine 2000; Paradeise et al. 2009; Rhoades and Sporn 2002). The remaining part of this paper investigates empirically to which extent such a convergent trend can be detected in staff changes across selected countries.

7.3. The five national datasets

The five countries were chosen for analysis partly based on the availability of disaggregated datasets previously analyzed by native scholars and partly based on their distinct historical variation in terms of state/market-coordination and national reform intensity. The small countries, Denmark and Norway, are both included to assess convergence among seemingly similar national university systems.

The five analyzed datasets on staff composition all stem from official registers used for accountability and oversight, but the ways in which they are constructed vary between the countries. However, they overlap sufficiently on important parameters to warrant comparison, most importantly in terms of period, data type, population, and categorization. The datasets are equal in categorizing the totality of employees on the universities' payroll according to their formal job attributes such as title, contract type, education, union, and/or status group. Table 1 provides an overview of the characteristics of the five datasets (see appendices A and B for further technical details).

Cross-country data variation is mitigated by three strategies. Firstly, a key strategy has been to unpack each of the national datasets and match the various staff subcategories into five fairly comparable staff categories (described in the following section).

Secondly, it has been attempted to align the populations and periods of the different datasets as closely as possible, because some of the datasets cover more diverse types of higher education organizations than others (e.g., hospital units and teaching-centered universities have been excluded) and occupational definitions have changed over time. Since cross-country data variation already complicates the analysis, only the longest period of consistent data is included per country in order to avoid adding intra-country data variation.

Despite aligned populations, periods, and staff categories, one still needs to keep cross-country data variation in mind when comparing the 'same' category across datasets. Such comparisons need to be done interpretatively, and to accommodate such reflexivity; a third strategy has been to explicate and discuss the characteristics of the national datasets and the national university systems.

Table 1. Overview of the five national datasets

	US	UK	Germany	Norway	Denmark
Period	2003–2011	2003–2011	2005–2017	1999–2017	2002–2017
Data type	Mandatory audit survey	Membership audit survey	Mandatory audit survey	Compilation of official registers	Payroll register
Frequency	Annual, cross-sectional (Nov.)	Annual, retrospective	Annual, retrospective	Selected years, cross-sectional	Quarterly, cross-sectional
Population	Research universities (Carnegie)	Research universities (Leiden Ranking)	All universities	Four universities	All universities
Categorizer	Local data providers	Local data providers	Local data providers	Researchers	Researchers
Basis for categorization	Job titles and funding records	Job titles, contract type, and highest held qualification	Job titles and status groups	Job titles	Job titles and collective agreements
PhDs on payroll	Ad hoc, part-time	Ad hoc, part-time	Ad hoc, part-time	Full-time	Full-time
Degree-holding minimum	Bachelor or equivalent exp.	Bachelor	Bachelor	Selected high-status job titles	Master
Faculty	Tenure or tenure-track	Open-ended contracts	Professors	Associate professors and above	Associate professors and above
Basis for FTE-computation	Full- (1/1) and part-time (1/3)	Contract duration and workload	Full- (1/1), part- (1/2) and short-time (1/5)	Contract duration and workload	Paid hours
FTEs (latest year)	1,180,000	187,200	212,200	20,020	31,000

Source[a)]	IPEDS	HESA	Destatis	NIFU	ISOLA
Key reference	(Rhoades and Frye 2015)	(Baltaru 2018)	(Krücken et al. 2013)	(Gornitzka et al. 2009)	(Stage and Aagaard 2019)

a. The Integrated Postsecondary Education Data System (IPEDS), Higher Education Statistics Agency (HESA), Federal Statistical Office of Germany (Destatis), Nordic Institute for Studies in Innovation, Research and Education (NIFU), and the Danish Agency for Modernization – Ministry of Finance (ISOLA).

7.3.1. Categorization

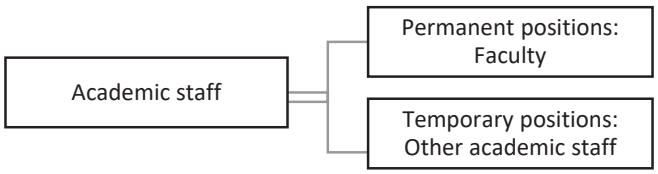
The main purpose of the categorization is to isolate the two parallel staff trends that seem to be characteristic of the move toward the market-coordinated model of universities: The dual rise of temporary academic staff and professional non-academic staff. Building on the work of Gornitzka and colleagues, these rising categories can be isolated from the totality of university employees by applying four general staff distinctions (Gornitzka et al. 2009; Gornitzka and Larsen 2004):

academic	↔	non-academic staff
permanent	↔	temporary staff
administrative/managerial	↔	technical/manual staff
degree-holding	↔	clerical staff

Following these rather simple distinctions, it is possible to sort the large number of various subcategories in each dataset into five fairly comparable staff categories. It should, however, be kept in mind that the categories are not completely identical across countries, despite efforts to streamline them, because staff structures and reporting categories differ between the countries.

The overarching distinction between academic and non-academic staff is often taken for granted and built into formal systems (Fumasoli et al. 2015). This is also the case for these five national datasets where all subcategories were explicitly marked as either academic or non-academic. The distinction between permanent and temporary applies to academic positions (Figure 2), and it is a tangible distinction that cuts across the different academic career structures employed in the respective university systems (Fumasoli et al. 2015; Teichler et al. 2013). Although an American term, 'faculty' will denote academic staff on open-ended contracts for all the five country-cases.

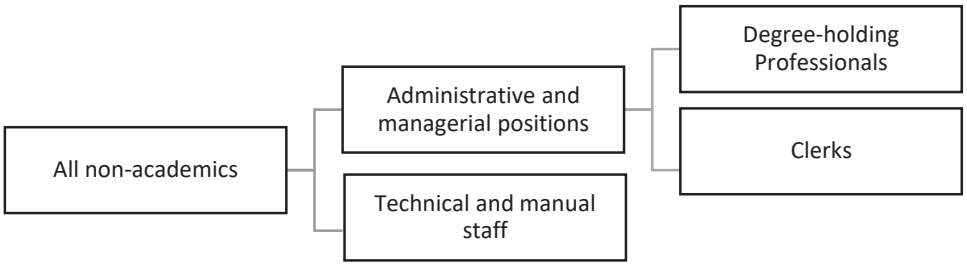
Figure 2. Permanent/temporary staff distinction



Two distinctions apply to the non-academic positions (Figure 3, Baltaru 2018; Gornitzka and Larsen 2004; Krücken et al. 2013): Firstly, the distinction between 'administrative and managerial staff' and 'technical and manual staff'

applies to all non-academic positions. The 'technical and manual staff' category usually holds quite different educational backgrounds and competencies than the other non-academic positions, and it covers diverse positions that contribute to the comfort, convenience, and hygiene of personnel and students or to the upkeep of the university's property; for instance, caretakers, cleaners, catering personnel, craftsmen, technicians, engineers, laboratory technologists, and librarians. Some technical staff also perform direct research support functions, in particular, laboratory technologists and a subset of technicians and librarians.

Figure 3. Two key non-academic distinctions



Secondly, the educational distinction between 'degree-holding professionals' and 'clerks' is here only applied to the administrative and managerial staff. Employees with a university-degree are separated from those without. The datasets are not disaggregated in ways that would enable one to specific actual tasks of the two groups of administrative staff. However, several scholars find that degree-holding professionals generally differ from the more traditional administrative clerks in terms of work tasks, attitudes, skill sets, discretion, networks, etc. (Schneijderberg and Merkator 2013). It is usually employees holding a university-degree that perform the new roles conceptualized as 'managerial professionals' (Rhoades and Sporn 2002), 'new higher education professionals' (Klumpp and Teichler 2008), 'third space professionals' (Whitchurch 2013), and 'audit-market intermediaries' (Enders and Naidoo 2019).

7.3.2. Analysis of proportions

Each of the datasets covers the full payroll of the universities and counts in the format of full-time equivalents (FTEs); it is therefore possible to analyze the development in the relative size of staff categories over time. Such an analysis of proportions captures each system as a whole, contrary to studies relying on headcount growth rates of selected categories (e.g., Gornitzka and Larsen 2004). The really interesting thing about staff developments is how a given

category develops *relative to all* other categories. Descriptive statistics of proportions give four main dimensions for analysis:

- Relative size (% of total)
- Intensity (% changed)
- Direction (Up/down)
- Timing (Years)

The cross-country data variation complicates comparison and involves both substantial differences between the national university systems (e.g., no associate professor level in Germany) and technical differences between the national databases. The latter primarily covers variation in the categories' lower threshold of inclusion (e.g. whether PhD students are on the payroll or what the minimum qualification of degree-holding professionals is) rather than principle differences.

Despite persistent data variation, the analysis captures the major shifts between the five staff categories, in particular, when major data-practicalities are taken into account. It provides a tangible heuristic basis, stimulating one to reflect upon the similarities and differences in the development of the five historically distinct university systems.

7.4. National case analyses

The following five national case analyses describe the historical roots and recent developments of each university system. Most importantly, they highlight the distinct historical backdrops against which the cross-country staff changes should be interpreted. In addition, similar formatted charts provide a detailed view of longitudinal staff changes for each country. While this section is mainly descriptive, the subsequent comparative section is more analytical and contains a cross-country summary chart.

