

The impacts of new governance on teaching at German universities. Findings from a national survey

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Abstract In this article we will present findings from a national survey questioning the actual impact of the new governance structures at German universities on academic teaching. To begin with, we give a theoretical underpinning to the economization of higher education institutions (HEIs) according to Principal-Agent Theory. This allows for the development of hypotheses about the influence of new selective incentives (merit pay, performance-related budgeting, Management by Objectives, teaching awards) on the professors' academic teaching behavior. Instructed by critical considerations on Principal-Agent Theory we extended the axiomatics of this economic theory by incorporating concepts like work task motivation and academic socialization for a supposedly more comprehensive explanation. Data from a nationwide German survey allows us then to test our theory-driven assumptions. Our target population was the entire collectivity of all professors at German universities from which we could draft a sample 8,000 individuals. An estimation of four different OLS-regression models shows that the hypotheses derived from Principal-Agent Theory must be rejected whereas the hypotheses based on motivational aspects and socialization processes can be confirmed. Based on our analysis we can conclude that for the status quo of implementation there are no direct influences of new selective incentives on the actual teaching performance whereas we have strong indications for altered mechanisms of enculturation in the field of universities. New Public Management (NPM) seems to produce a new breed of professors whose preferences and practice are conditioned by the imperatives evoked by this new managerialism.

Keywords Governance of universities · Teaching motivation · Selective incentives · Motivation · National survey

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Introduction

In recent years in all European countries, the governance of university systems has changed in the direction of New Public Management (Leišytė et al. 2009; Kehm and Lanzendorf 2007; Jansen 2007; De Boer et al. 2007; Enders et al. 2002). Conceptions like new managerialism (Deem and Brehony 2005), entrepreneurial university (Clark 1998), managerialist values (Amaral et al. 2003), and audit semiotics (Shore 2008) increasingly impose pressure on academia in Germany, too.

A review of existing literature about the German situation discloses a two-fold research gap in the discussion about the governance of universities:

1. Research on higher education and governance of higher education lacks representative, quantitative methodological scrutiny. Organizational research on the governance of higher education institutions (HEIs) is rarely conducted following a hypothetico-deductive method of testing hypotheses (for exceptions see Smeenk et al. 2009; Jansen 2007). There are quantitative surveys to be found on the status quo of the implementation of managerial steering mechanisms (for the German situation see Leszczensky et al. 2004; Liefner 2003). But, these studies provide only univariate statistics describing the meso-level of university organization instead of formulating testable hypothetical propositions about multivariate relationships between structural arrangements and their effects on individual behavior on the micro-level of professors.
2. Research on university governance does not include academic teaching. In the meantime, we have rather extensive and secured knowledge about the impact of managerial governance on research (e.g. Jansen 2010). It is rather surprising though that there is no scientific research on the effects of new managerial governance structures on academic teaching in Germany. Teaching is first of all an integral part of the institutional work order of any German professor and the financing of public universities by the respective Ministries of Education is principally based on performance in research and teaching. Besides, academic teaching is currently regaining ground in the political discourse about higher education. To counterbalance the overall trend of promoting outstanding research, policy makers like the German Rector's Conference ("HRK") and The Donors' Association for the Promotion of Science and the Humanities in Germany ("Stifterverband") (see HRK 2008) are pushing teaching excellence programmes and awards. The topic of teaching remains on the agenda of the never-ending controversy about the problem of how to reconcile the traditional German idea of the university as unity of research and teaching with the adverse structural conditions of present-day mass universities (Habermas 1987). As a discipline, naturally the didactics of teaching would eventually qualify for this field of research but it has not dedicated itself to the systematic exploration of organizational variables as antecedents of teaching performance. Research on the latter is scarce not only for the German context but on the international level as well (see Kember 1997). There is some groundwork to be done on the managerial governance of academic teaching before further elaborating on possible crowding-out effects concerning the research-teaching nexus (see Gottlieb and Keith 1997).

In consideration of the shortcomings mentioned above, our overall research interest questions the impacts of new governance structures at German universities on academic teaching: *Does managerial governance really affect the significance and the real effort put into everyday academic teaching of German professors?* These reforms are no end in itself,

but they intend to stimulate individual performance. Accordingly, in our model, the governance structure of a university is treated as the principle explanatory variable, which ought to help significantly to predict teaching behavior as the dependent variable. Otherwise, the actual state of reform has not reached its full potential or it is the wrong approach for steering universities and its members. In the end, all change reforms have to be measured against what they can actually achieve with regard to job performance.

We will answer our research question with the help of a quantitative survey targeting the population of 8,000 German university professors.¹ First of all, we will describe the theoretical underpinning of the neo-liberal transformation of the German university to develop testable hypotheses. We start with the Principal-Agent Theory and continue with a discussion of its potential explanatory power as well as some epistemological blind spots by referring to our empirical data.

Theoretical underpinning

The axiomatics of economic theories of organization are widely accepted among both scholars and practitioners of management at universities as *the* theoretical underpinning of governance and funding of higher education in the wake of the post-bureaucratic New Public Management (NPM) era (Lane and Kivisto 2008). According to Hughes (2006, cited after O'Flynn 2007) one of the four grand themes, which characterize NPM is the economic principle primarily drawn from Principal-Agent Theory and Transaction Cost Economics (O'Flynn 2007).

