Career choices in academia

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Socio-economic Sciences and Humanities Europe moving towards a new path of economic growth and social development - Collaborative project

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Contribution to the Project

Many studies point to the fact that the quality of academic research matters for economic growth. Building on Milestone MS63, this Milestone aims at identifiying several key features of university research organization which impact on the quality of academic research. These features would be one element or framework condition for a future sustainable European growth path which will also condition Europe's ability for breakthrough innovations dealing with climate change, population ageing, etc

Career choices in academia

Jürgen Janger* Klaus Nowotny†

Abstract

Based on a unique survey, we conduct a stated choice experiment to examine the determinants of career choice in academia. Both early and later stage researchers value a balance between teaching and research, appropriate salaries, working with high-quality peers and good availability of external grants. Attractive academic jobs for early stage researchers feature in addition a combination of early independence and career (tenure) perspectives; later stage researchers favour jobs which make it easy to take up new lines of research, which pay according to a public scheme including a performance element and where research funding is provided by the university. Our findings have important implications for the structure of academic careers and for the organisational design of research universities. Furthermore, they shed light on the institutional determinants of the asymmetric mobility of highly talented scientists between the EU and the U. S.

JEL classification numbers: I23, I25, I28

Keywords: academic careers, academic labour market, university organisation, brain drain

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1 Introduction

Empirical evidence shows not only that there is a substantial international mobility of highly talented researchers (Hunter et al., 2009), but also that this mobility is asymmetrically directed towards prestigious U. S. universities. This holds for many regions of the world, not only developing countries but also Europe (Laudel, 2005).

This is likely to impact on Europe's overall R&D performance (Docquier and Rapoport, 2012) and in particular on university research performance. Usually, the top 50 of various university rankings is predominantly populated by American research universities, even in rankings purely based on bibliometrics and controlling for university size such as the Leiden Ranking. In turn, this matters for Europe's ability to successfully undertake innovation as science-based innovation becomes more important for firms in countries close to the technological frontier (Aghion and Howitt, 2006; Narin et al., 1997) and the demand for highly-skilled graduates is rising. The so-called "European paradox" of excellent science which cannot be properly used by European industry has recently been shown to be a myth (Dosi et al., 2006; Albarrán et al., 2010). More importantly, not being able to retain or attract significant numbers of highly talented researchers reduces Europe's ability to deal with the "grand challenges" of our time such as climate change, resource scarcity and population ageing. A new socially inclusive, environmentally sustainable growth path needs the best science available.

At the same time, there has been little systematic research on the academic labour market and on what makes researchers choose one job over another in cross-country settings, leading to any asymmetric job flows. We contribute to the literature using a unique international survey of more than 10,000 early and later stage researchers for an experimental stated choice approach. Based on previous evidence, we construct a range of hypothetical jobs in academia and let respondents choose among randomly allocated job offers. From the chosen jobs, we can estimate probabilities of job choice given specific job characteristics and hence draw conclusions on which job feature sets researchers deem to be particularly attractive.

Our main results for both early and later stage researchers are that the remuneration component of jobs matters (salaries, health care and pension provisions), along with the quality of peers, the availability of grants and the balance between teaching and research tasks. The quality of life in the country of the proposed job must not be worse than in the current country of residence, however higher quality of life does not act as an attractor. As regards early stage researchers, systems of higher education which provide jobs featuring early career perspectives, early research and financial autonomy based on research performance only seem to be particularly attractive. Later stage researchers prefer jobs where their line of inquiry is not bound to the research of previous job- or chair-holders, speaking in favour of departmental organisation rather than chair-based systems. In addition, they favour jobs providing university internal funding to cover their research needs, supportive administration units and public pay schemes including a performance element. Such jobs are overall more likely to be found in the departments of U. S. American research universities with their "tenure-track" model providing early independence and career perspectives for early stage researchers. However, our results are not only

relevant for career structures of continental European higher education systems but also for American research universities, as the tenure track-model tends to become the "alternative" career path, meaning that tenure-track positions are increasingly becoming the minority among new job openings in academia (Stephan, 2012). The probability of taking up PhD-studies in the U. S. has declined significantly after 2000 (Stephan et al., 2013).

2 Literature

Several strands of the economic literature investigate the academic labour market and career choices by academic researchers. One strand looks at the economic determinants of occupational choice, i. e. the choice between becoming a researcher or something different altogether. In the U. S., this was motivated early on by a concern about shortages of scientists and engineers in the cold war race against the Soviet Union, but also because of economic growth concerns (Blank and Stigler, 1957; Arrow and Capron, 1959). There is widespread evidence that in the U. S., the supply of academic researchers is responsive to demand signals, i. e. that occupational choice reacts to relative earnings, job prospects in terms of job availability, the amount of stipends available and to total time required for training. While 50 years ago the reaction of supply to demand took quite some time—the time to finish science studies—market forces nowadays adjust more quickly in the U. S. due to the large inflow of trained foreign-borns into the academic workforce (Stephan, 2012).

The decision to become an academic researcher may also be influenced by the ease of switching between academia and industry, at least for disciplines where there are also strong private sector research activities. This boils down to the impact of relative earnings on career choice varying with "switching costs" between sectors. In countries where it is easy to switch from academia to industry, either as an employee or as an entrepreneur, and where industry uses a lot of tertiary trained researchers, there is a large market for scientists and engineers (Foray and Lissoni, 2010). This might affect career choices in two opposite directions: one the one hand, it reduces the risk of engaging in academic research, on the other hand, academic researchers may be more easily tempted to switch to jobs promising higher salaries. The work by Philippon (2010) suggests that the latter might have been the case for the U. S. in the run-up to the financial crisis.

Non-economic intrinsic motivations to become an academic researcher relate to the satisfaction researchers derive from the activity of research – the joy of puzzle-solving, curiosity-driven discovery of knowledge and freedom to do science (Stephan, 1996). To some extent, researchers are willing to "pay" for the privilege of being able to do science in terms of foregone salary (Stern, 2004), suggesting that relative earnings play a smaller role for academic researchers than for other professions, while still being relevant for job choice as discussed above. Non-economic extrinsic motivation has been labelled the quest for establishing "priority" (Merton, 1957), or being first to publicly document new knowledge. Establishing priority is also a main factor for career advancement.

The fact that all the recognition for a scientific discovery accrues only to the first author having made the discovery can turn science into a "winner takes it all" contest where small differences in initial performance lead to big differ-

ences in rewards, in this case in academic career perspectives (Dasgupta and David, 1994). Scientists who manage an early track record of scientific findings, publishing as quickly as possible, may benefit from cumulative advantages in obtaining funding for research projects (called the "Matthew effect", see Merton, 1968); this has recently been empirically substantiated for scientific disciplines where there are well-defined metrics to quantify career success, such as physics (Petersen et al., 2011). Overall, scientific productivity is a major determinant of career advancement as it should be, but even in the U. S., cohort effects play a role, meaning that there are "tides" in the academic labour market, where there are either not enough or plenty of job openings relative to the amount of PhD-holders looking for an entry into an academic career (Stephan, 2012). Evidence for Europe (Italy and France) shows in addition the role of seniority, gender, social and political capital of researchers and centralised recruitment policies for academic careers (Lissoni et al., 2011; Pezzoni et al., 2012), highlighting the effect of idiosyncratic national higher education systems on academic careers.

The European literature has looked in addition at factors explaining the international mobility of academic researchers, i. e. at job choices between different national higher education systems once people have made the decision to engage in research. This is motivated by two features of the European academic labour market: first, fragmented national researcher labour markets inhibit an integrated European Research Area and lead to thin labour markets, which make effective job matching more difficult. Musselin (2004) finds that in particular heterogeneous career structures at the level of national higher education systems and recruitment procedures prevent further integration of European national academic labour markets. Second, there is a well documented asymmetric flow of highly skilled European workers and researchers to the U. S. (Tritah, 2009; Docquier and Rapoport, 2009). It is in particular the "potential elite" (Laudel, 2005) moving, i. e. students going for their PhD to the U. S. or coming for post-doc positions and then staying in the U. S. because they found attractive jobs. Stay rates of European PhD-students in the U. S. are as high as approximately 70% (Finn, 2010). Among foreign PhD-students in the U. S., it is the most able PhDs who are more likely to stay (Van Bouwel and Veugelers, 2012; Grogger and Hanson, 2013a,b). Confirming these results from the receiving side, several studies find that foreign-born scientists—not only from Europe—contribute disproportionately to U. S. science and innovation performance, which implicitly attests to the quality of these scientists (Hunt and Gauthier-Loiselle, 2008; Stephan and Levin, 2001; Gaulé and Piacentini, 2012).

International mobility or migration decisions can be seen as a result of weighing benefits against costs (Docquier and Rapoport, 2012). In the setting of internationally mobile scientists, perceived benefits of entering an academic career abroad are related on the one hand to the low quality of the higher education system at home, no job openings, low salaries (push factors) and to an attractive academic labour market, high quality peers, career prospects, differential earnings, etc. in the destination country (pull factors). Costs can be the loss of access to the academic network in the home country, making return migration difficult, and the loss of family and social ties, as well as costs of adaptation to the destination country's language, culture and lifestyle. The outcome of this process of comparing benefits and costs is also amenable to policy factors such as immigration regimes, funding for career stints abroad, etc.

Among the empirical reasons or factors which tilt the balance of benefits and costs in favour of international mobility of scientists, Hunter et al. (2009) and Docquier and Rapoport (2009) identify the level of R&D spending in a country which is related to funding and job opportunities in the academic labour market. Van Bouwel and Veugelers (2012) use the quality of universities as explanatory factors for mobility (or rather, "stay") decisions. For PhD-students and post-docs, Stephan et al. (2013) confirm this, adding also career prospects associated with PhD-studies or post-doctoral research in the U. S. In a similar vein, Van Bouwel et al. (2011) find that European researchers move to the U. S. for career reasons, and come (back) to Europe for personal or family reasons. Generally, highly skilled migrants are less sensitive to costs of migration arising from the geographical distance between the source and the destination country (Docquier and Rapoport, 2012). Stephan et al. (2013) find that students and post-docs perceive the U. S. lifestyle negatively, while the loss of family contact as a cost of studying abroad is only weakly significant. The evidence on asymmetric flows of scientists from Europe to the U. S. suggests in any case that European scientists see more benefits in coming to the U. S. while for U. S. researchers costs seem to outweigh the benefits.

We are interested in shedding more light on the factors determining such career choices: which job characteristics make academic researchers choose one job over another? If career choice was merely related to the quality of institutions, turning a situation of brain-drain into a more balanced one of brain circulation would be a difficult endeavour for European institutions, as top researchers attract top researchers. Merely increasing research funding without looking at the determinants of academic careers in more detail could quickly turn out to be very inefficient. Systematic and comprehensive evidence of the relevant choice set for academic careers could be gained from a comparison of job offers, e. g. job offers made to European PhD-holders by U. S. research universities in comparison with job offers made to them by European research universities, subsequently asking PhD-holders which factors made them decide between jobs. However, establishing such a dataset of real job offers would be very difficult due to issues of confidentiality and international comparability. An exception is Stern (2004) who compiles a small sample of job offers made to 164 postdoctoral biologists, for the U. S. only. He looks however only at the impact of the science orientation of private sector researcher jobs on job choice and wages. Due to these difficulties, we decided to "build" our own jobs and conduct a stated choice experiment to analyse which job attributes impact on job choice.

3 Conceptual framework and survey implementation

3.1 Experimental design

At the heart of our approach is a stated choice experiment where the respondents to a survey are confronted with three hypothetical job offers that differ with respect to their attributes. The respondents were then asked: "Assuming all job attributes not mentioned in the job offers are equal, which job do you consider to be the most attractive, irrespective of your current job?"

In preparation for the survey, hypothetical job offers were constructed for early stage researchers (ESR) and later stage researchers (LSR). The hypothetical job offers for early stage researchers are supposed to contain the most important job attributes at the early stages of an academic career (i. e. up to the level of an assistant professor in a U. S. research university), while the jobs for later stage researchers are supposed to reflect job factors relevant for more established researchers (that is, positions comparable to associate or full professorships). For this approach to be successful, it is key to choose a limited range of relevant job attributes as overly complex job descriptions would put too much cognitive burden on the respondents (Hensher et al., 2005): they have to be able to compare the three jobs in a short matter of time. If the list of attributes is too long, a balanced comparison of jobs based on all the job attributes becomes impossible.

Based on the previous discussion and on previous research by Janger and Pechar (forthcoming), we therefore chose three broad job attribute categories (see table 1 for an overview): remuneration and fringe benefits (4 attributes), country characteristics (1 attribute), and working conditions (7 attributes). Appendix A shows the full list of the job attributes and their corresponding attribute levels. Our jobs focus on academic careers in research universities and their two central activities research and teaching, but are also relevant for basic research public research organisations (PROs). Even though in some countries such as France fundamental research organisations still dominate over universities as regards their research role in the public research system, research universities have become more central actors in such research systems worldwide (Mowery and Sampat, 2005; Foray and Lissoni, 2010). Our jobs are less relevant for applied research institutions such as the Fraunhofer institutes in Germany, where researchers carry out contract- or mission-oriented research.

[Table 1 about here.]

The first category consists of the level of net salary p. a., the patient contribution rate to health care expenditure, the expected pension net replacement rate at entry into retirement and "fringe benefits". Salaries are measured in Euro converted in U. S. dollars at purchasing power parities. They range from $ 25,000 p. a. to $ 65,000 p. a. for ESR and from $ 45,000 to $ 85,000 for LSR. This range is drawn from existing studies on the range of salaries in higher education systems (Altbach et al., 2012, e. g.).[1] The health and pension attributes are supposed to mirror the design of national health care and pension systems and to enable comparability of the remuneration component of academic jobs, as health care and pension systems can substantially impact on take home pay. Attribute levels of the patient contribution rate in the case of illness vary from 0 % to 10 % of a yearly salary; of the net replacement rate from 70 % to 85 % of net pre-retirement earnings. There are altogether 7 fringe benefits (each job showing one fringe benefit), mainly reflecting our purposefully international setting for job decisions: relocation support, parking lot at university, childcare facility available, company car, guaranteed place at nearby quality school for children, university housing and job offer for partner. We expect salaries and the pension net replacement rate to positively affect the probability of job

[1] Due to an error in the survey, the respondents were not informed about the currency, see section 5.2.

choice and the patient contribution rate to negatively impact on job choice. We expect fringe benefits (relative to the base category "parking lot at university") to positively affect job choice, while observing variation according to gender of researchers and to their career stage: childcare, for example, is likely to matter more for ESR than for LSR. The remuneration category helps us as a consequence to anchor our experiment in real life, and its results will shed light on the robustness of our approach.

The country characteristics category contains only one job attribute, the quality of life in the country of the job, featuring the three attribute levels worse, same or better than the quality of life in the current country of residence. Consistent with our motivational background of asymmetric international mobility, our setting is purposefully international, meaning that for the respondent it is obvious that the choice between jobs involves a change of country. We don't give an objective measure of quality of life, so that each respondent will apply his or her individual interpretation of quality of life. The work by the OECD (2011) on measuring the quality of life shows that even though there are many indicators suitable to reflect a country's position on issues relevant for the perception of quality of life, each individual will attach different weights to quality of life categories, so that providing an objective measure would have been impossible anyway. This is not a concern for us, as we are interested in the relative importance academic researchers attach to the quality of life as a non-monetary job attribute compared to other job attributes which influences job choice between two countries. Depending on the country, health and pension job attributes may also be seen as country characteristics rather than as components of the remuneration package. As we are more interested in the decision between academic careers rather than between countries, we choose not to include typical costs of the migration decision such as the adaptation to a country's culture or language requirements, e. g. teaching in a foreign language. As discussed before, such costs are usually comparatively low for highly-skilled migrants such as researchers while the length of the job attribute list is critical for the success of the experiment. Respondents are told that all three jobs are equal with respect to non-mentioned attributes.

Concerning the attribute category working conditions, two crucial attributes are research funding and the quality of peers, as evidenced by the previous discussion. For later stage researchers, we split funding characteristics of a job in two parts: the availability of university-external grants (availability of both short- and long-term grants good, short-term good and long-term poor, both poor) and the amount of research tasks which can be funded by university-internal funds (from 25 %, remainder via grants, to 100 %). The latter is also intended to capture university provision of research equipment and infrastructure in the case of engineering and natural sciences. For ESR, we use the same attribute of the availability of external grants, but choose to implement internal funding differently (see below). We expect researchers to prefer funding which they obtain without having to resort to writing proposals, however when they have to, a better availability of external grants is likely to impact job choice positively. The quality of peers in the new job is defined by the ranking of the most prestigious researcher in his or her field worldwide (from among top 5 to not among top 50). We expect the quality of peers to have a strong positive influence on job choice.

Next, we examine the organisational setting of academic jobs. To single out the most important job attributes related to organisational differences between universities, we rely on a survey by Janger and Pechar (forthcoming) who ask Austrian academic researchers in the U. S. about which features matter to attract highly talented researchers. The choice of attributes in that survey resorted to the comparative sociology of science and comparative higher education literature to determine the relevance of organisational features for university research quality and attracting talented scientists. For early stage researchers, the two most important attributes are perspectives for autonomously carrying through research projects and offering a career path akin to the U. S.style "tenure track" model, whereby assistant professors enter the academic workforce on a fixed term contract, but have the perspective of making it all the way to full professor based purely on their research performance. For later stage researchers, what matters is the ease of taking up new research fields, next to the already discussed available third party funding and quality of peers. The outcome of the survey is corroborated by several other sources. Anecdotal evidence from published interviews with researchers on why they moved to the U. S. and policy papers which address the Europe-U. S. brain drain, based often on researcher surveys or statements, reach similar conclusions on the importance of early independence and career perspectives for early stage research careers (see e. g. Arnold and Freyschmidt, 2011, for the German case, and the results of the Europe-wide public consultation on the European Research Area by the European Commission, 2012).[2]

We implement career perspectives as two separate attributes of our ESR jobs: career perspectives I refers to the length of the initial contract (from 2 to 6 years), while career perspectives II refers to the extension possibilities of the initial contract (not possible, for 3 years; tenure possible contingent on performance and job availability, tenure contingent purely on research performance). We expect the length of the initial contract to affect job choice positively, as well as contract extension options relative to the lack of such an extension possibility. Research autonomy is given as the percentage of research time which can be devoted to own research (0 % to 100 %), we expect higher shares to lead to higher job choice probabilities. We implement financial autonomy as different options to access university-internal funding (negotiation with chair-holder, negotiation with university management based on the quality of the research proposal and funding provided by the university without strings attached). We expect access

[2]Note that already in 1945, Vannevar Bush had a very similar assessment of important elements for attractive academic careers: "It is chiefly in [publicly and privately supported colleges and universities and the endowed research institutes] that scientists may work in an atmosphere which is relatively free from the adverse pressure of convention, prejudice, or commercial necessity. At their best they provide the scientific worker with a strong sense of solidarity and security, as well as a substantial degree of personal intellectual freedom. All of these factors are of great importance in the development of new knowledge, since much of new knowledge is certain to arouse opposition because of its tendency to challenge current beliefs or practice. [. . .] To serve effectively as the centers of basic research these institutions must be strong and healthy. They must attract our best scientists as teachers and investigators. They must offer research opportunities and sufficient compensation to enable them to compete with industry and government for the cream of scientific talent." Bush (1945), Chapter 3, Basic Centers of Research.

options which are dependent on operational unit- or university-level authorities to negatively affect career choice.[3]

As regards LSR jobs, we formulate the ease of taking up new lines of research as the amount of research time which needs to follow the work by the previous chair-holder (from 0 % research continuity, position does not replace a chair, to 100 %). We expect research continuity to negatively affect job choice, as it reduces research autonomy for LSR; it may also be that researchers don't want to be single heads of chairs with lots of subordinates and that they prefer a more collegiate and team-based style of work.