7.4.1. The United States: The stable one

The US university system is shaped by the fact that the first universities preceded the emergence of public governments and established professions (Rudolph 1990). The early US universities (private and public) developed independently as highly hierarchical organizations competing with one another for funding from external benefactors and students. In general, they were 'built at the institutional level, from above, by managers; they were not constructed from below by faculty guilds [as in the European countries]' (Rhoades and Sporn 2002, p. 15). The historical importance of university managers and external stakeholders for the US academic profession gave rise to the ideal of

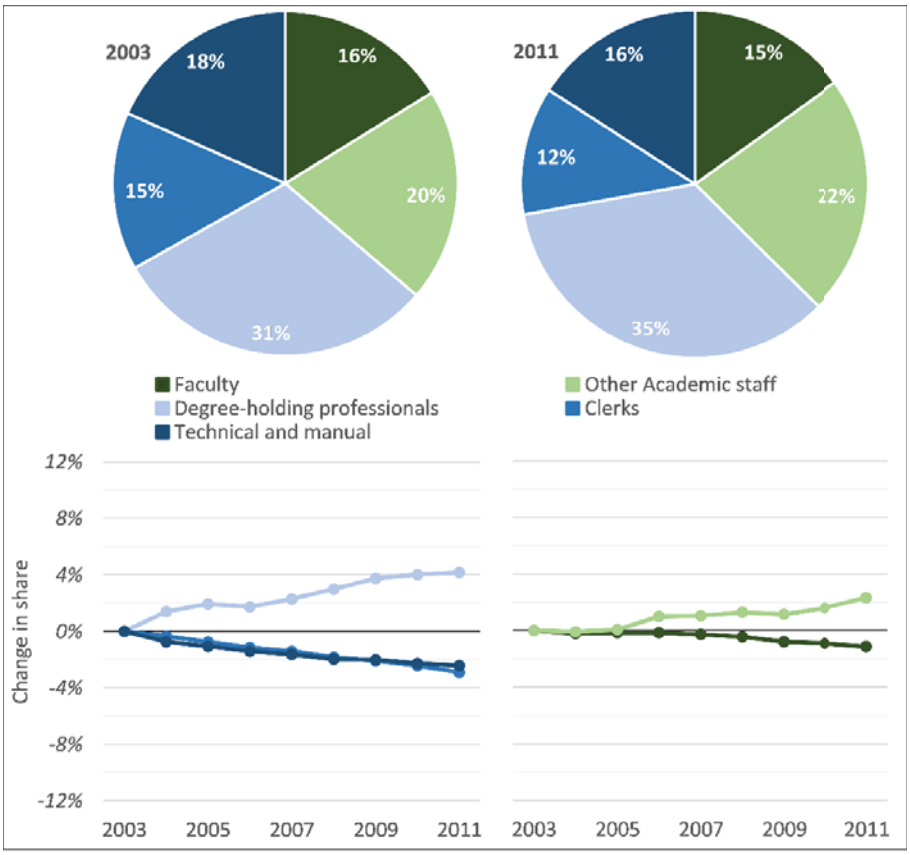
'shared governance' (Dill 2014). Hence, the US system has historically been characterized by self-reliant university organizations competing on market terms.

The US university system is a federal one, which has devolved almost all university governance matters to the individual states. The extensive devolution combined with historically self-reliant universities has resulted in a considerable horizontal and vertical differentiation. 'To date, neither the US federal government nor the states have attempted to regulate the internal governance of colleges and universities' (Dill 2014, p. 192). A comparative analysis of the university systems concludes that 'the most successful university system in league table terms, the US, has also been the most stable in institutional governance and continues to pursue the concept of shared governance' (Shattock 2014, p. 19).

Nonetheless, the financing of US universities, especially public ones, have become even more dependent on third party funding, student tuitions, and revenue generation in recent decades, not least after the world recession (Geiger and Heller 2011). Public universities have faced a relative decline in the state's share of total revenues, from around 43% in 1985 to under 25% in 2015 (Leisyte and Dee 2012; NCES 2016). For-profit universities have accented the revenue competition, comprising 7.7% of all enrolments in 2008 compared with 2.5% in 2000 (Geiger and Heller 2011).

As states have reduced their funding, their relationship to universities has shifted toward accountability and performance measurement, and scholars argue that this heightened market-coordination has increased managerialism within US universities (Bess 2006; Rhoades and Frye 2015). Most academics have thus become more "managed professionals" who are subject to greater division of labor and oversight by various authorities (Finkelstein et al. 2016; Rhoades 1998). In this process, the tenured faculty members that secure revenues have gained more control over core academic activities within their respective branches of learning (Finkelstein et al. 2011; Leisyte and Dee 2012).

Figure 4. Staff composition at US universities, 2003–2011



As Figure 4 shows, the share of academic staff in the US universities has grown slightly relative to the non-academic staff. In general, the relative size of the two academic categories has been reasonably stable except for smaller changes in 2006 and during the last few years of the period. Here the share of 'other academic staff' increased, whereas the share of 'faculty' decreased. On the non-academic side, slightly larger changes have taken place. In particular, the bulky category of 'degree-holding professionals' has expanded in relative size, while the two other non-academic categories have decreased side by side.

7.4.2. The United Kingdom: The NPM-pioneer

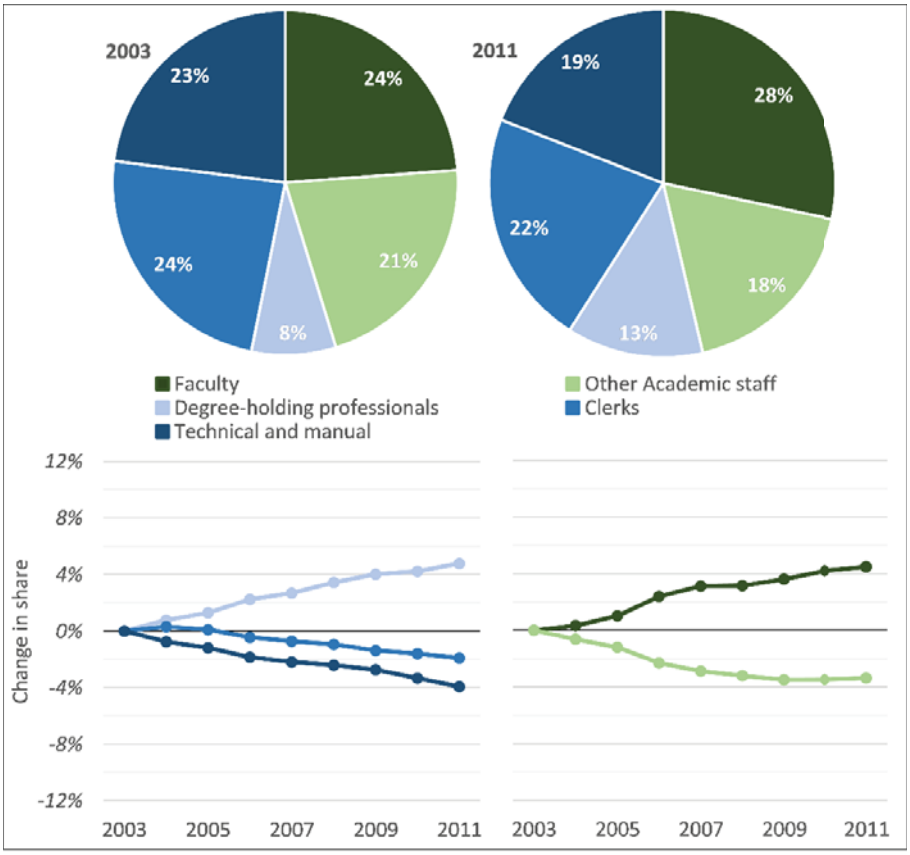
The UK university system is rooted in the elitist and teaching-centred Oxford-legacy articulated by Cardinal Newman in the 1850s, which idealises the university as a 'cloistered group of intellectuals pursuing the truth for the truth's sake and turning out well-rounded students versed in the liberal arts' (Burnes et al. 2014, p. 1). Since the founding of Oxford and Cambridge around 1200 through the University of London in 1820 to the civic universities in the 1900s, the UK universities 'owe their origins to independent benefactors and to charging fees to students. Even when they became fully funded by the state in

1945, they retained their independence and autonomy as if they were privately funded' (Shattock 2014, p. 22). Hence, the UK system has historically been characterized by a strong profession organized in autonomous universities operating largely on market terms.

The UK system is, in principle, a federal one, but the UK government has rather coherently issued the primary governance and funding regulation (tuition fees being a notable exception). The system has a high degree of horizontal and vertical differentiation, mainly brought about by historical privileges and competition. Since the beginning of the 1980s, the UK system has been a 'pioneer' in terms of NPM-inspired reforms (Burnes et al. 2014; Paradeise et al. 2009): 'The UK has been more continuously radical than any other European country in reforming funding mechanisms and in adopting internal structures to respond to changes in funding methodology' (Shattock 2014, p. 210).

