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**Working Paper**

## Does new public management repel talent? Findings from a choice experiment among German researchers

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# **Does New Public Management repel Talent? Findings from a Choice Experiment among German Researchers**

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## Abstract

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This paper analyses the factual effects of new public management governance on academics' job choice. Based on a large-scale choice experiment carried out with faculty from Germany's nine leading technical universities, we find that working environments characterised by levels of administrative burden and high expectations concerning third party funding acquisition are detrimental to self-actualisation and hence tend to repel potential candidates. More specifically, we find this effect to be most pronounced for those candidates that universities would be strategically most interested in: researchers with a strong track record and an interdisciplinary profile. Not denying potential benefits of external incentives for existing faculty, we therefore suggest to acknowledge intrinsic motivation as the key driving factor of academics choices and to design future governance structures accordingly.

# 1 Introduction

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The new public management (NPM) reforms have substantially transformed governance in public research organizations, universities implying a higher degree of managerial management and financialization . (Boer et al. 2007). Their intention was to strengthen performance incentives and strategic managerial control (Enders et al. 2008; Boer et al. 2007), and indeed some empirical works provide evidence that there can be positive performance effects (Schubert 2009b; Bolli and Somogyi 2011; Sandström and van den Besselaar 2018). Yet, the reforms also brought considerable structural changes (Muller-Camen and Salzgeber 2005; Hicks 2012), revealing complexities and tensions of performance-oriented research governance (Bogt and Scapens 2012; Diefenbach 2009; Butler and Spoelstra 2014; Rebora and Turri 2013). As such, the effectiveness of NPM remains controversial. In particular it is notable that the frequent harsh criticism and resistance comes from the academic community itself, i.e. the very employees who are affected by these changes. It thus seems that the higher degree of financialization, competition and bureaucratization may not be well aligned with researchers' preference structures concerning their working environment (Thomas and Davies 2005; Leišytė and Gozlan 2023; Uljens et al. 2016). Irrespective of their potentially positive incentivization effects on existing faculty, we therefore suggest that an unintentional side-effect of NPM-inspired reforms is that it becomes unattractive for researchers to accept job offers in universities strongly relying on managerialized governance mechanisms. Thus, these may lose their competitive edge on the academic labour market and limit their own capacity to strategically develop through talent attraction. If present, this effect which is not yet documented in the existing literature is of critical importance for the strategic management of universities with potentially long-lasting effects on performance.

Clearly NPM is not an unambiguously defined governance style and indeed differs strongly depending on the organizational and country contexts (Boer et al. 2007). Performance-based resource allocation, competitive third-party funding mechanisms and the increase in the reporting and other kinds of administrative burdens are among the most characteristic consequences of the implementation of the NPM governance framework in public research organisations. A steadily growing stream of literature has examined the impact of highly powered incentives on research efficiency, identifying positive effects at least under certain conditions (Schubert 2009b; Bolli and Somogyi 2011; Bolli et al. 2016; Sandström and van den Besselaar 2018; Schmoch and Schubert 2009; Jansen et al. 2007; Beerkens 2013). However, a number of studies have also reported unintended negative consequences, especially those affecting the working environment in the scholarly community (Teelken 2012; Kallio et al. 2016; Chandler et al. 2002). The negative effects on the work environments seem to be in-line with the oftentimes fierce opposition to more managerialized governance-styles from within the ranks of researchers, which may result from an incongruence with professional identities in the academic community (Morrish 2017). Particularly, Leišytė and Gozlan (2023) document the emergence of resistance platforms against new public management in the UK, France, the Netherlands and Belgium.

To make the point that NPM is often incongruent with the work conditions researchers seek, we build on Self Determination Theory (SDT) and argue that researchers seek work environments that align with their personal values and interests, fostering a sense of professional fulfilment and satisfaction (Sheldon et al. 2020). According to SDT, jobs offering higher possibilities to experience autonomy, competence and relatedness also increase intrinsic motivation (Ryan and Deci 2000). In this respect, the NPM's focus on introducing highly powered incentives and managerial orientation emphasises competitive elements which may increase extrinsic motivation. However, this may come at the expense of intrinsic motivation. Thus, when able to choose, SDT suggests that researchers

will place a penalty on job offers characterised more by managerialized forms of governance because they score lower on the level of intrinsic motivation (Potekhina and Blind 2020).

Extending our argument, we expect considerable heterogeneity. The preferences of two groups of researchers are of particular interest here: researchers with a strong track record and interdisciplinary researchers. These two groups bring value to universities in the form of research grants, highly cited publications, novel research and linkages with societal actors. Universities rely on the contributions and strategic competence of such researchers and attracting them is among the top priorities in recruitment strategies. Recruiting researchers with strong track records is particularly desirable for universities with subject performance-based governance, because such researchers increase the score highly in metrics-based evaluative environments. However, these two critical researcher groups may be particularly motivated by the desire for self-determination and autonomy, potentially escalating the tension between intrinsic motivation and highly powered performance incentives. Interdisciplinary researchers could be affected even more strongly, because their research output often falls outside standardized disciplinary benchmarking standards. (Kroll and Schubert 2023) hence put them at a disadvantage in the benchmarking exercises underlying performance-based incentivization.

To test our hypotheses, we draw on the results of a large scale choice experiment conducted in spring 2023 among all researchers of leading technical universities in Germany ("TU9"). Choice experiments are survey-based experimental designs presenting researchers with a set of hypothetical choice alternatives. While they have only recently come into use in science studies (Janger and Nowotny 2016; Rincke 2023; van Rijnsoever and Hessels 2021), the alternatives in choice experiments are exogenously given to the respondents, implying that the results of well-crafted choice experiments are not riddled by selection issues or omitted variable biases and can be considered to reflect causal knowledge about the respondents preference structures. Our results confirmed the baseline hypothesis that high reliance on third party funds and high administrative burdens reduce the likelihood of choosing an alternative by 24% and 13% respectively. Moreover, we showed evidence of heterogeneity in the responses, which were particularly pertinent in the natural and engineering sciences: More senior researchers and those with stronger track records were more likely to accept higher third-party funding requirements, while for them the negative effect of administrative requirements was inflated. Finally, performance-pay did on average not affect the choice, with the exception of highly interdisciplinary researchers who refrained from such arrangements.

This paper makes a contribution in several ways. On the conceptual level, we build on an emerging literature on the determinants of job choice in academia (Rincke 2023; Janger et al. 2019b; Janger and Nowotny 2016). This literature has largely focused on general determinants such as pay-level, access to strong peers, or teaching burden. There is little knowledge on how governance affects job choice. This constitutes a considerable gap with a view to evaluating the strategic appropriateness of different governance styles. In turn, the extant literature on the directly observable effects of governance has focused on individual, organizational or system-wide performance (Jansen 2007; Schmoch and Schubert 2009; Bolli and Somogyi 2011; Sandström and van den Besselaar 2018). However, this literature did not consider the effects of governance on job choice. If the attractiveness of the labour market is significantly affected by governance, however, this may significantly affect university strategic development capacities and thus have long-term implications on performance. Indeed, our findings suggest that there is a significant penalty exerted by higher reliance on competitive funds and higher administrative burdens. In terms of size, these considerable effects range between -13% and -24%.

