Academic Capitalism

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Summary and Keywords

Academic capitalism is a unique hybrid that unites the scientific search for truth and the economic maximization of profits. It turns universities into enterprises competing for capital accumulation and businesses into knowledge producers looking for new findings that can be turned into patents and profitable commodities. In order to understand what this new institutional setting means for science and the evolution of scientific knowledge, science as a field in a Bourdieusian perspective, which operates in the tension field between autonomy and heteronomy, is explored. On this basis, crucial features of academic capitalism and their impact on science as well as the evolution of scientific knowledge are described. Academic capitalism is located in the zone of the intersection of scientific research, economic profit maximization, and innovation policy. The institutional conflicts of interest involved in the corporate funding of academic research are addressed. The logic of academic capital accumulation is spelled out by describing the entrepreneurial university. Field effects of academic capital accumulation on science, namely over-investment at the top and under-investment among the rank and file, are examined, along with the organizational effects of academic capital accumulation in terms of managerial quality assurance on diversity and creativity as crucial prerequisites of advancing scientific knowledge. The main results of the analysis are summarized and some guidelines for future research are presented.

Keywords: academic capitalism, entrepreneurial university, New Public Management, stratification in science, academic freedom, university-industry cooperation, diversity in science, academic elite circulation, academic rankings, audit university

The Academic Field: Research between Autonomy and Heteronomy

From a field-theoretical perspective drawing on Bourdieu (1975), science is a field that is constituted in the scientific practice of actors assuming the habitus of researchers, which they acquired during their academic socialization process and which is a field-specific form of the habitus generated at home and at school as a member of a certain social class.

The practice in the scientific or academic field covers material struggles for positions and symbolic struggles on the doxa in the field (Bourdieu, 1975). In times of change, the doxa becomes an orthodoxy that is challenged by heterodoxy. These struggles always include conflicts about the borders of the field and the differentiation between outside and inside. The field's autonomy is not given once and for all, but is a matter of the more or less complete breaking of external influences. The field itself is not totally separated from the outside. Instead, it is subjected to the tension between the autonomous and the heteronomous pole (Figure 1).

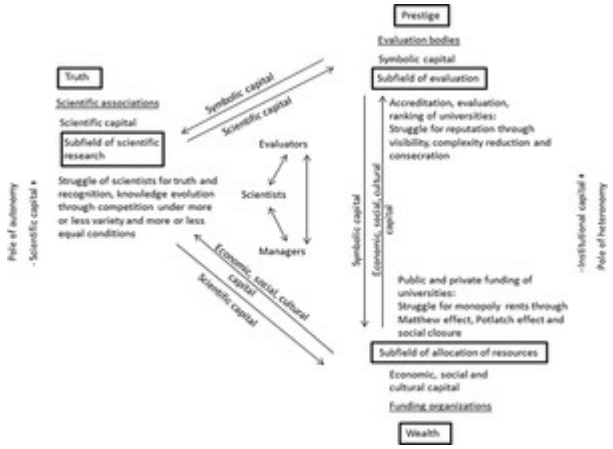

Figure 1. Science in the area of conflict between research, evaluation, and allocation of resources.

Source: Münch (2014, p. 123, Figure 4.4).

As shown in Figure 1, the field consists of three subfields: the subfield of scientific research at the pole of autonomy, and the subfields of resource allocation and evaluation at the pole of heteronomy. The subfield of scientific research is the arena for producing and distributing truth via scientific capital in terms of scientific publications receiving more or fewer citations, which determine their value. The players in the field possess more (+) or less (-) scientific capital. The subfield of resource allocation is the arena of competition for wealth via funds that provide money, chances of collaboration, and entitlements to produce scientific knowledge, that is, economic, social, and cultural capital. The latter are transmitted from the social space via the field of power to form assets of institutional capital in the scientific field. The players in the field possess more (+) or less (−) institutional capital. The subfield of evaluation is the arena for attributing prestige, that is, symbolic capital, via the assessment of research performance. Prestige can also be considered institutional capital, of which the players possess more (+) or less (−). A kind of exchange of capital takes place between the different subfields. Scientists produce scientific capital in terms of publications in exchange for funding in terms of economic, social, and cultural capital, and they do so in exchange for symbolic capital in terms of assessments. Also, funds in terms of economic, social, and cultural capital of researchers, departments, or universities are exchanged for symbolic capital in terms of prestige attributed according to more or less affluence of funds. The three subfields are represented by specific roles: the scientist, the manager, and the evaluator. Players can act exclusively in one of these

roles, for some time at least. Or, instead, they act in a synthesis of them, for example, scientists who are managing their research group and are evaluating research with more or less time allocated to one of these roles.

The autonomous pole bundles all those forces that defend the field against external influences: the doxa as the untouchable sacred core; the field-specific way of perception, thought, and action; the field-specific habitus; and the field-specific practice, actors, and bodies protecting the sacred core against external influences. The norms of science identified by Robert K. Merton (1973) can be seen as doxa and pillars of the autonomous pole: universalism, organized skepticism, disinterestedness, and intellectual communism. Making their bets, researchers are convinced that finding the truth and progress in knowledge are the only things that matter. This is the illusio tying everybody into the game. It is also one side of a double truth. Its other side is the experience that contributions to progress in knowledge are rewarded by recognition in the form of attention, reception, citations, editorships of scientific journals, memberships in important committees, and awards. The illusio also includes that these honors are coming along with the generated progress in knowledge, but are not the primary objects of desire. According to the illusio, any ambition aims at progress in knowledge. Hence, honor is considered a non-claimable gift in exchange for the gift made to the scientific community in the form of a contribution to the progress in knowledge. It also implies that the individual can be proud of rewards, but must not use them strategically for striving for further honors. This is required by the norm of disinterestedness. There is no direct connection between gift and return gift. Above all, the time span between the two must be large enough to conceal the connection. This makes the difference to the economic exchange of service and return service. It is also expected that all those are allowed to share the honor who paved the way toward the new finding, which means ultimately the entire scientific community.