A landmark decision in 1981 by the Thatcher government cut university funding by 25% over three years and allocated these funding reductions unevenly across universities using performance criteria. This massive intervention inaugurated an increasingly regulatory approach by successive governments (Burnes et al. 2014, p. 7). In the subsequent decade, funding was further coupled to competition and performance criteria, not least by the Research Assessment Exercise (RAE) (later the Research Excellent Framework). In 1992, the divide between universities and polytechnics was abolished, changing the 'university' landscape considerably by mixing governance models and untying research and teaching. The UK universities' adaption to reformed external conditions has 'radically questioned their traditional governance structures' (Hüther and Krücken 2018, p. 10), diminishing collegial powers in favor of a line management style of decision-making (Shattock 2014).

Figure 5. Staff composition at UK universities, 2003–2011



As Figure 5 shows, the share of academic staff in UK universities has grown marginally relative to the non-academic staff. Generally, a change in the share of the two academic categories has developed incrementally except for a larger change from 2005 to 2007. It is noteworthy that the already fairly large 'faculty' share has grown significantly and that the 'other academic staff' category has decreased from 2003 to 2011. The three administrative categories have all developed remarkably incrementally. The 'technical and manual staff' decreased at a faster pace than the 'clerks', while the 'degree-holding professionals' increased steadily at an even faster pace.

7.4.3. Germany: The laggard

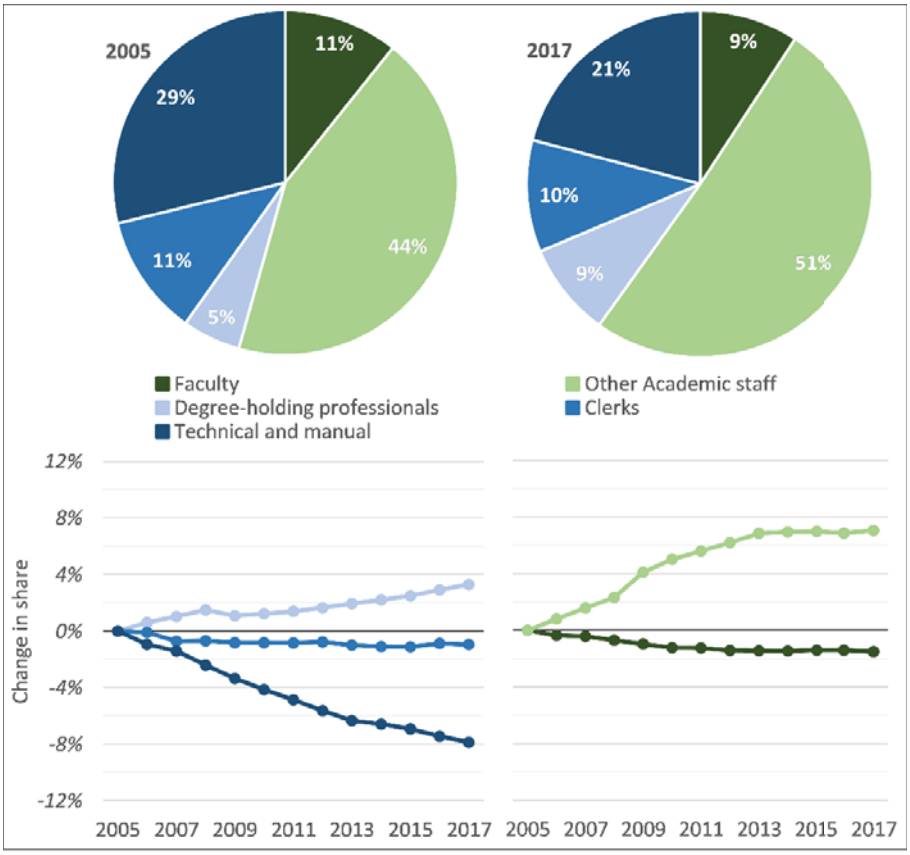
The German university system is rooted in the Humboldtian tradition. Humboldt founded the first German university in Berlin in 1810 on the principles: Freedom in teaching, learning, and research; unity of research and teaching; and *Bildung* (self-formation) as integral to education. The Lehrstuhl (chair) was a central pillar whose incumbent had a protected right to teach his/her discipline and had assistants to help. Clark described the German universities as a 'chair-based organization' of 'small monopolies in thousands of parts'

(1986, p. 140). The state was expected to safeguard academic autonomy by funding the universities and ensuring as little interference in academic affairs as possible. In return, the universities had to contribute to state and nation formation (Scott and Pasquolini 2016). Hence, the German system has historically been characterized by a strong academic oligarchy with close links to the state.

The German system is a federal one with the legal configuration on two levels: The state and the länders. The historical effect of this has been a considerable horizontal diversification but hardly any vertical differentiation (Kehm 2013). The actual enactment of the Humboldtian ideal has varied in the light of changing external demands, but the old ideal remains a core characteristic. The German system is often described as conservative and a 'latecomer' or 'laggard' when it comes to university reforms (Schimank 2005). In contrast to neighboring countries, German universities almost avoided significant changes to regulatory, funding, and management structures until well into the 1990s (Hüther and Krücken 2018).

However, several recent reforms have aimed to make fundamental changes to the German universities and devolved responsibilities from the state to the länders, which in turn delegated parts of it further down to the universities. Measures such as performance-based and third-party funding have increased to stimulate a higher degree of market-like competition between universities across länders. Furthermore, the positions and the offices of rectors and deans were strengthened, and university councils were introduced (Schimank 2005). Nonetheless, scholars continue to question whether the powerful and resilient position of German professors has actually been weakened in an overall picture or just complemented by additional processes (Hüther and Krücken 2018, p. 260).

Figure 6. Staff composition at German universities, 2005–2017



As Figure 6 shows, the share of academic staff in German universities has grown relative to the non-academic staff. At the beginning of the period from 2005 to 2013, the share of 'faculty' decreased, while the share of 'other academic staff' increased. At the end of the period from 2013 and onwards, the relative size of these two academic categories remained more or less stable. On the other side, the share of two non-academic categories changed steadily over the full period (2005–2017). Firstly, the category of 'technical and manual staff' accounts for the largest change as it has decreased by almost one-third in size, and secondly, the share of the 'degree-holding professionals' has increased steadily, especially at the end of the period. The last non-academic category of 'clerks' decreased slightly one year at the beginning of the period but has remained stable since.

7.4.4. The Nordic systems: The eager reformers

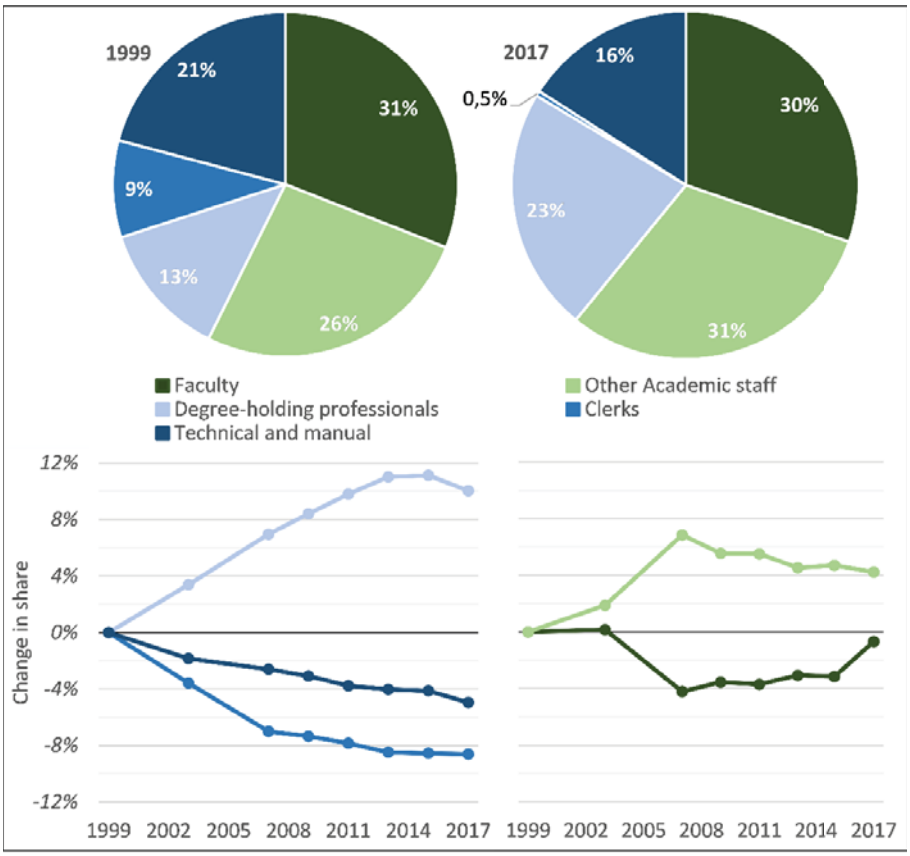
The Nordic university systems are rooted in a combination of the Humboldtian tradition and the egalitarian welfare state tradition. Extensive academic freedoms and stable funding were granted to the early Nordic universi-

ties in exchange for professional training for higher positions in the public sector. The universities were almost entirely publicly funded and controlled by the state as higher education policy was perceived to be an essential part of broader regional and social policies (Antikainen 2016; Pedersen 1982). Nonetheless, the Nordic university policy has traditionally been characterized by pragmatism, consensus, and a strong academic orientation (Aagaard and de Boer 2017), which is why the Danish and Norwegian systems have been characterized by collaboration between strong academic oligarchies and strong welfare states.

