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Author

Schulze-Cleven, Tobias

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**LIBERALIZING THE ACADEMY:
The Transformation Of Higher Education In the United States And Germany***

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**Tobias Schulze-Cleven
School of Management & Labor Relations - Rutgers University**

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ABSTRACT

Over the past two decades, public higher education has become widely recognized for its contribution to socio-economic adjustment. This paper probes its evolution in two large and affluent democracies, the United States and Germany, whose higher education systems represent distinct ideal types. The analysis argues that public authorities in both countries have liberalized their systems to spur innovation in the provision of higher education. Yet a broad convergence in associated market expansion has coincided with divergence in its modes and consequences. Tracing how the two countries' policy regimes have created path-dependent trajectories of reform, the paper contends that the institutions associated with each state's inherited role in higher education – “enabling” in the US and “constitutive” in Germany – have empowered different social groups to shape state action. Under the influence of investors and managers, institutional drift and conversion have pushed public higher education toward corporatization in the United States. In contrast, interventions by faculty and students have moderated the effects of institutional displacement and layering on the German system's stratification. Given the sector's growing importance, this analysis carries important implications for the comparative study of capitalist evolution.

Keywords: Liberalization, Institutional Change, Governance, National Comparison, Convergence, Divergence

As higher education has moved to the core of national socio-economic adjustment strategies, it has undergone a far-reaching institutional transformation. Across much of the world, the sector has experienced rapid expansion and structural change, with countries seeking to meet “world-class standards.”¹ Even though public higher education comprises only a small part of welfare states' expenditures, governments and economists alike emphasize that reforming it will improve both social inclusion and economic growth.²

Political scientists have begun to probe aspects of these ongoing institutional changes. Yet, they have conducted little conceptually integrated, national-level comparative research on the sector's evolution.³ The associated conceptual and empirical gaps have hindered a better understanding of the character of these institutional changes. What have been the political dynamics of policy reorientation during the last two decades, from its drivers to its manifestations and consequences? Have higher education reforms delivered what they promised? This paper addresses these questions by analyzing the transformation of higher education at public research universities in the United States (US) and Germany, two countries whose tertiary education institutions epitomize contrasting ideal types. In line with the two countries' broader social welfare and economic arrangements, liberal higher education institutions in the pluralist United States have long emphasized market-led governance, while those in more corporatist Germany have supported non-market coordination by universities and professors.⁴

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This paper argues that the evolution of public higher education during the last two decades represents a convergent state-sanctioned process of market-expanding liberalization.⁵ In seeking to open up their systems and encourage higher education providers to behave as strategic organizational actors, public authorities in both countries have delegated decisions about financial allocations to markets, at the expense of both direct bureaucratic administration and professional self-governance. More specifically, state authorities expanded market rule by reducing unconditional appropriations per student to promote public universities' *self-reliance*, implementing market-sustaining competition policy to encourage *rivalry* among universities, and expanding universities' autonomy to enable *decentralized decision-making*.⁶

This reorientation of governments' higher education and research policy is a central part of a broader realignment in welfare state strategies. Structural shifts – including economic internationalization, tertiarization, population aging, and the individualization of the populace's value orientations – have called into question public authorities' inherited ways of seeking to simultaneously sustain economic growth and social equity. In response, policymakers across the political spectrum have embraced market-based approaches to pacifying the social conflicts endemic to democratic capitalism, including by expanding and differentiating the "uses" of higher education.⁷ Policymakers in the two countries have however made different choices about how to grow the higher education sector and the markets within it. As public authorities pursued new objectives, inherited higher education institutions uniquely focused public authorities' agendas and empowered different interest groups to shape policy, in turn prompting public authorities in the US and Germany to adopt distinct strategies. These differential approaches have sustained contrasting modes of institutional change and produced distinct patterns of inequality among faculty and students.

The paper demonstrates how American authorities allowed their already relatively liberal and significantly differentiated public higher education system to undergo a process of *corporatization*, prompting nominally public institutions to increasingly behave like large for-profit private companies. At the same time, German authorities broke with long-standing commitments to the equal status of the country's public universities by sponsoring the system's move toward *stratification*. In demonstrating how higher education's evolution on either side of the Atlantic represents different versions of market-expanding liberalization, the analysis helps differentiate context-specific elements from broader characteristics of liberalization. Moreover, it demonstrates public authorities' continuing power to shape this process and its associated outcomes. This research breaks new conceptual and empirical ground in the study of evolving higher education by providing answers to pressing questions about the nature and effects of the sector's transformation.

The analysis proceeds in four sections. The first section conceptualizes patterns of liberalization and their drivers. Two empirical sections substantiate the claims and lay out how public authorities' strategies have sustained distinct national trajectories of higher education reform over the past two decades. Finally, the conclusion draws together the paper's contributions to our understanding of contemporary capitalism and spells out policy implications.

Institutional Reform as Liberalization

Tertiary education has become high politics in both the United States and Germany, with President Obama calling on the US to re-attain the "highest proportion of college graduates" worldwide, and Chancellor Merkel declaring "intelligent brains" to be "Germany's most important resource."⁸ Institutional changes have flanked such announcements. As North America's and Continental Europe's largest higher education systems by many measures,⁹ these two countries are key battlegrounds for political struggles over diverging conceptions of the nature and purpose of higher education. At the core of these struggles is the question of whether higher education will remain a collectively provided public good or morph into a private service that can be individually procured by consumers. How these battles over potential commercialization are settled in the US and Germany will have important implications for the balance between citizens' social rights and market constraints around the globe.¹⁰ This marks the two countries not just as theoretically but empirically highly influential cases.¹¹

State-Sanctioned Liberalization in Higher Education

The liberalization of higher education is a cross-national phenomenon grounded in policymakers' desire to use higher education as a means to manage the tensions between democratic capitalism's two constitutive logics: rule by both market competition and democratic citizenship. During the past couple of decades, strategies for accommodating competing capitalist and democratic principles have revolved around notions of building a "new welfare state" that simultaneously facilitates individuals' self-improvement and actively supports economic competitiveness.¹² In line with a decidedly liberal approach to regulating social life and inspired by new growth theory in economics, education policy has become the linchpin of reorienting social policy to the supply side. Policymakers across countries have increasingly required and rewarded citizens' self-initiative. In particular, they have become convinced that quality education – at all levels – needs to be more widely available in order to increase relative equality of opportunity and social inclusion.

It is a vision for an approach to social policy that sustains the life chances of populations and companies alike. For individuals, it is a vision that exchanges social policy's traditional emphasis on "decommodifying" citizens for a focus on activating workers, i.e. sustaining their employability and supporting their social security within – rather than outside – the labor market.¹³ For companies, the combination of greater access to and sustained research excellence in higher education provides better access to human capital, facilitates technology transfer and underwrites more flexible deployment of labor – all deemed necessary to escape intensifying price-based international competition and cope with aging populations.

While the timing of this programmatic reorientation has varied across countries, the belief in the need for technological innovation and more academically trained personnel has spread across the developed world and beyond, with universities becoming widely viewed as "engines of innovation" and education praised as "the best anti-poverty program."¹⁴ Following this "education gospel," the European Union heavily emphasized higher education in its 2000-10 Lisbon Strategy, which sought to turn the region into the world's "most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion."¹⁵ In the United States, where tertiary education has traditionally played a more important role in supporting nation-building and social mobility than in Europe, governments have increasingly emphasized the promise of higher education as a means to social equity. Meanwhile, other social policies – including public financial assistance and workforce development programs – were increasingly delegitimized and defunded in the 1980s and 1990s.¹⁶

Policymakers thus moved away from conceptions of universities as merely *indirectly* contributing to social welfare by generating and dispersing knowledge, instead embracing them as *directly* facilitating simultaneous economic and social adaptation. This shift in focus translated into narrower, economic rationalizations of public investments in higher education, with growing emphasis on education's positive effects on individual earnings and economic growth over its nurturing of an intellectually engaged citizenry and sustaining a vibrant democracy. Within higher education institutions themselves, where the inherent tensions between the goals of access and excellence are felt most acutely, these discursive shifts have left lasting marks. In particular, new political demands prompted "structural accretion," i.e. the adding of new functions and units without shedding existing ones.¹⁷ Increasingly large universities have morphed into "multiversities" that combine mass vocational education with the pursuit of specialized theoretical research.¹⁸

Public authorities embraced liberalization as the answer to the governability challenges associated with higher education's expanded mission. Replicating the general reorientation toward market-based forms of public support, governments embraced arguments for liberalization by encouraging horizontal and vertical differentiation among universities. Policymakers hoped that liberalization would enable systems to better serve the needs and goals of increasingly diverse constituencies – from globally recognized researchers to socially disadvantaged part-time students.¹⁹ Arguments about potential cost-savings also mirrored those advanced in discussions about the broader reorganization of the welfare state. Greater market control in higher education was perceived to help relieve tensions between the incessantly rising cost base and political resistance to increasing public subsidies. While opinions diverge regarding the scope for efficiency-based savings and their likely impact on access, the sector's cost pressures have long been undisputed. As a service, higher education offers limited opportunities for productivity increases absent major reorganizations in work processes. Moreover, it is a service that is provided by highly educated workers, some of whom have enjoyed strong wage increases as skill-based income premiums in the broader labor market have risen.

Hoping to produce "entrepreneurial universities" with internally (re-)focused structures and processes,²⁰ public authorities have pursued liberalization through three distinct measures. First, they increased universities' self-reliance by refraining from adjusting the size of unconditional funds to keep pace with enrollment growth. Second, public authorities boosted rivalry among universities by expanding competition for public funds. This expansion took many forms, including building "quasi-markets" that do not match supply and demand through prices. While quasi-markets break with traditional command-and-control techniques of administration, the public money available for service delivery tends to remain politically set. The focus is on public agencies acting as purchasers of services and distributing public funds to different autonomously organized providers based on particular performance criteria. Ancillary processes, such as the creation and expansion of rankings, further spurred competition. Third, authorities enabled decentralized decision-making to improve service quality and rationalize human resource management. For instance, they expanded universities' autonomy to set tuition and to differentiate professorial pay. Particularly with respect to quasi-markets, these market-making steps translated into greater rulemaking activity by public authorities. Policymakers had to specify desired outputs, from degrees awarded to research conducted, and create procedures for assessing these outputs (including the impact of research on driving forward an academic field, helping society, or spawning businesses).²¹ Moreover, the power to set these rules has given policymakers significant leverage to steer competition toward delivering different combinations of cost reductions and quality improvements. The following table illustrates the parallel developments in both countries.