Gift exchange makes a functional contribution to the solidarity of the community in question. It obliges the members to share their resources depending on their capabilities. In science, this means that all members make contributions to “progress in knowledge” as a collective good and earn recognition for it. This implies that neither the level of recognition nor the achievement are calculated. Hence, as a rule more work is done than could be expected for an exact calculation of the price-performance ratio. This specific feature of gift exchange is completely missed when it is measured with the yardsticks of economic exchange, a procedure usually carried out by economists.

Honors for contributions to progress in knowledge, however, are in no way distributed equally among scientists. On the contrary, it is only a small number of them who attract the greatest part of attention, while the wide mass of scientists will be known never or only little beyond the closest circle of intimates. This stratification between few very well-known and many little known scientists is located at the autonomous pole in a state of conflict with the principle of collegiality that claims that any member of the scientific community should receive the same respect and that equal attention must be paid to any statement or criticism irrespective of who launched it. At the autonomous pole, the ideal situation of speech is the regulative idea of discourse (Habermas, 1971). Communication

distorted by power or prestige means an obstacle to the progress in knowledge and calls for attempts at change. The scientific associations, above all, are the guardians of collegiality in as far as they make sure that everybody can give a lecture at their conferences provided they can present something that will advance knowledge. Scientific capital determines communication at the autonomous pole, which means statements that are measured exclusively by how much they contribute to progress in knowledge. Scientific capital can be accumulated but must not be taken into private possession. According to the norm of intellectual communism, it must be shared with everyone right from the start, and it remains the collective property of the scientific community.

At the heteronomous pole, the struggle for financial resources and status is fought. Two kinds of bodies, which link the scientific field and the field of power, are of significance here: bodies of resource distribution and bodies of status allocation. Resources are distributed by scientific funding organizations such as, for instance, the U.S. National Science Foundation (NSF) and the German Research Foundation (DFG) from inside the field but still at the heteronomous pole, but also by government bodies (ministries of science) and private sponsors (individuals, businesses) from outside the field. Status is allocated by evaluation committees from inside the scientific field and by rankings from outside the field, which follow the media's logic of attracting attention (Hazelkorn, 2015).

The struggle for resources is crucially shaped by three mechanisms of resource allocation (Münch, 2014, pp. 81–85). The *Matthew effect* as explicated by Robert K. Merton (1968) means accumulation of resources based on their unequal distribution among competitors so that inequality is increasing with every new round of competition. The *Potlatch effect* refers to the practice of powerful and rich families in tribal societies of inviting guests to celebrate a feast full of splendor including sumptuous gifts for their guests. The latter cannot reciprocate the gifts in ways other than gratefulness and subjection to the rule of the rich. In the academic field, affluent research centers at top-ranking universities create indebtedness of a similar kind with their fellows on temporary stay who reciprocate by subjection to the center's research program and citation of its publications. The *closure effect* says that the differentiation between elite departments and the mass of rank and file departments is based on the enduring separation of the elite from the masses by two factors, as Burris (2004) has spelled out, drawing on Max Weber (1922/1976, pp. 534–539): recruiting new faculty from among themselves and demonstrating academic luxury in terms of richness in impressive buildings, funds, publications, citations, and awards.

The struggle for reputation in evaluation processes can also be considered as being shaped by three mechanisms that support the unequal accumulation of reputation in symbolic struggles on the social construction of excellence (Münch, 2014, pp. 79–81). There is, first of all, the *visibility effect*, which implies that excellence is attributed according to the visibility of a department in the scientific community, which depends strongly on its size so that it is more visible in the number of publications, citations, highly cited scientists, referees, awards, and members of editorial boards and academies. Sheer size counts more than efficiency in terms of returns on investments. The logic of distinction is

more relevant than the logic of efficiency. Secondly, the *complexity reduction effect* focuses on the necessity of evaluation procedures and rankings to select a small number of relevant indicators for assessing performance at the expense of marginalizing a greater number of activities that are nevertheless important for an open evolution of scientific knowledge, so that diversity is shrinking and rather uniform departments outperform more pluralistic ones. Thirdly, the *consecration effect* turns profane numbers into sacred values of scientific activity so that they function as precious objects of scientific endeavors. The more evaluation committees make use of publication and citation indices the more scientific activity is strategically oriented to the production of publications and citations for its own sake. There is no more intrinsic interest in advancing knowledge on certain subject matters, but only extrinsic interest in research, which can be most effectively turned into publications and citations. The chances of selling findings determine their production, and selling activities become more important than production activities.

The three mechanisms of allocating resources and the three mechanisms of socially constructing excellence work together to produce and reproduce stratification of departments and universities at the heteronomous pole of the academic field in the circular process of turning resources into prestige, that is economic capital into symbolic capital, and prestige into the further accumulation of resources and so forth.

The heteronomous pole also forms the gateway for ideological influences from the field of power. Neoliberalism, for instance, can be interpreted as a global movement that has succeeded in achieving a hegemonic position. This is underlined by the fact that its principles, programs, and accompanying rhetoric have been adopted across all political parties and influence policies substantially. The movement is supported by a global network of experts, who all share the conviction that markets, competition, and evidence-based controlling are the tools best suited to raise the performance of organizations and individuals in all functional areas of society. For science, this influence of neoliberal programs means that policies of science and higher education have made the competition for resources and the central evaluation of scientific institutions via indicators and standardized processes the focal pillars of science’s coupling to the field of power. The results are often not ideal markets, as a rule, but largely distorted markets that do not meet the requirements of advancing research and higher education (Binswanger, 2010; Marginson, 2013).