The Nordic systems are regulated unitarily by their respective states, resulting in a low degree of both horizontal and vertical differentiation. Both the Danish and the Norwegian university systems have been depicted as 'slow reformers' up until the turn of the millennium when far-reaching and successive reforms were introduced. This shift has led Bleiklie to describe Norway as an 'eager and rapid implementer of comprehensive reforms' (2009, p. 127) and Aagaard and de Boer to describe Denmark as 'one of the most reform intensive European countries' (2017, p. 143). Antikainen (2016, p. 239) writes, 'among the Nordic countries, Denmark has been the trailblazer'.

The year 2003 was a turning point for both university systems. In that particular year, the Danish and Norwegian governments each launched a long-planned, path-breaking university reform followed by several complementary reforms in the decade after. The reforms altered both external conditions and internal management structures, and in both countries, the universities faced increased organizational autonomy, stronger accountability measures, and large-scale mergers. A larger part of their budget became dependent on performance indicators and competition, and the changes significantly empowered the board and the executive function at the expense of the traditionally powerful collegiate bodies (Degn and Sørensen 2015; Hansen et al. 2019).

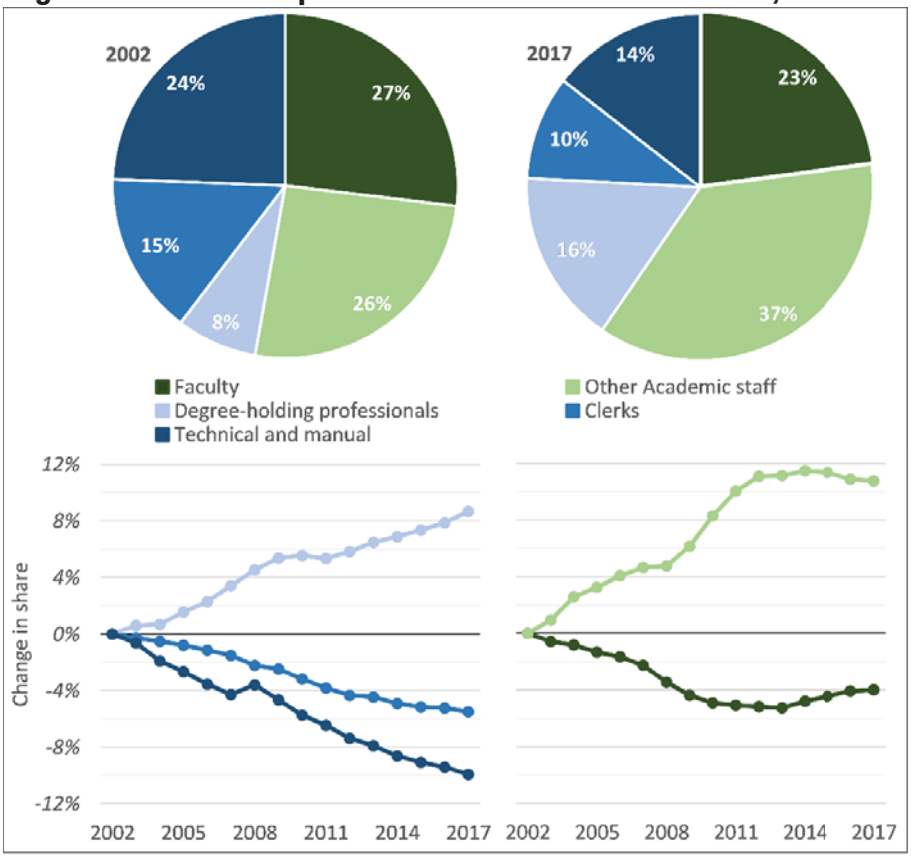
Figure 7. Staff composition at Norwegian universities, 1999–2017



Note**:** The number of 'technical and manual staff' in 1999, 2003, and 2007 has been estimated from the subsequent years, assuming the category has decreased gradually (as in the other countries).

As Figure 7 shows, the share of academic staff in Norwegian universities has grown relative to the non-academic staff. The academic side displays a non-linear development. The share of 'other academic staff' increases strongly until 2007, and then it decreases slowly over the following decade. The 'faculty' line displays a similar, but inverse and more moderate development with an extra rise in the last two years. In 2017, the share of 'faculty' is almost the same as in 1999. The category of 'clerks', which had a significant size in 1999, has almost disappeared in 2017, and the share of 'technical and manual staff' has steadily decreased. Contrary to this, the share of 'degree-holding professionals' has surged extensively and continuously until a breakpoint around 2013–2014.

Figure 8. Staff composition at Danish universities, 2002–2017



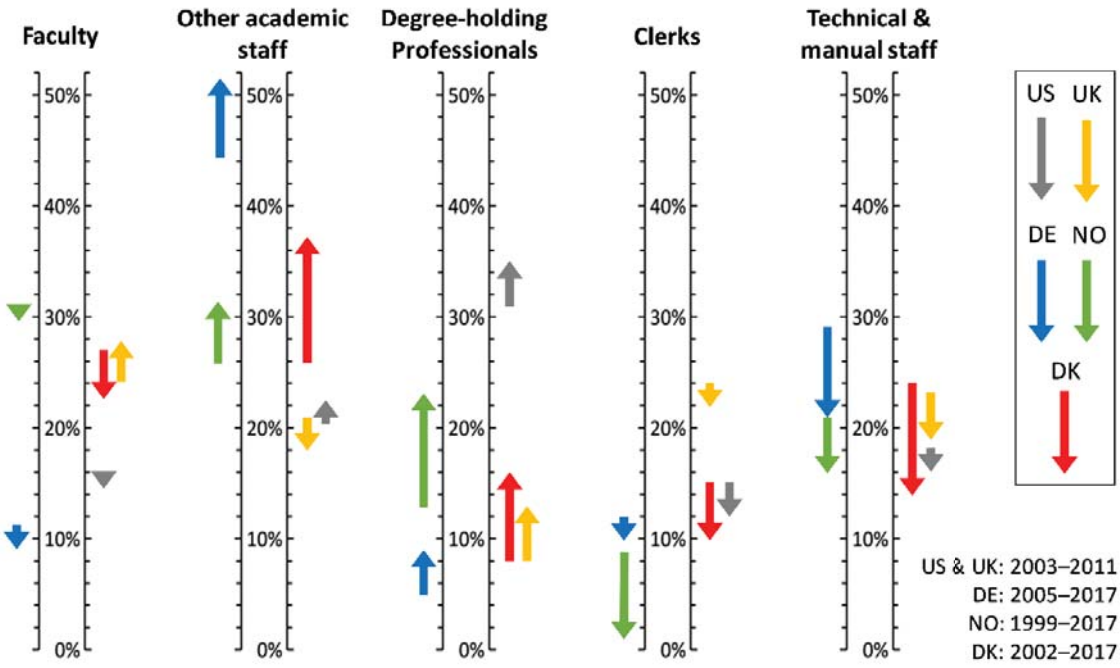
As Figure 8 shows, the share of academic staff in the Danish universities has grown relative to the non-academic staff. In particular, the share of 'other academic staff' grew extensively up until 2012, while its counterpart, the 'faculty' category, decreased in the same period. The development switched around 2012–2013, although not with the same intensity. Since then, the share of the 'other academic staff' has decreased, and the share of 'faculty' has grown slightly. On the other side, all three non-academic categories have changed incrementally year after year; the 'degree-holding professionals' have doubled their share of all employees, whereas the two other categories have decreased considerably from 2002 to 2017.

7.5. Cross-country analysis

Although the staff developments in each country are interesting in their own right, bringing them together side by side reveals some of the complex interplays between the national and global fields. The cross-country summary chart (Figure 9) shows simultaneously a pattern of variation and similarity between the different national systems over time. As described above, it is crucial to interpret the global pattern in light of national differences. However, as

this analysis shows, it is also crucial to interpret national patterns in light of global developments.

Figure 9. Cross-country summary of changes in the relative size of the staff categories over time



In Figure 9, it is noteworthy that all the arrows in each category point in the same direction, except two. Another overarching observation is that the share of academic staff has grown at the expense of non-academic staff. In other words, in none of the countries have the technical, administrative, and managerial side of the universities grown more than the academic side.

The absolute number of 'faculty' (i.e., the permanently employed academic staff) has increased significantly in the universities in all five countries, but the growth rates have not been high enough to break even in terms of sustaining their relative share. In essence, the cross-country upswing in academic staff relates to an intensified recruitment of 'other academic staff' rather than 'faculty'. The timing of the rise of 'other academic staff' is similar among the continental European countries (Figures 6–8), where the recruitment of these increased significantly in the years leading up to 2008 and after and lessened significantly again in the last years of the covered periods. Although with a shorter overlapping period, the US case also displays a slightly similar pattern but with a lower intensity of change.