Table 1: Convergent processes of liberalization in the US and Germany

Goal	Action	Countries	
		United States	Germany
Self-Reliance	Cutting back unconditional funding	Cutting of state and local per-student appropriations for public institutions by roughly 25 percent in real terms between 1999 and 2011	Cutting of base financing per student of roughly 10 percent in real terms per student between 1999 and 2001
Rivalry	Promoting competition for public funds	Promotion of competition between public, private non-profit and for-profit universities; experiments with outcomes-linked financing	Shift in public financing toward competition-based allocation; e.g., Excellence Initiative and expansion of research funding provided by the German Research Foundation (DFG)
Decentralized Decision-Making	Increasing autonomy	Relinquishment of states' attempts to plan for the provision of tertiary education; shift to indirect means of controlling institutions' performance	Revision of state laws governing universities, increasing universities' freedom but retaining states' ability to directly shape their room of maneuver

Sources: SHEEO (2013, 21), Wissenschaftsrat (2013a).

Existing Political Science Research on the Contemporary Transformation of Higher Education

While political scientists have probed liberalization in other areas of the political economy, they have not systematically assessed it within higher education.²² Filling this gap is a pressing need. Higher education is not simply one of many areas in which market expansion under liberalization has replaced "collective political decision making" associated with "the postwar settlement of democratic capitalism."²³ Rather, policymakers have identified expanded access to higher education as a means to compensate for the inequality-increasing effects of liberalization in other realms of the economy, including decentralizing wage-setting and orienting corporate governance toward investor interests.²⁴ As such, democratic capitalism's evolving character rides in part on the distributional outcomes the emerging varieties of "academic capitalism" can deliver.²⁵

Contemporary scholarship offers only limited insight into this transformation. Recent analyses of comparative higher education tend to focus narrowly on one of universities' primary constituency groups, i.e. students or faculty, or have concentrated on one of universities' two functions, i.e. research or teaching. These treatments are thus unable to capture the deep interconnections between these groups and functions. At the same time, scholars from other disciplines, whose empirically focused analyses of particular national systems or cross-national trends tend to be more comprehensive, have generally failed to spell out clear dimensions of the politics and nature of institutional changes in higher education. Finally, political science research on the supranational Bologna Process – under which European countries committed to harmonize their national higher education systems in terms of degree structure and workload requirements – offers little leverage on analyzing changes across the Atlantic.²⁶

Arguably, political science scholarship has made most progress in theorizing the politics of student access. Since it provides both a useful point of departure and a contrasting foil for the following analysis, it needs to be discussed in more depth. Deductive theorizing identifies three types of national tertiary systems: two high-enrollment "mass" higher education models, one that is in part privately financed (as in England) and another that is almost entirely publicly supported (as in Sweden), and a publicly-financed but low-enrollment "elite" model (as in Germany).²⁷ Based on the idea that public authorities encounter trade-offs between the goals of increasing enrollment, retaining a high degree of public subsidization and moderating the overall public cost of higher education, each model is conceptualized as prioritizing two goals over a third. The analysis posits that each model results from political parties acting on voters' economic preferences. Across mass-model countries, lower-income citizens voting for the political left are assumed to seek greater public subsidization, and the right's wealthier supporters are assumed to prefer lower rates of public spending on education. In countries with low-enrollment models, however, voters and their respective parties are assumed to hold the reverse preferences, given the regressive nature of access and the lower likelihood of children from low-status families going to college.

While this model can account for recent aspects of the American case,²⁸ it cannot explain the divergent forms of liberalization cross-nationally. Liberalization involves changing institutional features that this analysis assumes are stable. Moreover, policymakers across the political spectrum have equally embraced liberalization. For instance, in the United States, Republican and Democratic administrations alike have promoted liberalization to promote access, affordability, quality and accountability.²⁹ Similarly, in Germany, policy specialists from across the political aisle have joined forces to lobby for increasing public funding of

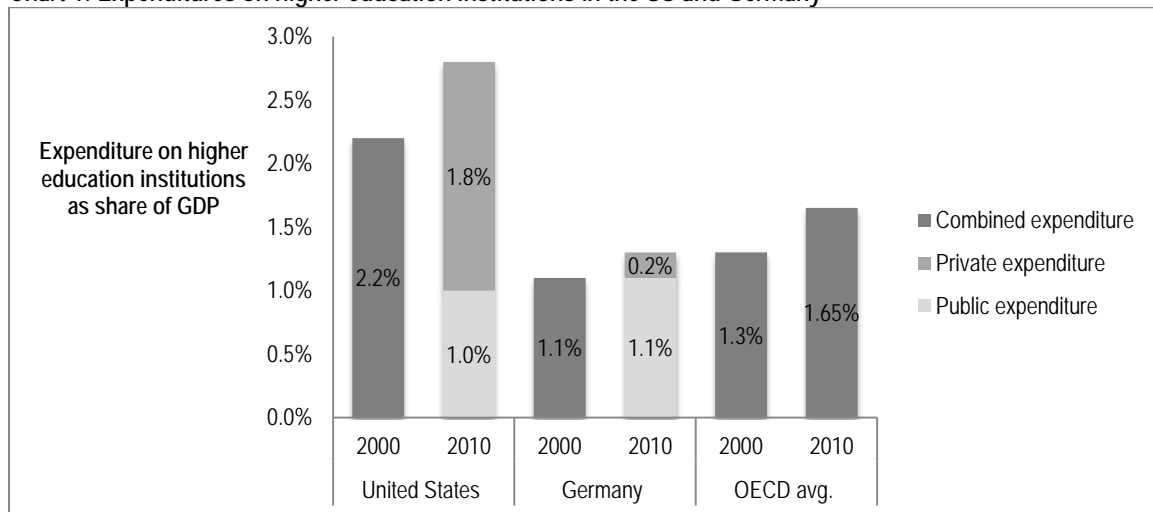
the sector. Moreover, the German left made the biggest push for increasing competition, which contravenes the model's assumption about the preferences of leftist parties in low-enrollment systems. Finally, the German right's support for tuition fees declined rather than increased as the system turned from restricted to mass access, which is the opposite of the deductive analysis' prediction.

The institutional features of inherited policy in Germany have shaped the ideas that both policymakers and the populace held about the issue of tuition fees, leaving them at odds with the preferences specified in the deductive model. Thus, rather than flowing from straightforward partisan preferences, *policy legacies* have fundamentally shaped countries' liberalization strategies in this sector.³⁰ As a first step toward demonstrating these relationships, the next section briefly reviews the historical development of each system.

The Development of State Authority in Higher Education in the United States and Germany

American and German higher education share important similarities, including their organization in federal structures and comparable levels of overall public funding (at about one percent of GDP). Yet, the two higher education systems differ in the share of private expenditures and provision – both much higher in the US than in Germany – and the legal conceptions of academic freedom, with *institutions* protected from interference by public authorities in the United States and *individuals* protected in Germany. Chart 1 provides an overview of the distribution and development of higher education funding since 2000.

Chart 1: Expenditures on higher education institutions in the US and Germany



Source: OECD (2013, 184 and 190); Wissenschaftsrat (2013a).

At the core of these differences lie the distinct historically rooted roles of public authorities in each system, particularly in how directive public authorities have been toward higher education institutions, and how they have conceptualized and financed public universities' missions. While American public authorities have long played a largely enabling role in higher education, German authorities have effectively constituted the system.

The US state grew into its role in higher education over time, gradually increasing its financial commitment and supporting the sector's transformation from a set of private religious colleges in the colonial Northeast into the largest and most diverse higher education system among the wealthy democracies. Today, almost three-quarters of tertiary students attend public universities and colleges, ranging from world-famous public research universities to teaching-focused community colleges. Highlights of national-level support for universities include the land grants of the Morrill Acts during the second half of the 19th century, various G.I. Bills underwriting early "massification" after World War II, the provision of student loans and the introduction of the Pell Grant program to cover tuition for students in financial need since the mid-1960s. Moreover, the federal government has strongly supported basic science research at universities through the direct sponsorship of university-administered laboratories and grant-making through various agencies. The core funding for public higher education has come from the fifty sub-national states, which have supported institutions' budgets with direct subsidies and provided students with financial assistance.

While this record of public support underlines the central place of higher education in the American welfare state, state authority has often remained diffuse and policymakers have exercised little direct control over how public funds were spent and how much tuition could be charged. Even political initiatives to systematize the public provision of higher education – such as the California Master Plan for Higher Education – usually deferred to individual universities.³¹ In line with a pattern of “public support for private responsibility,”³² the federal government has endorsed universities’ own peer-review accreditation process as the appropriate way to measure providers’ eligibility for federal student support since 1952. Thus, it has largely been competition rather than regulation that has ensured accountability and quality.³³ The federal government encouraged this pattern by providing individual students and scientists with financial support, i.e. only indirectly funding their public and private universities and colleges. Market forces have even been responsible for the tenure system’s maturation. Drawing on practices at a few institutions in the early 20th century, the American Association of University Professors (AAUP) codified core principles of academic freedom in 1915. However, the tenure system was only broadly implemented after World War II as a reaction to acute shortages of academic labor.

In contrast, until the early 2000s German universities were constituent parts of each sub-national state’s bureaucracy (*nachgeordnete Behörde*), charged with implementing a clearly defined public policy. This left universities with roughly equal status (to each other), but without independent agency. German universities were not allowed to autonomously decide on faculty employment or charge tuition fees. Students, on the other hand, had a legal right to university education (*Hochschulzugangsberechtigung*) after obtaining the highest secondary school qualification (*Abitur*), and also had the freedom to choose their own course of study (*Lernfreiheit*). Moreover, once professors were appointed with the status of a civil servant, they had free reign in academic matters (*Lehrfreiheit*). Constituting a rather small class of employees, professors held resource-endowed teaching chairs (*Lehrstühle*) that allowed them to autonomously pursue the goal of research-based teaching – an ideal formulated in the early 19th century by Prussian education reformer Wilhelm von Humboldt. After World War II, the freedoms of science, research and teaching became explicit, constitutionally protected civil rights – institutionalizing the pre-industrial corporate (i.e. corporatist) privileges of status groups in the system. Consequently, professors experienced few constraints from university administrations in the postwar period.³⁴ In addition, professors possessed substantial power vis-à-vis junior researchers and doctoral students, who – as full- or part-time agents within a professor’s teaching chair – have typically been dependent on the largesse of a single principal.