In the wake of this transformation of the allocation of resources and status, the universities have become entrepreneurial actors (Meier, 2009). Hence, science’s heteronomous pole is more strongly marked by universities struggling for the “best brains” than ever. Accordingly, struggles for positions, which are kept within tight limits at the autonomous pole by the scientific societies’ principle of collegiality, flare up heavily at the heteronomous pole. It is necessary to generate capital from attention and honor to secure the best possible position against competitors; money and prestige must be accumulated, which are not collective property but private property. An excellent example of the transformation of collective goods into private goods is the generation of science-based patents (Huang, Feeney, & Welch, 2011). It is important, in this context, not to share scientific knowledge at random with other individuals, because this would diminish one’s

chances for obtaining patents oneself. Hence, conflicts increasingly arise between compliance with the scientific norm of intellectual communism and the economic principle of securing competitive advantages over one's competitors (Kurek, Geurts, & Roosendaal, 2007; Walsh & Huang, 2014). The more priority is given to the entrepreneurial habitus in a scientific sub-discipline, the more the scientists will no longer share their resources with all others, but only with strategically selected partners. This occurs, as a rule, irrespective of whether the individual scientists directly act in an entrepreneurial way. This development is corroborated by a study on the fields of life and material sciences in Japan (Shibayana, Walsh, & Baba, 2012).

The scientist, the manager, and the evaluator are involved in a struggle that the scientist is threatened with losing by having to subject to the logics of management and evaluation (Ginsberg, 2011). He or she can try to escape from this pressure by seeking shelter in unobserved spaces and practicing "decoupling" (Meyer & Rowan, 1977). This is done by scientists who are well aware of the new constraint from outside but who still find a niche for themselves, scientists who use research funds from applied research for their own basic research—a frequently practiced strategy in nano research, for instance. The more scientists can rely on firmly established traditions of academic research, the more they can resist the temptations of commercialization (Murray, 2010). Along with the continuing overlap of research by the logic of the accumulation of competitive advantages, a colonization of science by external logics alien to science may arise (Power, 1997; Sauder & Espeland, 2009). This is the case whenever the habitus of the scientist changes and takes the form of a manager and/or evaluator or controller.

There is a growing conflict between the particularistic interest of entrepreneurially acting universities and the universalistic ethos of the scientific community represented by the disciplinary associations. The conflict recalls the situation in the United States at the turn from the 19th to the 20th century, when professors were treated as employees and subjected to the commercial interests of the university's donors. The situation triggered the foundation of the American Association of University Professors (AAUP) and its *Declaration of Principles on Academic Freedom and Academic Tenure* in 1915. This declaration underlines that academic freedom is the precondition for progress in scientific knowledge and that it is the special duty of the scientific community to guarantee that this freedom is granted and that it is used for no purpose other than searching for the truth. In this sense, academic freedom is an individual right of the individual researcher, on the one hand, but, on the other hand, it is related to the duty to avoid anything that could damage the search for truth, such as the commercial interests of external donors. The body best in charge of protecting academic freedom is the scientific community represented by its disciplinary associations.

Academic Capitalism in the Zone of Intersection of Science, Economy, and Innovation Policy

To understand how academic capitalism works and what impact it has on science, we start with the distinction of mode 1 and mode 2 of scientific research as established by Gibbons et al. (1994). Mode 1 distinguishes clearly between basic research and the application of its findings in industrial technology development. Mode 2 unites basic and applied research in close cooperation between universities and industrial firms. Etzkowitz (2003) extended mode 2 to the “triple helix” of the close linkage of innovation policy, scientific research, and industrial profit maximization in order to enhance the competitiveness of national economies. Academic capitalism can be located in the zone of intersection of these three components of the triple helix. It is a close linkage of science, economy, and innovation policy. It proceeds in the tension field of the different principles and rules of the game of these three fields.

The guardian of science and its autonomy is the scientific community represented by the different disciplinary societies. The rules of the game are determined by knowledge communism. Knowledge is produced in collaboration as a collective good. Sharing resources and knowledge is a crucial prerequisite of progress in knowledge. In contrast, knowledge capitalism is the core of the knowledge-based economy. Capitalist enterprises compete for the private utilization of knowledge and patents. Economic growth results from knowledge-based product and process innovations. Beyond direct intersection, science and economy are linked by innovation policy and output control of science according to its contribution to economic innovation. New Public Management and funding of research by competition make science and economy accountable in their collaboration toward stakeholders with an interest in innovations. Innovation policy serves as an instrument to link science and economy for advancing economically gainful innovations. Output control of science furthers its stratification into most successful top institutions and the rank and file institutions for mass education. At the intersection of science and economy, enterprise universities compete for patents. Academic capitalism is located at the intersection of innovation policy and output control of science to produce knowledge as a private good. Entrepreneurial universities compete for monopoly rents through accumulation of competitive advantages both in economic and academic terms (Marginson & Considine, 2000).

The linking of innovation policy, scientific discovery, and economic profit maximization is embedded in the field of power that is characterized by the hegemony of neoliberalism embodied in the transformation of public responsibility and trusteeship into private accountability toward private customers on markets and quasi-markets. In this context, the space of scientific autonomy is shrinking while the space of heteronomy at the intersection with politics and the economy is expanding. The intrusion of politics into science increases the space for the logic of power accumulation; the intrusion of the economy into science extends the space for the logic of capital accumulation. Thus, there is still a core of autonomy of basic research, though there is an expanding space of heteronomically de-

termined science guided by the logics of power and capital accumulation. Autonomous science still exists, but a greater part of scientific research leans toward heteronomy with close links to the economy and to politics (Figure 2)

Figure 2. Academic capitalism at the zone of the intersection of science, economy, and politics.