While the relative change of the two academic categories has either stabilized or slightly reversed in the last decade of the covered period, the three

non-academic categories have continued to change with no signs of stabilization in terms of intensity and direction of change in any of the countries. Instead, they have kept changing almost linearly in all the countries throughout the period (with Norway as a slight exception). Although with different intensity between the countries, the general picture is that the category of 'degree-holding professionals' has strongly increased, and the 'clerks' and the 'technical and manual staff' in particular have decreased.

In order to understand the cross-country developments in Figure 9, it is necessary to delve into four developments that stand out: The UK academic categories, the German 'other academic staff', the US administrative categories, and the disjointed Nordic development.

7.5.1. The UK academic categories

Firstly, the development of the academic side in the UK stands out as an exception to the rule. The 'faculty' category has grown, and the 'other academic staff' has decreased from 2003 to 2011. Nonetheless, this contrast to the other countries should be interpreted with caution. Aspects related to the data collection in the UK, compared to the other countries, suggest that the contrast is less pronounced than at first glance.

As in most other countries, fixed-term academic contracts received much bad publicity in the UK during the 2000s. However, the UK government has been the only one to incorporate a formal incentive in the funding allocation to limit the use of fixed-term contracts. The RAE encouraged the universities to ensure that researchers with international publications were formally on open-ended contracts at the census dates for evaluation (Madden 2009). It is a well-known issue that the UK universities quickly learned to play the 'RAE game', adjusting arrangements to inflate their scores (Martin and Whitley 2010). Common 'tricks' involved opportunistic use of non-traditional contract types, which was possible due to a non-standardised academic job structure and a sidelined reporting category for so-called atypical staff (UCU 2016).

While the number of fixed-term contracts formally decreased, open-ended contracts diversified, and atypical staff surged at the same time. The open-ended contracts have increasingly become part-time and/or teaching-only, and the atypical staff is basically very fixed-term staff (e.g., hourly paid) that are not counted as such nor as ordinary staff (Bonaccorsi et al. 2007; Madden 2009; Whitchurch and Gordon 2017). This sidelined category covers, for example, 'a significant number of graduate teaching assistants on hourly-paid contracts' (Locke et al. 2016, p. 56).

For instance, some universities reported completely unrealistic shifts between contract types to the UK Higher Education Statistics Agency (HESA).

The academic contracts that were open-ended increased apparently from 35% to 98.5% in University College London and from 44% to 99.7% in the University of Aberdeen. These were two of the particularly extreme and obvious cases, which were excluded from this paper's analysis; however, the universities remaining in the analysis may have done similar in a more discrete fashion.

In contrast to the pressure facing the UK data collection, the US data collection was redesigned in 2002 by an IPEDS taskforce to explicitly capture the emergence of non-traditional and temporary academic jobs (Fuller 2011, p. 126). The opposite development of the academic categories in the US and the UK assumingly reflects these opposite pressures on the data collections of that time. In accordance, the academic profession literature also highlights directional similarity rather than opposite developments in the US and the UK (Fumasoli et al. 2015; Teichler et al. 2013).

An additional important factor, which partly may explain the smaller size of the 'other academic staff' category in the US and the UK compared to the two Nordic countries, relates to how the countries employ PhD students (Bonaccorsi et al. 2007; Fumasoli et al. 2015). In the two Nordic countries, PhD students are employed as full-time employees throughout their 3–4 years of enrolment, while in the other three countries, most PhD students are only employed on an ad-hoc basis as part-time assistants. This constitutes a significant technical difference as well as a substantial difference between the national systems. This paper only captures organizational members on the payroll, so the universally expanding category of PhD students (Cyranoski et al. 2011) affects the here considered staff compositions differently.

7.5.2. The German 'other academic staff' category

Secondly, the German 'other academic staff' category stands out as significantly larger than in the other countries. In contrast to the US and the UK, it has grown almost as much as in the Nordic countries despite PhD students only being on the payroll periodically (Destatis 2016). In explaining this, Krücken et al. (2013) point to national differences in whether PhD students are considered students or academics. This difference is reflected in the German and Nordic universities' larger tendency to employ and remunerate junior academics formally. In the US and the UK, junior academics are more often expected to contribute to tasks and projects either unpaid or casually paid as part of their 'education' (Teichler et al. 2013). Furthermore, Krücken et al. (2013) argue that the German category of 'other academic staff" includes a larger number of non-academic jobs in formal academic positions than in the other countries with longer traditions of university managerialism. In the

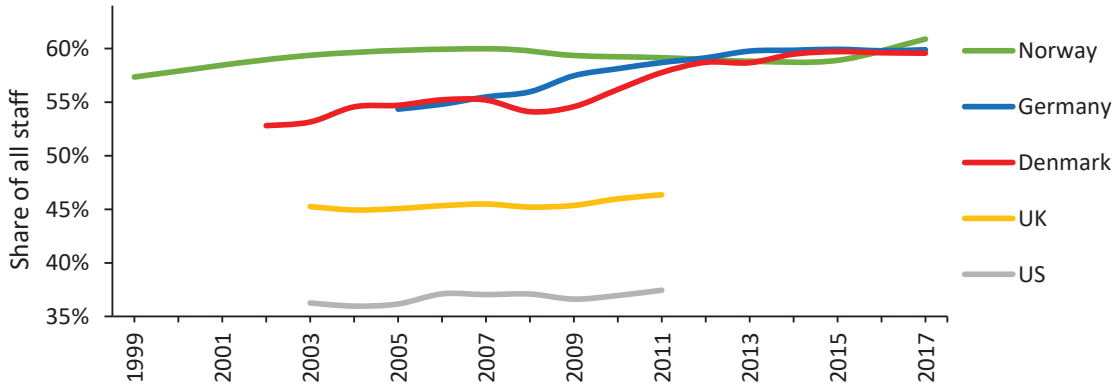
qualitative part of their study, they uncovered numerous people in academic positions, such as managers of departments, research clusters, or graduate schools, whose main bulk of work was clearly non-academic.

Despite these moderations, the German system still appears to be the one with the biggest share of temporary academics and the smallest share of permanent faculty. This is less surprising considering the German academic staff structure, which has no permanent mid-level position equivalent to associate professors in the other four countries. The crowd of academic positions below the professor rank are diverse, temporary, and 'at least formally assigned to a professor' (Hüther and Krücken 2018, p. 196). In order to qualify for a professor position, mid-level academics have either to write a second thesis (habilitation) or to secure a junior professorship (six years with evaluations about halfway and in the end).

7.5.3. The US administrative categories

Thirdly, the share of 'degree-holding professionals' in the US stands out as significantly more comprehensive than in the other countries. Its extraordinary size makes the administrative component of US universities much larger than in the continental European countries (with the UK as an in-between case; see Figure 10). This large transatlantic variation is a well-known issue. As Sporn wrote in 2003, 'administrative staff in the United States is often double the size of faculty, whereas in Europe the two are about equal in size' (Sporn 2003, p. 38). She attributes the variation to the different traditions of faculty involvement in managerial activities, pointing to a more established, independent, and elaborate role of administrative units in US universities (see also, Desrochers and Kirshstein 2014; Ginsberg 2011; Goldwater 2010).

Figure 10. Share of academic staff ('faculty' and 'other academic staff')



It is distinct for the US case that staff related to the 'degree-holding professionals' category have received much critical attention by US scholars over

several decades (for a review, see Leslie and Rhoades 1995). Snyder and Galambos (1988) drew attention to a disproportional growth of the so-called 'non-teaching professionals' already between 1966 and 1976. Ginsberg (2011) analyzed the following period from 1975 to 2005 in which he found that 'other professionals' had increased five times faster than 'faculty'. Hence, much bigger changes in staff composition have taken place in US universities in the decades leading up to, instead of during, the period covered here. Although less researched, this may also be the case for the UK universities due to the early NPM policies and funding reforms in the 1980s (Logue 2014; Scott 1995).

It should also be noticed that the criterion for being included in the category of 'degree-holding professionals' rather than in the one of 'clerks' is particularly inclusive in the US case. It was left to local data providers (i.e., HR-professionals and managers) to assess whether administrative employees met the minimum criterion of a bachelor's degree or the 'experience of such kind and amount as to provide a comparable background' (IPEDS 2002, p. 4). In comparison, the UK criterion was that the employees had formally reported at least a bachelor's degree as 'highest held qualification' to their employer. Similar rigid criteria are used in Germany (civil servant status groups) and Denmark (collective agreements). The Norwegian criterion is also inclusive; it is a selection of high-status job titles defined by a group of seasoned Norwegian researchers. The reliance on job titles alone makes the category cover people without a university degree in high-status positions.[5] In 2007, only 52% had with certainty a master's degree, while the remaining 48% had 'unspecified' qualifications (Gornitzka et al. 2009).