A far-reaching implication of this finding is that in order to understand the effects of governance changes, it is important to distinguish between governance systems' *de facto* effects on current,



observable behaviour, e.g. the performance gains achieved via incentivization and its more fundamental impact on motivations which become apparent if researchers are given a choice (Ryan and Deci 2000). While optimistic accounts of NPM suggested that resistance would remain temporary, seeing it as a natural phenomenon during periods of institutional change, this paper's findings imply that the problem is more fundamental. According to SDT, the observed poor alignment between managerial governance structures and researchers' preference structures favouring autonomy, competence and relatedness (Gagné and Deci 2005) must be considered as structural. Hence, it is unlikely that academics' resistance will diminish as researchers get more used to the new governance system. Rather they may choose to play by the rules when required, but to opt out whenever given the choice, as our job experiment demonstrated.

Finally, we provided evidence of non-trivial patterns of heterogeneity, which universities can take into account depending on the type of positions they seek to fill. Notably, when a specific job opening targets more senior researchers at the higher end of the performance distribution, the penalty from external funding requirements is lower while that of administrative tasks is higher. In particular, as the performance pay contingent on the additional reporting does not increase attractiveness substantially. As researchers avoid academic jobs involving high administration and external funding requirements, we argue that alleviating such burden constitutes an important lever to increase job market attractiveness. On the other side of the coin, universities might reduce their attractiveness by an overt focus on performance-based tools in particular when positions for more senior staff or high-performers are to be filled.

## 2 Theory

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### 2.1 The NPM approach in University Governance

The NPM governance model of the public services rose to prominence in the 1990s. NPM governance aims to organise universities more managerially and rests on several main tenets, among which is the bestowal of university managers with stronger decision-making powers; introducing more binding systems of incentivization, such as rewards for performance and sanctions for under-performance; and rule-based allocation of resources among others. Conceptually, all of those rely on the understanding of university governance primarily informed by principle agent theory, which suggests that introducing high-powered performance incentives and competition for resources will increase efficiency (Schubert 2009b). With its emphasis on clear goal-setting, control, resource optimisation, and performance evaluation, NPM has found wide-ranging implementation across public service domains worldwide, including higher education (Diefenbach 2009).

The impact of NPM on the research system has been profound. Universities received much broader operational autonomy under the new framework while the government, as the representative of the broader society, assumed a strategic priority setting role, but its operative decision-making capacity was greatly reduced. At the same time, the government increased its ability to steer research by decreasing long-term basic funding of universities and, correspondingly, increasing the size of competitive funding programmes (Hicks 2012). The decrease in basic funds has incentivised universities to make efforts to improve the efficiency of their operations and also to optimise resources in order to be competitive in the NPM governance framework. This has led to significant structural changes, which include, among others, the widespread use of performance-based goal-setting and budgeting, introduction of performance-based incentives for staff, the implementation of control, monitoring and evaluation mechanisms.

Whether these reforms have overall contributed to increasing efficiency of academic sciences has been up for debate. While a few quantitative studies have indeed provided evidence of increases in research efficiency under specific conditions (Schmoch and Schubert 2009; Schubert 2009b; Jansen et al. 2007; Bolli and Somogyi 2011; Bolli et al. 2016; Sandström and van den Besselaar 2018), in particular affected scientists who have also complained about the associated side effects resulting from increased competitive pressure, bureaucratization and administrative burdens (Teelken 2012; Chandler et al. 2002; Craig et al. 2014). While this disapproval may say little about the actual performance effects, it nonetheless begs the question how researchers react when offered choices. Notably, when making job choices researchers may be biased against work environments shaped by managerialism, resource competition and bureaucratization.

### 2.2 Researchers' Job Decisions and NPM

Rooted in the principal-agent-theory, the governance logic of NPM starts off from the basic premise that high effort levels require high degrees of *extrinsic motivation*. It posits that in the circumstances when principals set out specific goals, but are not able to closely monitor how agents fulfil them – similarly to how public bodies are not able to directly assess the quality of scientific knowledge – controls and performance incentives need to be set up to improve the efficiency of task execution. Without such extrinsic motivation (e.g. in the form of financial incentives) agents will display opportunistic tendencies, exert low levels of effort and engagement (Ward 2007; Tolfari 2005; Schubert 2009b).

Researchers' job decisions, however, are affected by many factors, including considerations of career opportunities, professional considerations, practical and family factors, as well as personal preferences. In labour psychology, several theoretical approaches have been developed to understand how individuals make job choices under such conditions of complexity.

In knowledge intensive contexts, self-determination theory is particularly useful because of its focus on intrinsic motivation resulting from experienced autonomy, competence and relatedness (Niemiec and Ryan 2009; Cerasoli et al. 2016; Marshik et al. 2017). Considerable evidence shows that job choice is systematically linked to the anticipated levels of autonomy, competence and relatedness (Sheldon et al. 2020; Chen 2017; Chantara et al. 2011; Guay et al. 2003).

A number of studies argue that the possibility to experience autonomy, competence and relatedness are particularly important in sciences. Notably, a strand of the literature emphasizes that academic identities are largely build on autonomy because academics are obliged to value scientific truth (McInnis 2009; Archer 2008; Henkel 2005). Accordingly, academics are heavily driven by personal curiosity (Strandburg 2005; Lindholm 2018) drawing them to research questions that align with their interests and passions and allowing them to autonomously shape their own research agendas.

Furthermore, scientists are motivated by the desire to contribute meaningfully to their field, advancing knowledge and making significant discoveries (Painter 2011). Pursuing a scientific career allows individuals to engage in activities that challenge their intellect and skills, providing a sense of accomplishment and mastery.

On the community level, scientific research has been self-organised and self-managed by community members (Polanyi et al. 2000). To be a scientist is to pursue own interests and passions while adhering to the norms of the community (Whitley 2000). Such work is rewarded by community recognition, which is expressed in the accumulation of scientific reputation. The community-based nature of scientific research makes it inherently collaborative (Meier 2023; Kroll and Schubert 2023; Kornfeld and Hewitt 1981), emphasizing the importance of relatedness in the career choices of scientists. Collaboration fulfils the need for social connections and shared goals. Accordingly, scientists often choose career paths that allow them to engage in collaborative endeavours, fostering a sense of community and mutual support (Darner 2014; Lemke 2002). We do not claim that SDT with its focus on intrinsic motivation applies universally to all contexts. In more hierarchical contexts with more sizeable wage disparities such as trading or consultancy SDT may indeed underestimate the power of extrinsic motivational factors. Academics, however, have usually opted into the science system for intrinsic motivations in the first place and often intentionally renounced alternatives with higher earnings. Hence, they will tend to uphold intrinsic motivation as the central criterion for all subsequent job choices. Thus, SDT presents a good framework to explain job choices in academia. Applied to the context of academia, it suggests that researchers seek to make job choices that align with their personal values and interests, fostering a sense of fulfilment and satisfaction in their work.

## 2.3 The Hypotheses

As already argued, NPM reflects a set of governance principles that have been widely implemented in many Western higher education systems over the last decades. While national contexts matter (Boer et al. 2007), all national implementations of NPM have in common that they emphasize increased competition for resources and individual-level incentivisation as its guiding principles (Enders et al. 2008; Bleiklie et al. 2016). In the wake of these reforms, in particular as the role of competition via increased reliance on third party funds and performance pay has increased, both of which can have considerable leverage to incentivize certain behaviours by instilling extrinsic motivation. As dis-

cussed previously, they may have negative effects on intrinsic motivation. Moreover, both incentivisation mechanisms and the allocation of third-party funds require some form assessment of anticipated or realized performance. This diverts considerable academic resources towards monitoring and benchmarking exercises in the form of peer reviews, evaluations or indicator-based assessments. Since many of these tasks cannot be easily delegated to administrative staff, NPM has inadvertently also increased the share of administrative routine tasks to researchers. In addition to the evaluation, also the drafting of research proposals, of which often only a minority are granted, has led to a further diversion of academic resources (García and Sanz-Menéndez 2005; Schweiger 2023).