Drawing on Streeck and Thelen (2005, pp. 8–9, 30–33), it might be said that the universities' growing dependence on third-party funds, sponsoring, patent yields, and tuition fees, along with the increasingly competition-geared allocation of public funds at the expense of block grants, involves a gradual transformation of the institutional structures, the practice and habitus of researchers in science. The individual steps do not reveal immediately the transforming impact they exercise when being combined and interacting. Hence, the augmentation of third-party funds or the growing number of patents as such seem to imply news of success and therefore a growth of the budget available for research and teaching. Who would object to such news? It is, however, not shown immediately how the growing amount of third-party funds, sponsoring money, patent yields, tuition fees, and competitively allocated public funds gradually changes science's institutional structures, principles, practices, and habitus. This is a transformation of science that has long taken place in secret, geared toward an adjustment to the institutional structures, principles, practices, and habitus of the economy. In terms of Streeck and Thelen (2005, pp. 19–30), this process initially takes the form of layering. This means that something new is added without removing the existing structure. A zone of intersection between science and economy is created. In the further course of events, this zone of intersection may occupy a larger space, thus reducing the zone that is free of intersections. In that case, the stage of ousting existing patterns of practice by new patterns has been reached. A conversion has occurred when no remainders of the old patterns are left. The university, which originally represented professional trusteeship, will then be an enterprise that is no longer distinguished from capitalistic businesses. In this case, the old patterns are represented by Merton's norms of universalism, organized skepticism, knowledge communism, and disinterestedness (Merton, 1973), while the new patterns are embodied by the principle

of capital accumulation and the practices of cut-throat competition aimed at monopoly rents.

Corporate Funding of Academic Research: Institutional Conflicts of Interest

The hybrid “academic capitalism” means more than just the structural coupling of science and economy. It implies the transfer of certain elements of capitalist economic practices to scientific practice (Clark, 1998; Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004; Marginson & Considine, 2000; Jacob, 2009; Lorenz, 2012; Münch, 2014; Berman, 2012). Slaughter and Rhoades (2004, pp. 1–34) identify the following typical features of this transfer:

1. New circuits of knowledge by linking scientific knowledge production directly to the production of marketable goods, for example with increased patenting activities or copyrighting of instructional material for teaching;
2. Interstitial organizations such as technology transfer or intellectual property offices at universities;
3. Intermediating organizations for linking universities with industry such as the Association of University Technology Managers (AUTM) or the Business-Higher Education Forum in the United States;
4. Enhanced managerial capacity of universities aiming at improving their external competitiveness and their internal controlling of business processes.

The direct linking of university and industry in research has been the subject of fierce debates in the United States, especially since the widely discussed case of a cooperation established between the Berkeley-based University of California’s Department of Plant and Microbial Microbiology (PMB) and the Swiss pharmaceutical corporation Novartis during the late 1990s and the early 2000s. In exchange for offering funds worth $25 million, Novartis was guaranteed the right of first utilization of any finding originating from research at PMB in proportion to the external funding it provided. Furthermore, Novartis secured two seats out of five in the department’s research council between 1998 and 2003. In this way, the company also had access to and a say in all research projects, even those that were not funded by Novartis but by public money. The major stumbling block was a private sponsor’s right to a say in publicly funded research (Washburn, 2005; Rudy et al., 2007). Remarkably, the deal between the PMB department at UC Berkeley and Novartis was initiated by members of the department via an auction from which Novartis emerged as the best bid. The auction was conducted even though public funding of research in the field of biotechnology had been rising in the years before, simply in order to enhance competitiveness in terms of available funds in comparison to other leading departments. The Novartis deal was, therefore, not a substitute for lacking public money but a means of securing competitive advantage. The deal was negotiated with direct support of the university administration, circumventing the university senate in summer 1998, when opposition by students and faculty could not successfully intervene. On No-

vember 23, 1998, it was formally signed. The Novartis deal is a case of what Slaughter and Rhoades (2004) call a new circuit of knowledge that links university research directly to economic profitability. In cases of conflict, economic interests can overrule the freedom of research and speech, that is, academic freedom. Both faculty and firm are involved in economic profit-making. The fact that such dangers for academic freedom are real is demonstrated by the case of a young researcher at UC Berkeley, Dr. Ignacio Chapela, who published findings that could be considered critical for business interests of corporations like Novartis. Dr. Chapela was first denied tenure, possibly because of opposition arising from members of the department involved in the Novartis deal, and granted tenure only with delay in a second attempt. As Slaughter (2011, p. 250) argues, the Novartis case is a paradigmatical example of academic capitalism, as it features:

> (1) creation of new circuits of knowledge that link the academy to the economy; (2) development of an administrative preference for science and technology able to generate external revenues, which undermines academic autonomy and credibility and threatens institutional potential for critique; and (3) weakening of faculty self-governance, which underpins the exercise of academic freedom on campus.

Despite harsh criticism of UC Berkeley's Novartis deal, university-industry partnerships of this kind have become standard in the meantime. For instance, UC Berkeley concluded a $500 million partnership with BP, the Lawrence Berkeley National Laboratory, and the University of Illinois at Urbana Champagne, establishing the joint Energy Biosciences Institute on the Berkeley campus in 2007. The value of this deal, which also met with protests, amounted to far higher than the sum of money invested in the Novartis deal (Dalton, 2007).