As in the US, direct financing for universities has come from the sub-national states (*Länder*), which enjoy constitutionally protected authority on cultural and educational affairs. However, since 1957, the Science Council (*Wissenschaftsrat*) includes representatives from federal and *Länder* authorities, as well as from the academy to advise on policymaking; moreover, from the 1960s onward, the federal government has provided infrastructural development support. Since the mid-1970s, coordination between the *Länder* and the federal government, as well as among the *Länder*, has been further buttressed by federal framework legislation (*Hochschulrahmengesetz*). The federal government provides two-thirds of financial support for students in need – as laid out in its education support legislation (*Bundesausbildungs-förderungsgesetz*, BAföG) – and funds 58 percent of the German Research Foundation (*Deutsche Forschungsgemeinschaft*, DFG), which finances research at universities through a variety of competitive grant programs.³⁵ Finally, while the higher education system significantly expanded during the 1970s, including through the creation of teaching-oriented Universities of Applied Sciences (*Fachhochschulen*),³⁶ Germany long retained an elite model, serving only a small (albeit growing) section of each birth cohort. Table 2 sums up key differences in the systems’ postwar characteristics.

Table 2: Structural characteristics of the higher education systems during the 1990s

Institutional Features	United States	Germany
Level of enrollment	High (mass model)	Low (elite model)
Share of private financing	Substantial (partially private model)	Low (public model)
Nature of governance	Liberal (market-centered)	Non-liberal (state/profession-centered)

Policy Shapes Politics

This paper argues that the inherited patterns of public intervention in higher education have not merely superficially influenced but fundamentally shaped the strategies that German and American public authorities adopted in liberalizing their respective public higher education systems.³⁷ By virtue of being multi-dimensional social contexts, policy environments exert their influence on the politics of reform in many and often crosscutting ways. Their effects involve different causal mechanisms, which can shape outcomes simultaneously and sequentially. Disentangling the relative importance of contexts' distinct dimensions and getting a precise reading on the patterns of multiple or conjunctural causation require close examination at specific points in time. That is, however, beyond the scope of this paper, which emphasizes conceptualizing liberalization in the sector and demonstrating variation in national outcomes over time.

Yet, even with the paper's focus on temporal processes, it is possible to put forward some general observations about the relative importance of different causal mechanisms. To do so, one needs to abstract from the complexity of inherited policy contexts, which the paper does by conceptualizing the state's inherited role as *enabling* in the US and *constitutive* in Germany. Second, rather than enumerating and later tracking a seemingly limitless set of potential causal mechanisms,³⁸ this section briefly considers four channels through which institutions can create path dependence: providing functional benefits, distributing power, entrenching ideas and shaping interests.³⁹ As should be readily apparent, given the breath of macro-level phenomena, all four basic channels of institutional effect have likely influenced outcomes at some point in time. The crucial questions are thus how much have they mattered relative to each other, and how they have interacted.

Four waves of macro-social inquiry into countries' political economies have examined different combinations of these basic institutional effects. This section treats them as alternative approaches for explaining the trajectories of liberalization in higher education. In a first approach, state-centric analysis in the 1980s and 1990s focused on how institutional endowments provided public authorities with different "capacities" to transform society, with higher levels of autonomy from society and embeddedness in it leaving authorities able to exert more power.⁴⁰ In the early 2000s, analyses of the "varieties of capitalism" (VoC) built instead on findings from institutional economics. Analysts employing this second approach turned to theorizing the differential functional benefits that national institutional configurations afforded companies, hypothesizing that profit-seeking firms will attempt to maintain the sources of comparative institutional advantage.⁴¹ Contemporary scholarship on the dynamics of institutional change combines the first wave's concern with power and the second wave's focus on functional benefits to develop a "power-distributional" approach. It views national institutions as leaving social groups with different interests, which – as dominant social coalitions – end up shaping the character of evolving national trajectories.⁴² Given the sophistication with which this third analytic perspective has been developed, it also succeeds in considering the role of ideas in providing actors with particular interests. This, finally, is an aspect that has also been highlighted in studies of American public policy. Scholars following this fourth institutionalist approach have viewed two effects of institutions pitted against each other: their influence on stabilizing political agendas through providing hegemonic ideas and their differential empowerment of interest groups that seek to disrupt agendas.⁴³

This paper argues that the record of policymaking reviewed in the next two sections is most compatible with the approach sketched out last. The patterns of public intervention have strongly affected the status and power of interest groups.⁴⁴ Endowed with distinct institutionalized power resources, the group in turn enjoyed a differential ability to influence the direction of public initiatives. In Germany, the professoriate and students could count on legal rights in defending their interests, and were recognized by statute as legitimate participants in university governance (*Gruppenuniversität*). In contrast, academics' professional power was never institutionalized in the US, with legal interpretations of academic freedom emphasizing the rights of universities' management over employees (faculty) and customers (students).⁴⁵ While German institutions thus empowered stakeholders within the system, those in the US gave more room and incentives for outside societal interests – from alumni to high-wealth benefactors and venture capital investors – to enlist management in driving "innovations" inside organizations and across the sector at large. Even though this analytic perspectives identifies different groups with partially aligned interests, it would be too far-fetched to conceptualize them as coalitions. Moreover, while the groups crucially shape how liberalization evolves in each institutional context, they are not the ultimate source of governments' turn to liberalization.

In assessing the relative leverage provided by the alternative explanatory perspectives, it is imperative to recognize that each country's policy heritage not only provided unique starting points but also particular constraints and opportunities, which both required and made possible different strategic moves for public authorities.⁴⁶ For instance, in making substantial progress on liberalization, it would have been enough for US authorities to refrain from updating support for higher education to fit the changing environment. American authorities could have kept expenditures nominally steady, i.e. failing to increase them in line with growth in both attendance and inflation. In contrast, German authorities had to actively take steps to launch liberalization, including changing the rules that prevented universities from exercising agency. In turn, as the case studies will demonstrate,

policy legacies provided public authorities with different degrees of leverage in shaping the evolution of the sector, both by virtue of the share of the financial flows they controlled in the system and the scope of rule-making in which they traditionally engaged.

Given their constitutive role in the system, German public authorities had effective control over many system parameters. This position allowed them to directly change many of the institutional structures by strategically adjusting the rules under which public funds are allocated, a process that left with substantial control in defining the parameters that would guide universities' strategizing. The task for US state authorities was a different one. With fewer – mostly enabling – regulations in place and not even half of the system's funds coming from public sources, further liberalization required less direct action on the part of public authorities. Moreover, exercising control over the direction of liberalization and maintaining the system's public purpose would have required the state to actively assert and likely expand its role in the sector.

Yet, as the case studies reveals, levels of overall state capacity have not greatly diverged between the United States and Germany. In both countries, interest groups have successfully challenged policymakers' attempts to set goals independent from powerful social interests and to roll out autonomously delineated policies. With a common federal organizations and legalistic traditions of governance providing a plethora of veto points, both countries' public authorities have been vulnerable to pressure group influence, both prior to policy adoption or during implementation. Neither does the empirical record reveal policymakers as primarily driven by a desire to build on a particular comparative institutional advantage, as the VoC perspective would suggest.⁴⁷ Nor were the discourses legitimating reforms anchored in different moral commitments. While American policymakers have long seen higher education as playing an important role in underwriting broad social mobility, reforms made during the last two decades have done little to maintain or strengthen this perceived strength.⁴⁸ Moreover, German policymakers often invoked the importance of maintaining high academic standards across all universities, a widely perceived asset of the country's system. Yet, in the spring of 2004, the federal government's original plans to spur competition in the sector via the so-called "Brain Up" initiative explicitly pursued the goal of directing additional financial support to only a few selected institutions. This is not to say that the first three institutionalist perspectives do not yield important insights into how national trajectories developed, quite the contrary. If properly applied in contextualized comparisons, they can be highly fruitful. However, when it comes to providing leverage for tracing the roots of divergence, it is more productive to focus on how inherited policy structured the power that different social interests – both clients and providers, individually as well as representative organizations – could bring to bear in politics.

Divergent institutional power resources have translated into contrasting modes of institutional change with unique outcomes. Institutional change in American public higher education has advanced through institutional *drift* and *conversion*. Drift – the phenomenon of policy change by non-action – was the result of public funding and regulation failing to keep up with increasing needs. Not only did state funding fall behind rising student numbers, policymakers also failed to expand competition (or anti-trust) policy that could ensure that competition serves broader social goals. Conversion – the re-interpretation of existing institutions – is a bottom-up mode of change, in which universities adopted new strategies to meet their educational missions.⁴⁹ Pressure from outside the higher education system as well as from universities' management has strongly conditioned the government's inaction (drift) and universities' conversion of existing rules. Investors and managers have functioned as a lobby against public market-correcting regulation, which could have included tying the receipt of federal support to institutions' guaranteeing higher employment standards for faculty and staff, co-determination practices involving faculty and students, demanding curricula, or earmarking of student tuition. Moreover, the entrance of for-profit providers into higher education has increased pressure on managers of non-profit and public organizations to adopt the practices of larger, bureaucratized, for-profit corporations. As a result, the liberalization of the sector in the US can best be described as *corporatization*. On both the macro- and micro-levels, practices in the sector increasingly resemble those in a market for consumer products, with public providers abandoning professional norms and embracing the private sector's steering mechanisms, goals and practices. For instance, large public research universities function evermore like multi-divisional firms, governed by strategy-setting managers that use financial indicators to control units in line with practices of Responsibility Centered Management (RCM).