Following Principal-Agent Theory, incentive structures are best-suited to overcome aspects of opportunism and goal divergence, which are especially problematic in organizational settings like professional bureaucracies and their member's pursuit of power, ideology, patronage, ease of management or allocative inefficiencies. To ensure compliance to his or her target-setting, the superior (principal) provides some form of external reward or applies coercive authority to maintain or enforce the contractual agreement with his or her agent. Standard solutions are monitoring, selective incentives, and punishment (Eisenhardt 1989). Thereby, three agency problems—usually all derived from the principal's point of view—complicate the processing of the exchange between the parties involved (Arrow 1985): hidden characteristics, hidden action, and hidden knowledge. If the principal can successfully motivate the agent with the help of selective incentives it is in the self-interest of the agent not to shirk: “the principal chooses to use outcome-based incentives to overcome in part the problems of moral hazard, despite operating at an informational disadvantage with the agent. This necessarily transfers risk to the risk-averse agent” (Miller 2005: 206). Selective incentives like merit pay in academia—a concept, which by the way can be traced back to the early nineteenth century (see Taylor et al. 1991)—are supposed to change the professor's behavior by changing his individual payoff (Kollock 1998). In case of universities, the efficacy of selective incentives is most likely limited by two reasons: (1) It is very difficult for superiors or—in the case of teaching—peers to monitor and reward the performance of professors (Frey and Osterloh 2002). (2) Most incentives in the forms of career, academic reputation, and selective incentives are provided for research activities, whereas professors also have to do the teaching. For that reason, they face the problem of multitasking, but Principal-Agent Theory is generally modelled as a one-dimensional theory (Holmstrom and Milgrom 1991). New selective

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incentives have to focus more on teaching because most existing incentives almost exclusively support research. Therefore, the principal has to strengthen the least valuable option for action: teaching. In Germany as well as in other European countries four main selective incentives have already been implemented to overcome agency problems: merit pay, performance related budgeting, Management by Objectives (MbO) and teaching awards. They represent manifestations of new university structures reflecting what is usually referred to as the ‘managerialistic reform’ of higher education. Altogether, their main purpose is to align the goals and objectives of the university with those of their faculty.

Merit pay

It is somewhat revolutionary for Germany’s academics to be subjected to performance pay. The English school system for example reportedly first experimented with merit pay at the beginning of the nineteenth century (Hoko 1988). In the beginning of 2005, a new salary system (“W-salary”) was introduced in Germany to displace the old seniority wage rule (“C-salary”) in the long run. All professors, which were appointed after January 2005, are paid within the framework of this new salary system while the others remain in the old seniority wage system. Now, two-thirds of the salary is fixed time wage and one-third is performance based. In principle, three different types of performance indicators are applied: (1) appointment negotiation, (2) extra salary for leading a department, (3) performance bonus for outstanding research or teaching. Only the latter really adheres to the principles of pay for *performance*, but for that purpose exact criteria have to be determined to define what is meant by ‘outstanding’ research or teaching. Our first hypothesis is:

H 1 Receiving merit pay for teaching positively affects the subjective significance attributed to and the real effort put into teaching behavior

Moreover, existing literature about merit pay in academia emphasizes that the bonus design has to be as transparent as possible (Christensen et al. 2010) and theorizing about motivational crowding-out effects discusses the ambiguous effects of external regulation of behavior via payment on intrinsic motivation (Frey 2002; Bohnet and Oberholzer-Gee 2002).

Performance related budgeting

German universities have been increasingly permitted financial authority. This means, they can now decide on how to distribute their overall budget internally to faculties, departments and professors. Usually they do not really make use of their autonomy and allocate the federal subsidies and grants in accordance with the parameters set by the federal states ministries (“Länderministerien”). Most universities have introduced performance related formulas. In most cases the performance criteria are of quantitative nature and include measures like third-party funding, number of PhDs, number of student enrolments or average time to complete studies. Our second hypothesis is:

H 2 Formula based budgeting for teaching positively affects the subjective significance attributed to and the real effort put into teaching behavior

Management by Objectives

In recent years, most German universities already established MbO (Jaeger et al. 2005). The president (or rectorate) negotiates cooperatively with faculties and/or with single chairs to reach an agreement on strategic objectives. By now, most German universities have established MbO's, which include both research and teaching objectives. We assume if at least one topic of the agreement on objectives regards teaching there will be an effect on teaching. Our third hypothesis is:

- H 3 Management by Objectives positively affects the subjective significance attributed to and the real effort put into teaching behavior, if there is at least one item in the agreement addressing academic teaching

Teaching awards

In the majority of cases universities in Germany award a prize for teaching to enhance the status of academic teaching. The prize money is usually rather modest (on the average about Euro 1,000.00). There is only one widely recognized and reputable national teaching award, which includes a money prize of Euro 50,000.00. Our fourth hypothesis is:

- H 4 Teaching awards positively affect the subjective significance attributed to and the real effort put into teaching behavior

It is important to note here, that depending on the design of the management-by-objectives or teaching awards being used, they usually do not qualify as *selective* incentives because they fail to discriminate between those who contribute to the organization's (collective principal) interest and those who do not (Olson 1968). Besides, awards suit in many respects the scientific community (Frey and Neckermann 2008): they match well with ideological restrictions and are advantageous in comparison to other monitoring and control mechanisms with regard to feasibility. Academics appreciate awards, and awards are supposedly less likely to crowd out intrinsic motivation (Frey and Neckermann 2008). A statistical comparison of means between the two groups of teaching award-winners and the rest already showed that there is no significant difference for the variables addressing the engagement in teaching activities (Wilkesmann and Schmid 2010).