In the following, we will discuss how these changes in governance are expected to affect academics' job choice. Beyond the mere baseline effects, we acknowledge heterogeneity: researchers differ fundamentally in their research focus and capabilities and these characteristics may give rise to relevant ramifications in the effects. Specifically, we will look at how the researchers' track-record and their interdisciplinary focus affect their willingness to take on jobs with NPM-aligned types of governance. Detailed knowledge about researchers with a strong track-record and interdisciplinary research approaches is particularly relevant also for universities due to their potential to contribute to high-quality or high-novelty research.

### 2.3.1 Reliance on Third Party Funding

Arguably, the reliance on third party funding as an option for researchers to develop his or her working group and standing within the university is the most essential novelty introduced by NPM inspired management reforms (Hornbostel 2001; Jansen et al. 2007; Schmoch and Schubert 2009; Bolli and Somogyi 2011; Bolli et al. 2016). While the acquisition of external funds has always had a (substantive) direct effect, NPM augments this effect by connecting third party funding performance to the allocations of basic funding (Christensen 2011; Enders et al. 2008; Boer et al. 2007) and to success in subsequent appointment procedures (Lutter and Schröder 2016; Schulze et al. 2008; Hamann 2019; Kleimann and Hückstädt 2021).

Nonetheless, following SDT, we still expect that researchers, who are primarily intrinsically motivated, will prefer financial research autonomy, i.e. a sound endowment with basic resources without strings attached (Janger et al. 2019a; Janger and Nowotny 2016). One reason for this is that dependence on external resources implies that scientists lose a substantial degree of autonomy in particular with respect to designing their research agendas (Miller 2004). Moreover, since funding applications are often unsuccessful, the pursuit of a research agenda is made erratic, reducing scientists' ability to autonomously develop long-term research lines. In addition, the evaluation of funding applications is performed by researchers and is a time-consuming process that cannot be delegated. The result is that, researchers expend time evaluation peer proposal and on writing their own applications, which gives them only a certain probability to pursue the proposed research line. This also reduces available resources and therefore their research autonomy (Aczel et al. 2021; Weissberg 2013; Gordon and Poulin 2009). Thus, we propose our first hypothesis:

***H1: Scientists are less likely to choose jobs involving higher needs to acquire third-party funds.***

While high reliance on external funds may compromise autonomy, their successful acquisition may offer an experience of competence resulting from the applied positive peer feedback and the associated increase in reputation and status (García and Sanz-Menéndez 2005; Münch 2009). The extrinsic motivation to secure third party funding may also reinforce intrinsic motivation of researchers to further their research lines, thanks to the recognition of their work by their peers, the university and the public. Since this effect relies on the experience of actual success, it is more likely to be relevant for researchers with a higher previous success rate. The success rates, however, are

not uniform across researchers, but are likely to depend on the researchers' track record of successful research (Laudel 2006). Their success rate and ability to comply with governance requirements is higher, thus easing the burden of needing to spend time to write proposals and to acquire funding (Graber and Wälde 2008; Fitzenberger and Schulze 2014; Fernandes and Walter 2023). Successful acquisition of third party funding also increases prestige and can at times be equivalent to that of publications, even in appointment procedures (Hicks 2012).

Another intervening factor is organisational seniority. With increasing seniority the tasks of proposal writing, processing of grants and reports can often be delegated to junior and administrative staff, while the reputational benefit primarily accrues to the principal investigator. Therefore, at later stages, researchers may still prefer full freedom provided by basic funding, yet at the same time accept the need to acquire third-party funds, which they can be more confident to obtain due to their competence, experience and resources. Hence, we offer the following hypothesis:

***H1a: The willingness to accept job offers with higher third-party funding requirements is moderated negatively by the researchers i) track records and ii) their seniority.***

Interdisciplinarity is also likely to affect a researcher's willingness to accept a job offer with higher third-party requirements. The reason is that many third-party funded projects are at least to some degree collaborative. Interdisciplinary researchers usually build their research approach on connecting otherwise separated communities through the development of interdisciplinary research activities (Gentzler 2003; Siedlok and Hibbert 2014). Therefore, interdisciplinary researchers may have an advantage in third party funding acquisition thanks to their diverse networks that allow for building novel research proposals, which link previously unconnected pools of knowledge (Brown et al. 2019; Fontana et al. 2020; Wagner et al. 2019).

In the case of interdisciplinary researchers, the extrinsic motivation provided by third-party funding acquisition may reinforce their intrinsic motivation to work in diverse collaborations, which are more convenient to organise in joint projects. Each joint project has the opportunity to develop proposals across disciplines as such researchers have access to a broader range of funders, including those in the non-scientific domain (Kaufmann and Kasztler 2009). Accordingly, they will feel a greater sense of agency and self-actualisation as, for them, third party funding does not depend on the idiosyncratic decisions of single selection panels in research councils (a situation that their more monodisciplinary colleagues may be facing) but instead opens up an array of options about which they can decide in a self-determined way.

Considering that university departments are still to a large extent discipline-based, interdisciplinary researchers often find it difficult to gain recognition for their achievements within disciplinary silos (Ryan and Neumann 2013; Bergland 2018). They may lose out on the allocation of long-term basic funds compared to their mono-disciplinary colleagues. In these circumstances, successful acquisition of third party funding can help interdisciplinary researchers demonstrate that their research is valuable as certified by the peer community. Summarising, we propose that:

***H1b: The willingness to accept job offers with higher third-party funding requirements will be less negatively affected for researchers with a strong interdisciplinarity focus.***

## 2.3.2 Performance-based pay

Ex-post financial incentivization schemes have a significant function in the NPM governance. Previous research has shown that academics care about personal income and choose thematic specialisation and career paths based on their preferences for monetary compensation (Janger et al. 2019a; Agarwal and Ohyama 2013). Financial incentives play a role in researchers' strategies to publish papers in specific journals and affect their productivity (Quan et al. 2017; Franzoni et al.

2011). Commercialisation of research results and academic spin-offs also offer financial incentives, a significant motivation for researchers to engage in these activities (Bozeman 2000).

Although SDT typically argues for the superiority of intrinsic motivational factors, these different empirical findings on the effectiveness of financial incentivization are not inconsistent with the theory. The fact, however, that incentivization can induce high performance levels at different levels by raising extrinsic motivation says little about the researchers' principal willingness to select into such high-powered arrangements. More specifically, their willingness will depend much on their individual anticipated reward prospects. In an effort to create cost-neutral financial incentives, many incentivization schemes that are de-facto implemented at universities display characteristics of a zero-sum-game, i. e. over performers gained more and underperformers gained less as for example the German performance pay-scheme for professors ("W-Besoldung") has been criticized by (Eckardstein 2003; Hornung et al. 2015). Thus the willingness to select into high-powered incentive schemes is likely to be heterogeneous across individuals and will depend on whether they perceive themselves as over performers (expecting gains) or underperformers (expecting losses). When assessing the average effects of financial incentive schemes across both groups, these effects should cancel each other out – as the 'average researcher' neither gains nor loses in the zero-sum game and hence his or her willingness to go into job environments thus governed should be unaffected.