Because of these different criteria, the two largest shares of 'degree-holding professionals' (the US and Norway) are probably to some extent inflated in comparison to those in the other three countries. If more comparable criteria had been available, some of the US and Norwegian 'degree-holding professionals' would most likely count as 'clerks' instead. This would, however, not change the fact that the combined administrative component ('degree-holding professionals' plus 'clerks') in the US universities is virtually in a league of its own in terms of relative size. The UK in-between position represents an interesting case; its non-academic side is significantly larger than in the continental European countries, yet smaller and somewhat differently composed than

[5] Specifically, the lowest ranked 'consultant' job title (job code 1065) has over time changed from being a high-status position to being a standard administrative position. It has replaced several traditional secretary positions. The share of the lowest ranked consultants who actually hold a university degree is unknown (Gornitzka et al. 2009, p. 18).

in the US system (smaller share of 'degree-holding professionals' and larger share of 'clerks' and 'technical and manual staff'). This in-between composition may reflect the historically larger faculty involvement in managerial activities than in the US universities and larger organizational independence than in the continental universities.

7.5.4. The disjointed Nordic development

Fourthly, the disjointed developments in the two Nordic countries stand out. It contrasts the common assumption that the Nordic national systems develop side by side. Around the millennium, the two academic categories were, in fact, close to identical in relative sizes in Norway and Denmark. They changed with almost the same intensity until around 2008, where the Norwegian system slowly but steadily reversed the development, while the Danish system further intensified it with a comprehensive PhD reform over the next six years. It was only hereafter that the Danish universities slowly began to reverse the development. As a result, 'faculty' decreased and 'other academic staff' increased more than twice as much in Denmark than in Norway, resulting in significantly non-identical academic compositions in 2017.

On the non-academic side, the two Nordic systems had dissimilar compositions from the beginning of the period. Early studies indicate that Norwegian universities began restructuring the non-academic staff a decade earlier than the Danish universities. Although not directly comparable to recent data (Gornitzka et al. 2009, p. 28), the Norwegian researchers show that the 'degree-holding professionals' began to rise in the early 1990s, and 'clerks' began to drop in the late 1990s (Gornitzka and Larsen 2004). A comparable development did not occur in Denmark until the early and late 2000s. For instance, the Norwegian universities employed close to 10 times as many 'degree-holding professionals' than 'clerks' in 2007, whereas in Denmark, 'clerks' still outnumbered 'degree-holding professionals' by a margin of 800 FTEs in 2007. Furthermore, compared to Denmark, the initially fewer 'technical and manual staff' in Norway may corroborate the observation of an earlier non-academic restructuring. Generally, across the countries, this category tends to decrease parallel to increases in 'degree-holding professionals'.

It should, however, be noticed that the inclusive Norwegian criterion for 'degree-holding professionals' described above stands in contrast to the Danish criterion, which is the most restrictive among the five countries. By combing job titles and collective agreements, the Danish data rigidly isolate non-academic employees holding a master's degree. The Danish category can, therefore, be presumed to include significantly fewer people without a university degree in high-status positions than the Norwegian one. This technical

difference moderates the variation between the Norwegian and Danish non-academic developments, which at first glance appears surprisingly large. However, despite the moderation, the development still seems to have started earlier and to have advanced more in Norway than in Denmark. But, considering the fact that 'degree-holding professionals' hold as a minimum a master's degree in Denmark (compared to a bachelor's degree in the US, the UK, and Germany), both Nordic countries display particularly strong efforts to restructure and professionalize non-academic capacities.

7.6. Discussion and concluding remarks

The comparative analysis shows major differences as well as a directional similarity. The staff compositions have generally moved in the same direction in each country, but with different intensity and from different starting points. The directional similarity increases when considering the technical caveats – not least with regard to the UK exception. Still, significant variation stands out as a key characteristic of the comparative staff analysis.

For the five national university systems, the intensity of staff changes documented here correlates with the intensity of change in external conditions documented by other studies (Dobbins and Knill 2014; Paradeise et al. 2009; Shattock 2014). These studies highlight that external conditions have changed the most in state-coordinated systems, which is also where the universities' staff composition has changed the most.

When comparing the two traditionally market-coordinated systems, the staff composition also seems to have changed more in the UK, where the state has increased its authority, than in the US. It is a common assertion that the US universities have faced the current global conditions and embraced the corresponding structures earlier than their counterparts in Europe (e.g., Ramirez 2013). In line with the view that the US currently has 'the most stable' system (Shattock 2014, p. 19), the analysis generally shows smaller staff changes in the US than in Europe from 2003 to 2011, which were the most change-intensive years in Europe; especially on the academic side.

The claims that the Nordic countries have been particularly reform-intensive in the last two decades (Aagaard and de Boer 2017; Bleiklie 2009) also corresponds with particularly extensive staff changes, especially in Denmark. Compared to these two fellow state-centered systems in the north, the German system may rightly be described as a laggard in terms of restructuring the non-academic workforce (Hüther and Krücken 2018, p. 1). However, the German system has not been lagging behind in terms of restructuring its academic workforce where temporary positions have surged as much as in the Nordic countries.

7.6.1. Major differences

By comparing staff composition throughout more than a decade, the continuance of major differences between the university systems becomes visible in a tangible way (Figures 9–10). The intensity and direction of change are far from erasing major system differences, and the European universities are clearly not developing toward a full emulation of the US organizational model (as it is sometimes implied in the literature). The much larger non-academic component in the US universities, and partly also in the UK universities, likely reflects these countries' very long traditions of organizational independence, market-coordination, and weak states. Contrary to this, it is possible that the continental European universities have smaller non-academic components because several responsibilities have traditionally been handled elsewhere in these countries' large public sectors.

A defining characteristic of the largely self-reliant US universities is that they encompass large in-house capacities for a wide range of non-academic areas. They have, for instance, large local offices responsible for athletics, endowments, alumni relations, tuitions, scholarships, student societies, stakeholders, legal compliance, marketing, dormitories, childcare, insurances, healthcare, and general campus services (Desrochers and Kirshstein 2014; Ginsberg 2011; Ramirez 2010). Naturally, it is an essential task for US university management to tie all these areas together and integrate them with academic activities. In-house capacities for similar areas are not absent in continental European universities, but they exist on a completely different scale than in the US. Although devolution and autonomy have been high on the agenda, the staff composition of the European universities has not at all developed in ways that suggest a move toward a situation similar to the one in the US.

A European move toward emulation of the full US organizational model would have entailed profound relative increases in each of the three non-academic staff categories at the expense of the academic ones. On the contrary, the share of academics increased in each of the European countries as a result of a disproportional growth in the category of 'other academic staff'. The continental European tradition of employing junior academics contribute to the continuance of major differences between the traditional state- and market-coordinated systems. Although people not on the payroll matters (collaborators, students, apprentices, contractors, volunteers, and so forth), the composition of those remunerated as formal employees represents particularly weighty organizational responsibilities. The global move toward a more bottom-heavy and temporary academic workforce, therefore, impacts the continental universities differently than the US and the UK universities.

Hence, the general picture is far from a full global convergence. The major differences between the university systems indicate important national path dependencies well beyond the external conditions that may have converged. National particularities – such as the large-scale athletics and endowments in the US, the chair system in Germany, big tuition fees in the UK, and the Nordic welfare systems – seem to be crucial for understanding the organization of the universities in the respective countries. The major differences extend well beyond a varied implementation or translation of formally similar mechanisms. Clear structural and functional factors seem to be decisive for the variation between the university systems, and some of these factors may lie outside the policy domain of higher education, which tends to be the usual target for convergence studies (Dobbins and Knill 2014). Relevant factors to consider may, therefore, be varieties of public sectors or labor markets.

7.6.2. Directional similarity

Although the major cross-country differences seem fairly stable, significant parallel changes do occur in each of the national university systems. One should not take this for granted since more diverse developments were indeed a hypothetical possibility. For instance, it is conceivable to think of a scenario where a focus on academic productivity results in a relatively larger category of 'faculty' rather than 'degree-holding professionals'.

The results raise the question of how directional similarity relates to convergence (Heichel et al. 2005; Mayrhofer et al. 2011). In this case, the directional similarity may reflect an interplay between path dependency and world models: The universities respond to globally shared conditions in addition to enduring national peculiarities. The directional similarity indicates a level of cross-country agreement about which staff categories one needs to increase in order to respond to recent changes in external conditions. The outcome is thus not an organizational convergence per se, but that dissimilar universities have added a similar layer of certain types of human resources.

In line with the institutionalist arguments of layering (e.g., Aagaard 2017; Capano 2018) or even de-coupling (Bromley and Powell 2012), it is likely that converging changes in external conditions promote *adding* certain organizational capacities on top rather than deeply aligning all parts of the organization to a 'world model'. Researchers have argued that recent globally shared conditions compel an accentuated line management, a flexible academic workforce, and upgraded 'external-facing' capacities (Kehm 2015a; Rhoades 2017; Rhoades and Sporn 2002). The latter includes, for instance, professionalized offices for marketing, accountability, evaluation, stakeholder relations, lobbying, internationalization, technology transfer, grant-writing support,

and communication (Krücken et al. 2009). These capacities have presumably enabled the universities to be – or at least appear to be – more strategic, flexible, and accountable (de Boer, Enders and Leisyte 2007; Krücken and Meier 2006). It is, however, an open question how deeply such changes have been implemented and whether they actually alter core academic processes for the better or worse (Hüther and Krücken 2018, p. 260; Maassen and Stensaker 2019; Whitley 2008b).