Another crucial feature of academic jobs for both ESR and LSR is the balance between teaching and research. Too much teaching limits the perspectives of a researcher to establish priority simply because he or she has got much less time to do research. The balance between teaching and research is measured as the shares of teaching and research in combined teaching and research time (from research only to 75 % teaching, 25 % research; a teaching only position would have made no sense given our other questions on research autonomy, funding etc.). We expect a negative effect of high teaching loads on job choice.

Finally, for LSR jobs we also include the attributes of the quality of administrative support and of the salary advancement scheme. The former has ranked high in the survey by Janger and Pechar (forthcoming) as a factor influencing research efforts by LSR, so that jobs which have little need for time devoted to administrative tasks (0 to 15 %) should have a higher probability of choice. The salary advancement scheme has three options, first salary growth via public scheme, second via public scheme and a possible performance bonus and third via individual research evaluation. Dasgupta and David (1994) suggest the desirability of the second option based on the winner takes it all characteristics of the scientific knowledge production process: pay cannot be based purely on performance, as this would put all the risks associated with knowledge production on scientists who enter contests for priority. So some "flat" component is necessary, which in universities may also be seen as a compensation for teaching, while bonuses (not necessarily monetary ones) can be given for establishing priority. The third option is inspired by two interrelated trends: first a tendency toward more autonomous universities in Europe which gain more control over managing academic staff and are more likely to use individual research evaluation for promotion and salary decisions (Musselin, 2013a,b), and second a change in university funding modes from block funding to research evaluation systems (Hicks, 2012). According to this literature, we expect the public pay schedule including a performance bonus to be preferred to individual research evaluation.

Our ESR and LSR jobs do not differentiate between disciplines. The survey by Janger and Pechar (forthcoming) has shown very little variation between disciplines, with the exception of funding for research equipment so that we expect researchers from disciplines which require costly research infrastructure to value the job attribute internal research funding and availability of grants higher.

Altogether, there are thus 12 job attributes for ESR and LSR jobs: 4 remuneration and fringe benefits, 1 country attribute and 7 attributes covering

[3]In 1962, Ben-David and Zloczower noted that the "exodus of European scientists [was] motivated not only by higher income but often by better conditions for and greater freedom of research" (p. 157)

working conditions. Given 3–7 different levels per attribute, we could build a total of more than 19 million LSR and more than 24 million ESR jobs. For computational simplicity in the survey implementation and to avoid having extremely bad next to extremely good jobs, we ascribe scores to the attribute levels (e. g., 1 for the lowest salary, 2 for the second lowest, etc.). We then sum those scores and sort the jobs according to this sum. Finally, for both ESR and LSR 30,000 jobs are drawn from the center of the resulting distribution. Depending on the respondents' career stage, they were confronted with three jobs for ESR or LSR that were randomly chosen from these job lists. The order of appearance of the job attribute categories also changes randomly, so that remuneration is not always at the top and working conditions are not always at the bottom. Figure 1 shows an example of a job choice for an early stage researcher.

[Figure 1 about here.]

3.2 Survey implementation

The stated choice experiment was implemented using a unique international survey conducted for the "Mobility of Researchers 2" (MORE2) project. In this project two surveys were conducted, one for European higher education institutions and one for researchers currently residing outside the EU. They use different sampling methodologies, described in detail in IDEA Consult (2013a,b). Basically, the first survey aims at achieving representativeness at the level of European countries for the questions asked on mobility behaviour, drivers and barriers, while the second one aims to collect views from non-EU researchers without a claim to representativeness. This is not a concern for us as we are not aiming at the country level but at researchers in general.

The first survey sets out by identifying as many European higher education institutions as possible for 33 countries and 3 fields of science (natural sciences and engineering, medicine, social sciences and humanities) based on the EUMIDA database on higher education institutions in Europe and the database built in the first MORE project. In the next step, random sampling of higher education institutions clustered at the level of countries and at the level of the 3 fields of science takes place. The obtained contact details were then used to collect researchers' data and views via a web survey and telephone interviews from May to July 2012. The overall response rate was 21 %. The stated choice experiment can only be conducted online so that we have 5,583 researchers who answered the online questionnaire.

The second survey's sampling methodology is based on "convenience sampling", web-based sampling to gather as many e-mail addresses as possible from academics' homepages and their CVs. The survey was also announced on the Euraxess homepage and sent via mail to communities of EU researchers abroad. Researchers were not identified by science fields. It was online from July to October 2012. From this second survey we gather 7,706 responses (response rate close to 4 %).

Because not all of the respondents have completed the survey, only 10,215 web-based interviews can be used in the empirical analysis. As mentioned above, we distinguish between early and later stage researchers. ESR are PhD-students, PhD-holders and post-docs (R1 and R2 researchers in the definition of the Eu-

ropean Commission, 2011). LSR have successfully entered an academic career and are distributed over the professorial ranks (R3 and R4 researchers). Our sample consists of 3,790 ESR and 6,425 LSR.[4] Depending on their self-reported career stage, the respondents were presented with three hypothetical job offers for early or later stage researchers. ESR are asked to conduct the experiment twice, i. e. they are presented twice with a choice between 3 randomly allocated jobs, while LSR are asked to choose once. All in all, we have the results of 13,502 experiments (7,077 for ESR and 6,425 for LSR) at our disposal.

Summary statistics for the 10,215 respondents are shown in table 2. While the distribution of respondents by gender is quite balanced for ESR, there are significantly more male than female respondents among LSR. Whether female LSR were less inclined to answer the survey or whether this is due to a lower share of female researchers in these positions cannot be answered by our data. However, the much higher share of male LSR is in line with gender statistics for high-level researchers (see, e. g., Duch et al., 2012). About 42.7 % of the early stage researchers were PhD students, 57.3 % were post-docs. Among LSR, 46.9 % considered themselves "established researchers", while 53.1 % reported to be "leading researchers". Concerning the distribution of respondents by country of residence, there are some differences between early and later stage researchers: while about 32 % of all LSR in our sample work in the USA, the share of U. S.-based researchers is only 9.1 % among ESR. Other important countries for ESR are the Netherlands (5.8 %), Germany (5.7 %), the U. K. (5.1 %), Poland (4.8 %) and Spain (4.1 %). Among later stage researchers, Australia (5.0 %), Turkey (4.4 %), Italy (3.6 %), the U. K. (3.4 %) and Spain (2.9 %) are among the most important countries of residence behind the United States. That the U. S. is probably overrepresented among the countries of residence, especially among LSR, is however not necessarily a problem: as shown in the next section, individual characteristics that do not vary across alternatives (such as country of residence, gender, etc.) do not afffect the econometric specification. Nevertheless, section 5.2 contains regressions by country groups (U. S. vs. EU vs. other countries) that reveal only slight differences by country of residence.

[Table 2 about here.]

Summary statistics for the job characteristics are shown in tables 3 and 4 for early and later stage researchers. The last three columns give the means of all explanatory variables for the job offers by the position they appeared in the survey (i. e., for the first, second or third jobs presented in the survey). Although on aggregate the job attributes are well balanced across job offers and there is hardly any difference between the means across job positions, the second job was chosen more often for both early and later stage researchers, probably because it was in the "middle". The econometric analysis must therefore also control for the position of the job offer in the survey.

[4]The assignment to career stages is based on the researcher's self-assessment. In the survey, researchers were asked "In which career stage would you currently situate yourself?". The respondents could then choose between four categories: "R1 First Stage Researcher (doctoral candidate stage or at equivalent, without having undertaken a doctorate)", "R2 Recognized Researcher (PhD holders or equivalent who are not yet fully independent; post-doctoral stage)", "R3 Established Researcher (researchers who have developed a level of independence; research specialist or manager, senior lecturer, senior scientist, ...)" or "R4 Leading Researcher (researchers leading their research area or field; professor stage)".

[Table 3 about here.]

[Table 4 about here.]

The next section describes our empirical approach to estimating the impact of job attributes on job choice.

4 Regression

4.1 Econometric framework

To model the researchers' job choice a random utility framework can be applied (Marschak, 1960) where each of the three choice alternatives (job offers) $j \in \{1, 2, 3\}$ yields a job-specific utility U_{ij} to each of the n respondents indexed by $i = 1, \ldots, n$. Imposing the simple behavioural model of a utility-maximizing decision maker, researcher i chooses job k if and only if $U_{ik} > U_{ij} \; \forall \; k \neq j$. Although we do not know the utility attached to each job, the job with the highest utility is known; and assuming that utility is linear in the observed attributes of the jobs X, we can define a representative utility function

$$V_{ij} = \beta' X_{ij} + \varepsilon_{ij} \tag{1}$$

where ε_{ij} is the unobserved portion of utility. Under the assumption that this random term is i. i. d. extreme value, we can estimate the probability of choosing a specific job k using McFadden's (1974) conditional logit (CL) model:

$$P(y_{ik} = 1) = \frac{\exp(\beta' X_{ik})}{\sum_{j=1}^{3} \exp(\beta' X_{ij})} \tag{2}$$

where y_{ik} is an indicator variable with $y_{ik} = 1$ if individual i chose job k and zero otherwise. The estimated parameters β are those that maximize the log-likelihood:

$$LL(\beta) = \sum_{i=1}^{n} \sum_{j=1}^{3} y_{ij} \ln P_{ij} \tag{3}$$

One feature of this approach is that all variables which do not vary across alternatives (such as gender, age, country of residence, current position and salary, etc.) cancel out in equation (2). This has the disadvantage that the effects of individual-specific variables cannot be estimated (unless they are interacted with alternative-specific variables), while it has the advantage that any unobservable individual characteristics affecting job choice (which could otherwise lead to omitted variable bias) are being controlled for. The next section will apply the CL model to the data surveyed from early and later stage researchers.

4.2 Conditional logit regressions

Table 5 shows the effect of remuneration and fringe benefits, country characteristics, and working conditions on the probability of choosing a specific job offer. Separate regressions were run for early and later stage researchers because (as highlighted in section 3) some of the characteristics describing working conditions differ between ESR and LSR. Apart from their sign and significance, the

estimated coefficients from the CL model cannot be readily interpreted. We therefore also report exponentiated coefficients. The exponentiated coefficients represent changes in the odds of choosing a specific job offer arising from a unit increase in a continuous explanatory variable or a change in a dummy variable from zero to one:

$$e^{\beta_m} = \begin{cases} \frac{P(y_{ik}=1|x_m+1)}{1-P(y_{ik}=1|x_m+1)} \Big/ \frac{P(y_{ik}=1|x_m)}{1-P(y_{ik}=1|x_m)} & \text{if } x_m \text{ is continuous} \\ \frac{P(y_{ik}=1|x_m=1)}{1-P(y_{ik}=1|x_m=1)} \Big/ \frac{P(y_{ik}=1|x_m=0)}{1-P(y_{ik}=1|x_m=0)} & \text{if } x_m \text{ is dichotomous} \end{cases} \tag{4}$$

Unlike marginal effects the changes in the odds do not represent additive, but multiplicative effects. But in the context of conditional logit models, where marginal effects are specific to the alternatives and dependent not only on the characteristics of this alternative but also on the characteristics of all other alternatives, interpreting the results as changes in the odds—which do not vary across alternatives or with other covariates—is actually more straightforward. The interpretation of the regression results in this section therefore relies mainly on interpreting changes in the odds of choosing a job offer.[5] As an alternative interpretation, willingness to pay calculations are reported in section 4.3.

[Table 5 about here.]

As the results in table 5 show, all of the coefficients are in line with the effects expected from the literature (see section 3). The coefficient of annual net salary is positive for both ESR and LSR, a higher wage increases the probability of choosing a job offer. For ESR the odds of choosing a job rise by around 3.6 % if the wage increases by $ 1,000, and the change in the odds for LSR is about the same (4.0 %). Because the logit coefficients are scaled, a comparison of effects between early and later stage researchers is, however, only admissible under the assumption that the variance of the unobserved portions of utility is the same across groups (see Allison, 1999; Williams, 2009, or Train 2009, p.41).[6] Comparisons of the coefficients and odds rations between early and later stage researchers must therefore be interpreted with caution, as all comparisons are contingent on the (untested) assumption that the residual variance is the same for both groups of researchers. What can be said however is that the effect of salary relative to the variance of the unobserved factors is higher for later than for ESR.

Under the assumption of equal residual variance, LSR appear to be more sensitive regarding the costs of health care: while the odds of choosing a job offer following a one percentage point increase in patient contributions decrease by 2.4 % for LSR, the same change in the costs of health care decreases the

[5] The odds of job k have a straightforward interpretation as the number of respondents choosing job k for each respondent choosing another job offer. Given that the job alternatives were randomly attached to one of the three positions in the survey, the expected probability of choosing job k is $P(y_{ik} = 1) = 1/3$, and the corresponding baseline odds of choosing job k are $P(y_{ik} = 1)/[1 - P(y_{ik} = 1)] = (1/3)/(2/3) = 1/2$: for each person choosing job k, two persons will choose another job offer. The exponentiated coefficients represent multiplicative changes in these odds: for example, an estimated coefficient of 2 implies that the baseline odds change to $1/2 \cdot 2 = 1$: there is now one person choosing job k for each person choosing any of the other two jobs. For marginal effects see appendix B.

[6] Whether this is the case can, however, not be tested because the early and later stage models are not nested.

odds by only 1.4 % for ESR. The difference between these groups most likely arises from different risks of becoming ill because LSR are—on average—older than ESR. As expected, a higher pension net replacement rate increases the odds of choosing a job offer for both early and later stage researchers: for a one percentage point rise in pensions the odds increase by 1.4 % for later and by 0.7 % for ESR.

Assuming that the residual variance is the same, there are some marked differences in the effects of fringe benefits between early and later stage researchers which may arise from the different needs of younger and older cohorts: for ESR, the odds of choosing a job increase by 29.4 % if the institution offers relocation support (compared to the base category "parking lot") and by 27.5 % if it offers a childcare facility, which increases the number of persons choosing such a job offer from a baseline one in three (odds 1:2) to almost two in five (odds 2:3).[7] For LSR these fringe benefits increase the odds only by 17.4 and 13.0 %. In addition, for the latter the effect of a childcare facility is only significant at the 10 % level while it is highly significant for ESR. Likewise, the effect of a guaranteed place in a quality school for the researcher's children or a job offer for the partner increases the odds for ESR by a higher percentage than for LSR. The only fringe benefit where the increase in the odds is higher for later stage than for ESR is university housing (19.2 vs. 26.8 %), while a company car does not significantly affect job choice for both groups.

Quality of life in the target country affects the choices of both early and later stage researchers, especially if the living conditions in the target country are worse than in the country of residence: compared to the base category ("the quality of life in the target country is comparable to your current country of work") the odds of choosing a job offer in a country where the quality of life is worse are 51.0 % lower for early and 59.9 % lower for LSR. In terms of the odds this means that for each early stage researcher choosing a job in a country with a lower quality of life there are four ESR choosing a different job (odds 1:4), and for each later stage researcher choosing the job located in a country with lower quality of life there are five LSR choosing a different job (odds 1:5). On the other hand, the odds of choosing a job (vis-à-vis the base category) increase by only 13.2 % for early and 12.1 % for LSR if the job is located in a country where living conditions are better than in the current country of residence. Quality of life can therefore be interpreted as a factor that is necessary, but not decisive for job choice as long as it is not worse than in the current country of residence. The results may also indicate that most researchers are fine with the quality of life of their current country of residence.

A higher teaching load is associated with a lower probability of choosing a job, but the effect appears rather small: the odds of choosing a job decrease by 0.6 % for later and 0.7 % for ESR for each percentage point increase in the teaching load. However, the overall impact depends on plausible differences of the teaching load between jobs. Teaching loads can vary substantially between universities and between higher education systems (think about a U. S. research university and a European "mass" university). Assuming a (nominal) 40 h working week, an increase of the teaching load from 8 to 16 hours corresponds to an increase of the time spent teaching (as a percentage of total time) from 20

[7] Having a childcare facility increases the baseline odds of choosing a job offer of 0.5 (1:2) to $0.5 \cdot (1 + 0.275) = 0.6375$, which roughly corresponds to odds of 2:3.

to 40 %. An increase in the teaching load from 8 to 16 h would then lead to a reduction in the odds of choosing a job of 11.4 and 13.5 %.[8] It has to be noted, however, that the teaching load is measured as the percentage of time devoted to teaching, not the percentage of time where the researcher is actually in the classroom. The teaching load inter alia includes also the time devoted to prepare lectures and exams, grade exams, etc.

The availability of external funds for research, on the other hand, has a markedly significant effect on job choice: compared to a situation where the availability of both short-term (up to 3 years) and long-term funding (up to 5 years) is good (the base category), the odds of choosing a job are 14.1–19.5 % lower if only the availability of long-term grants is poor and there is stiff competition for funds and 32.3–36.8 % lower if the availability of both long- and short-term funds is poor. External funds thus significantly affect job choice, with both early and later stage researchers paying attention to the availability of external grants when choosing a job.

The academic environment in the institution offering the job also plays a major role for the researchers' choice between different job offers: for ESR, the odds of choosing a job offer increase by 30.4 % if the most prestigious peer in the target institution is among the top 50 worldwide in the respondent's field of research, by 44.9 % if she/he is among the top 25 worldwide and by as much as 82.0 % if the most prestigious peer is among the top 5 (compared to the base category where the most prestigious peer is not among the top 50 worldwide in the respondent's field of research). The effects on the odds for LSR are similar, although their odds of choosing a job increase only by 62.1 % if the target institution hosts one of the top 5 researchers in the respondent's field of research. One explanation for this finding is that more established researchers are highly specialized in their field of research and thus have a higher probability of being among the top researchers in their field themselves. Another explanation is that the expected benefit of joint research and publications with highly prestigious peers is higher for ESR than for LSR who have an established scientific track record, so that the former place a higher value on this variable than the latter. Whether there is a true difference between early and later researchers or whether the difference is due to unobserved heterogeneity can only be revealed by looking at the willingness to pay in section 4.3.