In Germany, by contrast, institutional change has predominantly proceeded by institutional *displacement* and *layering*, with public authorities introducing new regulations to supplant or flank existing rules.⁵⁰ As policymakers sought to project public authority into the sector in pursuit of achieving "world-class standards," some of their plans ran up against the opposition of insider stakeholders, who successfully channeled reforms into a more socially inclusive direction. The German trajectory of liberalization is best characterized as a process of stratification that broke with the norm of equal status among universities to officially recognize a group of universities as leading institutions of "excellence." Rather than operating in price-based markets like their US equivalents, German universities have had to prove themselves in quasi-markets, where most funds continue to come from the state. Moreover, while managerial prerogatives have increased within university organizations, they remain checked by legally enshrined professional rights. Table 3 compares the two countries' liberalization pathways.

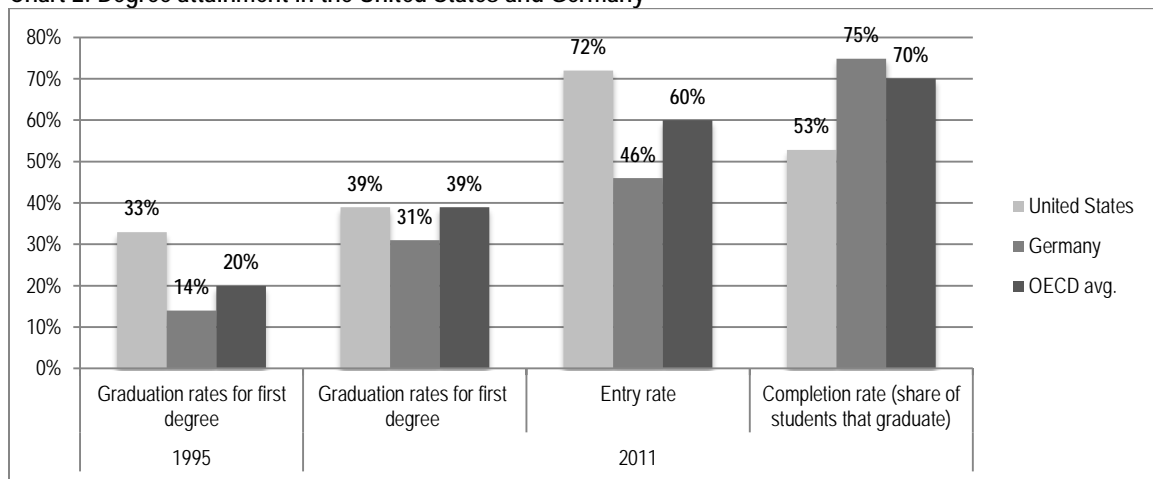
Table 3: The two liberalization pathways compared

Country	Characteristics	1990s	2010s	Character of Transformation
United States	Distinction between universities in system	Universities with different publicly sponsored missions	Market-generated patterns of differentiation	Corporatization
	Nature of governance at organizational level	Self-governed hybrid (professional & managerial)	Managerial	
Germany	Distinction between universities in system	Universities of equal status	State-sanctioned status distinctions	Stratification
	Nature of governance at organizational level	Professional	State-sanctioned hybrid (professional & managerial)	

The paper's next two sections discuss these two trajectories in greater detail, elaborating how state authorities in each country have liberalized their higher education systems in order to improve the systems' perceived competitiveness and manage the conflicting pressures associated with simultaneously pursuing research excellence and student access. Liberalization coincided with increases in access and attainment rates in both countries. In Germany, the number of students has risen 30 percent over the past two decades, with 31 percent of German birth cohorts having graduated from tertiary institutions' programs with a minimum length of three years in 2011. This more than doubled the 14 percent in 1995. Thus, German graduation rates are now far closer to rates in the US, where they grew from 33 to 39 percent during the same time period.

However, other countries increased their rates to even higher levels. While the United States has sought to maintain its lead in BA-attainment rates, which it retains among the 45-54-year age group, the proportion of the US population between 25 and 34 years of age with tertiary degrees and credentials has fallen to 12th place among countries of the Organisation for Economic Co-operation and Development (OECD).⁵¹ Moreover, American graduation rates have been highly unequally distributed across the population, with the rates among the United States' growing low-income and ethnic minority groups lagging substantially behind average attainment, particularly compared to white students and students from high-income backgrounds. Chart 2 provides an overview of trends in degree attainment rates.

Chart 2: Degree attainment in the United States and Germany

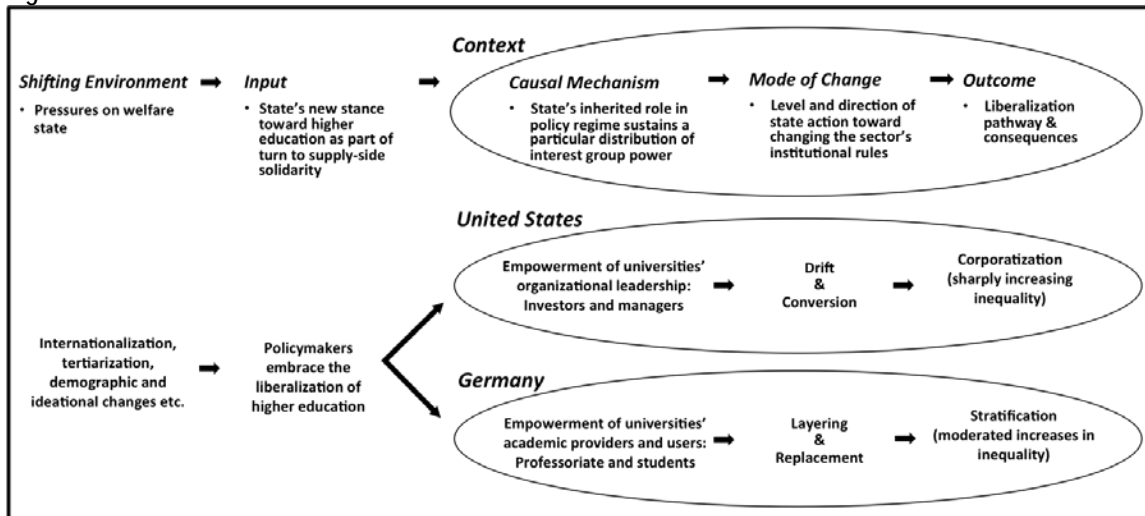


Source: OECD (2013, 56-68); Wissenschaftsrat (2013a). Note: The chart displays data for degrees of tertiary type A (ISCED 5A), i.e. programs that are "largely theory-based." Tertiary type B (ISCED 5B) programs tend to be shorter and are oriented toward practical, technical or occupational skill-building. Between 1995 and 2011, attainment in type-B programs moved from 9% to 12% in the United States and from 13% to 14% in Germany.

As both case studies show, the processes of differentiation under liberalization have come with strong tendencies toward higher inequality, including highly differential remuneration for faculty (in line with alleged market demands) and diverging attainment

among students of equal ability. Given that these inequalities often have little to do with individual performance, they sit rather uneasily with the emphasis on equality of opportunity in political discourses. Figure 1 reviews the paper's causal argument.

Figure 1: Overview of causal model



Note: This figure builds on Falletti and Lynch (2009, 1151).

United States: Corporatization through Institutional Drift and Conversion

The American trajectory of corporatization is based on three trends: a comparatively large decline in unconditional per-student public funding, for-profit providers' success in getting public authorities to support their broad market entry, and public institutions' adoption of for-profit providers' practices. The state's relative inaction and few power resources for faculty and students allowed for institutional drift and conversion.

Self-Reliance: Public Spending Falls Behind Increasing Enrollment

Outpacing recent population growth, college attendance has increased from 7.1 million full-time equivalent (FTE) students in 1987 to 11.5 million in 2012. However, sub-national states' spending on higher education has failed to keep up in the face of increased demands in other areas, including healthcare for the poor (Medicaid), K-12 education and prisons. By 2012, the level of state and local governments' support for higher education had fallen to the lowest inflation-adjusted point in the last quarter-century, \$5,906 per FTE, which is less than 70 percent of what it was in 2001.⁵² While the level of state support has long fluctuated with the business cycle, historically it tended to return to pre-recession levels when the economy recovered. This changed after 2001, when funding failed to rebound after that year's recession, and levels of support fell further during the Great Recession.

Seeking to make up for states' failure to increase overall levels of public funding to match increased participation, public higher education institutions raised tuition, particularly during recessions when students could least afford it. For instance, between 2009 and 2011, average tuition across public higher education institutions increased by a real 5 percent per year, and further rose by a real rate of 8.3 percent in 2012.⁵³ Net tuition as a percent of public higher education's total educational revenues increased from 23.3 percent in 1987 to 47 percent in 2012.⁵⁴ Public research universities have experienced larger than average cuts in public subsidies. With higher costs than institutions that award masters, bachelors (four-year undergraduate) or associate (two-year undergraduate) degrees only, public research universities have traditionally received higher public subsidies.⁵⁵ In turn, as public funding for research universities dipped below \$8,000 per FTE student in 2009, public research universities increased net tuition more strongly than other institutions. For both public research and master's institutions, net tuition revenues now surpass state and local appropriations.⁵⁶ Nevertheless, tuition increases have not always been enough to compensate for reductions in direct appropriations.⁵⁷

Escalating tuition has meant that the federal government's maximum Pell Grant for low-income students covers an increasingly smaller share of tuition, down to less than a third of average tuition at public four-year institutions in 2013-14, and even less at research universities.⁵⁸ However, Washington did nothing to check institutions' tuition growth. Nor could students or faculty force

policymakers' hands through legally sanctioned collective action or by taking public authorities to court over the failure to honor individual civil rights. Sticking to a neoliberal approach to regulation, federal policymakers instead sought to secure accountability through sustaining competition and sharpening consumer incentives. Toward that end, the federal government ended up supporting the trend toward greater student borrowing by reorienting programs from grants to loans. Moreover, it focused financial relief on the introduction of tax credits, from the Lifelong Learning and HOPE Education Tax Credits during the 1990s to higher tax credits for attending four-year colleges under the Obama administration. Notably, these credits only benefit those families and students who pay taxes, and they are also available to families who send their children to private institutions. The biggest change from past practice was the Obama administration's elimination of the middleman in the student loan system, which freed up funds to raise Pell Grants. While the federal government was also able to expand loan forgiveness and alternative repayment programs, it failed to turn Pell Grants into an inflation-indexed entitlement or to launch Obama's proposed Graduation Initiative for community colleges.