Nevertheless, the expectation of no effect holds only on average and conceals a considerable degree of heterogeneity across individual researchers, whose willingness to accept high-powered incentivization schemes will depend on their prospective gains or losses. Here we can distinguish between researchers with strong track-records, professor-level researchers and interdisciplinary researchers. The former will be expected to maintain their strong track record and consistently receive positive evaluations based on their metric-based performance. Such researchers will be rewarded for the tasks that they already perform while motivated intrinsically. Therefore, we expect that researchers with strong track records are likely to display an acceptance of stronger financial incentivization. Following a similar logic, a similar effect is expected to hold for researchers who already have a professorial position. We summarise that:

***H2a: The likelihood to accept high-powered incentive schemes is moderated positively by researchers' i) strong track records and ii) seniority.***

The opposite may be true for interdisciplinary researchers, NPM-oriented evaluative practices in fact reinforce disciplinary silos in departments (Ryan and Neumann 2013). Interdisciplinary research has become a risky strategy in terms of organisational career development, because disciplinary evaluation systems are unable to fully honour the value, contributions and impacts of interdisciplinary research (Fini et al. 2023; Bromham et al. 2016; Wagner et al. 2011). Most likely, they would primarily be connected to publication output, a dimension on which monodisciplinary researchers are known to perform better than multidisciplinary ones in pure quantitative terms (van Rijnsoever and Hessels 2011). Hence, we expect interdisciplinary researchers to be more likely to perceive themselves as 'underperformers' not likely to receive performance-based bonuses. The result is that, they will feel more deterred by such schemes than researchers with lower interdisciplinarity focus.

***H2b: The likelihood to accept high-powered incentive schemes is moderated negatively by the researchers' interdisciplinarity focus.***

### 2.3.3 Administrative Burden

As discussed previously, NPM governance emphasizes the importance of post-hoc monitoring and performance measurement, which typically rely on a range of indicators, regular formal evaluations and reporting (Boer et al. 2007; Schubert 2009a; Bleiklie et al. 2016; Field 2015; van Looy and Shafagatova 2016; Schubert 2009b; Bogt and Scapens 2012). Establishing and maintaining post-hoc performance measurements is costly, time-consuming and requires routinized administrative tasks (Maeder 2001). Such tasks divert researchers' resources from scientific work. They come in addition to the substantial burden associated with the governance of the collegiate- and consensus-based administration of loosely-coupled university structures (Woeleert 2023; Bentley and Kyvik 2013).

As a rule, researchers aim to minimise the amount of admin work they need to do (Bozeman et al. 2021). Although some tasks can be delegated, the evidence shows that tenured faculty in universities still spend an ever-increasing amount of their time performing routine administrative tasks (Barham et al. 2014). Administrative burdens have the overall detrimental effect on researchers' other duties and ambitions. Routine tasks do not instil intrinsic motivation and do not provide a sense of fulfilment for scientists (Ranz 2015; Torp et al. 2016; Niemiec and Ryan 2009). As administrative tasks are unlikely to offer experiences of competence even in the case of success, scientists may not even consider them part of their work duties (Torp et al. 2016). In consequence, researchers will seek to avoid jobs in which extensive reporting requirements add to an already high baseline administrative burden (Herbert et al. 2013a; Herbert et al. 2013b).

#### ***H3: Scientists are less likely to choose jobs involving high administrative requirements.***

Since administrative tasks do not lead to a greater experience of competence, but, quite the opposite, are considered outside of what is regarded the 'scientific profession', we expect that researchers with stronger track-records could be even less inclined to accept jobs characterized by high administrative requirements (García-Gallego et al. 2015). Strong track records are the result of both high research competence and of an intrinsically higher preference for research-related tasks. Higher research competence increases the opportunity costs of administrative tasks because of the *ceteris paribus* higher external value of research tasks that could have been performed instead.

The burden of administrative duties weighs down heavily on researchers occupying higher positions in the university hierarchy. For example, the baseline burden of meetings intensifies as academics develop their careers moving from 'ordinary' professor to head of institute or dean (Bozeman et al. 2021). The more managerial duties a specific researcher assumes, the smaller the share of his or her time can be placed on research (Barham et al. 2014) – to the possible detriment of the research output (Thelwall and Fairclough 2020). Hence, the prospect of facing further administrative duties will weigh down more heavily on senior academics whose time allocated to research is already limited. Summarising:

#### ***H3a: The willingness to accept job offers with higher shares of administrative tasks is moderated negatively by the researchers' i) track records and ii) their seniority.***

Researchers' interdisciplinarity focus could have similar preferences. It is well-known that maintaining an interdisciplinary focus is costly and requires substantial effort when managing heterogeneous connections (Kroll and Schubert 2023). On the level of the actual research tasks, difficulties result for example from bridging differences in assumptions, values, and approaches across disciplines. Moreover, interdisciplinary researchers are often penalized by their more disciplinary peers, which implies that they have to pursue their research agendas against organizational resistances (van Rijnsoever and Hessels 2011; Bromham et al. 2016; Fini et al. 2023). Both aspects may imply

that interdisciplinary researchers may already have a higher share of non-research tasks. Thus, their willingness to accept further administration tasks may be lower.

***H3b: The willingness to accept job offers with higher shares of administrative tasks is moderated negatively by the researchers' interdisciplinary focus.***



### 3 Data and Methodology

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The dataset is based on a survey of researchers employed in the alliance leading TU9 – German Universities of Technology in April-June of 2023. This TU9 is an alliance of large and research-intensive technological universities in Germany, comprising the RWTH Aachen, TU Berlin, University of Braunschweig, Karlsruhe Institute of Technology, Technical University of Darmstadt, TU Dresden, Leibniz University Hannover, University of Stuttgart, and Technical University of Munich.

#### 3.1 Generating the email contacts

Except for professors, currently no up-to-date large scale register of email contacts for German scientists exists. Since our survey intentionally targets also more junior scholars, we have decided to collect email contacts from the universities' web pages<sup>1</sup> using web scraping<sup>2</sup> techniques. The web pages refer to faculty home pages and department sub-pages that were manually identified. From there, Python scripts were customized to meet the layout characteristics of each university web page and collect the email address along with name and title. The title was used to distinguish academic staff. Contacts without academic title information (e.g. Dr. or Prof. Dr.) were removed.

After cleaning and removing redundant data, the survey was distributed to 4832 university researchers. Excluding invalid, unreachable email addresses and email addresses that rejected the invitation, the email was delivered to 4,350 addresses. The initial invitation was followed up by two reminders. Since the contact list contained details of non-research staff and non-research active staff (e.g. adjunct staff, emerita professors), we included several filtering questions in the questionnaire. Respondents who were not affiliated with one of the TU9 members, respondents without a doctorate and non-researchers were filtered out.

#### 3.2 Survey design and data generation

The survey consisted of three parts: demographic questions, the choice experiment and a number of questions regarding respondents' attitudes towards university governance. The language of the survey was German. Each invitation contained an individual link to access the survey in the EFS Tivian interface. Prior to starting the survey, each participant had to acknowledge the consent form, which included the consent for their bibliometric track record in Scopus to be matched with their responses and used in the analysis (20 respondents declined to consent and were not allowed to proceed to the survey). After the completion of the survey, participant data was matched to their bibliometric records in Scopus.

#### 3.3 Design of the Choice experiment

To test our hypotheses, we designed a choice experiment, where survey respondents were confronted with four consecutive decision scenarios each comprised two juxtaposed hypothetical job offers differing in specific governance characteristics. In each of the four decision scenarios, the respondents were told to select one of the two presented alternatives. All respondents were con-

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<sup>1</sup> Contact addresses could not be gathered for the University of Stuttgart, Karlsruhe Institute of Technology, Technische Universität Dresden and Technische Universität Berlin, because their web-pages block or encrypt staff email addresses.