Beyond (orthodox) agency theory

The four hypotheses above have been formulated in accordance with basic assumptions of orthodox Principal-Agent Theory. If this theory is adequate and in reality capable of covering most of the independent factors that explain academic teaching behavior, our regression analysis ought to feature a high model fit respectively explanatory power. Additionally, critical theoretical considerations prompted us a priori to extend and modify the axiomatics of Principal-Agent Theory for a supposedly more comprehensive explanation of academic teaching behavior.

Agent's acceptance of agentic status

A prerequisite of Principal-Agent Theory is the differentiation between the roles of agents and principals. Traditionally, the German professor can act as principal (Schimank 2005):

The rector actually was never a professor's principal. By law the professor was subjected to the minister who de facto did not intervene in an universities' daily operations. Nowadays, under the managerial self-governance regime, the rector is the principal, but normally he or she does not directly monitor teaching performance either. Classroom teaching is a compartmented social domain where the professor plays the role of the principal detached from any superior control. Therefore, our proposition to extend the scope of Principal-Agent Theory is that the professor's acceptance of his or her agentic status, as defined by new public management principles, is more relevant to his or her actual behavior than the objectively observed situation of resource dependency and formal authority relations. To put it in other words: Does the professor accept the prescribed agency and accountability that those managerial imperatives try to convey on him or her and act in accordance to them? Therefore, our fifth hypothesis is:

- H 5 The higher the professor's acceptance of his or her agentic status as prescribed by the principles of performance-oriented steering, the higher the level of subjectively attributed significance to and the real effort put into teaching behavior

Motivational status of agentic behavior

Economic theories of action presuppose *a*-cultural conceptualizations of man, and relate individual outcomes of action to formal structural variables of governance. In order to steer professors effectively via structural variables towards certain intended behavioral outcomes, it is only plausible to further specify the professoriate as *distinctive* self-interested and goal-directed actors. Extended models of cognitive-rationalist approaches to organizing supplement the micro-foundations of the base-line model, specifically the conceptualization of award mechanisms. Crowding theories are of particular interest here, because they put forward the idea that award mechanisms can be also *immaterial* and have *intrinsic sources*. "We may say that it is this intrinsic motivation which makes academics commit themselves to their scholarly activities not as a job but as a vocation, profession and hobby; which sustains them despite deteriorating working conditions and salaries" (Moses and Ramsden 1992: 105). To get a more detailed picture of the academics motivation to teach, we apply the self-determination theory of motivation (SDT; Ryan and Deci 2000) which enriches unitary conceptualizations of motivation by differentiating between different types of regulating behavior and their consequences. SDT claims that these distinct types of motivation can be arranged along a continuum between non-self-determined (amotivation) and self-determined (intrinsic motivation) behavior. Firstly, our question is, if this frequently referred to *intrinsic motivation* is actually capable of explaining the professor's engagement and commitment to teaching. Additionally, we will test the effects of less or not self-determined external regulation on teaching behavior.

- H 6 The higher the perceived level of self-determination in teaching (intrinsic regulation), the higher the subjectively attributed significance to and the real effort put into teaching behavior

Maybe, the average German professor's preferences for teaching are not materialistic in the first place and consequently effects of material reward mechanisms should not have the kind of impact expected by policy makers (principals).

Socialization of teaching behavior

In Principal-Agent Theory, actors behave without learning processes, without socialization. The formation of preferences has no systematic place in theories of rational choice (Vaughan 1998). If anything, emerging and enduring structural properties reconstitute ‘downwards’ the dispositions of an agent. What Hodgson calls reconstitutive downward causation (2007) means that social structures have some constraining and enabling power to mold their agents’ dispositions and aspirations: “(...) It is on habits, rather than merely on behaviour, intentions or other preferences” (Hodgson 2007: 109). Besides, literature on teaching behavior also points to socialized practices as an alternative explanans: “Each academic’s conception of teaching will have formed through some complex amalgam of influences such as experiences as a student, departmental and institutional ethos, conventions of the discipline and even the nature of the classroom. As teaching is central to the role of academics, conceptions of teaching tend to become subsumed *into unconscious*. It therefore, takes a major perspective transformation to change them (...) [emphasis added]” (Kember 1997: 271).

To describe (the style of) teaching as a result of institutionally socialized strategies of action, we make use of Trigwell and Prosser’s inventory of approaches to teaching (Trigwell et al. 1994; Trigwell and Prosser 2004). They offer a concept that allows us to understand specific organizational conduct (here: teaching), beyond the influence of intended extrinsic regulation via structural properties. The academic’s approaches to teaching have been originally analyzed in terms of the strategies they adopt for their teaching and the intentions underlying these strategies (Trigwell and Prosser 1996: 78). The authors distinguish between two general types of teaching: a teacher focused approach where the teacher only transfers information to the students and a student focused approach where the teacher helps the students to change their worldviews by developing their own new knowledge. The teaching approaches can be interpreted as general attitude towards the practice of teaching which are the product of organizational socialization.