Rivalry: Competition with For-Profit Institutions

At the same time, policymakers sponsored public universities' competition with for-profit institutions. With the federal government making available over \$30bn per year in student aid for the for-profit education sector, public programs funded about 86 percent of the revenues of the fifteen publicly traded for-profit institutions in 2009. An inquiry in the US Senate calculated an average profit margin of 19.7 percent on these institutions' total revenue, with 22.7 percent spent on marketing and recruiting alone.⁵⁹ Public money has thus supported growth in the share of the country's undergraduates enrolled at for-profit institutions from 2 percent in 1990 to 11.8 percent in 2009, even though most for-profit institutions charge higher tuition than comparable programs at community colleges or public universities.⁶⁰ In 2010, three-fourths of students at for-profit institutions were enrolled in businesses that were either owned by private equity companies or publicly traded.⁶¹ The sector's flagship institution, the Apollo Group's University of Phoenix, became the country's largest institution of higher education (with over 300,000 students) and the largest recipient of Pell Grant funds. Remarkably, the University of Phoenix and six other for-profit institutions were among the top ten recipients of Pell Grants in 2010-11.⁶² Moreover, while for-profit institutions receive a highly disproportionate 26 percent of all federal student aid, they graduate fewer students than national averages and are responsible for 44 percent of student loan defaults.⁶³

With strong influence in Washington between both political parties, corporate higher education interests were able to weaken the government's timid attempts to regulate the for-profit sector. Thus, when the Higher Education Act was reauthorized in 1998, federal authorities began backtracking on the light-touch regulatory regime put into place in 1992. Relaxing its already largely toothless regulation of higher education institutions' eligibility for federal student aid, legislators increased the ceiling of federal funds to 90 percent of revenue (from 85 percent), with the remaining 10 percent required to come from other sources. This "90-10 rule" was based on the assumption that students would only be willing to invest their own funds into a quality program. However, the schools could easily circumvent this control mechanism by offering small tuition scholarships, providing direct loans, or tapping into military and veterans' benefits, all of which counted toward the student's share. Not surprisingly, for-profit institutions have particularly targeted veterans, often engaging in high-pressure sales tactics and lying about various aspects of educational programs to induce them and other vulnerable populations to enroll and misrepresent personal assets on application forms for government support.⁶⁴

Two other regulations from 1992 – one banning colleges from paying recruiters bonuses based on the number of student sign-ups and the other requiring colleges to offer half of their classes face-to-face in order to ensure quality – met a similar fate. While a former University of Phoenix lobbyist served as the Assistant Secretary for Post-Secondary Education, the Bush administration provided a number of "safe-harbor" ways for institutions to provide recruiters with performance-based compensation. Moreover, in 2006, Congress removed the restriction on the share of correspondence courses, with the result that the University of Phoenix was servicing about three-quarters of its students through online enrollment six years later.⁶⁵

When widespread criticism – by the Congressional Budget Office, states' attorneys general and a Senate committee – finally put pressure on the Obama administration to more closely regulate for-profit institutions in 2010, the White House did not want to undercut competition. Rather, it proposed a narrowly economic outcome-oriented approach that made federal aid dependent on schools meeting targets for former students' "gainful employment," in addition to requiring for-profit institutions to be authorized by the states in which they operated. But the for-profit sector fought back with well-funded lobbying efforts, involving many politically connected investors and key Democratic Party operatives, as well as with announcements of plans for self-regulation.⁶⁶ Consequently, the for-profit industry was effective in watering down the Obama administration's original proposals. Moreover, it successfully challenged in court the lighter regulation presented in 2011, arguing that for-profit providers were being singled out and subjected to arbitrary standards.

At this stage, it remains to be seen how the for-profit providers will continue to develop. With the University of Phoenix and Kaplan Higher Education having closed some campuses in the wake of negative publicity and falling enrollment numbers, their enrollment and market shares might be beyond their peaks for the near future.⁶⁷ Crucially, however, the for-profit organizations' practices have set the tone for higher education as whole, from the organization of education delivery to human resource management practices. While public universities were once less keen to accommodate their customers' (i.e., students') increasingly unpredictable schedules, they have now taken a page from their for-profit competitors' playbook by offering more classes online, which come with the added benefit of binding less capital in classroom buildings. More broadly, they have adopted many of the for-profit sector's internal practices, including standardizing educational content to allow for reductions in both the amount and skill-endowment of labor inputs, growing the ranks of teaching-only staff to save on expenditures for a tenure-track professoriate keen on conducting research, and expanding revenue spent on the marketing of educational offerings.

Decentralized Decision-Making: Leveraging Autonomy to Turn into Public-Private Hybrids

Encouraged by policymakers in state capitols, who rapidly abandoned attempts to guide public institutions' particular social missions, public universities' leaders have tried to morph their organizations into "public-private hybrids," increasingly running them like private enterprises and tapping into private funding to cope with declines in unconditional per-student government funding. As tuition has become the largest source of revenue, universities' business model has become enrollment-focused, with the number of seats in the classroom seen as the core factor limiting revenues and universities experimenting with different strategies to maximize tuition income. Prominent examples are attempts to tap into economies of scale by expanding online offerings, and recruiting more students who can pay full tuition.⁶⁸ The latter takes the form of increasing the intake from out of state or moving institutions closer to students, either within the country or even abroad, as one state's flagship university did when it temporarily opened a satellite campus in Dubai.⁶⁹

To make themselves attractive to student customers, public universities have invested heavily in student facilities and reputation-raising strategies, from expanding athletics programs to setting up honors colleges. Moreover, across institutions, means-tested support has been reduced in favor of scholarships based on a variety of merit criteria. Often, consultants and enrollment management software help optimize resource allocation in financial aid by "efficiently" allocating scarce scholarship funds. In practice this means finding the minimal amount of merit-based funding needed to induce the matriculation of a desired candidate, including those students with high SAT scores that are needed to boost the institution's standing in a plethora of external rankings. Experiments in raising either productivity or income include offering massive open online courses (MOOCs) in cooperation with for-profit providers such as Coursera and Udacity, and partnering with the world's largest (for-profit) education company, Pearson Higher Education, to outsource the development and marketing of online offerings in exchange for tuition sharing. Moreover, the widespread adoption of "responsibility-centered" management principles, i.e. requiring individual units to measure and cover their expenses (including space utilization) with self-generated revenues (tuition fees and other sources of – potentially self-identified – income), has aligned budgeting incentives across university organizations in line with efficiency imperatives.

Many of these "innovations" have put huge pressure on traditional human resources management (HRM) practices in higher education institutions. Traditionally, faculty members enjoyed a high degree of autonomy secured by selected monopoly rights (shared governance, tenure, and status-based remuneration) that were granted in exchange for academics' dedication to performing a broader public purpose in line with professional commitments. Today this bargain holds for ever-fewer people. Since the rights were merely granted by universities rather than government, faculty have limited opportunities to appeal these retractions. Admittedly, the patterns of pay across the workforce are still far away from the type of polarized hourglass outcomes that exist in the for-profit sector – with the Apollo Group's co-CEO receiving \$25 million as his annual compensation package in 2012 while the great majority of faculty toiled as part-time instructors. Even so, public institutions are rapidly moving into the direction of greater earnings dispersion – in line with an ideology emphasizing "proper" work incentives and the realities of workers wielding differential amounts of individual market power. By 2012, nine public university presidents earned more than \$1 million a year, while the average compensation for presidents at the 25 highest-paying public research universities has risen by a third (to \$974,006) since 2009.⁷⁰

Alongside these striking salary increases for university presidents, growing shares of resources are committed to attracting highly regarded research faculty (who can attract outside funding, commercialize their research, or improve an institution's ranking) and academics who can claim to have credible exit options to lucrative private-sector employment (most notably those in business and law schools). At the same time, institutions have kept overall faculty compensation below forty percent of total expenditures by restricting pay for broad majorities of an increasingly precariously employed instructional workforce. Moreover, average full-time faculty salaries at public research universities have failed to show any significant real increase since 2002.⁷¹ With growing rates of hiring non-tenure-track instructors, the share of tenure-track appointments among existing faculty has fallen to about a

third of all faculty across institutions and below half at public research universities.⁷² Employment growth has been particularly strong among part-time instructors, a category that includes adjuncts, postdocs and graduate students.⁷³

With faculty autonomy and co-governance never legally codified, university leaders have often been able to abandon long-standing practices as they embraced top-down decision-making for allocating resources. Importantly, rather than checking such forms of institutional conversion, universities' governing boards and their many – and most influential – members from the world of business have tended to endorse these shifts.⁷⁴ At the University of Virginia, for instance, a small minority of members on the governing board successfully used the sheer force of their conviction to corral the board into removing the institution's president on the grounds of her excessively consensual (as opposed to top-down) leadership style. That the president ended up being reinstated was due to successful protest, which less illustrious faculty members at lesser-known institutions have a far harder time marshaling. In another sign of increasing managerialism, the growth in the number of managers has far outpaced gains in faculty positions across all types of public institutions.⁷⁵ At the same time, these shifts have left many higher education faculties with diverging interests, such that organizing effective collective action against corporatization has been an uphill struggle without the legal resources enjoyed by their German colleagues.

It is thus little wonder that the US population has become increasingly disillusioned with the sector. A majority now sees colleges and universities as being more interested in their bottom lines than in providing a good education,⁷⁶ and three-fourths of the population views higher education as too expensive to afford for most Americans.⁷⁷ Beyond increasing inequalities among faculty, corporatization has allowed total outstanding student-loan debt to climb to \$986 billion in early 2013, up nearly 50 percent from only four years before and twice as high (in real terms) as two decades ago. While college attendance rates have increased for the affluent, they have moved little for those in the bottom half of the income distribution. Half of high school seniors from high-income backgrounds with *average* test scores enroll in four-year colleges, while only 44 percent of those from low-income backgrounds with *high* scores do.⁷⁸ The picture gets even worse when one looks at completion rates. While a little short of 90 percent of students from families in the highest income quartile complete their degrees by age 24, only roughly a quarter of those from the lower half of the income distribution do so.⁷⁹

Germany: Stratification through Institutional Layering and Displacement

The German stratification trajectory flows from public authorities' far more activist policy stance. Growth in overall public higher education expenditures combined with changes in their allocation translated into both small declines in unconditional per-student funding and strong increases in competition-based allocation of research funding. Moving away from Humboldt's ideal of tightly coupling research and teaching, public authorities revised spending patterns to financially reward institutions with larger scale and higher reputations. Moreover, state governments have explicitly structured how universities could use their newly granted autonomy through the use of target agreements with universities and rule-setting on employment conditions. Overall, state activism moderated by empowered insiders produced institutional changes through institutional layering and displacement.