<sup>2</sup> Web scraper: Python package used for data collection: <https://github.com/dgltr/scrawler>

fronted with the same decision scenarios. The advantage of the choice experiment is the opportunity to estimate the importance of each specific governance characteristics without confounding factors (van Rijnsoever and Hessels 2021).

To define the relevant governance dimensions characterising the alternatives a literature review was performed where specified. They refer to the financial autonomy measured by the availability of base funds, the degree of the administrative burden and two for the degree of incentivization via performance-pay components and personnel endowment. Each of these dimensions was described by two dichotomous alternatives. A summary of the dimensions and alternative characteristics is found in Table 1.

**Table 1: The Set of Alternatives in the Choice Experiment**

Governance dimension/survey item	Characteristics
<b>Financial research autonomy</b>	<ul style="list-style-type: none"> <li>- An operational research group can be financed at the new chair largely from basic funds</li> <li>- An operational research group can only be financed at the new chair through continuous acquisition of third-party funds.</li> </ul>
<b>Administrative burden</b>	<ul style="list-style-type: none"> <li>- Administrative-formal tasks can be delegated predominantly (~10% of your personal working time is required for this)</li> <li>- Administrative-formal tasks often have to be done by yourself (~30% of your personal working time is required for this)</li> </ul>
<b>Incentivization - performance pay</b>	<ul style="list-style-type: none"> <li>- You will receive 10% guaranteed bonuses on top of your base salary</li> <li>- Bonuses on top of your base salary are only awarded after certain performance targets have been reached</li> </ul> <p>(0% for low target achievement, 10% for normal target achievement, 20% for high target achievement).</p>
<b>Incentivization - personnel endowment</b>	<ul style="list-style-type: none"> <li>- You will receive 25% guaranteed, further positions in addition to the base position</li> <li>- Additional positions will be allocated only after certain performance targets are met (0% for low target achievement, 25% for normal target achievement, 50% for high target achievement).</li> </ul>

Based on these dimensions and alternatives admissible choice alternatives were defined as representing each dimension by one alternative. We then defined a choice scenario by the juxtaposition of two choice alternatives out of which respondents were to select one. A combinatorially complete choice experiment would then imply 16 different choice alternatives, or, 8 different choice scenarios. It is clear that 8 different choice scenarios would result in a very high response burden potentially compromising the overall response quality. To circumvent this problem, we decided to restrict the number of choice scenarios to four. Because this limitation leads to a loss of information, we used an optimal design by the modified Fedorov algorithm as implemented in the R-package *idfix* (Traets et al. 2020). This algorithm requires making a priori assumptions on the preference weights of the dimensions. We assumed that researchers uniformly prefer lower administrative burdens and higher basefunding implying weights that do not differ in sign between researchers. We drew weights from a zero-truncated normal distribution with standard deviation one. For the incentivization dimensions, we assumed that potentially some researchers may prefer low-powered over high-powered incentives, while others may prefer the opposite. We therefore drew weights from a standard normal distribution – where both positive and negative weights may occur. The resulting set of choice scenarios then

represents the discrete choice design a so-called d-efficient design that minimizes the information loss resulting from the limitation of the number of choice scenarios to four.

### 3.3.1 Estimation specification and identification strategy

The analysis of the data resulting from the choice experiment seeks to determine the specific weight of the alternative characteristics from observing which alternative is picked in a specific scenario where two different alternatives are available. The approach is thus based on the notion of revealed preferences within a random utility framework. Specifically, we assume that the utility of a choice alternative representing a job offer on a structural part and an error term:

$$U_{ij} = V_{ij} + e_{ij}, i = 1, \dots, N, j = 1, \dots, J \quad (1)$$

where  $i$  indexes individuals,  $j$  indexes the alternatives. Moreover, we assume that structural part depends linearly on a vector of characteristics  $x_{ij}$  describing the alternative:  $V_{ij} = x_{ij}\beta$ . Central interest then lies in the  $\beta$  vector, which represents the preference weights. They are to be estimated.

It is clear that the probability that one alternative  $h$  is preferred over another alternative  $k$  is equal to  $P(U_{ih} > U_{ik})$ . To evaluate this expression and to obtain a likelihood function, we need to make an assumption about the error terms. If  $e$  follows an extreme value distribution, we obtain the following conditional logit expression (McFadden 1974):

$$P(y_{ih} = 1|x_{ih}) = \frac{\exp(x_{ih}\beta)}{\sum_{j=1}^J \exp(x_{ij}\beta)} \quad (2)$$

where  $y_{ih}$  is an indicator that equals 1 if individual  $i$  chooses alternative  $h$ . To estimate Eq. (1), we use the conditional logit expression with clustering at the individual level. From Eq. (2) we see that any variables that solely depend on the individual, i.e. variables for which  $x_{ih} = x_i$  holds, will drop out because they can be drawn before the summation in the denominator and before the exponential expression in the numerator. Thus, individual level variables may only affect the probability in Eq. (2) inasmuch they interact with alternative specific variables but not in isolation. This is why the conditional logit is sometimes said to include fixed effects.

In the baseline regression, in Eq. (2) we include only three baseline characteristics, where we note that we decided to drop the incentivization by additional personnel endowments which turned out to be insignificant in all specifications. To test for the moderation factors, we additionally include interactions with the respondents' individual level characteristics as discussed in Section 2. The following individual-level characteristics were included in the analysis:

The data about respondents' **professorship position** was assigned to respondents who indicated that they are full professors (excluding junior professors).

**The interdisciplinary focus** was derived from survey questions, in which the respondents were asked to assess on a Likert scale the extent to which their research was interdisciplinary, with 0 being extremely disciplinary and 4 being extremely interdisciplinary.

Researchers with the **strong track record** were identified by the number of publications among the 10% top-cited publications in the research field defined by the Scopus classification.

## 4 Results

### 4.1 Descriptive results

In total, the survey was answered by 490 respondents. From these we dropped all respondents without publications to exclude non-publication active researchers for which an academic career might not be the aspired goal leading to a total of 354 respondents, or 8.1% response rate. This response rate was on average expected for the academic survey. Such response rate is expected in surveys that use broad contact lists and include persons outside of the core target population. The respondents worked mainly at the RWTH Aachen and at the Leibniz University of Hannover (32% each), followed by the TU Munich (15%), TU Darmstadt (10%) and TU Braunschweig (5.6%). The share of other TU9 universities among the respondents was negligible.

We further restricted the sample so that all variables used in this analysis were complete. This ensured a common sample for all estimations. The resulting sample comprises data on 2812 ranked choice alternatives (20 choice alternatives were missing due to item-non-response). For this final estimation sample, key descriptive statistics are presented in Table 2. By construction in the d-efficient survey design, 50% of alternatives had high third-party funding requirements, high administrative requirements and high wage incentivization.

The average scientific age of the respondents was around 18 years and the median scientific age was 16 years, which means that the majority completed their doctorates in the early 2000s. About 57% of the respondents were professors. The remaining 43% had completed their PhD but did not hold a professorial position. Thus, in this study the perspectives of more senior researchers are represented, which is expected since the questions cover the issues of university governance and the organisation of project leaders' research groups, which is the domain of more experienced scientists.

15% of the respondents were from the social sciences and humanities. The remaining 85% scattered over the other fields including the natural sciences, mathematics, engineering, medicine and computer sciences. Among them, 10.5% identified their field as medical science, 8.5% identified it as electrical engineering, 5.4% as civil engineering. The respondents answering the survey on average reported an interdisciplinary focus of 2.36 (Likert scale from 0 (low) to 4 (high)) and the average number of top-cited publications was 2.09 (with however substantial heterogeneity and a long tail as the maximum of 31 publications shows).