While all of the above variables were included in the job descriptions for both early and later stage researchers, job attributes describing career perspectives, research autonomy and the way internal funds are acquired were only part of the job description for ESR. Table 5 shows that the initial contract length has a significantly positive effect on job choice: all else equal, the odds of choosing a job increase by 8.2 % for for each additional year, a three-year increase in initial contract length increases the odds by 26.7 %. But the possibilities of extending the initial contract are even more important: compared to a situation where no extension is possible (the base category), the odds of choosing a job offer are 71.6 % higher if an extension for another 3 years is possible (contingent on a positive evaluation of research performance). If tenure is possible, the odds of choosing a job offer double compared to a situation where no extension is possible. The difference between the coefficient of tenure contingent on performance

[8] The calculations of cumulative effects in the text use a higher degree of accuracy of the estimated effect on the odds ratios than shown in table 5 which are rounded to three decimal points.

evaluation and job availability and tenure contingent on performance evaluation alone is statistically significant at the 5 % level ($\chi^2(1) = 4.121$, p-value: 0.042), but the difference in the positive effect on the odds is not large (a 96.6 % increase if tenure is contingent on evaluation and job availability vs. a 114.9 % increase if tenure is contingent on evaluation alone). Career perspectives are thus an important determinant of job attractiveness, and as expected tenure plays a major role in determining the career choices of ESR.

Research autonomy, on the other hand, affects job choice only marginally for small changes in autonomy: for a one percentage point increase in research autonomy (the percentage of the time devoted to own research) the odds of choosing a job increase by 0.6 %. As with teaching, the overall impact depends on the plausible variation of research autonomy between jobs. If we compare a job with full research autonomy to a job where only 50 % of the time can be devoted to autonomous research, the odds of choosing the latter job are substantially (38.3 %) lower. The way university-internal funds are distributed has significant effects, too. Compared to a situation where university funds are provided by the university without strings attached (the base category), the odds of choosing a job are 12.4 % lower if internal funds must be negotiated with university management (dependent on the quality of the research proposal) and 17.9 % lower if they must be negotiated with the chair-holder/research group leader. A Wald test for equality of the two coefficients cannot reject the null hypothesis of no difference at the 5 % significance level ($\chi^2(1) = 2.856$, p-value: 0.091). Whether internal funds must be negotiated with university management or the research group leader is thus irrelevant; in both cases, the attractiveness of a job decreases relative to a situation where internal funds are provided without strings attached.

For LSR, the job descriptions also contained information on the ease of starting new lines of research framed as the amount of necessary research continuity, funding, the time devoted to administration and the salary scheme that were not part of the job descriptions for the ESR. Research continuity has a negative effect on job choice: if the position replaces an existing chair and requires the researcher to continue the previous chair's line of research, limiting the ease of starting new lines of research, the attractiveness of a job offer decreases. The effect is small for small changes in continuity: an increase in the time devoted to research continuity of 25 percentage points (e. g. from 25 % to 50 % of the time) decreases the odds of choosing a job offer only by 8.3 %. A change by 75 percentage points would however bring this number up to 22.8 %. The impact of continuity depends as a result, as above with teaching and autonomy, on the magnitude of variation between jobs.

The proportion of research tasks that will be funded internally by the university has a positive effect on job choice, albeit a rather small one: for each percentage point increase in the provided funds the odds of choosing the job rise by 0.6 %; a 25 percentage point increase raises the odds by only 14.9 %. As expected, the attractiveness of a job offer decreases with the administrative burden: if the time the researcher has to devote to administrative tasks increases by one percentage point, the odds of choosing a job offer decrease by 1.9 %. A 5 % increase in time devoted to administrative tasks lowers the odds of choosing a job offer by 9.2 %.

Finally, the job offers for LSR also contained information on salary advancement and the salary scheme. Relative to the base category, where salary ad-

vancement is according to an individual research performance evaluation, researchers would prefer a public salary scheme with boni for research or teaching performance (increase in the odds: 15.9 %), consistent with our expectations. Jobs with a public salary scheme without boni are less attractive than jobs where pay is based on individual performance, but the negative coefficient is not significant at the 10 % level.

In addition to the job characteristics discussed above, the effects of alternative-specific constants were also estimated for both early and later stage researchers. The constants show the effect of the job offer being the second job in the list (i. e. the central job offer in the table, see section 3) and the effect of the job offer being the third one in the list vis-à-vis being the first job offer in the list. The constants capture unmeasured attributes that affect the attractiveness of an alternative—in this case, the position of the job offer in the survey. The positively significant coefficient for the second alternative shows that the job offer positioned in the middle was—ceteris paribus—chosen more often than the first job offer. Because the job offers were distributed randomly in the table, this indicates that some respondents choose the second offer simply because it was in the middle. The odds of choosing the middle job offer are, however, only 17.1 % higher for early and 10.6 % higher for LSR. The effect of a job offer being the third in the list is negative for both early and later stage researchers, but only significant for the latter.

4.3 Willingness to pay

As is well known, the ratio of two parameters in a logit model can be used to calculate the trade-off between two variables x_{1k} and x_{2k} (see Train, 2009). Setting the total derivative of the logit probability to zero and solving for the change in x_{1k} that keeps the probability of choosing job k constant following a change in x_{2k} yields:

$$\left.\frac{dx_{1k}}{dx_{2k}}\right|_{dP(y_k=1)=0} = -\frac{\beta_2 P(y_k=1)\left[1-P(y_k=1)\right]}{\beta_1 P(y_k=1)\left[1-P(y_k=1)\right]} = -\frac{\beta_2}{\beta_1} \tag{5}$$

Using net salary as x_{1k}, this trade-off can be interpreted as the willingness to pay (WTP): it gives the amount of salary which would compensate an individual for an increase in x_{2k} by one unit so that the probability of choosing job k remains unchanged. If both β_1 and β_2 are positive, the compensation for an increase in x_{2k} is negative, as expected. The WTP not only has the advantage that it can be calculated easily and that its interpretation is straightforward, the WTP also has the advantage that it can be directly compared across groups because it is not affected by differences in scaling (see Train, 2009, p. 41). Furthermore, it illustrates the comparison between benefits and costs associated with career choices and allows us to attach a monetary value to the non-monetary job characteristics.[9]

[9]In principle, any continuous explanatory variable could be chosen as x_{1k} to calculate the trade-off. Salary was chosen because a trade-off calculation based on salary has two main advantages: first, in contrast to trade-offs based on continuous variables that are bound between 0 and 100 % (such as teaching, continuity, etc.), a trade-off based on salary can take on any positive and negative value and still have a meaningful interpretation (consider, for example, a trade-off that implies that teaching must decrease by more than 100 % of total time following a change in $x_{2k}$to keep the probability of choosing a job constant). Second, it has a straightforward interpretation as a willingness to pay in monetary terms.

[Table 6 about here.]

Table 6 shows the willingness to pay for ESR and LSR calculated from the conditional logit regressions in section 4.2. The last columns gives the difference between the WTP for early and later stage researchers along with the significance level of a test for this difference being zero. A significant difference indicates that the WTP for early and later stage researchers is not the same.

The calculations show a considerable willingness to pay for social security benefits, especially among LSR: a 1 percentage point increase in the patient contribution rate for health care must be compensated by an increase in the annual salary of about $ 620 for LSR (around $ 50 per month, in purchasing power parities), which is more than 50 % higher than the WTP of ESR although the difference is not statistically significant. If the pension net replacement rate is one percentage point higher, the salary can be $ 210 lower for ESR and $ 370 lower for LSR without changing the probability of choosing the job offer, but again the difference is not statistically significant at conventional significance levels. Almost all of the fringe benefits also command a sizable willingness to pay, especially for ESR. But only for a job offer for the researcher's partner the difference between early and later stage researchers of about $ 5,400 is statistically significant. Relocation support is valued at $ 4,400–7,300, university housing at around $ 5,000–6,100, and ESR attach a WTP of $ 8,800 to a quality school for their children, considerably more than LSR ($ 4,700). The difference is however only significant at the 10 % level.

If a job is located in a country where the quality of life is worse than in the current country of residence, researchers must be compensated with an additional salary of about $ 20,300 for ESR and about $ 23,700 for LSR (in purchasing power parities). On the other hand, researchers are willing to forego only $ 2,900–3,500 for living in a country where the quality of life is better. This again shows that quality of life is necessary but not decisive for choosing a job as long as it is not worse than in the country of residence.

Looking at the variables describing working conditions, ESR are willing to forego about $ 200 in salary for a one percentage point decrease in time spent teaching. This is significantly higher than the compensation required by LSR ($ 150). Early stage researchers thus attach more importance to a lower teaching load. One explanation for this finding is that the yardstick for measuring young researchers' performance—and thus the deciding factor that determines their future in academia—is the quantity and quality of (peer-reviewed) publications, not excellence in teaching; it is ESR who are mostly affected by the "publish or perish" mantra that characterizes the academic job market. It is not surprising that the teaching load weighs heavier on them than on the more established group of LSR.

The availability of external funding on the other hand is valued equally by early and later stage researchers: the compensation for a job where the availability of both long- and short-term grants is poor (compared to a job where the availability of both types of grants is good) is around $ 11,000-11,700, and the compensation required for a job where only the availability of long-term grants is poor is about $ 4,300 for early and $ 5,500 for LSR.

Working at a department where the most prestigious peer is among the top researchers in the field makes a job highly attractive for both early and later stage researchers, and the more prestigious the department, the higher the

willingness to pay: especially ESR are willing to forego the sizeable amount of $ 17,000 to work in a department where the most prestigious peer is among the top 5 worldwide. For LSR, the WTP is significantly lower. Working at an institution where a highly prestigious peer is affiliated can thus be seen as an investment into future earnings opportunities, especially for ESR.

Looking at the factors that were only included in the job descriptions for ESR it is obvious that the length of the initial contract as well as the opportunity to extend the working relationship command a substantial WTP: if the length of the initial contract increases by one year, the salary can decrease by about $ 2,200 without changing the probability of choosing the job offer. In addition, compared to a situation where no extension is possible ESR are willing to forego an income of $ 15,400 if there is the possibility of extending the contract for another three years. Even higher is their WTP for tenure, which varies between $ 19,200 (if tenure is contingent on the availability of a job offer and performance) and $ 21,700 (if tenure is contingent on research performance alone). Comparing these large effects with some of the other values, an early stage researcher would, for example, be indifferent between choosing a job with tenure in a country where the quality of life is worse than in her country of residence or choosing a job without tenure in a country where living conditions are comparable to her own country. Or she would rather choose a job with tenure than an otherwise equally attractive job at a prestigious department where one of the top 5 researchers in the same field is working. This shows that the prospect of gaining tenure, or the lack thereof, is probably one of the most important factors determining job choice among ESR. The WTP for a one percentage point increase in research autonomy is about the same size as the WTP for a one percentage point decrease in the teaching load: ESR are willing to forego an income of about $ 180 if the percentage of time they can devote to their own research increases by one percent of total time.

Finally, compared to a situation where internal research funds are provided by the university without strings attached ESR demand a compensation if the funds must be negotiated with the chairholder or with university management.

Looking at the variables that were only included for the later stage jobs, researchers ask for a small compensation if they have to continue the previous chair's line of research, while for each percentage point increase in research funding that is provided by the university there is a WTP of about $ 150. The compensation required to keep the probability of choosing a job constant after a one percentage point increase in time devoted to administration is about $ 500; this is more than three times the size of the compensation required after a one percentage point increase in the teaching load, and the difference is highly significant. Not surprisingly, researchers thus rather spend their time teaching then performing administrative tasks.

Finally, LSR would be indifferent between a job where salary advancement is according to individual research performance alone and a job where the salary is $ 3,800 lower but according to a public salary scheme with boni for research performance.

5 Robustness

5.1 Alternative estimators

The CL model's popularity is mainly due to its straightforward derivation and computational simplicity, which contribute to the model's almost universal availability in statistical and econometric software packages. Its appropriateness however depends on whether the assumptions underlying the CL model are satisfied.

One prominent assumption of the CL model is the well known fact that the ratio of the logit probabilities of two alternatives k and l depends only on the characteristics of k and l and not on the availability or characteristics of other alternatives, a property known as "independence from irrelevant alternatives" (IIA):

$$\frac{P(y_{ik}=1)}{P(y_{il}=1)} = \frac{\exp\left(\beta' X_{ik}\right) / \sum_{j=1}^{3} \exp\left(\beta' X_{ij}\right)}{\exp\left(\beta' X_{il}\right) / \sum_{j=1}^{3} \exp\left(\beta' X_{ij}\right)} = \frac{\exp\left(\beta' X_{ik}\right)}{\exp\left(\beta' X_{il}\right)} \tag{6}$$

While IIA has some advantages if satisfied—most notably it allows the consistent estimation of parameters on a subset of choice alternatives—its validity can be questioned if, for example, the choice between the jobs is not independent of the job the respondent is currently holding or other factors not considered in the analysis.

Whether IIA is satisfied or not can be tested using, for example, a Hausman test (Hausman and McFadden, 1984), which is based on testing the null hypothesis that the parameters of an unrestricted model including all alternatives (which is efficient and consistent under the null hypothesis but inconsistent under the alternative) are not significantly different from the parameters of a restricted model estimated on a subset of choice alternatives (which is consistent both under the null and the alternative hypothesis but inefficient). A significant test statistic rejects the null hypothesis and provides evidence against IIA so that the conditional logit model is not consistent.[10]

Table 7 shows the results of all possible Hausman tests that can be conducted for early and later stage researchers. For each test, one job alternative was excluded to estimate the restricted model. The resulting coefficients were then compared to the estimates of the full model from table 5 and tested for systematic differences. The Hausman test statistic is

$$H = \left(\hat{\boldsymbol{\beta}}_r - \hat{\boldsymbol{\beta}}_u\right)' \left[Var\left(\hat{\boldsymbol{\beta}}_r\right) - Var\left(\hat{\boldsymbol{\beta}}_u\right)\right]^{-1} \left(\hat{\boldsymbol{\beta}}_r - \hat{\boldsymbol{\beta}}_u\right) \tag{7}$$

where $\hat{\boldsymbol{\beta}}_u$ are the estimated coefficients of the unrestricted and $\hat{\boldsymbol{\beta}}_r$ are the estimated coefficients of the restricted model. The test statistic is then compared to the critical values of a χ^2 distribution with degrees of freedom equal to the number of common coefficients in the restricted and unrestricted models.

[Table 7 about here.]

[10] Using the conditional logit model can be justified if $\beta' X_{ij}$ is not too parsimoniously specified, i. e. if the remaining unobserved portion of utility is essentially "white noise" and there are no correlations in error terms across alternatives (Train, 2009, p. 35).

None of the six Hausman tests in table 7 shows a rejection of the null hypothesis at the 5 % level. For early stage researchers the test statistic is significant at the 10 % level if job 2 is excluded from the set of alternatives, but generally we conclude that there is no strong evidence against the IIA property in our data.

Another important assumption of the CL model is that the error terms ε_{ij} are independent and identically distributed for all j (see section 4.1): the unobserved portion of utility must be uncorrelated across alternatives and must have the same variance for all alternatives. But if unobserved factors related to one job alternative are also related to other job alternatives, the assumption of independence is no longer valid. The same holds true if there is more than one choice situation for each respondent, as is the case with the early stage researchers (see section 3), and the errors are correlated across choice situations: if an unobserved factor affects the first choice situation, it is likely to affect the second choice situation as well (see Train, 2009, p. 18).

If the error terms are correlated across choices or experiments, alternative methods of estimation such as multinomial probit (MNP) or mixed logit (MXL, for a thorough discussion see Train, 2009, ch. 5 and 6) can be applied. To test for the robustness of our results we therefore re-estimate our models for early and later stage researchers using MNP and MXL models.

5.1.1 Multinomial probit

The MNP assumes that the unobserved error terms are assumed to follow a multivariate normal distribution with a mean vector of zero and covariance matrix Ω which allows for an unrestricted covariance pattern. Because the integral of the probit choice probabilities does not have a closed form solution, estimation is based on maximum simulated likelihood (cf. Train, 2009, ch. 5).

[Table 8 about here.]

Table 8 shows the coefficients of the MNP estimation alongside the CL estimates from table 5. A comparison between the two models reveals that there are no differences in the signs and only minor differences in the significance levels of the estimated coefficients. Differences in the size of the parameters are to be expected given the different scaling of the coefficients in logit and probit models.[11] The only striking difference is that the alternative-specific constant for job 2 is no longer significant for later stage researchers; if there is a correlation in the error terms across alternatives, it appears to affect only the estimates of the alternative-specific constants, which are in any case of limited interest to us. All in all, the results of the MNP models are qualitatively similar to the CL results and we conclude that a possible correlation of the error terms across alternatives is no cause for concern in our model.

5.1.2 Mixed logit

As a second alternative we re-estimate the job choice using a MXL model. The MXL can be derived from utility maximization in two ways which are

[11] While logit coefficients are scaled so that the error variance is $\pi^2/6$, probit coefficients are usually scaled so that the errors have variance 1. Probit coefficients can thus be expected to be roughly equal to the logit coefficient divided by $\sqrt{\pi^2/6} \approx \sqrt{1.6}$.

formally equivalent (see Train, 2009, ch. 6): either from the assumption that there is individual taste variation, so that the coefficients are individual-specific and vary over decision makers according to a predefined (normal, logistic, etc.) distribution (in which case it is sometimes also called the "'random parameters" logit), or from the assumption that error components are correlated across the alternatives. Both interpretations are appealing in our application, but since the multinomial probit already suggests that correlation of the error terms across alternatives is not an issue in our application, we focus on the first interpretation of the MXL and assess the possibility of individual variations in tastes across researchers.

In this interpretation the utility function from equation (1) becomes:

$$U_{ij} = \beta_i' X_{ij} + \varepsilon_{ij} \tag{8}$$

Here, β_i is a vector of coefficients for individual i representing i's preferences. The utility function is thus heterogeneous across individuals, and the coefficient of a job characteristic can not only have a different magnitude for different individuals, but also a different sign. The coefficients in β_i are assumed to vary over decision makers with density $f(\beta|\theta)$ (the mixing distribution), where θ are the parameters describing the density of β. They are thus essentially "random" parameters drawn from a distribution described by θ. As in the conditional logit model, ε_{ij} is assumed to be i.i.d. and follow an extreme value distribution.

If the β_i's were known, the probability of choosing a specific job offer k could be computed from the logit formula from equation (2) with β replaced by β_i. But since the β_i's are unobserved, the probability of choosing job offer k is the integral of (2) over all possible values of β_i (Train, 2009, p. 138):

$$P_{ik} = \int \left(\frac{\exp\left(\beta_i' X_{ik}\right)}{\sum_{j=1}^{3} \exp\left(\beta_i' X_{ij}\right)} \right) f(\beta|\theta) d\beta \tag{9}$$

Because the integral in (9) does not have a closed form solution, it must be approximated through simulation.

The mixing distribution $f(\beta|\theta)$ for each random parameter must be chosen by the researcher. If a parameter β is assumed to be normally distributed, the estimated θs of this parameter are its mean μ_β and standard deviation σ_β. A sign restriction on a parameter could be imposed by specifying it as being log-normally distributed; for example, the coefficient of salary can be expected to be positive for all respondents, although its magnitude may vary between decision makers. Finally, parameters can also enter the model as fixed parameters if they are assumed not to vary across decision makers.[12]

To make our model as flexible as possible (and because models including normally and lognormally distributed parameters show a tendency of not achieving convergence), we specify all 26 parameters for the early stage regression (including the alternative-specific constants) and all 24 parameters for the later stage regression as being normally distributed. But since our maximum simulated likelihood estimator uses quasi-random Halton sequences (Halton, 1960) that are considered more effective than simulation based on random draws (see Bhat,

[12]Revelt and Train (1998) and Train (1999) cite Ruud (1996) showing that MXL models have a tendency to be unstable when all coefficients are allowed to vary across decision makers. Therefore, at least one coefficient should be fixed.