Pressure for reforming Germany's higher education system had long been building. After all, its guiding ideology remained essentially unchanged since Humboldt formulated it for training an elite cadre of state administrators in the early-19th century. Changes to the structure of attainable degrees were seriously debated as early as the late-1960s, with discussions focusing on the introduction of a three-year bachelor-type option below the master's level. These discussions recurred intermittently, with experts emphasizing that teaching larger sections of the population would require structural changes in the means of instruction.⁸⁰ Moreover, during the 1990s, it became conventional wisdom that organizational rigidities stood in the way of universities' better serving their students and researchers, with leading voices calling for "reform spirit," university autonomy and more money.⁸¹ However, time and time again, reform proposals were shot down, as the key political players were gridlocked over the distributional consequences of potential changes.

The pent-up demand finally broke through at the end of the 20th century, soon after the federal president's 1997 call to promote competition by "bursting bureaucratic bonds" and "releasing ... [the] education system into freedom."⁸² A year later, the federal education minister agreed to join with Britain, France and Italy in "harmonizing the architecture of the European Higher Education system,"⁸³ giving the impetus for the Bologna Process.

Self-Reliance: Declining Per-Student Base Funding in the Face of Federal Expansion

Germany has substantially increased its public investments in higher education. At the same time, however, authorities' conditional base funding per student has fallen by more than 10 percent in real terms between 1999 and 2011.⁸⁴ This outcome has been strongly conditioned by declines in *Länder* spending, 12 of which even reduced their unadjusted expenditures per student during the decade 2000-2010.⁸⁵

Nominally, overall yearly public spending on higher education grew from about €18bn in 2000 to €27bn in 2010, with federal government spending alone more than doubling from €2.3bn to almost €6bn. Private spending – including private research funding, donations, and tuition fees for a growing but still very small share of private institutions – tripled over the decade, but it remains comparatively low at 16 percent of expenditures.⁸⁶ Even after the 2007 Financial Crisis, public spending continued to increase substantially, with only Sweden and Norway in Europe matching Germany's 23 percent increase over 2008-13, albeit spread over an additional year (2008-14).⁸⁷ This represents a stark contrast with southern Europe, which was particularly battered by the financial crisis. There, fiscal austerity led to real declines in public funding of over 50 percent in Greece, over 20 percent in Italy and over 15 percent in Spain.⁸⁸

A significant portion of Germany's increased funding was meant to cover rising student numbers that were pushed up by two one-off events: First, the decrease from 13 to 12 years of secondary schooling required to attain the *Abitur* in most federal states led to the simultaneous graduation of two years of cohorts in many parts of the country. Second, the draft for young men was suspended in 2010, allowing former potential draftees to go straight from high school to university. In combination with the general upward trend in the share of cohorts entering higher education, the number of entering students very quickly rose from 300,000 in 2003 to around 500,000 per year during 2011-13. Overall, the number of tertiary students climbed from 2.0 million to 2.6 million over the decade.⁸⁹ To cover the associated additional costs, the federal government and the states devised a Higher Education Pact (*Hochschulpakt 2020*). For the pact's second phase from 2011-15, the federal government agreed to invest a total €7bn, and pledged another €2.7bn until 2018.

In contrast to the Higher Education Pact's unconditional character and focus on instruction, the rest of the extra public funding has been allocated via competition and directed at research. With "external" competition-based university funding having increased five times faster than public across-the-board "base" funding over the past sixteen years, the ratio of competition-based to base funding has changed from 1:7 to 1:3.⁹⁰ In this context, the creation of the "Germany Scholarship" (*Deutschlandstipendium*) program in 2010 is a particularly good example of policymakers seeking to increase universities' self-reliance. Geared to support meritorious students selected by the university with €300 per month, the federal government uses this program to match funds that both public and private universities raise from private sources.⁹¹ So far, however, universities' take-up has been slow due to lack of fundraising, with less than twenty thousand scholarships having been awarded in the first two years.⁹²

Tuition fees have also been part of the political agenda, albeit in very different ways than in the US. Claiming that the outlawing of tuition fees in the federal framework legislation infringed on the states' prerogatives in education, center-right *Länder* governments filed suit against the federal government in the Constitutional Court. After the court ruled in their favor in January 2005, seven *Länder* in the West introduced tuition fees of €500 per semester at all institutions, covering more than two-thirds of all students in Germany and 90 percent of students in the West, but generating only five percent of university revenue at its high point.⁹³ The way that the fees were introduced attracted a lot of criticism, because the states failed to flank them with easily accessible loan or grant programs that could help financially constrained students. Instead, policymakers introduced a variety of direct exceptions, e.g. only requiring the first two children per family to pay, or allowing universities to waive tuition for high-achieving students. Such exceptions meant that less than two-thirds of students in these *Länder* ended up paying tuition fees. With students taking to the streets to protest against the fees and squatting in university buildings to demand the honoring of their constitutionally granted rights, center-left parties positioned themselves strongly against the fees.

Thus, once *Länder* elections had brought center-left politicians into government in six of the tuition-charging states, these *Länder* retracted the fees. In the end, even conservative parliamentarians in Bavaria removed the fees when they were forced to vote on them again by a popular petition that had collected signatures from more than 14 percent of the electorate. In the face of popular protest and legally granted social rights to citizens, lawmakers found it hard to defend fees that appeared to be arbitrarily – and ultimately illegitimately – assessed.⁹⁴ As a result, since fall 2014 tuition fees are no longer levied at Germany's public universities.

Rivalry: Generating Reorganization through Research Competition

The increase in research funds made available through competition has functioned as public authorities' main mechanism for differentiating among universities. It provided the core of the paradigm shift away from the old guiding principle of status equality among all public universities toward officially sanctioned stratification. To be clear, this is not a privatization process. About two-thirds of universities' competitively acquired funds (€2.8bn) come from the public German Research Foundation (DFG) or the federal government.⁹⁵ Rather, these changes represent a move toward concentrating public research funds at selected institutions (*Spitzenuniversitäten*) to help them compete internationally, albeit at the price of reducing relative equality of

opportunity to do so domestically. Given that the competition-based distribution of research funds tends to reward scale, its increasing role has predominantly benefited the country's larger institutions, which have gained status and power.⁹⁶

The immediate impetus for the reorientation of higher education practices came from a center-left federal government, which embraced supply-side reforms as a way to counter high unemployment. In early January 2004, the governing Social Democrats presented their guidelines on innovation, including a call for "changing the structure of the university landscape so as to establish top universities and research centers that can also play in the premier league worldwide and compete with top universities like Harvard and Stanford."⁹⁷ Three weeks later, the Social Democratic federal education minister launched her initiative "Brain Up! Germany looks for its top universities," which sought to identify five universities that should receive direct federal funding. In addition to building on assessments for the need of reform by the Science Council, her proposal was likely influenced by the examples of the federally financed and highly-ranked ETH Zurich and EPF Lausanne in Switzerland, and also reflected complaints from junior German scholars in the US.

The government's plans, however, generated much opposition from the sixteen federal states, which did not want to see their states' universities sidelined, as well as from leaders of academic organizations who sought to protect academic governance from political intrusions. While most stakeholders disagreed with a proposal that – apart from the five winners – promised to produce only losers, many of them were keen to seize the moment to channel the momentum into producing a politically more promising and system-compatible initiative. Thus, within a couple of months, a joint commission between the federal government and the states came up with the basic outlines of a political compromise, which was broadly endorsed in late June. They agreed that all universities would be invited to compete for research support from a newly created Excellence Initiative (*Exzellenzinitiative*), funded 75 percent by the federal government and 25 percent by the states in which the selected institutions would be located. Institutions could submit thematically focused proposals to three pools of funding, for: 1) graduate schools (about €1 million per school yearly), 2) research clusters (about €6.5 million yearly) and 3) future concepts (€21 million over 5 years). Initially set at a volume of €1.9bn for two rounds of funding (2005/06 and 2006/07), a third round of €2.7bn was later added (for 2010/2012). To keep possibilities for political favoritism low, the initiative was organized in cooperation between the DFG and the Science Council, and 80-90 percent of reviewers were located outside Germany.⁹⁸ The official goal of the initiative was to "sustainably strengthen Germany as a research location, improve its international competitiveness and make visible top-level research at German universities."⁹⁹ The initiative further sought to encourage interdisciplinarity, raise the quality of training for junior researchers through team-based advising, attract "excellent" foreign scientists, and encourage institutions to specialize in particular missions.

All funding lines called on universities to embark on "profile-building," i.e. to focus their research activities thematically and align their organizations behind these goals. In this quest, they were explicitly invited to build on the strengths of local research institutes (from the Max Planck and Fraunhofer Societies, and the Helmholtz and Leibniz Communities), many of which have long provided the country's most distinguished scientists with generous resources and staff to pursue their research agendas. Bringing these elite scholars in closer contact with universities was seen as a key way of reducing the contrast between measures of scientific output and impact, which marked German academia as world-leading, and international university rankings that at the time listed at best four German universities among the global top 100.¹⁰⁰

With success in the third funding line being made conditional on selection in the first two categories, the third funding line quickly became known in popular parlance as the one designating "elite" university status. During the first round, three universities' future concepts were selected, and in the second round six more universities were added. Round three added another five, but also dropped three that had previously been chosen. This left eleven universities in the last round's third funding line, which are now commonly referred to as the "beacons" (*Leuchttürme*) that authorities hope will cast the light of German science onto the world.¹⁰¹

The Excellence Initiative's impact on the higher education system became quickly visible. For instance, many doctoral schools and research clusters now closely link universities to independent research institutes under particular research themes. Many observers have lauded the positive effects of the Initiative and related measures, including increases in federal and state funding for the DFG, some states' own separate excellence initiatives, and the separate Pact for Research and Innovation. Through the latter pact, policymakers committed to increase budgets for research organizations (i.e., the Max Planck and Fraunhofer Societies, and the Helmholtz and Leibniz Communities) by three percent per year between 2005 and 2010 and five percent yearly for the subsequent five years. Moreover, the similarly competition-based Quality Pact on Instruction (*Qualitätspakt Lehre*) was recently added to complement the research-based concentration processes already underway.¹⁰²

The Excellence Initiative and related measures represent a step toward the hierarchization of German academia.¹⁰³ During the initiative's first two rounds, the nine universities successful in the third funding stream received 58 percent of the available funds. This share far exceeded that of the twenty universities that had at that time been the most successful in winning regular research support from the DFG.¹⁰⁴ Given actors' reactivity to officially sanctioned status distinctions, both through changing their focus and modifying their behavior to match new expectations, the Initiative's outcomes will likely solidify into status rankings beyond its official end in 2017.