**Table 2: Summary statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Alt: TPF requirements high</b>	2812	0.50	0.50	0	1
<b>Alt: Admin requirements high</b>	2812	0.50	0.50	0	1
<b>Alt: Wage incentivization high</b>	2812	0.50	0.50	0	1
<b>Interdisciplinarity focus</b>	2812	2.36	0.89	0	4
<b>No. top-cited publications</b>	2812	2.09	3.75	0	31
<b>Professor dummy</b>	2812	0.57	0.49	0	1
<b>Social sciences and humanities</b>	2812	0.15	0.36	0	1

## 4.2 Regression results

The central regression results are presented in Table 3. In line with our a priori assumptions, which are summarized in the baseline hypotheses H1a and H1b, we indeed see that the respondents were significantly less likely to choose alternatives which involved a strong need to acquire additional third party funds as well as high administrative burdens. These effects are also considerable in terms of size. When calculating marginal effects, the TPF-coefficient corresponds to a 24% lower probability to choose an alternative characterized by high third party funding requirements. For high administrative burdens the decline in the probability amounts to 13%. These findings hold robustly in the baseline specification excluding interaction terms (Column 1) and all specifications with interaction terms (Columns 2-5). It is also interesting to note that in the baseline specification, the performance pay variable (high wage incentivization) was not significant, indicating that on average the respondents did not systematically prefer alternatives with lower or higher performance pay components.

**Table 3: Baseline regression results (raw coefficients)**

	(1)	(2)	(3)	(4)
<b>Alt: TPF requirements high</b>	-1.25770*** (-12.95)	-1.96841*** (-7.28)	-1.27793*** (-12.95)	-1.26426*** (-12.95)
<b>Alt: Admin requirements high</b>	-0.72864*** (-7.86)	-0.73739*** (-7.83)	-0.11445 (-0.48)	-0.73208*** (-7.85)
<b>Alt: Wage incentivization high</b>	-0.00609 (-0.14)	-0.00620 (-0.14)	-0.00614 (-0.14)	0.39728*** (2.82)
<b>Alt: TPF requirements high # Professor dummy</b>		0.36570** (2.05)		
<b>Alt: TPF requirements high # No. top-cited publications</b>		0.03635* (1.74)		
<b>Alt: TPF requirements high # Interdisciplinarity focus</b>		0.17126* (1.78)		
<b>Alt: Admin requirements high # Professor dummy</b>			-0.37198** (-2.20)	
<b>Alt: Admin requirements high # No. top-cited publications</b>			-0.03071* (-1.77)	
<b>Alt: Admin requirements high # Interdisciplinarity focus</b>			-0.14669 (-1.61)	
<b>Alt: Wage incentivization high # Professor dummy</b>				-0.22850** (-2.30)
<b>Alt: Wage incentivization high # No. top-cited publications</b>				0.00139 (0.13)
<b>Alt: Wage incentivization high # Interdisciplinarity focus</b>				-0.11638** (-2.24)
<b>Observations</b>	2812	2812	2812	2812

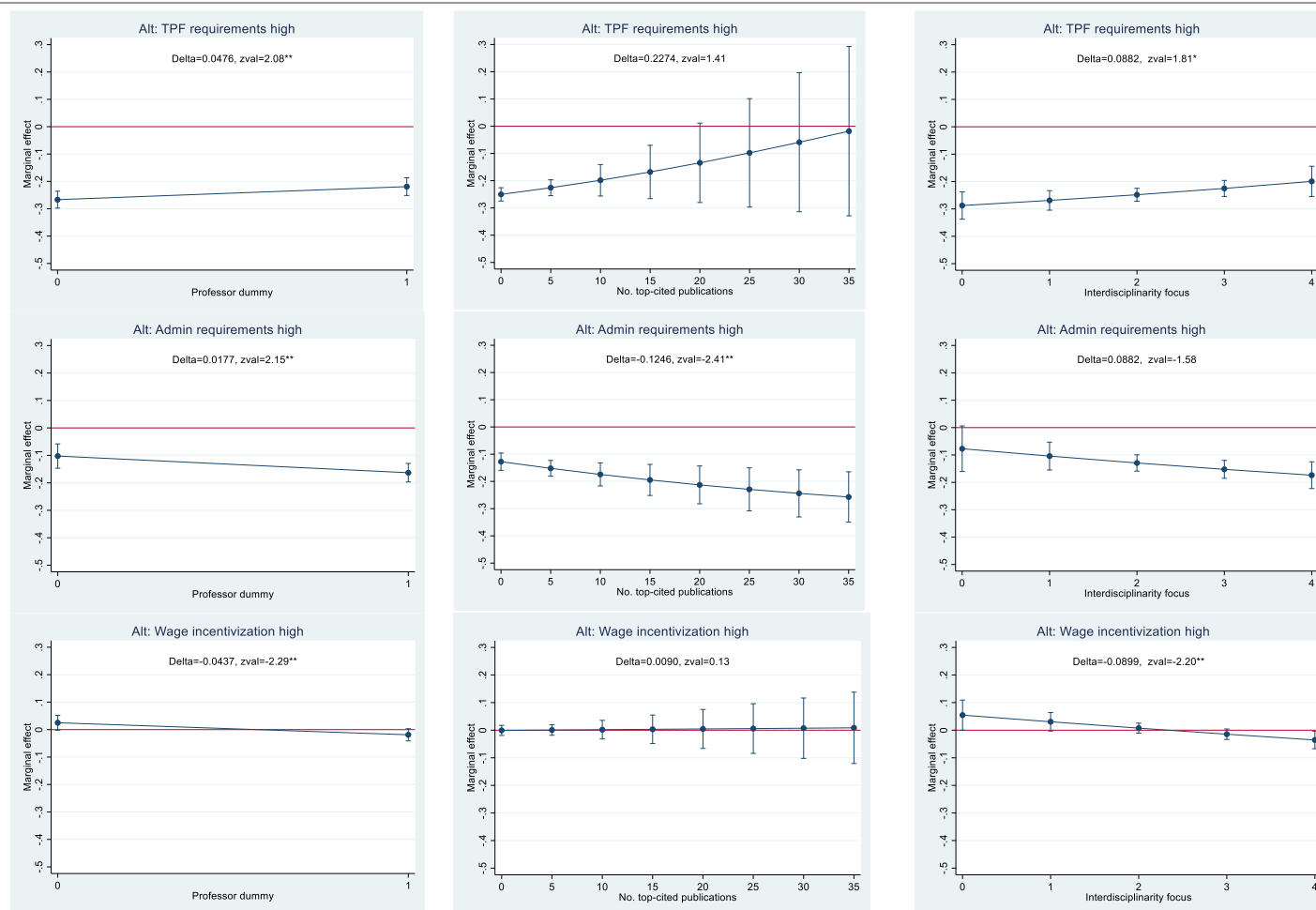
*t* statistics in parentheses; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Beyond the expected outcomes on the baseline hypotheses, Table 2, however, also demonstrates that there are substantial differences in the effects depending on the respondents' characteristics because in Columns 2 to 4 many of the interactions are significant. To explore these interactions, we focus, however, on the visualization in Figure 1, because the non-linearity of the conditional logit model makes the interpretation of the interactions tedious and unreliable without inspecting the marginal effects directly. For each of the nine interactions, we figure two types of valuable information. First, the reported delta statistic gives information on by how much the marginal effects differ when evaluated at the moderator sample minimum and maximum. A pairwise comparison test provides information on the statistical significance on the delta value. Second, the confidence intervals at each moderator level indicate whether the marginal effect is significantly different from zero (whenever the confidence interval does not include the zero) or not. This information can be used to deduce whether at a specific moderator level a governance characteristic affects the probability to accept a job offer positively, negatively or not significantly. To start with, we see that the professorial status irrespective of any of the moderators, high TPF requirements will reduce the respondents' likelihood to accept a job offer, because in all of the panels in the first row of Figure 1 the confidence intervals exclude the zero at all moderator values. While uniformly negative, the exact size of the effects, however, differs by individual level characteristics. In particular, the first panel in the first row shows that non-professorial staff have an about 27% lower probability to accept a job offer with high TPF requirements, while for professors the probability is 22% lower. The delta of about 5% is significant at the 5% level as the pairwise comparison test shows. The other moderations are not significant at the 5%-level, though the interdisciplinary focus significantly positively moderates the marginal effect at the 10% level.