H 7 The professor’s approach to teaching positively affects the subjectively attributed significance of and the real effort put into teaching behavior

Empirical evidence

Survey design

We will now test the aforementioned seven hypotheses with the help of a survey we conducted between May and July 2009. The target population was the entire collectivity of all professors at German universities. Our sample covers 8,000 professors that were selected from the e-mailing list of the German Association of University Professors (DHV). This enabled us to almost fully access our target population (see Table 1) because the DHV maintains a database of about 20,000 German professors’ e-mail-addresses (numbers are changing constantly) from which we were allowed to draw a sample of 8,000 participants. The coverage error should be rather insignificant because the sampling frame and target population are relatively congruent in numbers.

The professors paid within the framework of the new merit pay (pay-per-performance salary) are of special theoretical and empirical interest for our study, so we opted for a *disproportionate stratified sampling*, differentiating between two strata according to the

Table 1 Comparison sample—population

Variable	Percentage within Population (N = 21.226)		Percentage within Sample (n = 1,119)	
	%	n	%	n
Old wage class C (C3 + C4)	68.6	14,338	41.5	458
New wage Class W (W2 + W3)	31.4	6,569	58.5	645
Male	79.9	19,109	77.7	826
Female	20.1	3,914	22.3	237
Age (Mean)	49.7	23,023	49.0	1,030
Linguistics & Cultural Studies	21.4	4,915	26.1	292
Law, Economics and Social Sciences	14.8	3,413	18.3	205
Mathematics & Natural Sciences	24.7	5,678	27.2	304
Medicine, Veterinary Medicine and Pharmacy	13.5	3,105	7.9	88
Forestry, Agricultural Science, Nutritional Science	1.8	421	1.3	12
Engineering	9.9	2,282	7.0	78
Science of Art	11.7	2,687	1.2	13
Sports	0.8	187	0.5	6

salary-categories (merit pay vs. old seniority pay), in order to generate enough cases for reliable estimates. In a first step, we chose all 3,244 professors in the DHV's distribution list, which receive merit pay so that the selection probability (k/N) for a professor of this subpopulation is 55.42%. In a second step, the professors paid in the old salary system have been sampled randomly. Their selection probability is 35.15%. All 8,000 professors received an invitation from the DHV to participate via e-mail. Those mails contained a link to the online questionnaire starting with a short description of the survey. After a second reminder was sent and data cleansing with the help of plausibility checks we could make use of a total of 1,119 completed questionnaires. Thus, the response rate was 13.99%.

In order to get a more complete picture of possible non-response and the representativeness of our sample we examined differences between respondents (sample) and the general population. The population data were requested and retrieved from the German Federal Statistical Office that keeps precise record about the population of higher education institutions and their personnel (Destatis 2009). Table 1 shows the comparison between sample and population parameters in central categories.

Because we have comprehensive information about the distribution of these variables' values in the target population we can make use of weight factors to compensate the disproportionate sampling fractions (Kish 1990) for descriptive statistics. On the one hand, we were able to adjust the relation between professors paid according to the old and new wage system in our sample to the ratio found in the general population. On the other hand, there is no need to weight the disproportionate strata for the purpose of multivariate analysis given we integrate the respective variables in our model as predictors; which we did. We also did not weight the underrepresented minority of professors in arts because we will not analyze the faculties of arts separately because of the small case number.

Measurements

With regards to contents, the questionnaire can be divided into four main sections: (1) domains of academic teaching activity, (2) measures of teaching motivation/approach and measures of the person-organization relation (organizational commitment, person-organization-fit), (3) reported status quo of the university's managerial/academic self-governance structure, and (4) a socio-demographic section. All in all, we covered about over 200 single items in our (omnibus) survey on the managerial governance of academic teaching.

The dependent variable—academic teaching

Interestingly, there is no comprehensive model differentiating between dimensions of activity for academic teaching. Besides numerous inventories for the evaluation of teaching quality that mainly focus on classroom teaching activities and whose validity is still widely contested, there is no definition of academic teaching that covers all areas of action involved in fulfilling the task of teaching *beyond* the domain of actual seminars or courses taught (Cashin 1989). Drawing from Cashin's proposal of an expanded definition of teaching, and with the help of didactics experts, we developed our own inventory of academic teaching.

As organizational scholars it is not our task to assess and put to rest the contentious debate about teaching quality, so we were content to ask about the (1) attributed significance of teaching, which means the level of the professor's self-reported importance attributed to his/her engagement in a specific task ("How important is it for you to ...") and (2) the perceived real effort put into teaching behavior to realize these intentions or preferences ("How much effort does it actually take for you to ..."). All items were measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Moreover, we tried to cover the work load of teaching by collecting data on the types of courses taught as well as the approximated numbers of students per course, time and work put into the assessment of instruction or preparation of exams, etc. We finally concluded the following dimensions of activity for academic teaching:

- *Preparation and revision of content*: formulation of content, succession and composition of content areas, course fit within the larger curriculum, coordination of learning content with colleagues, course revisions, updating of content with new research findings and up to date examples.
- *Methods of instructional design*: conceptualization of methods of instruction, availability of additional learning aids, social organization of instruction (formation of learning/working groups, coordination of project teams etc.), audio-visual means of instruction, conceptualization and communication of instructional goals.
- *Evaluation*: grading of exams, support and consultation during student's preparations for exams.