Most recent developments show an increasing dependence of university budgets on the financial market and the application of new financial instruments so that the finance department has become the most powerful in the university. Hence, we can speak of a trend toward a kind of financialization of the university (Ginsberg, 2011; McGettigan, 2013; Engelen, Fernandez, & Hendrikse, 2014). In the Netherlands, making public universities owners of their buildings in 1995 was used as a "Trojan horse" for subjecting them to the new rule of finance management (Engelen et al., 2014, pp. 1076–1081). The managing of real estate called for an extraordinary expansion of the finance department and its power; it implied the application of complex financial instruments such as loans on real estate and their hedging by derivatives such as interest rate swaps. This turn to the financialization of the university implied the reorganization of the universities into profit centers and the implementation of new instruments of controlling, using output metrics as the basis for the allocation of funds.

For the entrepreneurial university interested in increasing its assets, it is of strategic importance to establish close links with leading corporations, particularly with corporations in the same patent profile. Such strategic alliances help universities to increase revenues and corporations to increase profits through joint research and patenting. Studies by Mathies and Slaughter (2013) and Slaughter, Thomas, Johnson, and Barringer (2014)

show that, in the United States, the leading private Ivy League universities, in particular, have established close links with leading corporations in as far as members of their board of trustees are also sitting on the boards of such corporations. In the period from 1994 to 2005, the total number of joint memberships declined somewhat, however the percentage of joint memberships in the same patent profile rose from 5.6% to 26.1% (Slaughter et al., 2014, p. 18). This is evidence of targeted strategic alliances on the level of governing boards of universities and corporations. As Slaughter et al. (2014, p. 26) speculate, the overall decline of joint memberships may be due to the targeted appointment of new members from the tremendously grown shadow banking system of hedge funds or similar privately held alternative asset corporations whose members on university boards of trustees are not known. Mathies and Slaughter (2013) and Slaughter et al. (2014) raise particularly the question of institutional conflicts of interest that are likely to occur with the overlap of board memberships of universities and corporations, particularly when the scientific interest of sharing resources and knowledge with anybody, of revealing evidence against established knowledge and of making such evidence public are in conflict with business interests. Mathies and Slaughter (2013, p. 1297) propose to establish a trans-university committee of trustees whose corporations are not in collaboration with their universities in terms of intellectual property rights. Such a committee could help to foresee and handle institutional conflicts of interest.

The Logic of Academic Capital Accumulation

Beyond such institutional conflicts of interest, turning universities into enterprises implies a tendency toward overruling the genuine rules of scientific practice by the rules of capitalist competition. The capitalist economy is characterized by competing businesses striving for profits and trying to gain competitive advantages over their rivals to secure monopoly rents. This is done, for instance, by innovations protected by patents or by creating a brand that ties the customers in such a way that they do not even take a look at competing products. Branding, for instance, is apparently behind the practice of the media to quote or let speak a Harvard professor before a professor from any other university is taken into consideration at all, independent of the real competences at stake. The voice of a Harvard professor is of higher worth irrespective of the truth spoken out by him or her. In the price struggle of mass goods, the exploitation of a cheap workforce is the key to success. In the quality competition of products in the so-called premium segment, the presentation of exclusiveness—which also includes a high price—is of crucial significance. Furthermore, price-fixing agreements within cartels may drive potential competitors from the market. Without a stark competition policy and the fighting of cartels by watchful cartel authorities, practices may easily gain the upper hand that distort competition and fuel the formation of monopolies, oligopolies, or cartels. Talking about the transfer of capitalist profit maximization to science, we should definitely bear in mind such distortions of the market that obstruct competition. Such distortions are even highly probable, because, unlike the economy, science is not yet sensitized to them and there are no explicit measures to prevent monopolies, oligopolies, and cartels.

To the outside, the striving for monopoly rents is the characteristic feature of a capitalist business, while to the inside it is comprehensive managerial control penetrating all operational processes and being geared toward the strategic goal of profit maximization. For companies depending on the capital market, shareholder value has become the crucial criterion for a company's competitiveness, determining whether or not investors will be attracted. Today, controlling works above all with the tool of marketizing business processes, either by in-house profit centers or by outsourcing and purchasing parts or services from outside. This marketization of the operational processes is complemented with a comprehensive control system that identifies the profitability of even the smallest process units via indicators at any time and shows what should be done at what place to increase profitability. The workforce is made up of entrepreneurs within the enterprise. On the one hand, they enjoy more scope for decision-making while, on the other hand, they have to prove their profitability anew every day. The "entrepreneurial self" is released to the freedom of self-determination but is, at the same time, exposed to the panopticon of an all-around feedback (Bröckling, 2007, pp. 236–247).

Academic capitalism means the transfer of these practices of a capitalist enterprise to science. This involves far more than the structural coupling of science and economy. It is more a sort of subjecting science to the laws of the economy. Hence, there is the danger of the autonomy of science coming to suffer from this situation so that it will be increasingly unable to meet its genuine function of advancing progress of knowledge, because it lacks the necessary institutional requirements. A crucial step toward the adjustment of scientific practice to the outlined practice of capitalist profit maximization is the so-called entrepreneurial university, which has developed in an exemplary manner in England and the Netherlands in response to the change of the allocation of funds to a competitive process. Burton Clark (1998) brought this development to the fore. Warwick in England and Twente in the Netherlands have become models for showing how a university's transformation into a quasi-enterprise can succeed. Achievement is measured, in the first instance, by the accumulation of capital, just as it is done for a capitalist business. Initially, we must simply think about financial resources, which are multiplied by successes in the competitive allocation of public funds and the recruitment of private sponsors, contracts with businesses from the industry, the foundation of own enterprises, and the acquisition of tuition fees. Growing financial resources make a university more attractive for professors and students. It can attract an increasing number of renowned scientists and can charge higher tuition fees as a result of the increased demand for places. In this way, it enters into an upward spiral where money and prestige are accumulated in a circular process.