The existing in-depth national case studies have previously linked the above described organizational developments to the rise of 'degree-holding professionals' and 'other academic staff' (Baltaru 2018; Gornitzka and Larsen 2004; Krücken et al. 2013; Rhoades and Sporn 2002; Stage and Aagaard 2019; Whitchurch 2013). The directional similar staff changes may corroborate the broad claim that the universities in different countries do face globally shared conditions compelling them to be more strategic, flexible, and accountable. Scholars have previously reached similar conclusions when comparing the existing national studies of staff composition (e.g., Baltaru 2018); however, this paper's comparative and longitudinal approach makes the interplay between national path dependencies and world models more visible than past single-country studies.

The major differences between the university systems may, on the one hand, be left out of sight if one only considers national variation to reflect different stages of a shared path of development: Away from predominantly collegial institutions toward more professionalized and hierarchically managed organizations. On the other hand, the major differences may as well conceal organizational changes as the outcome of merely national developments, although there is clearly a globally shared component involved in the national transformation processes.

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7.9. Appendices

The following two appendixes belong to chapter 7.

7.9.1. Appendix A: Period, data type, population, and categorization

7.9.1.1 Period

The US and the UK data end already in 2011 because a major definitional change was implemented to the Standard Occupational Classification (SOC), which both registers are modeled after. The definitional change entailed, for instance, a merge of non-academic professionals with academic professionals as one category of 'higher education professionals'. The period before this change is chosen over the later because it is longer and employs classifications that are more comparable to the other countries.

The US data begin in 2002/2003 because IPEDS expanded its collection of staff data that year. They implemented the so-called 'Employees by Assigned Position' (EAP) component to get a 'count of the number of employees that provide instruction regardless of their functional classification' (Fuller 2011, p. 126). Compared to past collections, the EAP also distinguishes staff by full- and part-time status, by function or occupational category, and by tenure status. The EAP thus provides a unique data window into the US staff composition between 2003 and the definitional change in 2011, which is particularly comparable to the other countries.

The UK data begin in 2003 because HESA also altered their collection of staff data that year; the German data begin in 2005 because the non-academic staff has since then been differentiated into civil servant status groups suitable for comparison; the Danish data begin in 2002 because staff data only exist for all universities from that year,[6] and finally the Norwegian data begin in 1999 because the researchers maintaining the database amended their categorization in that year.[7]

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[6] In 2007, a far-reaching merger process reduced the number of universities from twelve to eight and transferred twelve out of fifteen Government Research Institutes (GRIs) to the remaining eight universities (Aagaard et al. 2016). Contrary to a previous article using data since 1999 (Stage and Aagaard 2019), this paper includes the absorbed universities prior to the merge for which data are only available since 2002. The GRIs are not included until gaining university status during the mergers.

[7] Two types of positions (section manager and one of the lowest consultant positions) have been moved from the higher administrative category to the clerical category. Furthermore, the administrative staff in the university libraries have been excluded

7.9.1.2. Data type

All the datasets stem from official registers used for accountability and oversight. However, the registers differ in type; the US universities submit aggregated data at the organizational level, while the universities in the other countries submit disaggregated data at the individual level. The Danish and the US datasets draw on payrolls, and the UK one draws on contract portfolios. The German and Norwegian datasets are compilations of several registers compiled by Destatis and NIFU.

The datasets all record staff in full-time equivalents, but how these are calculated vary in level of detail. For instance, the Danish one calculates FTEs by paid hours, while the US one calculates by full-time and part-time only. Furthermore, it is unclear how honorarium paid staff are counted in general, and how hourly paid staff are counted in the less fine-grained datasets. In the UK dataset, the so-called 'atypical staff' (contracts of less than four consecutive weeks) are explicitly excluded (UCU 2016).

7.9.1.3. Population

The focus of the paper is on universities that combine education and research in conjunction with a doctorate-granting authority. This delimitation is somewhat built into the German, Norwegian, and Danish datasets as their higher education systems are organized binary: 'Universities' on the one side, and 'universities of applied science' on the other side. While this is not formally the case in the US and the UK, the same differentiation exists more or less informally (Shattock 2014). Thus, the US and the UK datasets were trimmed down to match the other datasets even though the dividing line is a contested issue. The paper assumes that the UK universities identified by the Leiden Ranking and the US universities identified by Carnegie Classification are fairly structurally equivalent to the universities in the binary systems.

In the US, 185 universities were identified as doctoral research universities by the Carnegie Classification and as consistent data-providers by the Delta Cost Project. According to Carnegie Classification (2010), doctoral research universities grant at least 20 research doctorates per year and have high research activity (measured by R&D expenditures and research staff). Delta Cost Project has constructed a matched set of universities that have consistently reported data to IPEDS from 1987 to 2015. The project identified and excluded universities that changed Carnegie Classification or had inconsistent data or

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from the sample. Gornitzka and colleagues stress that figures prior to 1999 cannot be directly compared to those after (Gornitzka et al. 2009, p. 18, 28).

extreme outliers during the period (see also, Jaquette and Parra 2014). Combining the Carnegie Classification and the Delta Cost Project is a strategy adopted from Hurlburt and McGarrah (2016).

In the UK, 43 universities were identified as research-intensive by the Leiden Ranking and as consistent data providers to HESA. The ranking includes universities that have produced at least 1,000 Web of Science indexed research articles or reviews (co-authored publications are counted fractionally) in the period 2013–2016.

Staff working at integrated university hospitals figure in the German dataset, which accounts for large numbers of medical, nursing, and clerical staff. In the other countries, hospitals figure as separate entities collaborating with universities. To match the datasets, the paper adopts the strategy of Blümel and colleagues (2010, p. 160) and excludes staff associated with hospitals by organizational unit IDs.

Appendix B contains a complete list of included universities in each of the five countries.

7.9.1.4. Categorization

The datasets all categorize staff by combining functional classifications and occupational categories in one way or another. The functional classifications constitute a division of labour at the aggregated level, which is then linked to certain occupational categories and positions at the individual level. Hence, every university employee on the payroll in all five countries has been categorized according to the formal attributes of their individual job position, such as job title, organizational allocation, union, or status group. However, the way in which the categorization has been carried out and which attributes that have been considered differ between the countries.

In Germany, the US, and the UK, the categorization of staff took place as part of the formal data submission process. The respective data-collecting agencies provided comprehensive manuals, FAQs, and exemplars to guide the local data groundwork. Each individual employee was assigned to functional classifications and occupational categories locally. Despite detailed guidelines, the process was not mechanical and included local interpretation. For instance, in the US case, the sentence following the specific rules for what counts as 'faculty' provides ample leeway: 'Faculty is those persons identified by the institution as such' (IPEDS 2002, p. 1).

In Denmark and Norway, the categorization of staff took place as part of two research projects. The projects inferred rules for categorizing staff and imposed them mechanically on the administrative data compiled from across

all national universities. The method ensured consistency but was insensible to variation in local practices.

In addition to the specifications described above in the method section, Tables 2–4 further specify the categorization of the three categories: 'Faculty', 'other academic staff', and 'degree-holding professionals'.

Table 2. Faculty

Country	Indicator	Content
US	Contract type	Tenured or tenure-track faculty positions
UK	Contract type	Staff on open-ended academic contracts
Germany	Job title	All professor positions
Norway	Job title	Professor, Associate Professor, Docent, Academic Leader, Amanuensis, and special professional teachers
Denmark	Job title	Professors, Associate Professors, and equivalent positions, such as Senior Researchers.

Table 3. Other academic staff

Country	Indicator	Content
US	Contract type	Academic staff in non-tenure (-track) positions whose primary responsibility is instruction, research, and/or public service
UK	Contract type	Staff on fixed-term academic contracts
Germany	Job title	Academic positions below the professor-rank, which are diverse, temporary, and 'at least formally assigned to a professor' (Hüther and Krücken 2018, 196)
Norway	Job title	Researchers, Postdocs, PhDs, and Research Assistants
Denmark	Job title	Assistant Professors, Postdocs, Researchers, PhDs, and Academic Assistants

Table 4. Degree-holding professionals

Country	Indicator	Minimum qualification
US	Reported in a category requiring a degree	Bachelor's degree or 'experience of such kind and amount as to provide a comparable background' (IPEDS 2002, p. 4)
UK	Highest held qualification	First-degree level/bachelor's degree
Germany	Civil servant status groups	Bachelor's degree
Norway	High-status job titles	In 2007, 52% had master's degrees; the rest had unspecified qualifications (Gornitzka et al. 2009)
Denmark	Collective agreements	Master's degree

7.9.2. Appendix B: Complete list of covered universities by country

Denmark (2017)	Norway (2017)
University of Copenhagen	University of Oslo
Aarhus University	University of Bergen
Aalborg University	University of Tromsø
The Technical University of Denmark	Norwegian University of Science and Technology
University of Southern Denmark	
Copenhagen Business School	
IT university of Copenhagen	
Roskilde University	