2001; Train, 1999, 2009; Hensher, 2001), only 20 normally distributed parameters can be included. The reason for this is that the Mata routine implemented in the STATA statistics package to generate the Halton draws (see Drukker and Gates, 2006) imposes limitations on the number of random (i. e., normally or lognormally distributed) parameters. In addition, MXL models with a large number of random parameters may face convergence problems upon estimation.

We therefore proceed in three steps to identify the random parameters: in the first step, we allow only those parameters to vary across decision makers in the MXL regression where a strong heterogeneity in tastes could be expected. For early stage researchers we included the coefficients of health care and the pension replacement rate as well as the dummy variables for fringe benefits, availability of external funding and the alternative-specific constants in the list of random parameters. For the later stage researchers we assumed the same list, plus the coefficients for university research funding and the dummy variables for salary scheme. In the second step, the coefficients that turn out to be fixed in the first step—that is, the coefficients where the estimated standard deviation of the parameter's normal distribution is not significantly different from zero at a 5 % significance level—are excluded from the list of random parameters. Instead, we include all other coefficients that were assumed to be fixed before. The coefficients that turn out to be fixed in the second step regression are then again excluded from the list of random parameters, and only those where the estimated standard deviation is significantly larger than zero (at a 5 % significance level) are retained in the list of random parameters for our third (and final) step regression. In the case of categorical variables (with the exception of the fringe benefits), all category dummies were treated as being random if at least one of them had a standard deviation significantly larger than zero. The results of the final step regressions for early and later stage researchers are shown in table 9.[13] The table reports both the estimated means (μ_β) as well as the estimated standard deviations (σ_β) of the normal distribution that is assumed to describe the random parameters. Coefficients where no σ_β is reported are treated as being fixed parameters.

[Table 9 about here.]

Both qualitatively and quantitatively the MXL coefficients are relatively similar to the CL coefficients of table 5. For both groups, the mean of the salary coefficient in the MXL is slightly larger than the estimated parameter of the CL model, and for early stage researchers the MXL model indicates heterogeneity in the importance of salary for job choice across early stage researchers. There are thus differences in tastes across early stage researchers that cannot be linked to observed factors. In addition, the effects of the teaching load, the length of the initial contract, the possibility of extension for another three years and research

[13] The regression results of the first two steps are available from the authors upon request. We follow Hole (2007) in using 500 Halton draws in the simulated log-likelihood regressions. Although there is no general agreement on the number of Halton draws to be used to achieve stable parameters, Hensher and Greene (2003, p. 154) note that models with a small number of alternatives and random variables can "produce stability with as low as 25" Halton draws per observation, and that "100 appears to be a 'good' number". Because the initial elements of the Halton sequences can be correlated across dimensions, Train (2009, p. 227) recommends to discard at least the the first κ elements, with κ at least as large as the ιth prime number where ι is the number of random parameters to be estimated. Because the final early (later) stage regression uses 17 (11) random parameters, the first 59 (31) elements are dropped.

autonomy are also heterogeneous for early stage researchers. For later stage researchers, the health care patient contribution turns out to be heterogeneous, possibly reflecting differences in health status across respondents; heterogeneity among later stage researchers can also be observed for the effect of the most prestigious peer being among the top 25 in the respondent's field of research.

For both early and later stage researchers, the effect of a job offer for the partner varies across respondents, which may reflect differences in marital status. The effect of the job being in a country where the quality of life is worse than in the country of residence is also relatively heterogeneous across both groups of respondents: the MXL model thus indicates that while quality of life is highly important to some respondents, it is rather irrelevant for others. For both early and later stage researchers the coefficient of the availability of external funds is also found to be heterogeneous, as are the alternative-specific constant for the second (middle) job in the list.

The MXL model therefore reveals that some coefficients are heterogeneous, but given that the estimated effects are not only qualitatively, but also quantitatively similar to the the computationally simpler CL model, it adds little to the insights already gained.

5.2 Differences in the interpretation of salary across countries of residence

As mentioned in section 3, the respondents were not explicitly informed about the currency of the salary included in the job descriptions due to a survey error. There is thus the possibility that researchers from different countries interpreted the net salary not as an amount in U. S. dollars but in their national currencies. For example, consider a Hungarian researcher who is confronted with a job offer with a salary of 50,000. While it can be expected that the basic relationship between salary and job attractiveness does not change—so that ceteris paribus a job offering 50,000 is more attractive than a job offering 40,000—whether the researcher interpreted the 50,000 as a salary in U. S. dollars, Euros or Hungarian Forint may make a difference when calculating the WTP: the researcher may be willing to dismiss a job offer including university housing in favor of an (in all other respects) similar job which offers $ 10,000 more but no fringe benefits, while she may not be willing to do the same for job offering HUF 10,000 more.[14]

In this section we therefore check for the robustness of our WTP calculations to different possible assumptions about the currency of the salary by dividing the early and later stage researchers into three subgroups: those living in the U. S., those living in one of the 17 countries of the Eurozone, and those living in another country. For each of these groups, we re-estimated the CL model from section 4.2 for each of these subgroups and calculated the WTP.[15] The results are shown in table 10 for early and table 11 for later stage researchers. Implicitly, the regressions also test whether there are significant differences between countries

[14] At the time of the writing, 10,000 Hungarian Forint were worth about $ 44.43.

[15] Again, the WTP was calculated because it can readily be interpreted across subgroups while differences in coefficients may also be due to unobserved heterogeneity between researchers working in the U. S., the Eurozone and other countries. The conditional logit regression results upon which the WTP calculations are based are not shown in this paper but available from the authors upon request.

of residence and whether the structure of sending countries affects the results of our empirical analysis.

[Table 10 about here.]

[Table 11 about here.]

The resulting WTP calculations show that despite some differences in the WTP between those living in the U. S., the Eurozone and the other countries the overall scale of the WTP is rather similar: for example, the willingness to pay for a job offer for the partner is about $ 17,700 for early stage researchers living in the USA, $ 12,600 for those living in the Eurozone and around $ 14,700 for early stage researchers living in a country outside the U. S. or the Eurozone (at purchasing power parities). In another example, the salary of a later-stage job where the availability of short- and long-term external funding is poor must be around $ 10,000 higher for researchers in the USA, $ 11,800 higher for researchers in the Eurozone and $ 13,800 for researchers in other countries (at purchasing power parities). For a more formal test of the discrepancies between currency areas we calculated the difference in WTP across country group pairs and tested whether the resulting values are significantly different from zero.

[Table 12 about here.]

[Table 13 about here.]

Table 12 shows that there are only a few significant differences in willingness-to-pay for early stage researchers across currency areas if a 5 % significance level is used. The WTP for a childcare facility is significantly higher for researchers in other countries than for researchers in the Eurozone, but not significantly higher than for researchers in the U. S. The higher WTP for researchers working in the USA compared to those working in the Eurozone is also not statistically significant. Researchers working in the USA on the other hand are indifferent with respect to working in a country with superior quality of life: their WTP for job offers in countries where the quality of life is better than in the U. S. is not significantly different from zero, while researchers working in the Eurozone and other countries have a significant WTP for a better quality of life of about $ 3.700 and $ 5.100 at purchasing power parities. Likewise, the WTP for living in a country with worse quality of life is significantly lower for U. S.-based researchers than for researchers from the Eurozone or other countries.

The compensation required for an additional percentage point of time spent teaching is significantly lower for early stage researchers working in the U. S. than for those working in the other two country groups (albeit only at the 10 % level when compared to Eurozone-based researchers), while no significant difference between researchers in the Eurozone and researchers in other countries can be observed. Finally, there is also a significant difference in the valuation of initial contract length between U. S. researchers and those working in the Eurozone or other countries.

Among LSR, there are also only a few differences between the country groups that are significant at the 5 % level (see table 13). As among early stage researchers, the WTP for a childcare facility is not significant for later stage researchers working in the USA. U. S.-based researchers also require a significantly lower compensation for living in a country with lower quality of life than

researchers from other countries. As for the ESR, the compensation required for an increase in the teaching load is lower for those working in the USA. Finally, there are significant differences between U. S.-based researchers and researchers working in the Eurozone or other countries concerning the salary schemes.

These differences in WTP across country groups are very likely due to heterogeneity in tastes and differences in university organization (for example, the lower WTP for early stage researcher's contract length in the U. S. may be due to a better availability of ESR positions across the country) and not due to differences in currencies. All in all, we are therefore confident that the missing information about the currency of the salary included in the job offers did not significantly influence the results, and that our WTP can be interpreted as an amount in U. S. Dollars at purchasing power parities. Furthermore, we conclude that the country structure has only a limited effect on our main results.

5.3 Nonlinear effects of teaching and other continuous variables

Up to now we assumed that the continuous job attributes have a linear effect on representative utility. There is reason to doubt this assumption. Consider teaching: a linear effect of the research share in combined teaching and research time would imply that research only jobs (for example, as in the German Max Planck or the French CNRS basic research institutes) are deemed to be the most attractive for university researchers. In fact, these non-teaching research institutes came into being to cope with the rising teaching burden in Europe's universities at the beginning of the 20th century (Ben-David, 1978). Rising student numbers made the unity of teaching and research as a classic feature of the Humboldt-university increasingly difficult within the European one-tier systems. In the U. S. however, universities developed a two-tier system, an undergraduate/general education-tier and the graduate school, where researchers could teach graduate students in limited numbers, compatible with frontier research (Clark, 1995).[16]

What we observe however is not evidence for pronounced international migration towards Max Planck and CNRS institutes, but rather large international inflows of talented researchers into U. S. research universities featuring some amount of teaching.[17] Individual intrinsic motivations for teaching include a genuine interest in training young potential researchers, in imparting knowledge acquired to others, which is at the heart of the role of an academic (Ben-David, 1971). More extrinsic motivations relate to teaching's effect on keeping research interests broad (Martin, 2003) and to opportunities to employ graduate students as research assistants in labs. In brief, teaching may be good for establishing "priority" and we therefore expect a nonlinear effect of teaching on the probability of job choice.

A similar argument can be made for the level of salaries. According to our discussion of intrinsic and extrinsic motivation of academic researchers, one

[16]The U. S. graduate school system is thus seen as an organisational innovation which successfully adapted the Humboldt model (education through science) to the challenges of strongly rising student numbers (Ben-David, 1978).

[17]Note that the high visibility of U. S. research universities in international rankings arose out of their teaching function, as the Shanghai ranking was conceived to guide Chinese students' international study application decisions.

may think that once a certain minimum threshold level of net income has been reached, the importance of salary declines in comparison with job attributes more directly related to academic work (see Stern, 2004, for the willingness to forego salary in exchange for greater academic freedom). In addition, economic theory suggests that the marginal utility of income is decreasing.

To test for such nonlinearities we include squared terms of salary, health care patient contribution, teaching load and research autonomy to the regression for early stage researchers. The results are shown in table 14.[18]

[Table 14 about here.]

If its squared term is included, the effect of salary increases from 0.035 (see table 5) to 0.105. The negative coefficient of its squared term however indicates that there is a decreasing marginal utility of income. The probability of choosing a job offer increases until the salary reaches $ 69,200. For values of income beyond this point the probability of choosing a job offer would actually decrease again, but this is outside the range of our salary variable ($ 25,000–65,000). This is also illustrated by the top panel of figure 2, which shows the probability of choosing the individual jobs when the salary of job 1 varies from the lowest to the highest value in the sample for early stage researchers while keeping the value of all other variables (as well as the value of salary for jobs 2 and 3) at the mean.

The bottom panel of figure 2 shows the probability of choosing each of the three job offers when the healthcare patient contribution rate varies from zero to 10 %, which is the maximum value in the sample. As indicated by the three lines the probability of choosing a specific job does not change much over the range of the healthcare contribution rate. The probability of choosing job 1 initially decreases as the contribution rate rises and reaches a minimum at about 6.3 % after which an additional increase has only little effect on the probability of choosing job 1.

[Figure 2 about here.]

A stronger effect can be observed for the teaching load: if the squared value of the teaching share in combined research and teaching time is included, the coefficient of teaching actually becomes positive: starting from a teaching load of zero percent of total time, the probability of choosing job 1 actually increases if the teaching load rises. The maximum probability of choosing job 1 can be observed at a teaching load of 27.0 %, which corresponds to 10.8 h if 40 h per week are spent on teaching and research. Furthermore, the probability of choosing job 1 does not decrease below its value at a teaching load of zero until it reaches about 55 %. This means that a job with a teaching load of 50 % would still be preferred to a job with no teaching at all. As measured in the survey, the teaching load includes not only the time spent in class, but also the time spent preparing lectures, exams, etc. The regression model therefore shows that a teaching load of zero is not the optimum and that even early stage researchers prefer some teaching to no teaching, consistent with our expectations.

[18] Although the retirement pension net replacement rate and the length of the initial contract are also continuous their squared terms are not included. If they are included the coefficients of pension replacement rate, pension replacement rate squared, length of contract and length of contract squared are all insignificant.

[Figure 3 about here.]

Finally, the effect of research autonomy is still positive as before, so that the probability of choosing job 1 increases as autonomy increases; but it now does so at a decreasing rate: as autonomy gets larger than about 70 %, the effect of an additional percentage point of research autonomy becomes smaller and eventually negative, as can be seen from the bottom panel of figure 3. The maximum probability of choosing job 1 can be observed at a research autonomy of 90.2 %. Our results show that jobs with a very high degree of research autonomy are preferred to jobs with lower degrees of autonomy but full autonomy is not attractive from early stage researchers' point of view, probably because early stage researchers believe that they could benefit from some guidance for their research or because they perceive a (small) degree of dependence as a possibility to collaborate with the more established researchers at their institution, and not as a limitation of their freedom to pursue their own research.

[Table 15 about here.]

A regression with squared terms of the continuous variables (salary, health care patient contribution, teaching load, research continuity, university research funding and time devoted to administration) was also estimated for the later stage researchers, and the results are shown in table 15.[19] As before, we also calculated the probabilities of choosing each of the three jobs if one of the continuous variables of job 1 varies while all other variables are held at their respective mean values.

As the top panel of figure 4 shows, the probability of choosing job 1 increases as the salary of job 1 rises, but just like for early stage researchers the marginal utility of an additional unit of income eventually decreases as the salary reaches the upper limit in the sample ($ 85,000). The bottom panel of figure 4 again shows that the probability of choosing a job decreases with the health care contribution rate, but there is a rather small overall effect of this variable on job choice. If the teaching load of job 1 varies while the other variables are held at their mean, the same picture emerges for later stage researchers that we observed for early stage researchers: initially, the probability of choosing job 1 increases with the teaching load until a value of 28.8 % of time, which corresponds to about 11.5 h of a 40 h working week (see the top panel of table 5). As before, it stays above its initial value (at a teaching load of zero) until a teaching load of about 58 % is reached.

[Figure 4 about here.]

The coefficient of the squared value of research continuity is not statistically different from zero; research continuity therefore has a negative effect over the whole range of values. On the other hand, the squared term of university research funding is significant, albeit only at the 10 % level. An increase in university research funding raises the probability of choosing job 1, but the effect decreases as research funding approaches 100 % (see the middle panel of figure 5). If internal funds cover a high share of research-related expenditure needs, a further increase in this share will only have a small additional effect

[19] The squared value of the retirement pension net replacement rate was not included for the same reasons as before.

on the attractiveness of a job. This may be due to the fact that in reality, university internal research funding very rarely covers all the research funding needs and academics are used to applying for external grants to fund additional research expenditure needs. This would speak in favour of base funding of research to be complemented by research grants. If its squared value is included, time devoted to administration has a positive effect while the squared term is negative. Thus, starting from zero administrative tasks the probability of choosing job 1 actually increases if the time devoted to administration rises, but the probability soon reaches its maximum at about 4.0 % of total time, as the bottom panel of figure 5 shows. Beyond this point, an increase in time devoted to administrative tasks of job 1 decreases the probability of choosing this job. The optimal time devoted to administration of 4 % corresponds to about 1.6 h per week; later stage researchers apparently prefer to perform a small share of administrative tasks, maybe because it helps them to keep in touch with what is happening at their department or because it raises their sense of belonging to the administrative unit.

[Figure 5 about here.]

The analysis of non-linear effects in the continuous variables thus reveals some interesting relationships; most importantly, it supports the assumption that teaching does not always have a negative effect on job choice, but can actually be an attractor for both early and later stage researchers. From our results we can conclude that there is an optimal teaching load of about 27–29 % of total time (or 11–12 h per week, including time for preparation of lectures outside the classroom), and that although the probability of choosing a job where teaching requires more than 30 % of total time would on average be low, researchers at various stages of their career prefer some teaching to no teaching at all. Whether this is due to more intrinsic or more extrinsic motivation, or a combination of both, we cannot ascertain with our data.

6 Applications

6.1 Differences between fields of science

In this and the following three subsections we examine the determinants of career choice for various subgroups of our sample of early and later stage researchers. We start with differences between ESR and LSR according to their field of science. We have information on altogether six fields of science (agricultural, social, natural and medical sciences as well as humanities and engineering) only for those ESR and LSR which have responded to the EU higher education survey (see section 3). Hence, our sample is considerably smaller. Due to the low number of respondents, we drop the field of agricultural sciences from the presentation of our results. We further drop the fringe benefit coefficients from the presentation of our results, as we are not interested in them here.

Table 16 and 17 show that in general, the job attributes keep their sign and levels of significance known from the baseline results (see table 5). Exceptions are the health, pension and internal funding attributes which are sometimes not significant. Noteworthy differences between the fields of science can be seen for the level of salary, which seems to be more important for researchers in

the medical sciences and in engineering. While a $ 10,000 rise in salary would increase the odds of job choice by 30 to 32 % for researchers in the humanities, it would increase the odds of job choice for researchers in engineering by 47 to 54 %. In engineering and the medical sciences, private sector involvement by academics is more likely so that it is plausible that attractive jobs have to feature higher salaries.

As expected, the availability of external grants matters much more to researchers from equipment-heavy sciences such as the medical sciences, while in the humanities, a poor availability of external grants has an insignificant effect on the probability of job choice. In the results for LSR, both medical sciences and engineering show very high coefficients on the job attribute availability of external grants. Another difference is in the importance of high quality peers for job attractiveness. Medical sciences and engineering show a lower importance compared with social sciences and natural sciences. This could be explained by the different role of publishing in the former disciplines, which rely somewhat less on publishing to establish priority, in particular engineering, so that the visibility of high quality peers is reduced. The results for the significance of differences in WTP for certain job attributes and selected discipline pairs (table C3 in the Appendix) confirm the differences for peers and funding.