The accumulation of economic capital is accompanied by an increase of other capital types. Recruiting a greater number of renowned scientists increases the network of cooperation partners, while higher amounts of money help to invite more scientists for short- and long-term stays. The university becomes more attractive for foreign students, who form a global alumni network after having graduated and returned to their home countries. All this increases the volume of available social capital. Over a longer period of time, cultural capital may increasingly add to social capital. The university is covered by

the media more frequently, its professors are coveted lecturers and commentators, its visibility is heightened by publications, and it becomes a cultural authority contributing to forming our view of the world. This position is then similar to that of *The Harvard Business Review*, which determines strongly the global understanding of economy, businesses, and management. What is growing, above all, is the field-specific scientific capital due to the university's increased visibility in the Web of Science of the Institute for Scientific Information (ISI) of Thomson Reuter in Philadelphia. Likewise, the institutional capital augments in the form of memberships in the most influential organizations of science. Alongside this growth of different capital types in a mutually strengthening process the university's prestige is rising as the symbolic reflection of material success. Hence, material capital is transformed into symbolic capital. The circular accumulation of money and prestige also involves a close connection and mutual enhancement of academic and commercial activities. Owen-Smith (2003) demonstrates a shift from separate systems of academic reputation and commercial success in patenting toward an increasingly closer connection of these for the 89 most research-intensive U.S. universities between 1981 and 1998. Both converge in establishing one stratification order in which academic publications and commercial success mutually enhance each other in a process of circular accumulation of advantage.

To the outside, the university acts like a capitalist enterprise by investing all sorts of existing capital in research and teaching in such a way as to augment it. In this context, the circle of economic and symbolic capital, money, and prestige is of crucial significance, which also drags along the other capital types. To the inside, forms of management and controlling have also been transferred to the university from capitalist enterprises. The university management has gained in decision-making power, while senate and faculty councils have lost a great deal of their impact (Ginsberg, 2011). The university management is meant to be enabled to take strategic action. Target agreements and performance-related resource allocation are used to achieve in the competition with other universities (Lorenz, 2012). The accreditation of study courses and increased measures of quality management in teaching—for instance by the regular evaluation of courses by students and by further training seminars—underline the students' new understanding of being "customers," which has likewise been borrowed from the economy. In view of scarce resources, staffing in university management has been extended considerably at the expense of cutbacks in the merely administrative sector.

Field Effects of Academic Capital Accumulation: Over-Investment at the Top and Under-Investment among the Rank and File

In his study *Creating Entrepreneurial Universities*, Burton Clark (1998) has described the success story of this transformation of the university into an enterprise. Indeed, the cases of Warwick and Twente show an astonishing rise to the rank of a university that has succeeded in advancing the circular accumulation of material and symbolic capital. This is

proven not least of all by the increase in third-party funds. Can this be seen as evidence that the transfer of strategies and programs used by capitalist enterprises to universities makes science flourish as well? Taking only the increase of third-party funds and the subsequent augmentation of other capital sorts at a university as evidence, as Clark does, and neglecting the consequences for the entire system and scientific practice as a whole would mean ignoring major consequences that are of crucial significance for arriving at a farther-reaching assessment.

Problems start with limiting the view on performance to measurable indicators, which are themselves part of the adjustment of scientific practice to the economic one. When an enterprise increases its sales figures while staying profitable, we usually do not wonder whether this rise in sales occurred at the expense of other enterprises being ousted from the market, as long as there are sufficient alternatives available. It is the job of the cartel authorities to guarantee this availability. The question arising here is how many alternatives are needed to have a sufficient amount of choice. For scientific products, this need not necessarily be the same dimension as for economic goods. For economic goods, the price is the crucial criterion. There must be enough competitors to avoid customers having to pay exaggerated prices. For scientific products, in contrast, there is no such criterion. Something completely different is what matters here, namely the renewal frequency of knowledge. This is the genuine, scientific yardstick that helps to assess whether a sufficient amount of different sources for generating knowledge is available. However, contrary to price competition, where a handful of suppliers might be sufficient, it is not possible to determine an optimum level here. There are no upper limits at all for knowledge generation. As a rule, we would like to have more renewal of knowledge than science is able to produce. Hence, a maximum of variety is required. This is not least of all because it is impossible to make any concrete plans as to where and when a new discovery will be made or a new idea created from which new knowledge will result. Robert Merton and Elinor Barber (2006) called this the serendipity of progress in knowledge. Hence, there cannot be enough locations where knowledge is generated.

Preserving diversity is the reason why science has to be treated as a public good, as Michel Callon (1994) has emphatically argued. Being a private good, scientific knowledge will be subjected to the struggle for monopoly rents and the corresponding marginalization of heterodox views of the world; it will slip into lock-in effects of the path-dependent development of knowledge that is common to the economic production of private goods. According to Callon’s analysis, the economic definition of a public good does not suffice to protect science as a public good. In economic terms, a public good cannot be divided into individually acquired and consumed slices, and nobody can be excluded from its consumption. A clear example is the air we all need in order to breathe and survive. However, in the wake of neoliberal reforms, many public goods have been privatized over the past 30 years, from mass transportation right through to higher education. It is, therefore, a question of a political decision whether a good is considered public or private. The economic definition of the public good is, hence, insufficient for protecting science from policies of privatization.