For the purposes of this article, we exclusively focus on the dimension 'methods of instructional design' because the latter discriminates the most between people who are engaged in teaching and those who are not. A principal components analysis clearly shows for both dimensions only one latent variable with Cronbach's Alpha = .74 for 'attributed significance to methods of instruction' and Cronbach's Alpha = .76 for 'real effort put into methods of instruction' (see Table 4 in "[Appendix](#)").

The independent variables

Merit pay

We measured the independent variables in our first hypothesis dealing with merit pay in academia with the two following items: “Do you have merit pay for teaching at your university?” and “Are you receiving *merit pay for teaching?*”.

University governance—management instruments

In order to parameterize our second hypothesis, we constructed a dummy variable that differentiates between percentages-based budgeting mechanisms that distribute at least some percentage on the basis of teaching performance, and those that do not include teaching. The original item is: “Based on the overall formula-based budget mechanism at your university, what percentage of the tangible means/staff appropriations is distributed according to criteria of teaching performance?”. The item “Does your agreement on objectives [with the dean/rectorate] include any statements on the advancement of teaching activity?” is used to gather information that addresses the instrument of Management by Objectives (hypothesis three). To collect data on the use of teaching awards (hypothesis four) we have asked “Does your university promise a teaching award that you could potentially win?” and “Have you ever won a teaching award?”.

Self-perception of agentic status

To get information about the professors’ self-perception regarding his/her agentic acceptance of economic performance-related imperatives evoked by managerial steering mechanisms at universities (fifth hypothesis), we developed a four-item scale: general reactance towards managerial governance, non-feasibility of measuring academic performance, inadequacy of managerial governance for professors, awareness of managerial instruments as restricting control mechanisms. This scale is reliable with Cronbach’s Alpha = .81.

Motivation to teach

To get findings about the professors’ motivation to teach, we used items from Fernet et al.’s (2008) Work Tasks Motivation Scale for Teachers (WTMST), which we translated into German and supplemented with a few items out of the Academic Motivation Scale (AMS) developed by Vallerand et al. (2008). Both questionnaires are reliable tools for modelling Deci and Ryan’s Self-Determination Theory of motivation (2000). All items are measured on a five-point Likert scale. A principal component analysis with varimax rotation shows four latent variables. With a KMO-value of .84 and an explained variance of 58.0%, four factors (see Table 5 in “Appendix”) could be validated: ‘intrinsic motivation’ (Cronbach’s Alpha = .83), ‘introjected motivation’ (Cronbach’s Alpha = .70), ‘external motivation’ (Cronbach’s Alpha = .71) and ‘amotivation’ (Cronbach’s Alpha = .60).

Socialized teaching behavior

To measure aspects of socialization processes, we collected data on the teaching approach (hypothesis seven) by translating Prosser and Trigwell’s (2006) inventory. A principal

component analysis with oblimin rotation ($\Delta = 0$) of Prosser and Trigwell (2006) items shows two latent variables: teacher focused (Cronbach's Alpha = .70) and student focused (Cronbach's Alpha = .54; see Table 6 in "Appendix"). The reason why Cronbach's Alpha for the student focused scale does not prove satisfactory is that we used a short-scale version of four items instead of the original item-length including eight variables which is necessarily sub-optimal with regards to reliability, because of sheer test-length (Schmitt 1996). We deliberately opted for expectable lower reliability and aimed at higher criterion-based validity by *excluding items, which are essentially repetitions of each other* (Schmitt 1996: 353). High internal consistency can be antithetical to high validity (Kline 1986). Even though this scale has a low estimate of reliability, it nonetheless contributes significantly to the explanatory power of our regression model.

We also asked the respondents if they have made any work experiences outside the scientific field and for how long they were engaged (in years). This information may well be an important constraint on the career trajectory as an academic: When a professor once worked in a private company before he or she was appointed to the current position at the university, he or she probably differs from the pure-bred academic in regards of teaching habits.

Apart from these hypothesis-driven independent variables we also included the usual suspect of gender as a control variable and the date of their last appointment to routinely check for gender-sensitivity and for tenure effects in attributed significance and real effort put into teaching behavior. We categorized the variable last appointment into three groups: (1) The last appointment was 2 years or less ago. These are the newcomers at the recent university. (2) The last appointment was three to eight years ago. This period includes professors in the old as well as professors in the new salary system. (3) The last appointment was more than 8 years ago. This group of mature professors is the reference category.

Another plausible effect is the influence of different disciplines on teaching behavior. For example, most probably economists should significantly differ from educationalists in respect of their approach to respectively reflection of academic teaching. Therefore, we ran separate OLS regressions for all disciplines covered by our sample (see Table 1) to test this effect. To sum up the results, we can contrary to the expectable reject any specific disciplinary effect. Thus, we legitimately neglect the disciplines in the following OLS regressions.

Empirical results and findings

We used OLS-regression analyses to check our theory-driven hypotheses (Table 2). We estimated four multiple regression models to test linear associations among variables: we always separately tested for both groups; professors paid by the new merit pay and the ones paid by the old seniority pay, as well as for both dependent variables ('subjectively attributed significance to methods of instructions' and 'real effort put into teaching methods'). All effect sizes (strength and direction of relationship) are represented by non-standardized regression coefficients.