Germany (2016)	United Kingdom (2013–2016)
University of Kassel	University of Oxford
University of Duisburg-Essen	University of Cambridge
University of Paderborn	Imperial College London
University of Siegen	University of Manchester
University of Wuppertal	King's College London
Fernuniversität Hagen	University of Edinburgh
Charité – Universitätsmedizin Berlin	University of Southampton
Europa-University of Viadrina Frankfurt	University of Birmingham
Humboldt-Universität Berlin	University of Nottingham
University of Rostock	University of Sheffield
University of Greifswald	University of Liverpool
University of Halle	University of Leeds

University of Magdeburg	University of Warwick
University of Leipzig	Cardiff University
Technical University of Dresden	Newcastle University
Technical University of Chemnitz	Queen Mary University of London
Technical University of Bergakademie Freiberg	University of Exeter
University of Jena	Durham University
University of Bamberg	London School of Hygiene & Tropical Medicine
University of Bayreuth	Queen's University Belfast
University of Oldenburg	University of York
University of Osnabrück	University of Leicester
University of Passau	Lancaster University
Katholische Universität Eichstätt-Ingolstadt	University of St Andrews
Bauhaus-University of Weimar	University of Sussex
Technical University of Ilmenau	University of East Anglia
University of Erfurt	University of Strathclyde
HHL Leipzig Graduate School of Management	University of Bath
Technical University of Dresden	University of Reading
University of Leipzig	University of Surrey
Jacobs University Bremen	University of Loughborough
European School of Management and Technology Berlin	University of Dundee
Hertie School of Governance Berlin	Swansea University
Hafencity Universität Hamburg	London School of Economics and Political Science
Helmut-Schmidt-Universität Hamburg	Brunel University London
University of der Bundeswehr München	University of Plymouth
Deutsche Hochschule der Polizei Münster	University of Kent
Universitätsklinikum Schleswig-Holstein	Heriot-Watt University
University of Vechta	University of Hull
University of Hildesheim	City, University London
University of Lüneburg	Bangor University
University of Kiel	Cranfield University
University of Lübeck	University of Ulster
University of Hamburg	
University of Göttingen	*Universities within the Leiden ranking that are excluded as inconsistent HESA data providers:*
Technical University of Hamburg-Harburg	The University of Aberdeen
University of Bremen	The University of Glasgow
Bucerius Law School Hamburg	University College London
University of Bochum	The University of Bristol
University of Bonn	The Open University
University of Düsseldorf	

University of Köln
University of Münster
University of Dortmund
University of Bielefeld
Deutsche Sporthochschule Köln
University of Frankfurt
University of Gießen
University of Marburg
University of Trier
Technical University of Kaiserslautern
University of Mainz
H für Verwaltungswissenschaften Speyer
University of Freiburg
University of Heidelberg
University of Konstanz
University of Tübingen
University of Koblenz-Landau
University of Erlangen-Nürnberg
University of München
University of Würzburg
University of Regensburg
University of Augsburg
University of des Saarlandes Saarbrücken
Universitätsklinikum Gießen und Marburg
FU Berlin
Universitätsmedizin Mainz
Technical University of Braunschweig
Technical University of Clausthal
University of Hannover
Zeppelin University Friedrichshafen
DIU Dresden International University
TH Aachen
Universität Witten-Herdecke
International Psychoanalytic University Berlin
Technical University of Darmstadt
European Business School (EBS) Oestrich-Winkel
Karlsruher Institut für Technologie (KIT)
University of Stuttgart
Technical University of München
Technical University of Berlin

ESCP Europe Wirtschaftshochschule Berlin
H für Politik München
Medizinische H Hannover
Tierärztliche H Hannover
University of Hohenheim
University of Mannheim
University of Ulm
Priv. wiss. H Stuttgart, Seminar für Waldorfpädagogik
Psychologische Hochschule Berlin
Bard College Berlin, A Liberal Arts University
KLU Kühne Logistics University
H für jüdische Studien Heidelberg
Filmuniversität Babelsberg
EUF Europa-Universität Flensburg
University of Potsdam
Frankfurt School of Finance & Management
Steinbeis-H Berlin
PH Freiburg
PH Heidelberg
PH Karlsruhe
PH Schwäbisch Gmünd
Ludwigsburg PH
PH Weingarten
Augustana-H Neuendettelsau
H für Kirchenmusik der evangelischen Kirche von Westfalen, Herford
Freie Theologische H (FTH) Gießen
Evangelische Hochschule Tabor, Marburg
Theologische Fakultät Fulda
Philosophisch-Theologische H Frankfurt a.M.
Theologische Fakultät Paderborn
Theologische Fakultät Trier
Theologische H Vallendar
Philosophisch-Theologische H St. Augustin
Philosophisch-Theologische H Münster
H für Philosophie München
Kirchliche Hochschule Wuppertal/Bethel
Lutherisch-Theologische H Oberursel
Theologische H Friedensau

US (2011)	US continued
Arizona State University at the Tempe Campus	University of California-Davis
Auburn University Main Campus	University of California-Irvine
Ball State University	University of California-Los Angeles
Baylor University	University of California-Riverside
Boston College	University of California-San Diego
Boston University	University of California-Santa Barbara
Bowling Green State University-Main Campus	University of California-Santa Cruz
Brigham Young University	University of Central Florida
Brown University	University of Chicago
Carnegie Mellon University	University of Cincinnati-Main Campus
Case Western Reserve University	University of Colorado Denver
Catholic University of America	The University of Colorado at Boulder
Claremont Graduate University	University of Connecticut
Clarkson University	University of Dayton
Clemson University	University of Delaware
Cleveland State University	University of Denver
College of William and Mary	University of Florida
Colorado School of Mines	University of Georgia
Colorado State University	The University of Hawaii at Manoa
Columbia University in the City of New York	University of Houston
Cornell University	University of Idaho
Dartmouth College	The University of Illinois at Chicago
Drexel University	University of Iowa
Duke University	University of Kansas
Duquesne University	University of Kentucky
Emory University	The University of Louisiana at Lafayette
Florida Atlantic University	University of Louisville
Florida International University	University of Maine
Florida State University	University of Maryland-Baltimore County
Fordham University	University of Maryland-College Park
George Mason University	University of Massachusetts-Boston
George Washington University	University of Memphis
Georgetown University	University of Miami
Georgia Institute of Technology-Main Campus	University of Michigan-Ann Arbor
Georgia State University	University of Minnesota-Twin Cities
Harvard University	University of Mississippi Main Campus
Howard University	University of Missouri-Columbia
Idaho State University	University of Nebraska-Lincoln
Illinois Institute of Technology	University of Nevada-Las Vegas

Indiana University-Bloomington	University of Nevada-Reno
Indiana University-Purdue University-Indianapolis	University of New Hampshire-Main Campus
Iowa State University	University of New Mexico-Main Campus
Jackson State University	University of New Orleans
Johns Hopkins University	The University of North Carolina at Chapel Hill
Kansas State University	The University of North Carolina at Greensboro
Kent State University-Kent Campus	University of North Dakota
Lehigh University	University of North Texas
Louisiana State University and Agricultural & Mechanical College	University of Notre Dame
Louisiana Tech University	University of Oklahoma Norman Campus
Loyola University of Chicago	University of Oregon
Massachusetts Institute of Technology	University of Pennsylvania
Miami University-Oxford	University of Pittsburgh-Pittsburgh Campus
Michigan State University	University of Rhode Island
Michigan Technological University	University of Rochester
Mississippi State University	University of South Alabama
Montana State University	University of South Carolina-Columbia
New Jersey Institute of Technology	University of South Dakota
New York University	University of South Florida
North Carolina State University at Raleigh	University of Southern California
North Dakota State University-Main Campus	University of Southern Mississippi
Northeastern University	University of Toledo-Main Campus
Northern Arizona University	University of Utah
Northern Illinois University	University of Vermont
Northwestern University	University of Virginia-Main Campus
Nova Southeastern University	University of Washington-Seattle Campus
Ohio State University-Main Campus	University of Wisconsin-Madison
Ohio University-Main Campus	University of Wisconsin-Milwaukee
Oklahoma State University-Main Campus	University of Wyoming
Old Dominion University	Utah State University
Oregon State University	Vanderbilt University
Pennsylvania State University-Main Campus	Virginia Commonwealth University
Portland State University	Virginia Polytechnic Institute and State University
Princeton University	Wake Forest University
Rensselaer Polytechnic Institute	Washington State University
Rice University	Washington University in St Louis
SUNY at Albany	Wayne State University
SUNY at Binghamton	West Virginia University
	Western Michigan University

SUNY at Buffalo	Wichita State University
Saint Louis University-Main Campus	Wright State University-Main Campus
San Diego State University	Yale University
South Dakota State University	Yeshiva University
Southern Illinois University Carbondale	
Southern Methodist University	
Stanford University	
Stevens Institute of Technology	
Stony Brook University	
Syracuse University	
Temple University	
Texas A & M University	
Texas Tech University	
The University of Alabama	
The University of Montana	
The University of Tennessee	
The University of Texas at Austin	
Tufts University	
Tulane University of Louisiana	
University of Akron Main Campus	
The University of Alabama at Birmingham	
The University of Alabama in Huntsville	
University of Alaska Fairbanks	
University of Arizona	
University of Arkansas Main Campus	
University of California-Berkeley	