Interestingly, the balance between teaching and research has an insignificant effect on job choice for ESR and LSR in medical sciences. This may be related to the way of teaching in some medical science disciplines, where researchers teach students in hospitals "on the case" so that there is a real unity of teaching and research. Furthermore, among ESR researchers, social scientists value research autonomy significantly higher than engineers. An increase in autonomy by 10 percentage points would increase the odds of job choice for social scientists by 32 % and for engineers by only 6 %. This could be explained by the different organisation of working units of engineers vs. social scientists in terms of group structure and authority relationships, but further research is warranted.

[Table 16 about here.]

[Table 17 about here.]

6.2 Gender differences

We now turn to gender differences in the valuation of job attributes. The gender information is available for the full sample, so that we return to the same sample as for the presentation of the baseline results, split into early stage researchers (table 18) and later stage researchers (table 19). We show the coefficients from the logit regressions as well as the result of the test of significant differences between the WTP of ESR and LSR. WTP figures are reported in appendix C. We keep fringe benefits in our results, as we suspect that gender differences may play a role in the differential appraisal of such benefits. We start with a discussion of results common to ESR and LSR.

Based on the regression coefficients, both ESR and LSR results indicate that male researchers attach more importance to salaries, whereas female ones place more weight on health and pension components of the remuneration package. For female ESR and LSR, a salary increase by $ 10,000 would increase the odds of choosing a job by 34 to 39 %; for male ESR and LSR, by 50 to 53 %.

Differences between the WTP for various job attributes confirm this in particular for healthcare; for female ESR, the difference is not significant, but it has to be borne in mind that the WTP itself for healthcare is highly significant for females, but insignificant for males (table C4). Furthermore, there has to be a significantly higher compensation for females in order to accept a job in a country featuring a worse quality of life than in the current country of residence (the amount of the compensation is between about $ 28,500 and $ 31,000 for females, whereas males would equalise job choice probabilities with a salary increase of approximately only $ 14,000 to $ 20,000).

Regarding working conditions, two significant differences stand out. The first difference between males and females relates to funding attributes of academic jobs. The odds of job choice increase for female ESR when jobs show a good availability of long- and short-term grants while they increase for female LSR for jobs showing higher shares of research which can be funded by university-internal funds. Both findings may relate to the more competitive setting of obtaining research funding via grants. There is experimental evidence that women shy away from competition while men embrace it, due to men being more overconfident and to gender differences in preferences for performing in a competition (Gneezy et al., 2003; Niederle and Vesterlund, 2007). There is also evidence for the U. S. that historically, women have received a lower level of institutional support in terms of research resources which may explain the different valuation of our job attributes relating to funding (Duch et al., 2012). A second significant difference is the higher willingness to pay of females ESR and LSR for working with top peers. Female researchers seem to think that it is more beneficial to work with high quality peers. E. g., female ESR would accept a salary decrease by approximately $ 22,000 to work with top peers, while the corresponding figure for male ESR is a mere $ 12,000. This may again be due to lower self-confidence of females, but further research is warranted.

Turning to ESR only, as expected we see significant gender differences relating to the availability of childcare facilities and to the quality of schools. A more minor difference regards one attribute level of the job attribute contract extension. Females are willing to pay significantly more for an extension possibility of the initial contract by a mere three years, again possibly related to lower self-confidence. In our sample, 30.4 % of men declare to feel very confident about their future career prospects, while only 19.6 % of females declare to do so. It is further interesting to note that female LSR are indifferent between individual research evaluation and a public salary scheme with bonus, whereas male LSR prefer a public salary scheme with bonus to individual research evaluation; the difference in WTP is however not statistically significant. Female LSR are also significantly more likely to ask for a higher compensation for high levels of research continuity based on the previous chair-holder, although the difference is quantitatively small (around $ 3,000 in terms of WTP for an increase of 50 percentage points in continuity). This may be related to females being more inclined to work in teams rather than being at the top of a hierarchical pyramid, or again to a lower level of confidence: females might be more likely to fear that they will not be able to pursue their own line of research. This also warrants further research.

[Table 18 about here.]

[Table 19 about here.]

6.3 Mobile vs. non-mobile researchers

The survey we used for the implementation of our stated choice experiment also featured questions about international mobility experiences of ESR and LSR. Researchers who have been mobile for more than 3 months within the past 10 years are particularly interesting for us, as they have knowledge of different higher education systems and may thus have acquired a sharper understanding of what they see as an attractive job. Franzoni et al. (2012) find in addition superior performance for mobile academics. We also include our range of fringe benefits, which mostly are of particular importance to academics changing countries for their job. Mobile researchers will have a personal experience of the difficulties involved in moving countries and we are as a consequence interested in how they value our range of proposed fringe benefits. Table **??** shows results similar to our baseline results as regards the signs of the coefficients and the levels of significance.

Mobile ESR and LSR seem to attach more importance to the level of salary and to fringe benefits such as relocation support (in particular, ESR), childcare facilities, schools for children and a job offer for the partner, consistent with our expectations. An increase of 10,000 in salary would lead to the odds of job choice increasing by 36 % for ESR who have not been internationally mobile and by 54 % for ESR who have been internationally mobile. A better quality of life shows somewhat higher coefficients for mobile ESR and LSR than for ESR and LSR who have not been internationally mobile. Among the job attributes referring to working conditions, mobile researchers see jobs involving a higher teaching load as less attractive than not mobile ones (in particular, LSR). Peers among the top 5 worldwide are highly valued by mobile researchers.

As regards ESR specific working conditions, mobile researchers show strong preferences for jobs involving attractive career perspectives as well as a high research autonomy. Offering tenure track based on performance only would increase the odds of job choice for mobile ESR by 162 % (non-mobile ESR: 93 %); increasing research autonomy by 50 percentage points yields effects of 50 % (mobile ESR) and 32 % (non-mobile ESR). However, mobile ESR are not willing to trade these attributes off against a lower salary as evidenced by the analysis of the significance of differences in willingness to pay, which are mostly insignificant with the exception of the willingness to pay for a job offer for the partner of the researcher. Scaled against the attribute salary, there thus do not seem to be significant differences between mobile and non-mobile researchers. Preferences for a higher level of salary by mobile ESR compensate the preferences for high levels of the other attributes. However, a different picture could emerge when using other variables for scaling the other job attributes instead of salary (cf. section 4.3). Another way of interpreting the results is to state that mobile researchers value a well balanced job, featuring both relatively high salaries and attractive working conditions, and that they are both extrinsically and intrinsically motivated.

[Table 20 about here.]

[Table 21 about here.]

6.4 The potential and the current "elite"

Finally, as outlined in our survey of the literature, asymmetric scientist mobility is rather a phenomenon of early stage researchers. It is mostly PhD-holders or post-docs which seize the opportunity of a job offer in a U. S. research university and then stay there, rather than U. S. research universities luring away established researchers from Europe. As stated, our survey allows for splitting ESR into the constituting career stages R1 (PhD-students) and R2 (PhD-holders and post-docs). ESR at the career stage R2 are looking out for an entry into an academic career and can be seen as feeding the "potential elite" described by Laudel (2005).

According to table 22 PhD-students (R1 researchers) seem to be quite happy taking any job, as they do not place a lot of importance on the length of the initial contract and do not differentiate between a 3 year extension of the initial contract and tenure contingent on the availability of a position. They are also not concerned with health and pension attributes of the jobs proposed, most likely due to their age. R2 researchers by contrast show results very similar to our baseline results, only stronger so for the job attributes salary, teaching load and career perspectives, in particular for tenure options. Offering tenure track based on performance only would increase the odds of job choice by 152 % for R2 researchers (76 % for R1 researchers), amounting to a significant difference in WTP of 6,276. An additional year of initial contract length increases the odds of job choice by 12 % for R2 and by 4 % for R1 researchers. This may reflect little academic labour market experience on the part of PhD-students and more active job seeking by PhD-holders and post-docs, which leads to a more thorough appraisal of varying job attributes.

In addition, the survey also asked respondents how confident they were about their future career prospects. A very high confidence level could be interpreted as a proxy for the talent of these researchers. Of course this is debatable as it is based on a subjective assessment. Furthermore, note the small sample of highly confident researchers at the R2 career stage. Hence we are cautious about the interpretation of our results shown in table 23 for R2 researchers indicating high levels of confidence with regard to their future career prospects and R2 researchers not displaying high levels of confidence.

Highly confident PhD-holders and post-docs place a lot of weight on the level of salary, on the quality of life not being worse than in the current country of residence and on tenure options, as well as on research autonomy and on peers among the top 5. An increase of 10,000 in salary would raise the odds of job choice by 64 %. Offering tenure track based on performance only would increase the odds of job choice by 270 %, the opportunity to work with a top-5 peer by 165 %; a job offer with very high research autonomy (90 %) increases the odds of job choice by 105 %. If our interpretation of the answers on the level of confidence is correct, then we find here some plausible clues as to why there is asymmetric mobility of highly talented ESR towards U. S.-style research universities, as these universities can offer such a range of job attributes as described here.[20]

However, similar to mobile ESR, when compared with not highly confident R2 researchers, highly confident R2 researchers are not willing to trade off vary-

[20] Janger et al. (forthcoming) look more closely at differences between higher education systems with regard to the structure of academic careers.

ing levels of job attributes against their salaries, as evidenced by the analysis of the difference in WTP among the two subgroups of R2 researchers. In any case, we stress again that these results should be interpreted with great care.

We now turn to the current "elite", our LSR. Table C5 in appendix C shows the results for LSR split into R3 researchers (to be thought of as tenured associate professors, for example) and R4 researchers (akin to full professors). The differences are less pronounced than for ESR (note also the larger sample size for leading R4 researchers). R4 researchers show a higher preference for the level of salary, but a lower concerning the quality of life in the country of the job. Furthermore, poor availability of external funding is less of a problem for R4 researchers. This is presumably due to more experience and a better track record which makes it easier to obtain grant funding.

Table C6 juxtaposes R4 researchers split by their level of confidence (very high vs. the rest). Highly confident R4 researchers' job choice is significantly influenced by the level of salary, by a peer among the top 5 and by research continuity (whether the R4 researchers has to follow the line of inquiry of his pre-decessor in a job or whether it is easy to set up a new line of research). An increase of the share of research which has to be in the lines of the predecessor by 50 percentage points would reduce the odds of job choice by 21 %. Highly confident R4 researchers most likely want to be completely free in what they do and not be constrained by demands which follow from the position as a chair-holder. However, again due to the preference for salary, there is no significant difference in WTP for non-salary job attributes in comparison with the group of not highly confident R4 researchers.

[Table 22 about here.]

[Table 23 about here.]

6.5 Career choice implications of job attribute bundles

In this last subsection, we do not look at the differences between the impact of individual job attributes on job choice among subgroups of ESR and LSR, but rather examine differences between choice probabilities of varying bundles of job attributes, i. e. of "specific" jobs which mirror real-world differences between academic jobs. As there are several contributions outlining the organisational differences between national higher education systems at the working unit level, we choose working conditions attributes for bundling which are often related to working unit organisation in universities. The comparative higher education literature focuses less on career choice implications, but on how institutional differences may affect scientific knowledge production and the governance of higher education systems and individual universities (e. g. Ben-David and Zloczower 1962; Ben-David 1968; Clark 1983). While these contributions are now quite dated, the structural organisational features they describe are still commonplace.[21]

The most important difference between national systems lies in the organisation of the operating units of universities, either as a chair-based system or as a department system (Clark, 1983). A chair concentrates the authority over

[21] In 1968, Ben-David remarked: "The ossification of European science organization ... has created a scientific gap between the U. S. and Western Europe", Ben-David (1968, p. 88).

the operating unit in one person, the chair holder, while other members of this organisational unit work as subordinates. This model arose from medieval guild structures and spread, e. g., via the success of the German research university in the 19th century to other countries (e. g. to Japan, Eastern European countries such as Poland, etc.), but also via colonialism. By contrast, a department spreads responsibilities and powers among a number of professors of similar rank and allows more readily for the participation by associate and assistant professors and hence for a collegial basis of academic work. The division of labour is functional rather than hierarchic: "departmentalism" arose in the U. S. as a functional bureaucratic response to the challenge of administrative control over growing individual colleges and emerging universities in the 19th century (Clark, 1983) and has also been adopted by a variety of countries such as England, the Netherlands or France, to name just a few.

A chair-based model will make it more difficult to offer jobs for ESR which feature early research autonomy and career perspectives, as there is only one position at the top of the operating unit, the chair-holder. High real levels of research autonomy granted will certainly depend on the chair-holder's discretion, rather than being a systemic feature in a department-style model. Offering career perspectives to assistant professors all the way up to the level of full professor would be difficult in chair systems, as it would be equivalent to hiring people to which the chair-holder promises that they can replace him or her. Even if there was one such position, for many other researchers interested in academic careers moving to the top would not be possible in such a setting. The options for a growing number of independent researchers at the same rank are very limited in chair-based systems, restricting career options. For example, statistics on the share of independent researchers among total academic researchers amount to 61 % for the U. S. (24 % full professors) and to 35 % for Germany (8 % full professors) (Kreckel 2008, shares are for the year 2004). A chair-based model makes it also more difficult to take up and pursue new research fields as the official recognition of new research fields which allows for the allocation of resources to this field depends on a formal decision by the university to set up a new chair. Ben-David and Zloczower (1962) observed that this restricts the differentiation of science, which may in turn reduce chances for establishing priority, impacting negatively on one's academic career.

We model the career choice implications of different organisational forms of the operating units of universities by specifying a bundle of job attributes—by assigning pre-defined values to a range of job attributes—for two jobs which are supposed to mirror a department-based and a chair-based organisational model. We then compare the predicted choice probabilities for these jobs to ascertain the combined impact of a bundle of job attributes on job choice. We simulate two ESR jobs in two stylised higher education systems, one supposed to mirror the U. S. research university system, the other the classic German university model (which is now changing, but for the sake of contrast we describe it in its classic form, which is still widespread). A typical ESR job in the U. S. department-based system would be an assistant professor on a tenure track option, i. e. he can go all the way up to full professor provided that his research is evaluated positively. He enjoys full or very high research autonomy and obtains funding from the university (start-up package). A typical ESR job in the German chair-based system would be a university assistant to a full professor on a fixed-term contract without further, contract-enshrined career perspectives

however good his research performance may be (he would have to apply for a different position). His research autonomy would be limited, depending on his full professor, just like the funding for his research (unless he writes a proposal for an external grant).

To simulate these jobs, we set the following values: research autonomy 100 (U. S.) and 0 (Germany), contract extension 4 (U. S. – tenure track) and 2 (Germany – 3 years of extension possible), way of access to internal funding by proposal to the university (U. S.) vs. negotiation with chair-holder (Germany). We hold the other job attributes constant, i. e. at their mean for both jobs. Among all ESR, the probabilities of job choice ceteris paribus would be 75 % for the job within a department model and 25 % for the job within the chair-based system; among mobile ESR, the probability would be 79 vs. 21 %; among very confident R2 researchers it would be 87 % vs. 13 %. This simulation holds salaries and peers at identical levels; it is highly likely that in a top U. S. research university, the quality of peers and the salary level will be significantly higher than in a German or Polish research university. On the other hand, research autonomy will be much higher in some German positions (e. g., the Juniorprofessor). Taken together, the shown probabilities are probably rather a lower bound for the range of real probabilities. We also calculated salary levels which would compensate the researcher in the chair system for the drawbacks in comparison with the U. S. system. In brief, a university offering jobs more similar to typical German chair systems would have to pay twice as much (60,000 rather than 30,000 USD) as a university following more U. S.-style organisation of academic work to equalise job choice probabilities.

Of course, this comparison is highly stylised. Our main aim was to illustrate the impact of a bundle of job attributes on career choices in academia. Many other combinations of attributes are possible which may be used to illustrate differences in job choice probabilities which arise from specific higher education settings.

7 Summary and conclusions

In this research we examined career choice motivations by early and later stage academic researchers. So far there has been limited analysis of which factors make academics choose one job over another, mostly due to limited data availability. We try to overcome this limitation by conducting a stated choice experiment using jobs which we built according to insights from the previous literature. Our results support earlier evidence and add a variety of explanations for career choices in academia. Among attractive job features for both early and later stage researchers we have found salaries to matter, in particular for male, later stage and mobile researchers as well as researchers from disciplines where private sector involvement is likely (medicine, engineering). This confirms evidence that academic researchers do react to relative earnings, not just as a factor for the choice between two jobs in academic research, but also between a job in academic research and in private sector (research) jobs. Health and pension characteristics of jobs also exert significant influences on job choice, in particular for female researchers as regards health care and later stage researchers concerning the pension arrangement. Part of the remuneration package we designed for our choice experiment were also fringe benefits

mostly related to facilitating taking up jobs which involve a change of country. Academics who already have been internationally mobile put the highest value on these fringe benefits; child-related benefits add to job attractiveness from the perspective of early stage researchers.

The quality of life in the country of the job to be chosen can be seen as a necessary, but not sufficient characteristic: it must not be worse than in the current country, but a better quality of life does not add much to job attractiveness so that quality of life is not an attractor.

Our job attributes contained a number of features framing the working conditions of academics. For both ESR and LSR, in line with the previous literature, we find highly significant effects of the quality of peers in the job and of the availability of external research funding grants, in particular for equipment-intensive fields of science such as the medical sciences. These are important elements which usually are more likely to be found in prestigious research universities which can either draw on endowments or on generous funding by national higher education systems. Attractive jobs feature moreover a balance between teaching and research. Jobs with some teaching—a bit less than a third of combined teaching and research time—are favoured over jobs with no teaching and jobs with too much teaching. While a too high teaching load restricts research and hence the possibilities for establishing priority as the major determinant of a successful academic career, some teaching can be beneficial because it allows researchers to make contact with promising students and potential young researchers, and can contribute to a deeper understanding of their field. Teaching may also be intrinsically motivated by the desire to impart knowledge.

Concerning working conditions specific to early stage researchers, we find a very strong role of career perspectives, i. e. the length of the initial contract and its extension possibilities in the form of tenure contingent only on research performance, and of organisational factors (research and financial autonomy). Early stage researchers seem to be particularly attracted to job environments where they can enjoy early independence and where this independence leads to own research which supports the claim to a tenured position. Early stage researchers want to take their career in their own hands. This is in line with accounts of researchers' intrinsic and extrinsic motivations which may be closely connected: The possibility of early freedom to do own science may confer an early start to attempts at establishing priority, in turn triggering processes of cumulative advantage, related inter alia to advantages in applying for external funding (the so-called Matthew effect in science, shown to be empirically at work in several disciplines by Petersen et al., 2011). These results are stronger specifically for PhD-holders and post-docs, where processes of career choice involving a change of country are most likely according to empirical evidence. When we interpret levels of confidence in future career prospects as a proxy for quality, our results are even stronger for highly talented PhD-holders and post-docs, providing some clues to the observation of asymmetric mobility of talented scientists in the direction of the U. S.

LSR-specific job attributes describing the working environment of researchers included the amount of research which can be funded from university internal sources. LSR favour jobs where these funds can cover a high share of research needs. Further attractive job characteristics are administrative support for researchers which minimises the time spent on administrative tasks and a salary scheme which is based on a public scheme but involves an element of perfor-

mance pay. Researchers were sceptical towards individual research evaluation as a means to determine salary hikes. Moreover, later stage researchers, and in particular highly confident ones, dislike jobs where it is less easy to take up new lines of research or where they have to continue lines of research by the researcher they are replacing. This speaks in favour of university recruitment based on quality, rather than fit with narrow discipline needs.