Hypotheses one to four have to be rejected. According to all four regression models there are no significant effects of managerial instruments on academic teaching. Consequently, as far as *the current status of implementation* is concerned, we can conclude that neither merit pay, formula based budgeting, nor teaching awards effect teaching behavior at all. The influence of the variable 'teaching award winner' is the exception to the rule.

Table 2 Linear regression models

	Significance methods (non-stand. regression coef.)		Effort methods (non-stand. regression coef.)	
	New merit pay	Old seniority pay	New merit pay	Old seniority pay
Hypotheses 1–4				
Formal governance of academic teaching				
Merit pay for teaching at university (1 = yes; 0 = no)	.000	–	–.049	–
Receiver of merit pay for teaching (1 = yes; 0 = no)	–.001	–	–.123	–
Formula based budget for teaching (1 = yes; 0 = no)	–.026	–.034	–.030	–.145
Agreement on objectives includes (1 = yes; 0 = no)	–.014	.079	.056	.023
Teaching award at university (1 = yes; 0 = no)	–.060	–.031	–.011	.013
Teaching award winner (1 = yes; 0 = no)	–.105	–.227 ⁺	–.054	–.418 ^{**}
Hypothesis 5				
Self-perception not to be an agent to managerialism	–.096 ^{**}	–.109 ^{**}	.010	–.117 ^{**}
Hypothesis 6				
Motivation to teach	.094 ⁺	.176 ^{**}	.064	.072
Intrinsic teaching motivation	.057	.051	.057	.070
Introjected teaching motivation	–.047 ⁺	–.044	–.048 ⁺	–.029
Extrinsic teaching motivation	.039	.092	–.036	.180 ^{**}
Amotivation	.113 ^{**}	.101 ⁺	.211 ^{**}	.128 [*]
Hypothesis 7				
Socialized teaching behavior	.476 ^{**}	.252 ^{**}	.336 ^{**}	.229 ^{**}
Academic career trajectory	.157 ⁺	.366 ^{**}	.064	.381 ^{**}
Control variables				
Teaching approach: teacher focused	–.203 ^{**}	–.236 [*]	–.077	–.351 ^{**}
Teaching approach: student focused	.116	.254	.091	.548
More than 3 years in private companies	.086	.127	–.014	.026
Gender (1 = male; 0 = female)	.602	.433	.602	.433
Last appointment (1 = 1–2 years)	.259	.139	.113	.135
Last appointment (1 = 3–8 years)				
n				
Adjusted r ²				

Level of significance 1% (**), 5% (*), 10% (+)

For the group of teaching award winners within the old seniority pay this variable has a significant negative effect on the self-reported effort put into teaching methods. We can only interpret this impact with the level of experience and routine that especially senior outstanding teaching award winners presumably have in regards to teaching methods.

The professors' rejection of their agentic status prescribed by the principles of performance-oriented governance has an expectable negative impact on the attributed significance to and real effort put into teaching methods; i.e. hypothesis five is confirmed. This finding is evidence for our assumption that the professors' self-conception not to be an agent of this new managerialism has a negative effect on both dependent variables.

All in all, we cannot generally confirm the claim of hypotheses six. A perceived level of high self-determination (intrinsic motivation) in teaching positively effects *only* the significance attributed to teaching behavior but not the real effort invested in teaching. Surprisingly, there is a positive impact of amotivation on real effort put into teaching methods for professors within the old seniority pay. Maybe it can be attributed to their tenure during which they have learned to deal with frustrating teaching conditions (amotivation) in a way that they do not allow them to influence their actual teaching activities negatively. To the contrary, they seemingly react with an increased teaching effort.

In alignment with the seventh hypothesis, the two teaching approaches (teacher and student focused) have a significant positive effect on the attributed significance to and effort put into teaching methods. Specifically, the student oriented conception is one of the strongest predictors in our model. These results support our a priori theorizing to overcome the limitations of Principal-Agent Theory. The work experience of more than 3 years in private sector enterprises has a positive impact on teaching behavior in general. However, this relation is only highly significant for the group within the old seniority pay.

The variable of gender shows also a significant impact on the dependent variables. Females generally attribute a higher significance to teaching methods than males. The variable 'last appointment' has no significant effect at all.

In summary, we have to reject the assumption about a goal-directing or performance-enhancing influence of selective incentives according to Principal-Agent Theory whereas we have rather strong empirical evidence for the influence of socialized, 'cultural' factors on teaching methods. Up to now, the new governance system in Germany has no direct impact on their professor's teaching behavior. Nevertheless, our analysis made us aware of the salary scheme which obviously makes a difference. Therefore, we conducted a comparison of means for independent groups and the non-parametric Mann–Whitney-U rang sum test to analyze differences between the two salary groups of professors. The results of our regression analysis gave us reason to believe that these collectives might best represent two distinct and distinctive groups as far as a change of attitude towards new ways of organizing universities is concerned (Table 3).

Quite interestingly, we can see that there is an identifiable difference in preferences and practices between the old seniority pay and the new merit pay: Most notably the variables acceptance of agency, extrinsic motivation, and preferences for symbolic or monetary compensation performance bonus. The self-perception not to be an agent is significantly higher in the group characterized by the old seniority pay. The salary groups do not differ in regards of intrinsic but in extrinsic motivation, i.e. the professors remunerated by merit pay are more externally regulated. Additionally, the merit pay group values performance bonuses to a higher degree both in monetary and symbolic respects. This result further underpins the assumption of professors paid within a more performance-oriented salary system adapting to the latent imperative evoked by the NPM doctrine of getting adequately paid according to the level of performance or engagement.