Decentralized Decision-Making: Toward State-Guided Autonomy

Allowing universities to implement their proposals required changes in the *Länder* laws governing universities. Most laws were significantly revised to increase universities' autonomy, with the name of the "University Freedom Law" (*Hochschulfreiheitsgesetz*) in the state of North Rhine-Westphalia capturing the spirit of the times. The amended laws allowed the states to provide universities with "global budgets" that provided university leaders more flexibility in allocating spending as they saw fit; moreover, institutions were given complete independence in hiring decisions. Nevertheless, policymakers retained power to shape institutions' activities, including their human resource management practices. Key among policymakers' levers of influence have been multi-year target agreements between individual universities and the states' education ministries, which specify targeted areas of expansion and their funding bases.

Another crucial aspect – which similarly contrasts with the US – is the degree to which public authorities influence the work conditions and pay structures for universities' employees, either through public-sector collective bargaining agreements or administrative rulemaking for civil-servant professors. To provide universities with ways to financially incentivize faculty and differentiate their employment conditions, public authorities introduced a new pay scale (W-1 to W-3, with the latter being equivalent to full professor). The scale weakened principles of seniority-based salary increases and gave universities the autonomy to offer individual pay packages that included target agreements and performance-related elements to counter external offers, recognize particular achievements and remunerate faculty for undertaking special responsibilities. However, simultaneously, the new salary system also reaffirmed the commitment to pay all professors with a certain record of achievement the same base salary within each federal state and across disciplines.

Two aspects of the pay scale's introduction illustrate how public authorities' actions were highly consequential but also limited by legal provisions protecting the professoriate's prerogatives. When the revision of the higher education framework legislation in 2002 introduced the W-1 junior professorship (*Juniorprofessur*), the position was conceived as a fixed-term rank akin to an American assistant professor. While the new position failed to offer an opportunity for tenure in accordance with established pathways of promotion to tenured W-2 and W-3 professorships, many federal and state policymakers saw it as an important step to bring German practices into line with international norms. They hoped that the junior professorships would reduce the average age of professors' first appointment and increase the share of female and foreign professors. However, these plans were met with skepticism in the Humanities and in professional disciplines such as Law and Medicine. In turn, a few states with conservative governments successfully challenged the federal government's authority on determining professorial ranks before the Constitutional Court. This decision and the skepticism among some disciplines left the established qualification pathway to tenure (*Habilitation*) in place. Thus, while universities quickly adopted the new professorial category, encouraged by subsidies from the federal government and states, the initial growth of these positions has stalled. In 2010, with 1200 junior professors representing about 5 percent of all professorial positions, their number fell 80% short of the federal government's original goal.¹⁰⁵

Another example is the public authorities' intention to introduce the new pay scale in a revenue-neutral way, which involved lowering new professors' base salaries significantly to create room for performance-based top-ups. Policymakers were again not able to implement the reform as planned. This time, the German Association of University Professors and Lecturers (*Hochschulverband*) financed a W-2 professor's successful lawsuit against the state of Hesse on the grounds of inadequate remuneration. According to the judgment of the Constitutional Court, all civil-servant professors deserve "sufficient" base pay that acknowledged the additional qualifications academics had to acquire compared to other civil servants. As a result, the federal states have had to increase their base pay, which has particularly benefited professors with less market power and provided real increases in the average actual pay of the professoriate.

As these two examples illustrate, traditional norms of academic freedom and university governance in line with Humboldt's conception of a "republic of scholars" remain strong, as do public authorities' commitments to supporting higher education as a public good. Within universities, reforms in German academia have produced a "managerial turn," but thus far its scope and reach have been far more contained than in the US.¹⁰⁶ The amended state laws on university governance have strengthened the role of university leaders, allowed for a differentiation of senior management functions, and facilitated the creation of new organizational structures. Thus, in contrast to stability in the size of the professoriate, the number of high-status management

positions has risen. Moreover, universities' managers have benefited from newfound flexibility in their salary negotiations, with most university presidents (*Rektoren*) in North Rhine-Westphalia having earned €130,000-137,000 in 2012 and universities' administrative directors (*Kanzler*) also having earned above €100,000. The salary of the highest earner increased from less than €90,000 in 2004 to more than €150,000 in 2012.¹⁰⁷ In practice, however, these managers have limited means to exercise power vis-à-vis academic, in turn focusing on giving advice and providing services rather than using their authority in a hierarchical fashion. In turn, academic professionals continue to define the core processes of German universities, setting implicit limits on managerial power. Moreover, similar to top administrators, prominent professors have also been able to raise their salaries up to twice the basic W-3 grade, with states' ministries' having to pick up anything above this ceiling and exceptions being negotiated for leading medical staff in teaching hospitals.¹⁰⁸

Within the broader academic workforce, these reforms have increased precarity and hierarchy in several ways. Given that the funds within the above-mentioned initiatives have been temporary, the share of contingent positions has increased. For instance, the share of junior researchers holding temporary contracts – already high by international standards before the reforms – rose further to 90 percent (from 79) over the new century's first decade. The share of those holding part-time positions (often PhD students) is up from 38 to 45 percent.¹⁰⁹ Moreover, most new programs emphasized the creation of positions for junior researchers, with the first two years of the Excellence Initiative displaying a 10:3:1 ratio of doctoral students to postdocs to professors. Consequently, the share of professors among the personnel at universities has decreased from 12 to 9 percent over the decade.¹¹⁰ Thus, rather than easing career bottlenecks, the initiatives have arguably worsened them for even the most successful academics. With few permanent positions, legal protections intended to protect employees against mistreatment by superiors – specifically laws limiting fixed-term publicly-financed contracts to a maximum of six years post-PhD – have moreover ended up enforcing a strict “up or out” regime. It is thus unsurprising that Germany remains a net exporter of active researchers, with a recent study noting that particularly the “patent-active innovators” displayed a tendency to leave.¹¹¹

Liberalization's impact on inequality among students is not yet clear, but some early trends are troubling. Compared to the US, the system has sustained more equal economic outcomes and greater public purpose, yet the German system's historically high social selectivity has yet to markedly decrease. Moreover, according to an analysis based on a rather small sample, the Excellence Initiative might have increased the degree of homogeneity among student bodies across institutions, with self-selection effects possibly leading high-achieving high school graduates to attend at higher rates those universities that were successful in the Excellence Initiative's third funding round. In contrast, high-achieving high school students from families with parents who lack a tertiary education seem to exhibit a declining rate of attendance at these “elite” institutions.¹¹²

Toward Academic Capitalism: Contradictions Moving from Without to Within?

This paper theorizes and demonstrates how two very different higher education systems have undergone parallel processes of liberalization over the last two decades. Public authorities in both the United States and Germany have sanctioned a convergent form of institutional evolution by reducing permanent per-student financial support to universities, expanding market-sustaining competition policy and creating more room for decentralized decision-making. The analysis reveals that market expansion in contemporary higher education was not spontaneous but planned, just as it was with the *laissez-faire* policies in the wake of industrialization.¹¹³ In line with political economists' arguments about “freer markets [requiring] more rules,” this liberalization has left public authorities with increased scope to steer developments in the sector.¹¹⁴ Finally, liberalization has given rise to similar effects across both cases. For instance, with respect to faculty, it increased precarity as well as polarization of incomes and working conditions. Moreover, both countries have exhibited a trend toward hierarchization within academic workplaces.

And yet, the analysis has also shown that convergent processes of liberalization do not translate into identical outcomes. In Germany, a combination of institutional displacement and layering produced stratification among institutions. In the US, in contrast, drift in both funding and regulation, accompanied by bottom-up processes in which universities implemented existing rules differently (institutional conversion) has underwritten a process of corporatization. This analysis speaks against blanket characterizations of institutional changes as representing the demise of public higher education. Such over-generalizations are neither analytically very helpful, nor do they provide leverage for charting better outcomes. Public authorities continue to invest heavily in higher education, with federal authorities in both countries having expanded their commitments to support students. In the face of a complex social reality, finer conceptual lenses are needed to probe national systems' evolution and track public authorities' continuing influence. Using concepts developed in comparative political economy scholarship, this paper delineates the underappreciated political drivers behind increasing inequality in higher education. The close observation of causal processes reveals how institutions have shaped interest groups' power resources in this sector. At the same time, it demonstrates that the impetus for liberalization has been broadly shared among politicians of different partisan colors, that state capacity did not significantly diverge between public authorities in the two countries, and that ideas about institutional arrangements' functional benefits were not the most important factor guiding policymakers.

More broadly, the research illustrates the limits of seeking to use higher education to manage broader tensions in democratic capitalism. The academy's ability to provide effective social policy turns on using public authority to channel market incentives in the appropriate direction. Without such welfare state activism, the contradictions of broader social arrangements under capitalism will merely be replicated within the higher education system. As Mancur Olson argued long ago, the impetus for rent-seeking remains a perennial threat.¹¹⁵ As such, participants in academic capitalism share with capitalists in other markets the tendency to strive toward monopoly or oligopoly, accumulate capital and obtain a disproportionate share of society's goods.¹¹⁶ Thus, for academic capitalism to deliver the desired public purpose and support students' social mobility, actions to prevent both interest groups' capture of the state and the reproduction of privilege are crucial. It is here that the discourses framing the US reform debate appear most at odds with evolving reality. If education is supposed to be the most important social policy lever, then it is time to deprioritize public subsidies to under-performing for-profit institutions as well as to non-profit private research universities, which remain far less inclusive than public ones. In contrast to public research universities, which experienced decreases in average public subsidies per FTE student between 1999 and 2009, public subsidies *increased* for private research universities by 36 percent (to above \$15,000) and thus to almost twice the amount received by their public counterparts.¹¹⁷ In helping to clarify the drivers, patterns and consequences of public regulation, case comparisons such as the one in this paper can help improve how public authorities approach the sector's alignment with its public purpose.