Reports about a university's achievements in recruiting third-party funds do not show whether this will benefit science as a whole. This would have been the case if the available resources in the system augmented and the strategy applied by Warwick and Twente had helped to raise the competitors' capital as well. Indeed, the entrepreneurial strategy has fed more private money into the system and has thus balanced the simultaneous reduction of public funds. At the same time, the allocation of funds has, however, become increasingly unequal, because the ever fiercer competition for funds has brought the Matthew effect very strongly to the fore (Merton, 1968). A further consequence of replacing block grants by the competition for third-party funds has been the increasing separation of enriched research from impoverished teaching (Meier & Schimank, 2009). The latter is increasingly conducted by a host of low-paid part-time instructors on temporary contracts, while highly paid star scientists are freed from teaching obligations. Furthermore, the curriculum has to adapt to the market to attract students paying ever higher tuition fees. The curriculum turns away from criteria of professional trusteeship for the provision of a public good and toward criteria of market success in selling a private positional good. It becomes a profane job restricted to offering prestigious titles at the highest price or mass articles at the lowest price.

A whole series of further features contributes to the scientifically counter-productive effects of the conversion of universities into enterprises with regard to external struggles for positions in the academic field. A major feature is the overlap of genuine scientific competition for progress in knowledge between individual scientists or research groups with the competition between universities for the best of these scientists. The strengthening of this competition for the "best brains" will in no way fuel scientific competition itself. This is overlooked as a rule. On the contrary, it will lead to a concentration of top scientists at few locations that form a closed circle from which they reproduce themselves continually. As Val Burris (2004) has shown in an interesting study, the top 20 departments of sociology in the United States recruit 88% of their junior faculty from their own circles. This high level of self-recruitment can be considered a sort of scientific caste system, which reduces variety and hence impairs progress in knowledge. This caste system is, however, the inevitable consequence of a cutthroat competition without the intervention of a scientific cartel body. And sociology is even far less closed than economics, for instance (Fourcade, Ollion, & Algan, 2014).

Approaching such a closed system of elite circulation it can be observed that the greater number of the lower ranking locations increasingly hand their top scientists over to the higher ranking locations. This is an essential effect of the fiercer competition for resources in the UK. The fact that Warwick has become a particularly coveted location has ensured that previously competitive locations are no longer in demand. A clear shift of scientific staff from the middle ranges to the top (Leišytė, de Boer, & Enders, 2006) can be observed. In science, the economic competition has generated a kind of academic cannibalism. The top locations withdraw the best brains from the wide mass of locations and thus oust these from competition. This, in turn, reduces variety and undermines science's power of renewal. These barriers to progress in knowledge triggered by the concentration of an abundance of research funds among the top institutions and the simultaneous

impoverishment of the wide mass of them can be recognized in that, as a rule, there is a curvilinear u-shaped relationship between investments and returns in the form of publications. Hence, the marginal utility of each invested euro rises up to the critical mass specific for a certain subject on the medium level. Beyond that level, the marginal utility of additionally invested funds drops (Jansen, Wald, Franke, Schmoch, & Schubert, 2007; Münch, 2014, pp. 223–228, 231–233; Münch & Baier, 2012; Baier & Münch, 2013). Looking at data from the British Research Assessment Exercise (RAE) for chemistry, total output of articles increases with total investments of money in a positive linear way; output of articles per professor varies with investments of money per professor in a curvilinear inverted u-shaped way; output of articles per 1 million pounds of invested money decreases with investments of money (Figure 3).

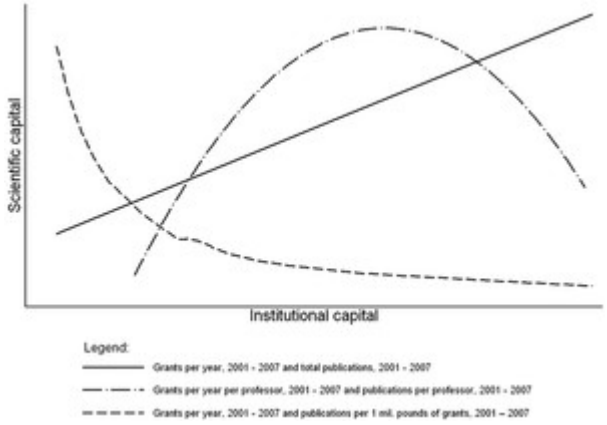

Figure 3. The relationship between institutional and scientific capital.

Sources: Research Assessment Exercise (2005); Research Assessment Exercise (2006); Research Assessment Exercise (2008); Münch (2014, pp. 227–228, Figures 7.8–7.10). Notes: Grants are measured per year in thousands of pounds. Author's own calculations.

Organizational Effects of Academic Capital Accumulation: Shrinking Diversity and Creativity

The strengthening of the university management in academic capitalism establishes a kind of audit university and involves a weakening of precisely that level that generates knowledge and fuels progress in knowledge, namely the level of individual researchers. There is no other organization where the top possesses so little knowledge and the lower level of researchers so much. We might even say that the university management knows nothing while the researchers know everything. Accordingly, the university management is forced to apply metrics (Porter, 1995; Power, 1997). However, control by metrics must fail in this case because there is no other activity that is so difficult to assess by metrics as scientific practice in research and teaching. Every indicator and every set of indicators must, therefore, necessarily lead to a reduction of variety, which is counterproductive for

science. Furthermore, this occurs in a functional area of society in which variety is what matters most for raising performance. The greater the variety, the greater are the chances for achieving progress in knowledge. However, the increasingly tighter control of researchers' output forces them to subject ever more to the normalizing measures of the peer review of high-impact journals. Science drives toward intellectual closure under such conditions (Subramaniam, Perrucci, & Whitlock, 2014). What is particularly normalizing is the impact of the increasingly more powerful rankings on science (Espeland & Sauder, 2007, 2009; Sauder & Espeland, 2009; Hazelkorn, 2015). Evidence exists from economics, for instance, showing that the Research Assessment Exercise (RAE) has supported the dominant neoclassical school and has marginalized heterodox approaches such as political economy, because publications in high-impact journals are most highly rated so that publication efforts are concentrated on these journals, which favor orthodox over heterodox views (Lee, 2007; Lee, Pham, & Gu, 2013). The new Research Excellence Framework (REF) will not change anything in this respect. The institutional basis of the normalizing effect of peer review in economics is a kind of oligopoly of editors and authors of economics journals (Hodgson & Rothman 1999; Fourcade, Ollion, & Algan, 2014). Similar effects are revealed by a study on history (Hamann, 2014).