Concerning the administration requirements in the middle row, we see that all marginal effects are downward sloping indicating that professorial researchers, researchers with more top-cited publications and researchers with a higher interdisciplinary focus are less likely to accept job offers with high admin requirements. The downward pattern is, however, only significant at the 5%-level for the professor and the publication moderator, while not for the interdisciplinary focus. Notably, the effect of administration on the probability to accept a job offer is almost uniformly negative (confidence intervals not incorporating the zero) as was also the case for TPF requirements. Yet, we do see that for very disciplinarily oriented researchers the admin requirements (point estimate: -8%) are not significantly different from zero.

Finally turning to the role of performance pay, which was close to zero and not significant on average, we do see some interesting patterns when looking at the interactions. First, professors are about 4% less likely to accept jobs with high wage incentivization, an effect that is significant at the 5% level. Moreover, the effect switches sign (+2% for non-professors, -2% for professors), where both effects, though slightly non-significant at the 5%-level, are significant at the 10%-level. A similar switch in sign is visible for the interdisciplinary focus. Very interdisciplinary researchers are about 4% less likely to accept high performance-pay components. Very disciplinary researchers are 5% more likely (both effects significant at the 5% level). Moreover, the delta statistic of -9% is significant at the 5%-level as well.

**Figure 1: Visualization of the moderation effects**



\*Delta represents the difference in effects at the sample minimum and maximum of the moderating variable: inference based on two-sided z-test.

### 4.3 Robustness checks

We performed a number of robustness checks. First, we split the sample into researchers from social sciences and humanities (15%) and STEM-backgrounds plus computer sciences (85%). The baseline effects are significant and robust in both subsamples as Table 4 and Table 5 show. The interaction terms are in the majority only significant in the STEM sample. In the social sciences and humanities none of the interactions was significant at the 5%-level. While this may be in parts a small-sample phenomenon, our results may also hint towards yet unexplored disciplinary differences, which would need further analyses.

**Table 4: Baseline results (STEM & computer science)**

	(1)	(2)	(3)	(4)
<b>Alt: TPF requirements high</b>	-1.28527*** (-12.14)	-2.22047*** (-7.27)	-1.31962*** (-12.08)	-1.29239*** (-12.12)
<b>Alt: Admin requirements high</b>	-0.72333*** (-7.14)	-0.73993*** (-7.11)	0.01691 (0.07)	-0.72680*** (-7.13)
<b>Alt: Wage incentivization high</b>	-0.00821 (-0.18)	-0.00843 (-0.18)	-0.00833 (-0.18)	0.38973** (2.57)
<b>Alt: TPF requirements high # Professor dummy</b>		0.62138*** (3.11)		
<b>Alt: TPF requirements high # No. top-cited publications</b>		0.03675* (1.67)		
<b>Alt: TPF requirements high # Interdisciplinarity focus</b>		0.19027* (1.81)		
<b>Alt: Admin requirements high # Professor dummy</b>			-0.56514*** (-3.03)	
<b>Alt: Admin requirements high # No. top-cited publications</b>			-0.03049* (-1.70)	
<b>Alt: Admin requirements high # Interdisciplinarity focus</b>			-0.15129 (-1.56)	
<b>Alt: Wage incentivization high # Professor dummy</b>				-0.26934** (-2.47)
<b>Alt: Wage incentivization high # No. top-cited publications</b>				0.00438 (0.42)



	(1)	(2)	(3)	(4)
<b>Alt: Wage incentivization high # Interdisciplinarity focus</b>				-0.10611*
				(-1.86)
<b>Observations</b>	2394	2394	2394	2394

t statistics in parentheses; \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

**Table 5: Baseline results (social sciences and humanities)**

	(1)	(2)	(3)	(4)
<b>Alt: TPF requirements high</b>	-1.10521*** (-4.48)	-1.06089* (-1.76)	-1.12323*** (-4.43)	-1.11552*** (-4.54)
<b>Alt: Admin requirements high</b>	-0.75890*** (-3.23)	-0.78925*** (-3.25)	-0.61200 (-0.87)	-0.76483*** (-3.26)
<b>Alt: Wage incentivization high</b>	0.00336 (0.03)	0.00367 (0.03)	0.00327 (0.03)	0.54359 (1.41)
<b>Alt: TPF requirements high # Professor dummy</b>		-0.82473* (-1.88)		
<b>Alt: TPF requirements high # No. top-cited publications</b>		-0.09410 (-0.69)		
<b>Alt: TPF requirements high # Interdisciplinarity focus</b>		0.18072 (0.76)		
<b>Alt: Admin requirements high # Professor dummy</b>			0.54987 (1.35)	
<b>Alt: Admin requirements high # No. top-cited publications</b>			0.02415 (0.20)	
<b>Alt: Admin requirements high # Interdisciplinarity focus</b>			-0.19365 (-0.77)	
<b>Alt: Wage incentivization high # Professor dummy</b>				-0.02896 (-0.12)
<b>Alt: Wage incentivization high # No. top-cited publications</b>				-0.12535 (-1.21)
<b>Alt: Wage incentivization high # Interdisciplinarity focus</b>				-0.16164 (-1.33)
<b>Observations</b>	418	418	418	418

t statistics in parentheses; \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

A further important robustness check concerns the question of the so-called independence of irrelevant alternatives (IIA) assumption, which is implicit in the conditional logit model. The IIA implies that any ranking between two alternatives depends only on the characteristics of the two concerned alternatives and not on the absence or presence of other alternatives. Concretely, if A is preferred over B in a direct comparison of A and B, this preference order does not depend on whether an alternative C exists or not. The IIA assumption looks innocuous but can be violated in practice. Important cases are for example strategic voting. Assume that a voter wants to prevent candidate C under all circumstances, then whether A is preferred over B may depend on whether C is an available alternative or not. In our case, the artificial construction of our alternative does not probably give rise to strong strategic incentives. However, it is still worth inspecting whether our results are robust to failures of the IIA. One possibility to generalize models is to create a nesting structure, where we assume independence within specified groups but allow for dependence across groups and then to use nested logit. We decided to create a nesting structure that relies on whether an alternative is characterized by high basic funds or not, which splits the 8 alternatives into two equally sized groups. The results are found in Table 6. While the significances somewhat decline, most of the findings remain robust, which overall confirms our findings.