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¹ Schofer and Meyer (2005), Salmi (2009).

² Goldin and Katz (2008).

³ Busemeyer and Trampusch (2011).

⁴ Ansell (2008, 192-193), Clark (1983, 143), Esping-Andersen (1990), Hall and Soskice (2001). Corporatism refers to the legal recognition of organized (i.e. "corporatist") social interests. In contrast, "corporatization" captures the adoption of business principles in formerly public bureaucracies.

⁵ The concept of "liberalization" refers to the opening of systems, with "marketization" being the means to do so.

⁶ This conceptualization of liberalization is adapted from Höpner et al. (2011, 3).

⁷ On the "uses of higher education," see Kerr (1963).

⁸ Obama (2010), *Handelsblatt* (2011).

⁹ In terms of scientific citations during 2004-08, Germany comes in third worldwide with its 7.3 percent share; the United States leads with 30.4 percent (The Royal Society 2011, 25). In terms of countries' shares of total scientific publication output, Germany comes in fifth at 6 percent trailing the US' 21.2 percent (ibid., 17). At the time of writing, the United States has over 4,000 postsecondary institutions with roughly 17 million students. Germany has over 400 higher education institutions with about 2.4 million students. In the US, 290 are research universities, with 107 classified as Carnegie level I; Germany has 105 research universities.

¹⁰ For instance, the German approach to sustaining competition among universities has informed such reforms as the Excellence Initiative in neighboring France and the Malaysian Clusters of Excellence Policy further afield.

¹¹ Gerring (2007, 89).

¹² Bonoli and Natali (2012).

¹³ On "commodification," see Polanyi (1944). On "decommodification," see Esping-Andersen (1990).

¹⁴ Respectively, Pinkwart (2012), Obama (2010).

¹⁵ Respectively, Grubb and Lazerson (2007), Lisbon European Council (2000).

¹⁶ Thelen (2014, 120-128).

¹⁷ On "structural accretion," see Smelser (2012).

¹⁸ On "multiversities," see Kerr (1963).

¹⁹ Monopolkommission (2000), Wissenschaftsrat (1985).

²⁰ On "entrepreneurial universities," see Clark (1998).

²¹ This analysis breaks with Clark's influential conceptualization of a "triangle of coordination" (1983, 143), which models the relationship between the state, markets and academic oligarchy in zero-sum terms. Clark's triangle is unable to capture processes of marketization in the US, because his model characterizes the country's system as already market-centered.

²² Most analytically-ambitious comparative accounts of higher education's long-term evolution and patterns of complex causation are rather dated; see Windolf (1998), Heidenheimer (1997).

²³ Streeck and Thelen (2005, 30).

²⁴ See the conceptualization of "embedded flexibilization" by Thelen (2014).

²⁵ On academic capitalism, see Münch (2011), Slaughter and Rhoades (2004).

²⁶ Regini (2011).

²⁷ Ansell (2008).

²⁸ The Democrats have sought to expand public subsidies while the Republicans positioned themselves against it (Mettler 2014).

²⁹ These policy goals are given in the final report of the Commission on the Future of Higher Education, which was organized by the Bush administration's Secretary of Education Margaret Spellings (Department of Education 2006). The same themes can be found in President Obama's competition-based "Race to the Top" program and in his "First in the World" initiative.

³⁰ The analysis thus brackets potential effects from differences in state structures, which are far smaller than between other countries given that both the US and Germany are federally organized.

³¹ The University of California has been a public trust since 1879, which allows the university to make internal management decisions independently of politicians.

³² Gilbert and Gilbert (1989, 163).

³³ This is notwithstanding the political appointment of some positions on universities' boards.

³⁴ Article 5 (paragraph 3) of the Federal Republic's Constitution states that "science, research and teaching are free" (own translation).

³⁵ In 2014, a deal was struck to change the legislation. Thus, in the future, the federal government will finance the student support program in its entirety, creating – in theory – additional fiscal room of €1.2bn per year for states to fund universities (Dohmen and Krempkow 2014, 7).

³⁶ Germany went through its own postwar "massification" of educational opportunities with the expansion of the country's vocational education system.

³⁷ On the general point that inherited policy shapes the pattern of politics, see Lowi (1964).

³⁸ See Falletti and Lynch (2009, 1150) for a sample.

³⁹ Mahoney (2000, 515-526).

⁴⁰ Evans (1995).

⁴¹ Hall and Soskice (2001).

⁴² Thelen (2014).

⁴³ Baumgartner and Jones (2009).

⁴⁴ Bogumil et al (2013, 17). According to Clark (1983, 10), "he who says academic organization says interest groups."

⁴⁵ Schrecker (2010, 23-56).

⁴⁶ "Analytically equivalent" state actions are thus different in each national context; see Locke and Thelen (1995).

⁴⁷ Moreover, the main agents in VoC analysis, organized capital and labor, have only played marginal roles.

⁴⁸ Admittedly, perception and actual performance have been diverging for a while.

⁴⁹ Mahoney and Thelen (2010, 15-16).

⁵⁰ Ibid.

⁵¹ Perna and Finney (2014, vii-1).

⁵² SHEEO (2013, 8-21).

⁵³ SHEEO (2013, 9).

⁵⁴ SHEEO (2013, 25).

⁵⁵ The US does not only feature a great variety of institutions, but these institutions also do not always use coherent descriptors for themselves, such as "university" for institutions with developed graduate programs or "college" to refer to undergraduate teaching.

⁵⁶ Kirshstein and Hurlburt (2012, 3).

⁵⁷ SHEEO (2013, 7-9).

⁵⁸ Mettler (2014).

⁵⁹ HELP Committee (2010).

⁶⁰ Burd (2009), Lederman (2010).

⁶¹ HELP Committee (2010).

⁶² NCES (2012).

⁶³ Lichtblau (2011).

⁶⁴ Stanley (2010), Burd (2009).

⁶⁵ Lewin (2012).

⁶⁶ Lichtblau (2011), Garofalo (2011).

⁶⁷ Lewin (2012).

⁶⁸ The University of Wisconsin-Madison and the University of Michigan, Ann Arbor have out-of-state shares between 30 and 40 percent, further outdone by the flagship universities in small states like Vermont and Delaware. Other flagship institutions are playing catch-up.

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- ⁶⁹ Michigan State University opened its Dubai campus in 2008.
- ⁷⁰ Respectively, Harkinson (2012), Stripling (2014), Erwin and Wood (2014, 4).
- ⁷¹ Desrochers and Wellman (2011, 27).
- ⁷² Kezar and Maxey (2013).
- ⁷³ Desrochers and Wellman (2011, 30), Kezar and Maxey (2013).
- ⁷⁴ Slaughter and Rhoades (2004, 249).
- ⁷⁵ Greene et al. (2010).
- ⁷⁶ Callan (2010).
- ⁷⁷ Pew Research Center (2011).
- ⁷⁸ Carnevale and Strohl (2010).
- ⁷⁹ Tough (2014).
- ⁸⁰ Müller-Böling (2000), Wissenschaftsrat (1985), Wissenschaftsrat (1993, 14).
- ⁸¹ Glotz (1996).
- ⁸² Herzog (1997, 33).
- ⁸³ http://www.ehea.info/Uploads/Declarations/SORBONNE_DECLARATION1.pdf (accessed October 30, 2014)
- ⁸⁴ Wissenschaftsrat (2013b, 115-116).
- ⁸⁵ Dohmen and Krempkow (2014, 27).
- ⁸⁶ Dohmen and Krempkow (2014, 16).
- ⁸⁷ EUA (2014, 11).
- ⁸⁸ EUA (2014, 16).
- ⁸⁹ Dohmen and Krempkow (2014, 10-12).
- ⁹⁰ Vogt (2014).
- ⁹¹ See <http://www.bmbf.de/de/14295.php> (accessed August 26, 2013).
- ⁹² http://www.deutschlandstipendium.de/_media/bf_bilanz_deutschlandstipendium_2012.pdf (accessed October 30, 2014)
- ⁹³ Wissenschaftsrat (2010).
- ⁹⁴ Interview, September 2014.
- ⁹⁵ Vogt (2014).
- ⁹⁶ Hartman (2010), Münch (2011).
- ⁹⁷ Sondermann et al. (2008, 10), author's translation.
- ⁹⁸ Sondermann (2008, 12).
- ⁹⁹ <http://www.bmbf.de/de/1321.php> (accessed Aug 26, 2013), author's translation.
- ¹⁰⁰ Politically, it did not matter much that these rankings – including the popular Shanghai ranking – all have particular biases, including only measuring English-language publications, focusing heavily on the natural sciences, rewarding scale over efficiency, and measuring achievements that lie far in the past.
- ¹⁰¹ In 2012, the list of eleven awardees encompasses the two institutions in Munich (LMU and TU), Humboldt University and Free University in Berlin, as well as the universities in Aachen (RWTH), Bremen, Dresden (TU), Heidelberg, Cologne, Konstanz and Tübingen. In addition to Karlsruhe (KIT), the universities in Freiburg and Göttingen lost their status again.
- ¹⁰² <http://www.bmbf.de/de/15375.php> (accessed August 26, 2013), author's translation.
- ¹⁰³ Münch (2011).
- ¹⁰⁴ Hartmann (2010, 372).
- ¹⁰⁵ CNRJS (2013, 13).
- ¹⁰⁶ This assessment builds on Krücken et al. (2013).
- ¹⁰⁷ Lieb (2014).
- ¹⁰⁸ Interview, September 2014.
- ¹⁰⁹ CNRJS (2013, 16).
- ¹¹⁰ CNRJS (201e, 14), Sonderman (2008, 6).
- ¹¹¹ EFI (2014, 85-106).
- ¹¹² SNV (2011, 3).
- ¹¹³ Polanyi (1944).
- ¹¹⁴ Vogel (1996).
- ¹¹⁵ Olson (1984).
- ¹¹⁶ Münch (2011).
- ¹¹⁷ Desrochers and Wellman (2011, 32).