The way ESR and LSR view organisational job attributes (research autonomy, career perspectives, research continuity), they give support to departmental organisation at the working unit level of universities, as compared with a more chair-based organisational structure. In the latter, having only one researcher at the top necessarily limits career perspectives and research as well as financial autonomy, while the replacement of the chair is going to face stricter demands on the contents of his or her research and teaching. In a more team-based department structure, several researchers of similar rank can work together, allowing for more career options, research autonomy and ease of taking up new lines of research. Again, these organisational features are commonplace in U. S. -style research universities, so that these universities do not only enjoy advantages as regards the quality of their peers and funding/salaries, but also with respect to their working environments for researchers. In a companion paper (Janger et al., forthcoming), we shed a closer look at specific national higher education systems and how they influence job attractiveness.

Insofar as talented researchers attract talented researchers, turning a situation of asymmetric into one of symmetric mobility (or one of brain drain into one of brain circulation) faces the challenge of considerable inertia and persistence. However, as stated, high quality peers are not the only job attractor. European universities can offer attractive career perspectives and working environments, while the career model of U. S. universities in the form of the tenure track has come under a lot of strain recently, in addition to problems of funding. An evolution of European career systems towards more similar structures characterised by our findings above would also lead to deeper integration of academic labour markets in Europe, boosting the efficiency of job matching, increasing competition and hence undoubtedly raising the profile of European science.

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	Job offer 1	Job offer 2	Job offer 3
Remuneration and fringe benefits			
Net salary p.a. (incl. bonuses)	55000	65000	45000
Health care is...	... covered, in case of illness patient contribution (max. 2.5% of yearly salary)	... covered, in case of illness patient contribution (max. 5% of yearly salary)	... fully covered
Retirement pension: Expected net replacement rate is...	...80% of net pre-retirement earnings	...85% of net pre-retirement earnings	...75% of net pre-retirement earnings
Fringe benefits covered	University housing	University housing	Relocation support (flat search, etc.)
Country characteristics			
The quality of life (consider e.g. education, health, income) in the target country is...	... comparable with your current country of work	... comparable with your current country of work	... comparable with your current country of work
Working Conditions			
Career perspectives I: Length of initial contract is...	2 years	4 years	6 years
Career perspectives II: Extension of initial contract...	... is possible for 3 years in case of positive performance evaluation	... is possible for 3 years in case of positive performance evaluation	... is not possible
Split between teaching and research tasks is...	... teaching (75%), research (25%).	... teaching (25%), research (75%).	... research only.
Research autonomy: Time for own research	50% of research time (remainder for chairholder, group leader)	50% of research time (remainder for chairholder, group leader)	No own research, support of chair holder/research group leader
University-internal funds for research...	... must be negotiated with university management (quality of the research proposal).	... must be negotiated with the chairholder/research group leader.	... must be negotiated with the chairholder/research group leader.
University-external funds for research: Availability of...	... both long-term and short-term grants is poor (stiff competition).	... both long-term (5 years) and short-term grants (up to 3 years) is good.	... short-term grants (up to 3 years) is good, while that of long-term grants (5 years) is poor (stiff
Your most prestigious peer at your department...	... is among the top 25 worldwide in your field.	... is not among the top 50 worldwide in your field.	... is not among the top 50 worldwide in your field.

Figure 1: Example of job choice experiment for an early stage researcher.

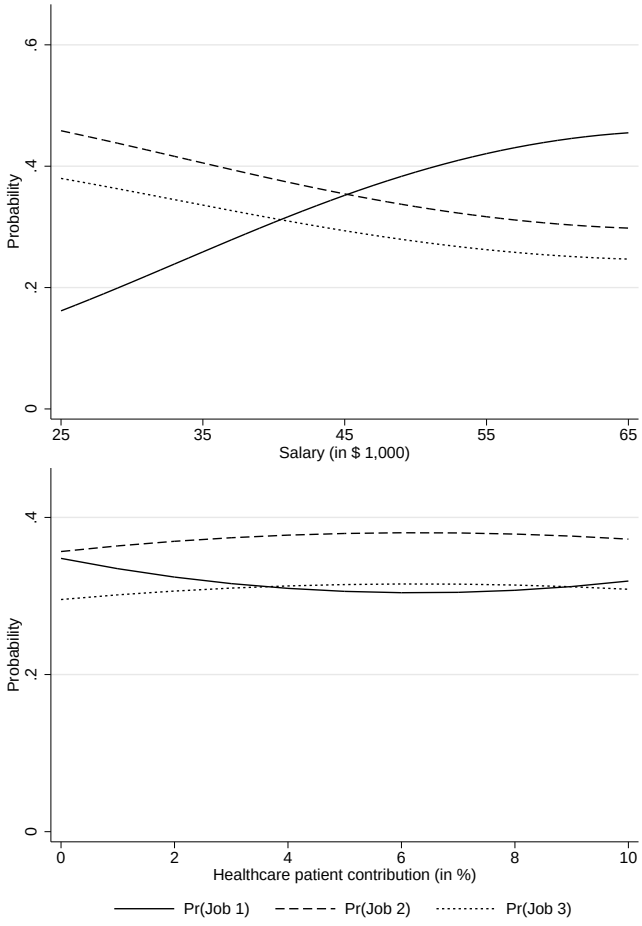

Figure 2: Predicted probabilities of choosing jobs 1, 2 and 3 for early stage researchers at various levels of job 1 salary (top) and job 1 healthcare patient contribution (bottom). All other variables at mean values.

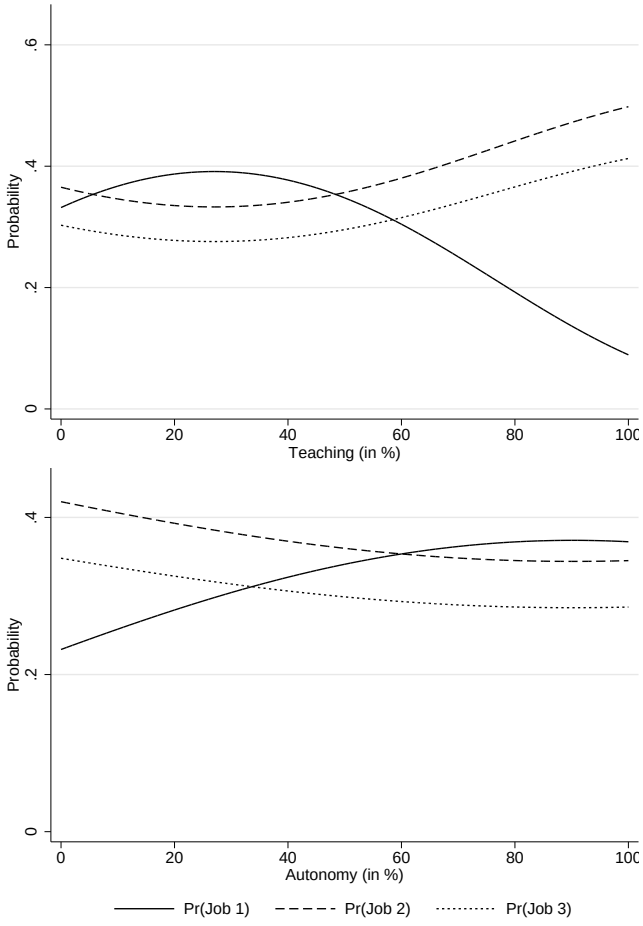

Figure 3: Predicted probabilities of choosing jobs 1, 2 and 3 for early stage researchers at various levels of job 1 teaching load (top) and job 1 research autonomy (bottom). All other variables at mean values.

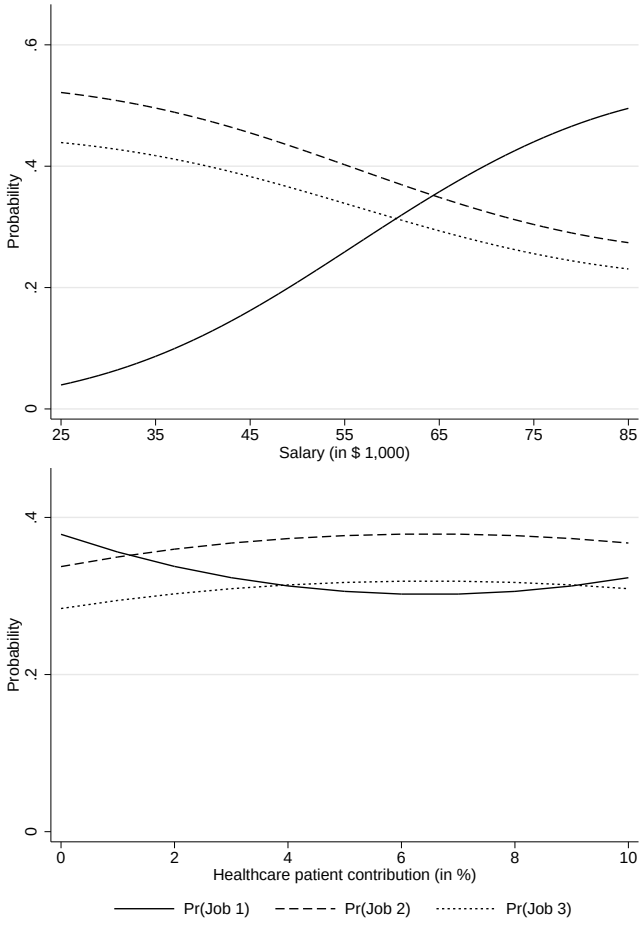

Figure 4: Predicted probabilities of choosing jobs 1, 2 and 3 for later stage researchers at various levels of job 1 salary (top) and job 1 healthcare patient contribution (bottom). All other variables at mean values.

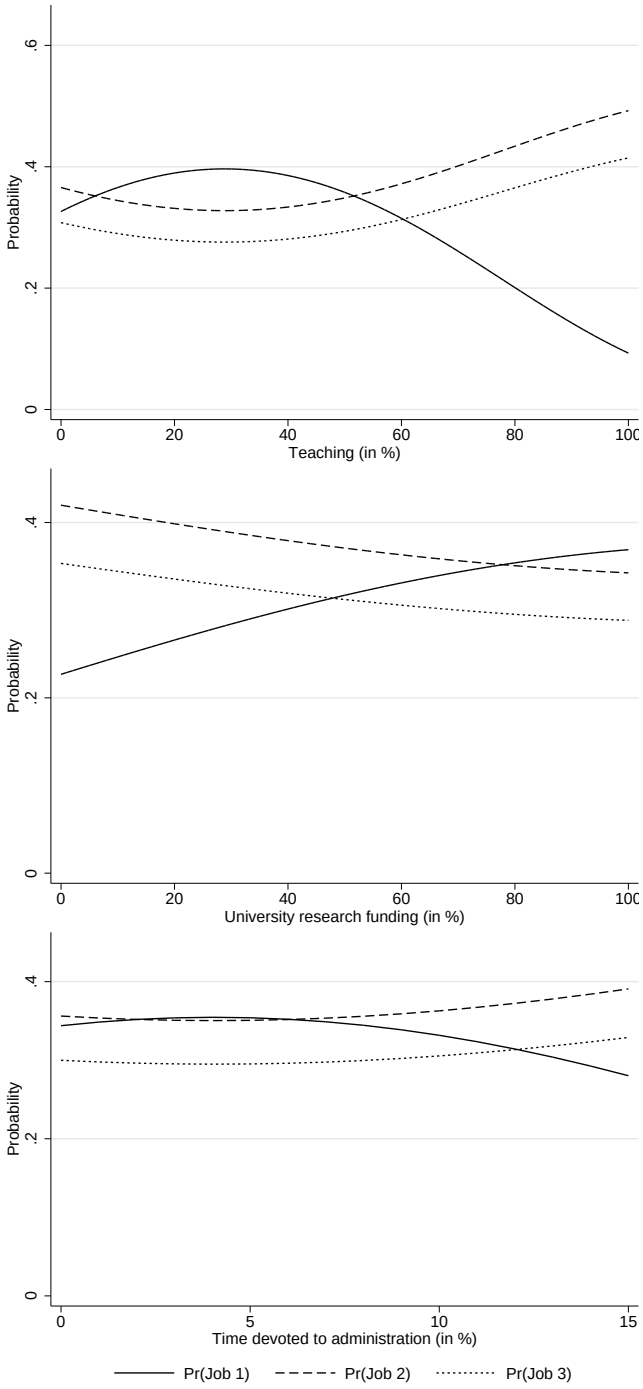

Figure 5: Predicted probabilities of choosing jobs 1, 2 and 3 for early stage researchers at various levels of job 1 teaching load (top), job 1 university research funding (middle) and job 1 time devoted to administration (bottom). All other variables at mean values.

Early stage	Later stage
Remuneration and fringe benefits	**Remuneration and fringe benefits**
Net salary p.a. (incl. bonuses)	Net salary p.a. (incl. bonuses)
Health care: Patient contribution rate	Health care: Patient contribution rate
Retirement pension: Expected net replacement rate	Retirement pension: Expected net replacement rate
Fringe benefits covered	Fringe benefits covered
Country characteristics	**Country characteristics**
Quality of life	Quality of life
Working Conditions	**Working Conditions**
Career perspectives I: Length of initial contract	Ease of starting new lines of research
Career perspectives II: Extension of initial contract	Quality of administrative support
Research autonomy: Time for own research	Salary advancement scheme
University-internal funds for research (accessibility, financial autonomy)	University-internal funds for research (how much of research can they fund)
University-external funds for research (availability)	University-external funds for research (availability)
Quality of peers (research reputation)	Quality of peers (research reputation)
Split between teaching and research tasks	Split between teaching and research tasks

Table 1: Job attributes

	Early stage		Later stage	
	Total	%	Total	%
Female	1,884	0.497	2,193	0.341
Male	1,906	0.503	4,232	0.659
First stage researcher (R1)	1,619	0.427	–	
Recognized researcher (R2)	2,171	0.573	–	
Established researcher (R3)	–		3,014	0.469
Leading researcher (R4)	–		3,411	0.531
Albania	7	0.002	8	0.001
Australia	126	0.033	322	0.050
Austria	126	0.033	132	0.021
Belgium	126	0.033	62	0.010
Brazil	55	0.015	98	0.015
Bulgaria	46	0.012	58	0.009
Canada	19	0.005	30	0.005
Chile	3	0.001	5	0.001
China	22	0.006	31	0.005
Croatia	61	0.016	88	0.014
Cyprus	20	0.005	77	0.012
Czech Republic	69	0.018	52	0.008
Denmark	111	0.029	97	0.015
Egypt	3	0.001	6	0.001
Estonia	31	0.008	60	0.009
Finland	73	0.019	77	0.012
France	58	0.015	110	0.017
Germany	215	0.057	157	0.024
Greece	36	0.009	182	0.028
Hong Kong	1	0.000	6	0.001
Hungary	60	0.016	68	0.011
Iceland	8	0.002	20	0.003
India	21	0.006	32	0.005
Iran	5	0.001	1	0.000
Ireland	139	0.037	147	0.023
Israel	7	0.002	67	0.010
Italy	132	0.035	229	0.036
Japan	22	0.006	36	0.006
Korea, South	0	0.000	9	0.001
Latvia	23	0.006	26	0.004
Lithuania	82	0.022	111	0.017
Luxembourg	61	0.016	18	0.003
Macedonia (FYROM)	17	0.004	53	0.008
Malta	22	0.006	52	0.008
Mexico	16	0.004	49	0.008
Netherlands	221	0.058	132	0.021
New Zealand	7	0.002	34	0.005
Norway	56	0.015	124	0.019
Poland	181	0.048	96	0.015
Portugal	125	0.033	123	0.019
Romania	80	0.021	112	0.017
Russia	30	0.008	33	0.005
Serbia and Montenegro	7	0.002	5	0.001
Singapore	7	0.002	19	0.003
Slovakia	66	0.017	53	0.008
Slovenia	65	0.017	83	0.013
South Africa	8	0.002	25	0.004
Spain	155	0.041	184	0.029
Sweden	127	0.034	76	0.012
Switzerland	139	0.037	121	0.019
Taiwan	1	0.000	12	0.002
Turkey	81	0.021	281	0.044
United Kingdom	193	0.051	216	0.034
United States	344	0.091	2,053	0.320
Other countries	74	0.020	67	0.010
Respondents	3,790	1.000	6,425	1.000

Table 2: Distribution of respondents by gender, career stage and country of residence.

	Early stage						
	Total				Mean by job number		
	Mean	S. D.	Min.	Max.	Job 1	Job 2	Job 3
Job chosen	0.333	0.471	0.000	1.000	0.321	0.366	0.313
Net salary p. a. (in 1,000)	45.035	13.945	25.000	65.000	45.020	44.710	45.376
Health care patient contribution (in %)	5.002	3.509	0.000	10.000	4.976	5.034	4.998
Retirement pension net replacement rate (in %)	77.443	5.520	70.000	85.000	77.348	77.560	77.422
Relocation support (=1)	0.144	0.351	0.000	1.000	0.144	0.145	0.143
Parking lot (=1)	0.141	0.348	0.000	1.000	0.138	0.144	0.140
Childcare facility (=1)	0.149	0.356	0.000	1.000	0.149	0.148	0.149
Company car (=1)	0.145	0.352	0.000	1.000	0.145	0.139	0.150
Quality school for children (=1)	0.145	0.352	0.000	1.000	0.145	0.148	0.142
University housing (=1)	0.140	0.347	0.000	1.000	0.143	0.141	0.135
Job offer for partner (=1)	0.138	0.344	0.000	1.000	0.137	0.136	0.140
QoL worse than in country of residence (=1)	0.327	0.469	0.000	1.000	0.331	0.331	0.319
QoL comparable to country of residence (=1)	0.345	0.475	0.000	1.000	0.347	0.344	0.344
QoL better than in country of residence (=1)	0.328	0.470	0.000	1.000	0.322	0.325	0.337
Teaching load (in %)	37.643	27.874	0.000	75.000	37.417	37.396	38.116
Short/long-term ext. fndng. poor/poor (=1)	0.333	0.471	0.000	1.000	0.334	0.337	0.328
Short/long-term ext. fndng. good/poor (=1)	0.340	0.474	0.000	1.000	0.340	0.337	0.342
Short/long-term ext. fndng. good/good (=1)	0.327	0.469	0.000	1.000	0.326	0.326	0.331
Most prestigious peer not among top 50 (=1)	0.246	0.431	0.000	1.000	0.239	0.244	0.255
Most prestigious peer among top 50 (=1)	0.253	0.435	0.000	1.000	0.254	0.254	0.251
Most prestigious peer among top 25 (=1)	0.255	0.436	0.000	1.000	0.258	0.254	0.254
Most prestigious peer among top 5 (=1)	0.246	0.430	0.000	1.000	0.249	0.247	0.240
Length of initial contract (in years)	3.753	1.471	2.000	6.000	3.727	3.765	3.767
Extension: not possible (=1)	0.242	0.428	0.000	1.000	0.242	0.242	0.242
Extension: 3 years (after evaluation) (=1)	0.259	0.438	0.000	1.000	0.260	0.256	0.261
Extension: tenure (availability and perf.) (=1)	0.256	0.437	0.000	1.000	0.258	0.252	0.259
Extension: tenure (performance) (=1)	0.243	0.429	0.000	1.000	0.240	0.250	0.238
Research autonomy (in %)	50.592	34.844	0.000	100.000	50.569	51.017	50.191
Internal funds to be neg. with chairholder (=1)	0.332	0.471	0.000	1.000	0.333	0.334	0.330
Internal funds to be neg. with university (=1)	0.338	0.473	0.000	1.000	0.341	0.337	0.336
Internal funds provided without strings (=1)	0.330	0.470	0.000	1.000	0.326	0.329	0.334
Observations	21,231				7,077	7,077	7,077

Table 3: Summary statistics of explanatory variables, early stage researchers. S. D.: standard deviation.