**Table 6: Testing the IIA assumption with a nested logit model**

	(1)	(2)	(3)	(4)
<b>Alt: TPF requirements high</b>	-1.27823*** (-13.21)	-1.98106*** (-7.27)	-1.29373*** (-12.44)	-1.29174*** (-12.43)
<b>Alt: Admin requirements high</b>	-0.73253*** (-7.32)	-0.74166*** (-7.77)	-0.13376 (-0.56)	-0.73554*** (-7.79)
<b>Alt: Wage incentivization high</b>	-0.01643 (-0.22)	-0.00449 (-0.09)	-0.01242 (-0.24)	0.36756*** (2.59)
<b>Alt: TPF requirements high # Professor dummy</b>		0.37804** (2.09)		
<b>Alt: TPF requirements high # No. top-cited publications</b>		0.03707* (1.72)		
<b>Alt: TPF requirements high # Interdisciplinarity focus</b>		0.16927* (1.75)		
<b>Alt: Admin requirements high # Professor dummy</b>			-0.36678** (-2.14)	

	(1)	(2)	(3)	(4)
<b>Alt: Admin requirements high # No. top-cited publications</b>			-0.03134*	
			(-1.77)	
<b>Alt: Admin requirements high # Interdisciplinarity focus</b>			-0.14086	
			(-1.54)	
<b>Alt: Wage incentivization high # Professor dummy</b>				-0.23760**
				(-2.29)
<b>Alt: Wage incentivization # No. top-cited publications</b>				0.00335
				(0.33)
<b>Alt: Wage incentivization # Interdisciplinarity focus</b>				-0.11075**
				(-2.12)
<b>High_TPF_requirements Academic age</b>	0.00112	-0.00019	0.00067	0.00194
	(0.34)	(-0.09)	(0.30)	(0.84)
<b>/type</b>				
<b>Low_TPF_requirements_tau</b>	1.00000	1.00000	1.00000***	1.00000*
	(0.00)	(0.37)	(3.40)	(1.72)
<b>High_TPF_requirements_tau</b>	1.00000	1.00000	1.00000	1.00000
	(0.00)	(0.25)	(1.56)	(0.42)
<b>Observations</b>	2780	2780	2780	2780

*t* statistics in parentheses; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

In a final robustness check we replaced the publications as an indicator of the strength of the track record by excellence rate, i.e. the share of the researcher's publication in the 10% most cited publications world-wide. The results were robust to this change and were even becoming more significant.

## 5 Discussion

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In line with SDT assumptions, our analysis confirmed earlier findings in the literature with regard to researchers' dislike of administrative burdens (Bozeman et al. 2021; Barham et al. 2014; Ranz 2015; Niemiec and Ryan 2009) (Torp et al. 2016) as well as their preference to conduct science freely without having to bother with proposal writing (Janger and Nowotny 2016; Janger et al. 2019a). The seeming contrast of these observations to some established findings that new public management does increase performance, can well be explained based on the premise that researchers are primarily intrinsically motivated. Once on the job, and exposed to changes in university governance, researchers have little option but to join in playing the new game. They might deplore the change in conditions, as many have (Thomas and Davies 2005), but in their majority as well chose to play it successfully. In the terms of SDT, their intrinsic motivation in this situation will be to retain and create room for self-actualisation in a given system, that, for different external reasons, they may not be in a position to readily leave. Given the circumstances, this may well prompt them to play by the rules effectively. Once that system itself becomes the object of choice, however, individuals will come to very different conclusions and the intrinsic component of their criteria reveals itself more clearly. Seen through the lens of SDT, this seeming contradiction in empirical findings can thus be easily resolved at a conceptual level.

From a different angle, SDT allows us to understand why an at least limited responsiveness to wage incentives could not be confirmed. While this finding is at odds with some suggestions in the existing literature (Janger et al. 2019a; Agarwal and Ohyama 2013), it stands to reason given the specific empirical situation in Germany. Different from other countries, there is very limited variance in the pay-schemes of scientists, even professors. Until the very late career stages, when universities actively seek to convince high performers to stay and others to lure them away, meaningful top-ups to standard paygrades are rare. And even then, star scientists would typically be rewarded by funds that they are free to dispose of (Mueller and Schnurbus 2023) rather than through performance pay schemes, which are simply not very prevalent. More profoundly, however, wage incentives neither increase nor decrease researchers' options for self-actualisations and hence will not substantially affect intrinsic decisions. When its external component is, in addition, very limited, it is completely conclusive that no general effect can be found.

Overall, three initial findings thus corroborate that SDT appears as a suitable conceptual choice to explain job choices. More so, this comes to bear with regard to the more specific contribution of this paper, the exceptions from the above rules that may apply to certain, relevant subgroups. For example, the finding that high prior performance tends to increase researchers' acceptance for TPF performance-based systems, aligns with the assumption that they can fulfil its demands more easily so that it weighs less on their capacity for self-actualisation (Graber and Wälde 2008; Fitzenberger and Schulze 2014; Fernandes and Walter 2023; Herbert et al. 2013a; Herbert et al. 2013b). Where this is not the case, as in the social sciences and humanities, the assumption does not hold. At the same time, it tends to decrease their acceptance of (further) administrative burdens, in line with the assumption that those with more limited freedom in their daily work will react to such a burden more strongly (Bozeman

et al. 2021; Barham et al. 2014; Thelwall and Fairclough 2020). Likewise, it confirms the assumption, first fully developed in this paper, that researchers' breadth of disciplinary orientation also increases their readiness to accept more TPF performance-based systems. This confirms SDT-based assumptions regarding the greater degree of self-actualisation that they may experience in such an environment. This is remarkable as it stands in contrast to other assumptions to different effect. Among them e.g. interdisciplinary researchers' assumed lack of confidence to be able to comply with different disciplines' parallel expectations and obtain external rewards. This, however, may still come to bear, and be reflected in our findings concerning their greater aversion to administrative burdens. Just like seniority, interdisciplinarity orientation is likely to increase the baseline necessity to engage with various processes at once, and make researchers more sensitive to any further increase in it. In light of the additional burden attached to every additional proposal, the first, positive, finding on third-party funding requirements stands out as even more remarkable.

In summary, our application of the self-determination theory to job choices in academia has allowed us to not only confirm a number of existing assumptions but to explain them better and in a conceptually much better grounded way. In addition, we could demonstrate that SDT-based reasoning allows us to correct predictions concerning specificities where principle-agent theory would have suggested different, here not confirmed, assumptions.

## 6 Conclusions

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Apart from its distinct and case-specific empirical contribution, this paper has demonstrated that and why self-determination theory should become an indispensable complement in framing our conceptual understanding of researchers' behaviour. While we do not dispute earlier studies' findings that researchers may be receptive to external incentives, we suggest to see this openness as contingent on context and as secondary to intrinsic motivation. Even if to a degree willing to abide by new rules in given environments, researchers will tend to prioritise freedom over reward once given the choice of context. Conceptually, there may thus not even be a fundamental contradiction in assumptions between principle-agent theories focussing on extrinsic motivation, and self-determination theory highlighting intrinsic motivation. For good reasons, psychological research has consistently seen them as factors influencing the same individual simultaneously (Ryan and Deci 2000, 2019). In addition, we believe that our findings are of direct relevance to university managers. Increasingly confronted with funders' shifting perception of universities' role in society, the strategic and lasting repositioning of their organisation – not least by hiring capable scientists – may be as high on their agenda as any increase in performance. In this situation, they need to understand that new public management, if unintended, has consequences with the potential to negatively affect these strategic efforts.

Having explored this field for the first time, we concede potential limitations resulting from the specific sample on which we have worked and leave it to future research to establish whether a more general heuristic for academic career choices can be developed on their basis.

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