Table 3 Mean comparison and Mann–Whitney-U-test between groups

	Group	N	Mean \pm SD	Mann–Whitney-U-test
Acceptance of agency	New merit pay	621	3.11 (1.06)	.000
	Old seniority pay	444	3.39 (1.08)	
Intrinsic-identified motivation	New merit pay	633	4.27 (0.67)	.776
	Old seniority pay	447	4.27 (0.68)	
Introjected motivation	New merit pay	631	2.99 (0.83)	.915
	Old seniority pay	445	3.00 (0.86)	
Extrinsic motivation	New merit pay	630	2.95 (1.27)	.000
	Old seniority pay	447	2.66 (1.26)	
Amotivation	New merit pay	632	1.55 (0.68)	.324
	Old seniority pay	445	1.61 (0.73)	
Teacher focused approach to teaching	New merit pay	631	3.17 (0.70)	.000
	Old seniority pay	447	3.42 (0.68)	
Student focused approach to teaching	New merit pay	632	3.88 (0.69)	.000
	Old seniority pay	447	3.71 (0.66)	
Effort put into methods of teaching	New merit pay	629	3.26 (0.82)	.001
	Old seniority pay	445	3.11 (0.84)	
Attributed significance to methods of teaching	New merit pay	629	3.54 (0.77)	.000
	Old seniority pay	445	3.32 (0.80)	
A performance bonus is of principal importance, because it rightfully awards teaching in <i>monetary</i> respect.	New merit pay	629	3.62 (1.38)	.000
	Old seniority pay	441	2.78 (1.49)	
A performance bonus is of principal importance, because it rightfully awards teaching in <i>symbolic</i> respect.	New merit pay	621	3.62 (1.38)	.000
	Old seniority pay	441	3.18 (1.47)	

High levels of significance are highlighted in bold characters

Discussion and conclusion

We can now answer our main research question: On the one hand, there are no significant direct impacts of the new selective incentives (based on Principal-Agent Theory) on the actual self-reported teaching behavior, yet. Selective incentives are probably not the best way to highlight the relevance of teaching. On the other hand, we observe altered mechanisms of enculturation in universities. Here, sociological concepts of interest seem the more appropriate than explanations offered by economic theories of organizations (Swedberg 2005). Sociologists like Bourdieu make the analytical shift from interests as ends to interests made cultural by stressing the means (dispositions, cultural toolkits) through which people in organizations formulate strategies of action (Rambo 1999: 329). Organizations (inclusive universities) as fields constitute distinct social arenas of symbolic (inclusive economic) resources and profits producing forms of interests that may seem like disinterestedness from the outside point of view (Bourdieu 1998: 84 ff.). Whereas the corporate manager may be driven and directed by the logic of the economic field, the

academic's scientific practice is traditionally adhering to the principle of gaining scientific authority as the currency that can be transferred into symbolic power (Bourdieu 1975). In the wake of its 'economic colonialisation' (see Bourdieu 1998) the scientific field is converting and subsequently it may produce a new breed of professors in the future with a habitus structured by the new governance model.

Even if selective incentives have no direct effect on teaching behavior, we can observe diverged attitudes. Professors within the new merit pay scheme have higher preferences for the new bonus system than the professors in the old seniority pay. In the long run they will probably expect corresponding incentives for their expenditure of work. Because in Germany the new merit pay provides them with less basic salary than the old seniority pay, they have no chance but to rely on incentives to better their total income. We should question if the rector (principal) is really willing to give incentives to the agent because we can apply the moral hazard principle from Principal-Agent Theory for the principal, too: „... even when an outcome-based incentive system is socially efficient, the principal may prefer not to implement it. The reason for this is a form of moral hazard: the principal can expect to earn a higher residual profit with an inefficient contract than if the agent is induced by a bonus to take the socially efficient outcome. The bonus necessary to induce the efficient action is simply greater than the possible return to the principal. The principal's self-interest tempts the principal away from the efficient use of incentives” (Miller and Whitford 2006: 215). In this case, all professors will get rather amotivated in the long run. Theoretically, the question arises if economic theories are in the end adequate to help us understand or inform us about developments, social mechanisms and individual practices of higher education institutions. Culturally under-determined conceptions like Principal Agent Theory are by and large reluctant to deliver satisfying descriptions about the social creation and *modus operandi* of distinctive interests because the idea of preference formation is not accounted for within the rational choice axiomatic (Ouchi and Wilkins 1985: 464 ff.). Less orthodox rational choice theorists have acknowledged these shortcomings and started to consult cultural theories of interaction to capture intrinsic symbolic interests and meaningful purposes (see Rambo 1999: 327 ff.).