It is therefore quite reasonable for science to use other tools for quality assurance than the economy (Marginson, 2008). Unlike the economy, where identifiable control measures can raise the output of precisely defined products, progress in knowledge cannot be controlled in science. It even defies any control. Any attempt at controlling means a limitation of chances for progress in knowledge. In science, indicator-based control is nothing but a substitute that simulates something that might even be prevented from developing by precisely that measure. When a university has raised its third-party funding by establishing large research centers, this does not mean that it makes a greater contribution to progress in knowledge in that way. It simply has collected more money than before. This has been done, as a rule, at the expense of subjecting researchers to constraints of cooperation that ultimately limit their space for creativity in research. In many cases, this is not a freely chosen cooperation, but rather an enforced one on the spot, while the greatest part of fruitful cooperation is usually carried out irrespective of the location. Individualists are subjected to a team order, which makes them lose a substantial degree of their creative capabilities (cf. Heinze, Shapira, Rogers, & Senker, 2009; Whitley, 2011). This is what happens in fact in as far as the entrepreneurial university aims at strategically planning large-scale fund raising by focusing on large-scale research collaborations. It has turned into a strategically planning university.

It is only by incurring a considerable loss in creativity, variety, dynamism, and renewal that science can be forced into the form of teams. These teams compete with each other like the teams in the Champions League of Football in order to select the winner from always the same group of clubs every year—clubs that are rich enough to buy the best players and coaches (Milanovic, 2011, p. 191). Obviously, science is not a game that is suitable for entertainment. Nevertheless, its adjustment to capitalist competition has made it apt for that game so that the media generate money from the annual publication of uni-

versity rankings. This is certainly a lucrative process for the media, but a problematic one for science, as has been pointed out so far.

Summary and Guidelines for Further Research

As summarized in Figure 4, two global forces are transforming the academic field toward establishing a kind of academic capitalism: the neoliberal agenda of New Public Management (NPM) and the establishment of an academic champions league by international and national university rankings. These two forces are superimposing the institutional competition of universities for monopoly rents on the individual competition of scientists for progress in knowledge and recognition of contributions to this progress by the scientific community. Three features of the new university carry forward this process: The entrepreneurial university aims at monopoly rents and the circular accumulation of material and symbolic capital. The audit university is tightening internal controls via quality management. The strategic planning university is aiming at the acquisition of third-party funds by establishing large-scale research collaborations. These three global trends are filtered by country- and subject-specific cultures and institutions to produce a path-dependent development of special varieties of academic capitalism (Münch & Schäfer, 2014). This development is shaped by material structures varying between oligopoly and pluralism and symbolic structures varying between orthodoxy and heterodoxy. Material struggles for positions in the field invoke three mechanisms of inequality production and reproduction: (1) the Matthew effect of rewarding the already rewarded; (2) the Potlatch effect of creating dependency of the broad mass on the top institutions; and (3) the closing effect of circulating faculty exclusively among the top institutions themselves and displaying academic luxury that is unavailable to the broad mass. Symbolic struggles on the doxa and the rules of the game in the field invoke three mechanisms of constructing reality: (1) the visibility effect of allocating attention to institutions according to their visibility; (2) the effect of complexity reduction of limiting the assessment of institutions to a small set of indicators in order to make them commensurable and easy to rank; and (3) the consecration effect of raising the gaming of indicators to a sacred quality seal. The entrepreneurial university turns this practice away from the rules of the game of the autonomous core of science as it is guarded by the scientific community represented by the different disciplinary societies, that is, away from sharing resources and knowledge as collective goods, away from collegiality, and toward competition for accumulating resources and prestige, material and symbolic capital. The audit university establishes a panopticon of monitoring research according to an unavoidably narrow set of indicators so that uniformity replaces the diversity of paradigms, methods, and topics of research. The strategic planning university turns research away from the freedom of individual scientists to decide on their own on what to do and with whom to collaborate according to converging research interests spontaneously and leads it toward the constraint of joining collaborative research projects that have been strategically established in order to allow for the acquisition of large-scale funds. Enhanced scrutiny of further research should focus on the effects of these changes of scientific practice on the evolution of scientific knowledge. Major questions for future research include, for instance, how far the compe-

tition for capital accumulation between university enterprises is increasing inequality in possessing material and symbolic capital and is sharpening the separation of enriched research and impoverished teaching between and within universities, because money and prestige are accumulated primarily through research excellence. It is also important to investigate the relationship between investment and returns and scrutinize how far increasing inequality in the availability of resources results in strengthening an inverted u-shaped relationship with over-investment at the top and under-investment in the lower ranks with shrinking total productivity of the entire system. Furthermore, we have to look at closely and in detail at the diversity-destroying effects of the audit university and at the creativity-destroying effects of the strategic planning university, which sets narrow limits to freedom of research (Figure 4).

Figure 4. Academic practice between collegiality and competition, diversity and uniformity, freedom and constraint.

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