	Later stage						
	Total				Mean by job number		
	Mean	S. D.	Min.	Max.	Job 1	Job 2	Job 3
Job chosen	0.333	0.471	0.000	1.000	0.328	0.359	0.313
Net salary p. a. (in 1,000)	64.784	14.123	45.000	85.000	64.678	64.762	64.913
Health care patient contribution (in %)	4.982	3.500	0.000	10.000	5.003	4.914	5.030
Retirement pension net replacement rate (in %)	77.500	5.548	70.000	85.000	77.435	77.590	77.474
Relocation support (=1)	0.140	0.347	0.000	1.000	0.135	0.142	0.143
Parking lot (=1)	0.139	0.346	0.000	1.000	0.145	0.140	0.133
Childcare facility (=1)	0.143	0.350	0.000	1.000	0.141	0.144	0.144
Company car (=1)	0.143	0.350	0.000	1.000	0.144	0.138	0.145
Quality school for children (=1)	0.154	0.361	0.000	1.000	0.155	0.153	0.153
University housing (=1)	0.140	0.347	0.000	1.000	0.136	0.141	0.144
Job offer for partner (=1)	0.141	0.348	0.000	1.000	0.143	0.143	0.139
QoL worse than in country of residence (=1)	0.321	0.467	0.000	1.000	0.319	0.326	0.317
QoL comparable to country of residence (=1)	0.343	0.475	0.000	1.000	0.342	0.337	0.350
QoL better than in country of residence (=1)	0.336	0.472	0.000	1.000	0.339	0.337	0.332
Teaching load (in %)	37.293	27.525	0.000	75.000	37.257	36.949	37.673
Short/long-term ext. fndng. poor/poor (=1)	0.325	0.468	0.000	1.000	0.324	0.325	0.325
Short/long-term ext. fndng. good/poor (=1)	0.348	0.476	0.000	1.000	0.359	0.349	0.337
Short/long-term ext. fndng. good/good (=1)	0.327	0.469	0.000	1.000	0.317	0.326	0.337
Most prestigious peer not among top 50 (=1)	0.246	0.431	0.000	1.000	0.247	0.245	0.247
Most prestigious peer among top 50 (=1)	0.256	0.436	0.000	1.000	0.252	0.256	0.258
Most prestigious peer among top 25 (=1)	0.249	0.433	0.000	1.000	0.248	0.247	0.252
Most prestigious peer among top 5 (=1)	0.249	0.432	0.000	1.000	0.253	0.251	0.242
Research continuity (in %)	49.321	36.998	0.000	100.000	49.712	48.928	49.322
University research funding (in %)	62.637	27.902	25.000	100.000	63.012	62.374	62.525
Time devoted to administration (in %)	7.482	5.555	0.000	15.000	7.493	7.483	7.472
Public salary scheme (=1)	0.333	0.471	0.000	1.000	0.338	0.333	0.329
Public salary scheme with bonus (=1)	0.334	0.471	0.000	1.000	0.334	0.329	0.338
Individual research performance (=1)	0.333	0.471	0.000	1.000	0.328	0.338	0.334
Observations	19,275				6,425	6,425	6,425

Table 4: Summary statistics of explanatory variables, later stage researchers. S. D.: standard deviation.

	Early stage		Later stage	
	(1)	(2)	(3)	(4)
	β	e^{β}	β	e^{β}
Net salary p. a. (in 1,000)	0.035***	1.036***	0.039***	1.040***
	(0.001)	(0.001)	(0.001)	(0.001)
Health care patient contribution (in %)	−0.014***	0.986***	−0.024***	0.976***
	(0.005)	(0.004)	(0.005)	(0.005)
Pension net replacement rate (in %)	0.007**	1.007**	0.014***	1.014***
	(0.003)	(0.003)	(0.003)	(0.003)
Relocation support (=1)	0.258***	1.294***	0.174***	1.189***
	(0.060)	(0.077)	(0.063)	(0.075)
Childcare facility (=1)	0.243***	1.275***	0.122*	1.130*
	(0.059)	(0.075)	(0.063)	(0.071)
Company car (=1)	0.094	1.099	−0.016	0.984
	(0.061)	(0.067)	(0.064)	(0.063)
Quality school for children (=1)	0.309***	1.363***	0.184***	1.203***
	(0.060)	(0.081)	(0.062)	(0.074)
University housing (=1)	0.176***	1.192***	0.238***	1.268***
	(0.062)	(0.073)	(0.063)	(0.080)
Job offer for partner (=1)	0.490***	1.633***	0.336***	1.399***
	(0.061)	(0.100)	(0.063)	(0.089)
QoL worse than in country of residence (=1)	−0.714***	0.490***	−0.913***	0.401***
	(0.041)	(0.020)	(0.043)	(0.017)
QoL better than in country of residence (=1)	0.124***	1.132***	0.114***	1.121***
	(0.037)	(0.042)	(0.039)	(0.044)
Teaching load (in %)	−0.007***	0.993***	−0.006***	0.994***
	(0.001)	(0.001)	(0.001)	(0.001)
Short-/long-term ext. funding poor/poor (=1)	−0.391***	0.677***	−0.459***	0.632***
	(0.040)	(0.027)	(0.042)	(0.026)
Short-/long-term ext. funding good/poor (=1)	−0.152***	0.859***	−0.216***	0.805***
	(0.039)	(0.033)	(0.040)	(0.032)
Most prestigious peer among top 50 (=1)	0.265***	1.304***	0.335***	1.398***
	(0.045)	(0.058)	(0.047)	(0.066)
Most prestigious peer among top 25 (=1)	0.371***	1.449***	0.373***	1.452***
	(0.046)	(0.067)	(0.048)	(0.070)
Most prestigious peer among top 5 (=1)	0.599***	1.820***	0.483***	1.621***
	(0.046)	(0.084)	(0.049)	(0.079)
Length of initial contract (in years)	0.079***	1.082***		
	(0.011)	(0.012)		
Extension: 3 years (after evaluation)	0.540***	1.716***		
	(0.047)	(0.080)		
Extension: tenure (availability and perf.)	0.676***	1.966***		
	(0.047)	(0.092)		
Extension: tenure (performance)	0.765***	2.149***		
	(0.049)	(0.105)		
Research autonomy (in %)	0.006***	1.006***		
	(0.000)	(0.000)		
Internal funds to be neg. with chairholder	−0.197***	0.821***		
	(0.040)	(0.033)		
Internal funds to be neg. with university	−0.133***	0.876***		
	(0.038)	(0.034)		
Research continuity (in %)			−0.003***	0.997***
			(0.000)	(0.000)
University research funding (in %)			0.006***	1.006***
			(0.001)	(0.001)
Time devoted to administration (in %)			−0.019***	0.981***
			(0.003)	(0.003)
Public salary scheme (=1)			−0.063	0.939
			(0.042)	(0.039)
Public salary scheme with bonus (=1)			0.148***	1.159***
			(0.041)	(0.047)
Alternative specific constant: 2nd job in list	0.158***	1.171***	0.101***	1.106***
	(0.032)	(0.037)	(0.033)	(0.036)
Alternative specific constant: 3rd job in list	−0.048	0.953	−0.073**	0.930**
	(0.033)	(0.031)	(0.034)	(0.031)
Observations	21,231		19,275	
Pseudo-R^2	0.123		0.132	
Log-likelihood	-6,820.652		-6,124.797	

Table 5: Conditional logit regressions of job choice for early and later stage researchers. Standard errors in parentheses. Standard errors for early stage researchers corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers and 6,425 experiments among 6,425 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Willingness to pay (WTP)		
	(1)	(2)	(3)
	Early stage	Later stage	Difference
Health care patient contribution (in %)	0.393***	0.615***	−0.222
	(0.128)	(0.124)	(0.180)
Retirement pension net repl. rate (in %)	−0.211**	−0.366***	0.155
	(0.082)	(0.078)	(0.113)
Relocation support (=1)	−7.339***	−4.423***	−2.916
	(1.712)	(1.612)	(2.347)
Childcare facility (=1)	−6.901***	−3.109*	−3.792
	(1.684)	(1.596)	(2.327)
Company car (=1)	−2.682	0.406	−3.089
	(1.726)	(1.632)	(2.380)
Quality school for children (=1)	−8.800***	−4.702***	−4.098*
	(1.715)	(1.577)	(2.334)
University housing (=1)	−5.001***	−6.058***	1.057
	(1.753)	(1.609)	(2.387)
Job offer for partner (=1)	−13.942***	−8.568***	−5.374**
	(1.783)	(1.619)	(2.423)
QoL worse than in country of residence (=1)	20.310***	23.273***	−2.964*
	(1.273)	(1.262)	(1.778)
QoL better than in country of residence (=1)	−3.537***	−2.900***	−0.636
	(1.064)	(0.996)	(1.458)
Teaching load (in %)	0.207***	0.154***	0.052**
	(0.018)	(0.016)	(0.024)
Short/long-term ext. fndng. poor/poor (=1)	11.107***	11.705***	−0.597
	(1.174)	(1.097)	(1.617)
Short/long-term ext. fndng. good/poor (=1)	4.315***	5.516***	−1.201
	(1.107)	(1.033)	(1.518)
Most prestigious peer among top 50 (=1)	−7.538***	−8.534***	0.995
	(1.297)	(1.230)	(1.789)
Most prestigious peer among top 25 (=1)	−10.537***	−9.509***	−1.028
	(1.347)	(1.253)	(1.845)
Most prestigious peer among top 5 (=1)	−17.022***	−12.308***	−4.714**
	(1.383)	(1.263)	(1.876)
Length of initial contract (in years)	−2.245***		
	(0.314)		
Extension: 3 years (after evaluation)	−15.355***		
	(1.382)		
Extension: tenure (availability and perf.)	−19.225***		
	(1.418)		
Extension: tenure (performance)	−21.748***		
	(1.485)		
Research autonomy (in %)	−0.184***		
	(0.014)		
Internal funds to be neg. with chairholder	5.593***		
	(1.126)		
Internal funds to be neg. with university	3.769***		
	(1.093)		
Research continuity (in %)		0.088***	
		(0.012)	
University research funding (in %)		−0.142***	
		(0.016)	
Time devoted to administration (in %)		0.492***	
		(0.078)	
Public salary scheme (=1)		1.601	
		(1.067)	
Public salary scheme with bonus (=1)		−3.762***	
		(1.051)	
Observations	21,231	19,275	40,506

Table 6: Willingness to pay (WTP) calculated from conditional logit regressions of job choice for early and later stage researchers and difference between early and later stage researchers. Standard errors for WTP and difference in WTP in parentheses were computed using the delta method. Based on 7,077 experiments among 3,790 early stage researchers and 6,425 experiments among 6,425 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Degrees of freedom	Job excluded in Hausman test		
		Job 1	Job 2	Job 3
Early stage	24	29.889	34.309*	19.178
		(0.188)	(0.079)	(0.742)
Later stage	22	23.380	22.845	28.277
		(0.381)	(0.411)	(0.167)

Table 7: Hausman test statistic H for violations of conditional logit IIA property. p-values in parentheses. The 5 % critical values of the χ^2 distribution with 24 and 22 degrees of freedom are $\chi^2(24) = 36.415$ and $\chi^2(22) = 33.924$. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Early stage		Later stage	
	(1)	(2)	(3)	(4)
	CL	MNP	CL	MNP
Net salary p. a. (in 1,000)	0.035***	0.028***	0.039***	0.031***
	(0.001)	(0.001)	(0.001)	(0.001)
Health care patient contribution (in %)	−0.014***	−0.011***	−0.024***	−0.019***
	(0.005)	(0.004)	(0.005)	(0.004)
Retirement pension net repl. rate (in %)	0.007**	0.006***	0.014***	0.011***
	(0.003)	(0.002)	(0.003)	(0.002)
Relocation support (=1)	0.258***	0.209***	0.174***	0.130***
	(0.060)	(0.048)	(0.063)	(0.049)
Childcare facility (=1)	0.243***	0.191***	0.122*	0.094*
	(0.059)	(0.047)	(0.063)	(0.048)
Company car (=1)	0.094	0.078	−0.016	−0.011
	(0.061)	(0.048)	(0.064)	(0.049)
Quality school for children (=1)	0.309***	0.248***	0.184***	0.137***
	(0.060)	(0.049)	(0.062)	(0.048)
University housing (=1)	0.176***	0.146***	0.238***	0.185***
	(0.062)	(0.049)	(0.063)	(0.049)
Job offer for partner (=1)	0.490***	0.389***	0.336***	0.256***
	(0.061)	(0.051)	(0.063)	(0.049)
QoL worse than in country of residence (=1)	−0.714***	−0.559***	−0.913***	−0.693***
	(0.041)	(0.036)	(0.043)	(0.039)
QoL better than in country of residence (=1)	0.124***	0.097***	0.114***	0.091***
	(0.037)	(0.030)	(0.039)	(0.031)
Teaching load (in %)	−0.007***	−0.006***	−0.006***	−0.005***
	(0.001)	(0.001)	(0.001)	(0.000)
Short/long-term ext. fndng. poor/poor (=1)	−0.391***	−0.312***	−0.459***	−0.352***
	(0.040)	(0.033)	(0.042)	(0.034)
Short/long-term ext. fndng. good/poor (=1)	−0.152***	−0.125***	−0.216***	−0.168***
	(0.039)	(0.031)	(0.040)	(0.032)
Most prestigious peer among top 50 (=1)	0.265***	0.207***	0.335***	0.251***
	(0.045)	(0.035)	(0.047)	(0.038)
Most prestigious peer among top 25 (=1)	0.371***	0.293***	0.373***	0.281***
	(0.046)	(0.037)	(0.048)	(0.038)
Most prestigious peer among top 5 (=1)	0.599***	0.471***	0.483***	0.367***
	(0.046)	(0.039)	(0.049)	(0.039)
Length of initial contract (in years)	0.079***	0.063***		
	(0.011)	(0.009)		
Extension: 3 years (after evaluation)	0.540***	0.413***		
	(0.047)	(0.039)		
Extension: tenure (availability and perf.)	0.676***	0.525***		
	(0.047)	(0.040)		
Extension: tenure (performance)	0.765***	0.594***		
	(0.049)	(0.042)		
Research autonomy (in %)	0.006***	0.005***		
	(0.000)	(0.000)		
Internal funds to be neg. with chairholder	−0.197***	−0.154***		
	(0.040)	(0.031)		
Internal funds to be neg. with university	−0.133***	−0.107***		
	(0.038)	(0.030)		
Research continuity (in %)			−0.003***	−0.003***
			(0.000)	(0.000)
University research funding (in %)			0.006***	0.004***
			(0.001)	(0.000)
Time devoted to administration (in %)			−0.019***	−0.015***
			(0.003)	(0.002)
Public salary scheme (=1)			−0.063	−0.049
			(0.042)	(0.032)
Public salary scheme with bonus (=1)			0.148***	0.112***
			(0.041)	(0.032)
2nd job in list	0.158***	0.091**	0.101***	0.027
	(0.032)	(0.040)	(0.033)	(0.039)
3rd job in list	−0.048	−0.070	−0.073**	−0.075*
	(0.033)	(0.046)	(0.034)	(0.044)
Observations	21,231		19,275	
Log-likelihood	-6,820.65	-6,819.42	-6,124.80	-6.119.39

Table 8: Conditional logit and multinomial probit regressions of job choice for early and later stage researchers. Standard errors in parentheses. Standard errors for early stage researchers corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers and 6,425 experiments among 6,425 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Early stage		Later stage	
	(1)	(2)	(3)	(4)
	μ_β	σ_β	μ_β	σ_β
Net salary p. a. (in 1,000)	0.050***	0.027***	0.054***	
	(0.004)	(0.006)	(0.006)	
Health care patient contribution (in %)	−0.016***		−0.033***	0.107***
	(0.006)		(0.008)	(0.040)
Retirement pension net repl. rate (in %)	0.011***		0.019***	
	(0.004)		(0.005)	
Relocation support (=1)	0.353***		0.237***	
	(0.084)		(0.088)	
Childcare facility (=1)	0.341***		0.164*	
	(0.083)		(0.086)	
Company car (=1)	0.133		−0.002	
	(0.083)		(0.086)	
Quality school for children (=1)	0.425***		0.256***	
	(0.086)		(0.088)	
University housing (=1)	0.237***		0.335***	
	(0.085)		(0.093)	
Job offer for partner (=1)	0.656***	0.732**	0.393***	1.142***
	(0.094)	(0.310)	(0.106)	(0.344)
QoL worse than in country of residence (=1)	−1.056***	1.011***	−1.309***	0.966***
	(0.088)	(0.174)	(0.175)	(0.326)
QoL better than in country of residence (=1)	0.175***	0.368	0.164***	0.364
	(0.053)	(0.363)	(0.058)	(0.590)
Teaching load (in %)	−0.011***	0.016***	−0.008***	
	(0.001)	(0.003)	(0.001)	
Short/long-term ext. fndng. poor/poor (=1)	−0.552***	0.623***	−0.646***	0.725**
	(0.065)	(0.224)	(0.097)	(0.321)
Short/long-term ext. fndng. good/poor (=1)	−0.216***	0.418	−0.288***	0.150
	(0.055)	(0.349)	(0.064)	(0.576)
Most prestigious peer among top 50 (=1)	0.351***	0.008	0.445***	0.215
	(0.064)	(0.130)	(0.081)	(0.749)
Most prestigious peer among top 25 (=1)	0.519***	0.336	0.473***	0.811**
	(0.072)	(0.680)	(0.084)	(0.319)
Most prestigious peer among top 5 (=1)	0.820***	0.467	0.630***	0.583
	(0.080)	(0.286)	(0.097)	(0.415)
Length of initial contract (in years)	0.111***	0.239***		
	(0.017)	(0.061)		
Extension: 3 years (after evaluation)	0.701***	0.558**		
	(0.073)	(0.261)		
Extension: tenure (availability and perf.)	0.909***	0.322		
	(0.080)	(0.261)		
Extension: tenure (performance)	1.036***	0.418		
	(0.088)	(0.403)		
Research autonomy (in %)	0.009***	0.012***		
	(0.001)	(0.002)		
Internal funds to be neg. with chairholder	−0.262***			
	(0.057)			
Internal funds to be neg. with university	−0.177***			
	(0.054)			
Research continuity (in %)			−0.005***	
			(0.001)	
University research funding (in %)			0.008***	
			(0.001)	
Time devoted to administration (in %)			−0.026***	
			(0.005)	
Public salary scheme (=1)			−0.086	
			(0.058)	
Public salary scheme with bonus (=1)			0.205***	
			(0.060)	
2nd job in list	0.192***	0.685***	0.049	1.091***
	(0.046)	(0.143)	(0.063)	(0.364)
3rd job in list	−0.088*	0.573***	−0.148*	0.759
	(0.049)	(0.181)	(0.083)	(0.466)
Observations	21,231		19,275	
Log-likelihood	-6,781.705		-6,113.226	