On the basis of our cross-sectional data we can speculate with regard to practical advice. Either the management of academic teaching will reach its full direct impact on the professors' behavior some time in the future, if selective incentives are implemented and designed to address teaching more efficiently by providing a more substantial and worthwhile financial backup. Otherwise, the practice of managing academic teaching should tie in with our findings on socialized routines, e.g. by sending professors to workshops for the didactics of academic teaching at an early stage of habitualization. Perhaps it makes more sense to support academic teaching by offering instructional training than by offering selective incentives. Certainly, the latter can be done at a more reasonable price without possible implications of crowding out intrinsic motivation (Frey 2002). To make a profound assessment of these presuppositions, research on university governance has to gain more insight about and further scrutinize the relationships between the design of those incentive systems and their actual effects. Here a quite straightforward example: How much money will be needed before a professor seriously thinks about intensifying his or her performance? We need further information about these decisive details of implementing and realizing Management by Objectives, merit pay etc. Ultimately, research has to investigate long-term changes with the help of longitudinal studies, to be capable of appropriately assessing the consequences of this reform in progress.

In the end, our study is to be seen as a genuine preparatory work to invent, test and validate measures and inventories for further quantitative research in universities. Our

study demonstrates the necessity and benefit of a trans-disciplinarian (see Jansen 2007: 110 ff.) approach in a sense that we were not afraid to make use and incorporate heterogeneous scientific research.

Appendix

See Tables 4, 5, and 6.

Table 4 Principal component analysis of instructional design (importance and effort)

DV: instructional design of courses	Important	Effort
How important is it for you to principally put effort into teaching as (importance $\alpha = .74$)		
... to develop specific methods of instruction? (e.g. discussions, lectures, experiments, case studies)	.760	
... to enrich the courses teaching–learning-process with additional learning aids? (e.g. handouts, motivational instructions, web-based resources)	.750	
... to conceptualize/organize the social organization of the teaching–learning-processes? (e.g. cooperative learning groups, project teams)	.759	
... to conceptualize/organize the use of audio-visual means of instruction? (e.g. instructional films, e-learning, audio-tapes, beamer)	.675	
... to conceptualize and communicate clear educational/instructional goals for your respective courses? (e.g. content (area) coverage, intended learning outcomes like higher-order problem-solving skills)	.551	
How much effort does it actually take for you (actual effort: $\alpha = .76$)		
... to develop specific methods of instruction? (e.g. discussions, lectures, experiments, case studies)		.766
... to enrich the courses teaching–learning-process with additional learning aids? (e.g. handouts, motivational instructions, web-based resources)		.764
... to conceptualize/organize the social organization of the teaching–learning-processes? (e.g. cooperative learning groups, project teams)		.772
... to conceptualize/organize the use of audio-visual means of instruction? (e.g. instructional films, e-learning, audio-tapes, beamer)		.711
... to conceptualize and communicate clear educational/instructional goals for your respective courses?		.562

Table 5 Principal component analysis of motivation to teach

Principal Component Analysis (PCA) Teaching motivation	Factor			
	Intrin	Intro	Ext	Amot
Intrinsic-identified regulation: $\alpha = .83$				
Because for me, the task of teaching is of personal importance.	.823			
Because I find the task of teaching interesting.	.805			
Because I derive much pleasure from teaching.	.773			
Because the task of teaching provides the chance to realize an aspect of my academic profession that is of personal meaning to me.	.766			

Table 5 continued

Principal Component Analysis (PCA) Teaching motivation

	Factor			
	Intrin	Intro	Ext	Amot
Because I see my teaching as a significant contribution to my students overall academic progress.	.550			
Introjected regulation: $\alpha = .70$				
Because my aspiration is to be successful at teaching, otherwise I would feel like a loser.		.785		
Primarily to get positive feedback from my students.		.750		
Because a good performance in teaching attributes largely to my self-esteem as a professor.		.595		
Because I would feel bad if I would neglect my task of teaching.		.508		
External regulation: $\alpha = .71$				
Because I get paid for it.			.793	
Because my university/employment contract demands to teach.			.734	
Amotivation: $\alpha = .60$				
I don't know, sometimes I don't see the actual purpose of teaching.				.780
I don't know why, because the work conditions provided for academic teaching are unbearable.				.772
Teaching does not mean a lot to me, because I cannot really see what academic teaching can accomplish in my students.				.556

Intrin intrinsic-identified regulation, *Intro* introjected regulation, *Ext* external regulation, *Amot* amotivation

Table 6 Table principal component analysis teaching approach with oblimin rotation ($\Delta = 0$)

Principal Component Analysis (PCA) approaches to teaching inventory

	Factor	
	TF	SF
Teacher focused: $\alpha = .70$		
In this subject students should focus their study on what I provide them.	.481	
I structure my teaching in this subject to help students to pass examinations.	.750	
I present material to enable students to build up an information basis in this subject.	.487	
In my teaching I try to cover the subject in a way it might as well be presented in key readings and textbooks.	.658	
I should know the answers to any questions that students may put to me concerning the content of my courses.	.564	
It is important to present a lot of facts to students so that they know what they have to learn for this subject.	.686	
Student focused: $\alpha = .54$		
In my teaching I invest a lot of time, to concern myself with the knowledge creation on the side of my students.		.724

Table 6 continued

Principal Component Analysis (PCA) approaches to teaching inventory

	Factor	
	TF	SF
I set aside some teaching time so that students can discuss, among themselves, ideas in this subject.		.661
It is better for students in this subject to generate their own notes rather than copy mine.		.564
My teaching should enable my students for self-directed learning processes.		.626

TF teacher focused, SF student focused

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