Table 9: Mixed logit regressions of job choice for early and later stage researchers. Standard errors in parentheses. Standard errors for early stage researchers corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers and 6,425 experiments among 6,425 later stage researchers. 500 Halton draws used in simulating log-likelihood. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Early stage		
	(1)	(2)	(3)
	USA	Eurozone	Other
Health care patient contribution (in %)	0.575*	0.294	0.421**
	(0.324)	(0.182)	(0.212)
Retirement pension net repl. rate (in %)	−0.124	−0.224*	−0.256*
	(0.194)	(0.118)	(0.136)
Relocation support (=1)	−7.546*	−6.072**	−8.440***
	(4.021)	(2.460)	(2.838)
Childcare facility (=1)	−4.836	−3.394	−10.926***
	(4.297)	(2.405)	(2.786)
Company car (=1)	4.114	−2.345	−4.484
	(4.121)	(2.434)	(2.895)
Quality school for children (=1)	−9.951**	−5.731**	−11.605***
	(4.290)	(2.424)	(2.855)
University housing (=1)	−0.877	−5.368**	−5.461*
	(4.629)	(2.497)	(2.873)
Job offer for partner (=1)	−17.725***	−12.584***	−14.667***
	(4.391)	(2.588)	(2.899)
QoL worse than in country of residence (=1)	21.313***	20.236***	19.736***
	(3.221)	(1.868)	(2.045)
QoL better than in country of residence (=1)	1.548	−3.734**	−5.133***
	(2.605)	(1.495)	(1.797)
Teaching load (in %)	0.105**	0.202***	0.237***
	(0.043)	(0.026)	(0.029)
Short/long-term ext. fndng. poor/poor (=1)	9.298***	9.753***	13.366***
	(2.782)	(1.716)	(1.934)
Short/long-term ext. fndng. good/poor (=1)	2.080	3.742**	5.616***
	(2.833)	(1.621)	(1.784)
Most prestigious peer among top 50 (=1)	−3.302	−7.789***	−8.290***
	(3.109)	(1.918)	(2.086)
Most prestigious peer among top 25 (=1)	−9.576***	−12.011***	−9.602***
	(3.427)	(1.981)	(2.157)
Most prestigious peer among top 5 (=1)	−15.038***	−18.164***	−16.731***
	(3.587)	(2.006)	(2.251)
Length of initial contract (in years)	0.376	−3.083***	−2.044***
	(0.782)	(0.455)	(0.519)
Extension: 3 years (after evaluation)	−16.619***	−15.638***	−15.112***
	(3.495)	(2.004)	(2.240)
Extension: tenure (availability and perf.)	−21.970***	−19.383***	−18.692***
	(3.668)	(2.105)	(2.245)
Extension: tenure (performance)	−26.255***	−22.909***	−19.666***
	(3.853)	(2.175)	(2.397)
Research autonomy (in %)	−0.160***	−0.191***	−0.187***
	(0.033)	(0.021)	(0.024)
Internal funds to be neg. with chairholder	8.058***	3.694**	6.952***
	(2.753)	(1.633)	(1.834)
Internal funds to be neg. with university	4.192	3.985**	3.166*
	(2.824)	(1.618)	(1.737)
Observations	1,878	9,393	9,960

Table 10: Willingness to pay (WTP) calculated from conditional logit regressions of job choice for early stage researchers in U. S., the Eurozone and other countries. Standard errors in parentheses computed using the delta method. Based on 7,077 experiments among 3,790 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Later stage		
	(1)	(2)	(3)
	USA	Eurozone	Other
Health care patient contribution (in %)	0.706***	0.912***	0.262
	(0.170)	(0.245)	(0.246)
Retirement pension net repl. rate (in %)	−0.239**	−0.386**	−0.542***
	(0.105)	(0.154)	(0.155)
Relocation support (=1)	−3.438	−5.696*	−4.718
	(2.169)	(3.148)	(3.230)
Childcare facility (=1)	1.587	−6.272**	−6.488**
	(2.221)	(3.147)	(3.146)
Company car (=1)	0.659	2.714	−1.730
	(2.200)	(3.211)	(3.244)
Quality school for children (=1)	−4.014*	−5.740*	−5.544*
	(2.102)	(3.103)	(3.179)
University housing (=1)	−4.204**	−6.811**	−7.281**
	(2.137)	(3.169)	(3.236)
Job offer for partner (=1)	−8.126***	−6.547**	−11.539***
	(2.229)	(3.153)	(3.224)
QoL worse than in country of residence (=1)	20.529***	22.491***	27.182***
	(1.643)	(2.488)	(2.620)
QoL better than in country of residence (=1)	−1.140	−3.898**	−4.315**
	(1.341)	(1.941)	(2.007)
Teaching load (in %)	0.109***	0.188***	0.182***
	(0.021)	(0.032)	(0.031)
Short/long-term ext. fndng. poor/poor (=1)	10.021***	11.768***	13.737***
	(1.467)	(2.186)	(2.192)
Short/long-term ext. fndng. good/poor (=1)	3.479**	8.417***	5.484***
	(1.391)	(2.100)	(2.027)
Most prestigious peer among top 50 (=1)	−10.217***	−9.916***	−4.757**
	(1.666)	(2.456)	(2.410)
Most prestigious peer among top 25 (=1)	−10.759***	−9.941***	−7.486***
	(1.686)	(2.484)	(2.471)
Most prestigious peer among top 5 (=1)	−11.076***	−12.001***	−13.888***
	(1.717)	(2.501)	(2.498)
Research continuity (in %)	0.076***	0.105***	0.090***
	(0.016)	(0.023)	(0.023)
University research funding (in %)	−0.139***	−0.116***	−0.161***
	(0.021)	(0.031)	(0.031)
Time devoted to administration (in %)	0.373***	0.637***	0.512***
	(0.105)	(0.156)	(0.153)
Public salary scheme (=1)	4.876***	−1.038	−0.670
	(1.439)	(2.117)	(2.124)
Public salary scheme with bonus (=1)	−1.184	−7.064***	−4.549**
	(1.409)	(2.120)	(2.089)
Observations	6,159	5,634	7,482

Table 11: Willingness to pay (WTP) calculated from conditional logit regressions of job choice for later stage researchers in U. S., the Eurozone and other countries. Standard errors in parentheses computed using the delta method. Based on 6,425 experiments among 6,425 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Difference in WTP—early stage researchers		
	(1) USA vs. Eurozone	(2) USA vs. other	(3) Eurozone vs. other
Health care patient contribution (in %)	0.281	0.154	−0.127
	(0.372)	(0.387)	(0.280)
Retirement pension net repl. rate (in %)	0.100	0.132	0.032
	(0.227)	(0.237)	(0.180)
Relocation support (=1)	−1.473	0.894	2.368
	(4.709)	(4.917)	(3.755)
Childcare facility (=1)	−1.442	6.091	7.532**
	(4.919)	(5.116)	(3.680)
Company car (=1)	6.459	8.598*	2.138
	(4.781)	(5.031)	(3.782)
Quality school for children (=1)	−4.220	1.654	5.874
	(4.922)	(5.148)	(3.744)
University housing (=1)	4.492	4.584	0.093
	(5.254)	(5.443)	(3.806)
Job offer for partner (=1)	−5.141	−3.058	2.083
	(5.091)	(5.256)	(3.885)
QoL worse than in country of residence (=1)	1.078	1.577	0.500
	(3.720)	(3.812)	(2.769)
QoL better than in country of residence (=1)	5.282*	6.680**	1.398
	(3.001)	(3.162)	(2.337)
Teaching load (in %)	−0.096*	−0.132**	−0.035
	(0.050)	(0.051)	(0.039)
Short/long-term ext. fndng. poor/poor (=1)	−0.455	−4.068	−3.613
	(3.265)	(3.385)	(2.585)
Short/long-term ext. fndng. good/poor (=1)	−1.662	−3.536	−1.875
	(3.261)	(3.345)	(2.410)
Most prestigious peer among top 50 (=1)	4.487	4.988	0.501
	(3.650)	(3.740)	(2.833)
Most prestigious peer among top 25 (=1)	2.434	0.026	−2.409
	(3.954)	(4.045)	(2.928)
Most prestigious peer among top 5 (=1)	3.126	1.693	−1.433
	(4.106)	(4.231)	(3.014)
Length of initial contract (in years)	3.459***	2.420***	−1.038
	(0.903)	(0.937)	(0.690)
Extension: 3 years (after evaluation)	−0.980	−1.507	−0.526
	(4.025)	(4.147)	(3.005)
Extension: tenure (availability and perf.)	−2.587	−3.278	−0.691
	(4.224)	(4.296)	(3.077)
Extension: tenure (performance)	−3.346	−6.590	−3.243
	(4.420)	(4.533)	(3.236)
Research autonomy (in %)	0.031	0.027	−0.004
	(0.039)	(0.041)	(0.032)
Internal funds to be neg. with chairholder	4.364	1.106	−3.258
	(3.197)	(3.304)	(2.455)
Internal funds to be neg. with university	0.207	1.026	0.819
	(3.251)	(3.312)	(2.373)
Observations	12,271	11,838	19,353

Table 12: Differences in willingness to pay (WTP) calculated from conditional logit regressions of job choice for early stage researchers in U. S., the Eurozone and other countries. Standard errors in parentheses computed using the delta method. Based on 7,077 experiments among 3,790 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Difference in WTP—later stage researchers		
	(1) USA vs. Eurozone	(2) USA vs. other	(3) Eurozone vs. other
Health care patient contribution (in %)	−0.206	0.444	0.649*
	(0.304)	(0.303)	(0.353)
Retirement pension net repl. rate (in %)	0.147	0.303	0.156
	(0.186)	(0.187)	(0.218)
Relocation support (=1)	2.258	1.280	−0.978
	(3.852)	(3.852)	(4.445)
Childcare facility (=1)	7.859**	8.075**	0.216
	(3.903)	(3.866)	(4.442)
Company car (=1)	−2.055	2.389	4.444
	(3.891)	(3.945)	(4.538)
Quality school for children (=1)	1.726	1.529	−0.197
	(3.795)	(3.819)	(4.444)
University housing (=1)	2.606	3.077	0.471
	(3.814)	(3.915)	(4.522)
Job offer for partner (=1)	−1.578	3.413	4.991
	(3.926)	(3.967)	(4.493)
QoL worse than in country of residence (=1)	−1.962	−6.652**	−4.691
	(2.947)	(3.022)	(3.548)
QoL better than in country of residence (=1)	2.758	3.175	0.417
	(2.386)	(2.400)	(2.806)
Teaching load (in %)	−0.079**	−0.072*	0.006
	(0.038)	(0.038)	(0.045)
Short/long-term ext. fndng. poor/poor (=1)	−1.747	−3.716	−1.970
	(2.669)	(2.665)	(3.115)
Short/long-term ext. fndng. good/poor (=1)	−4.938*	−2.005	2.933
	(2.540)	(2.464)	(2.940)
Most prestigious peer among top 50 (=1)	−0.301	−5.460*	−5.159
	(2.949)	(2.950)	(3.427)
Most prestigious peer among top 25 (=1)	−0.818	−3.273	−2.455
	(3.018)	(3.007)	(3.509)
Most prestigious peer among top 5 (=1)	0.926	2.812	1.886
	(3.044)	(3.021)	(3.537)
Research continuity (in %)	−0.029	−0.015	0.014
	(0.029)	(0.028)	(0.033)
University research funding (in %)	−0.022	0.023	0.045
	(0.038)	(0.038)	(0.044)
Time devoted to administration (in %)	−0.264	−0.139	0.125
	(0.189)	(0.185)	(0.218)
Public salary scheme (=1)	5.914**	5.546**	−0.368
	(2.581)	(2.558)	(3.003)
Public salary scheme with bonus (=1)	5.880**	3.365	−2.514
	(2.589)	(2.493)	(3.001)
Observations	11,793	13,641	13,116

Table 13: Differences in willingness to pay (WTP) calculated from conditional logit regressions of job choice for later stage researchers in U. S., the Eurozone and other countries. Standard errors in parentheses computed using the delta method. Based on 6,425 experiments among 6,425 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Early stage
Net salary p. a. (in 1,000)	0.105^{***}
	(0.009)
Net salary p. a. (in 1,000)^2	-0.001^{***}
	(0.000)
Health care patient contribution (in %)	-0.063^{***}
	(0.016)
Health care patient contribution (in %)^2	0.005^{***}
	(0.002)
Retirement pension net replacement rate (in %)	0.007^{**}
	(0.003)
Relocation support (=1)	0.258^{***}
	(0.060)
Childcare facility (=1)	0.248^{***}
	(0.060)
Company car (=1)	0.091
	(0.061)
Quality school for children (=1)	0.314^{***}
	(0.060)
University housing (=1)	0.182^{***}
	(0.062)
Job offer for partner (=1)	0.493^{***}
	(0.062)
QoL worse than in country of residence (=1)	-0.727^{***}
	(0.042)
QoL better than in country of residence (=1)	0.131^{***}
	(0.038)
Teaching load (in %)	0.019^{***}
	(0.002)
Teaching load (in %)^2	-0.000^{***}
	(0.000)
Short/long-term ext. funding poor/poor (=1)	-0.400^{***}
	(0.041)
Short/long-term ext. funding good/poor (=1)	-0.160^{***}
	(0.039)
Most prestigious peer among top 50 (=1)	0.270^{***}
	(0.045)
Most prestigious peer among top 25 (=1)	0.383^{***}
	(0.047)
Most prestigious peer among top 5 (=1)	0.607^{***}
	(0.047)
Length of initial contract (in years)	0.075^{***}
	(0.011)
Extension: 3 years (after evaluation)	0.547^{***}
	(0.047)
Extension: tenure (availability and perf.)	0.683^{***}
	(0.047)
Extension: tenure (performance)	0.768^{***}
	(0.049)
Research autonomy (in %)	0.015^{***}
	(0.002)
Research autonomy (in %)^2	-0.000^{***}
	(0.000)
Internal funds to be neg. with chairholder	-0.190^{***}
	(0.040)
Internal funds to be neg. with university	-0.128^{***}
	(0.039)
Alternative specific constant: 2nd job in list	0.161^{***}
	(0.032)
Alternative specific constant: 3rd job in list	-0.051
	(0.033)
Observations	21,231
Pseudo-R^2	0.141
Log-likelihood	-6,675.378

Table 14: Conditional logit regression of job choice for early stage researchers. Based on 7,077 experiments among 3,790 researchers. Standard errors in parentheses corrected for clustering within respondents. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Later stage
Net salary p. a. (in 1,000)	0.120^{***}
	(0.013)
Net salary p. a. (in 1,000)^2	-0.001^{***}
	(0.000)
Health care patient contribution (in %)	-0.105^{***}
	(0.017)
Health care patient contribution (in %)^2	0.008^{***}
	(0.002)
Retirement pension net replacement rate (in %)	0.015^{***}
	(0.003)
Relocation support (=1)	0.175^{***}
	(0.064)
Childcare facility (=1)	0.141^{**}
	(0.063)
Company car (=1)	-0.017
	(0.065)
Quality school for children (=1)	0.194^{***}
	(0.063)
University housing (=1)	0.229^{***}
	(0.064)
Job offer for partner (=1)	0.339^{***}
	(0.064)
QoL worse than in country of residence (=1)	-0.927^{***}
	(0.044)
QoL better than in country of residence (=1)	0.111^{***}
	(0.040)
Teaching load (in %)	0.021^{***}
	(0.002)
Teaching load (in %)^2	-0.000^{***}
	(0.000)
Short/long-term ext. funding poor/poor (=1)	-0.477^{***}
	(0.042)
Short/long-term ext. funding good/poor (=1)	-0.218^{***}
	(0.041)
Most prestigious peer among top 50 (=1)	0.335^{***}
	(0.048)
Most prestigious peer among top 25 (=1)	0.382^{***}
	(0.049)
Most prestigious peer among top 5 (=1)	0.506^{***}
	(0.049)
Research continuity (in %)	-0.004^{***}
	(0.002)
Research continuity (in %)^2	0.000
	(0.000)
University research funding (in %)	0.011^{***}
	(0.003)
University research funding (in %)^2	-0.000^{*}
	(0.000)
Time devoted to administration (in %)	0.023^{**}
	(0.011)
Time devoted to administration (in %)^2	-0.003^{***}
	(0.001)
Public salary scheme (=1)	-0.062
	(0.042)
Public salary scheme with bonus (=1)	0.148^{***}
	(0.041)
2nd job in list	0.109^{***}
	(0.033)
3rd job in list	-0.070^{**}
	(0.034)
Observations	19,275
Pseudo-R^2	0.151
Log-likelihood	-5,993.756

Table 15: Conditional logit regression of job choice for later stage researchers. Based on 6,425 experiments. Standard errors in parentheses. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Humanities	(2) Social sciences	(3) Natural sciences	(4) Medical science	(5) Engineering
Net salary p. a. (in 1,000)	0.028***	0.028***	0.031***	0.034***	0.038***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)
Health care patient contribution (in %)	0.006	−0.027*	−0.012	−0.033**	−0.006
	(0.018)	(0.014)	(0.014)	(0.017)	(0.017)
Retirement pension net replacement rate (in %)	0.008	0.013	0.016	−0.014	0.007
	(0.011)	(0.009)	(0.010)	(0.011)	(0.010)
QoL worse than in country of residence (=1)	−0.740***	−0.608***	−0.628***	−0.825***	−0.605***
	(0.159)	(0.124)	(0.126)	(0.162)	(0.151)
QoL better than in country of residence (=1)	−0.052	0.250**	0.006	0.343**	0.262**
	(0.141)	(0.124)	(0.120)	(0.145)	(0.126)
Teaching load (in %)	−0.006**	−0.008***	−0.006***	−0.003	−0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Short/long-term ext. funding poor/poor (=1)	−0.172	−0.359***	−0.365***	−0.642***	−0.290**
	(0.164)	(0.128)	(0.134)	(0.152)	(0.138)
Short/long-term ext. funding good/poor (=1)	0.260	−0.025	−0.289**	−0.301**	−0.175
	(0.169)	(0.120)	(0.130)	(0.148)	(0.132)
Most prestigious peer among top 50 (=1)	0.361**	0.555***	0.549***	0.164	0.283*
	(0.167)	(0.161)	(0.151)	(0.166)	(0.148)
Most prestigious peer among top 25 (=1)	0.395**	0.648***	0.766***	0.338**	0.231
	(0.176)	(0.160)	(0.153)	(0.162)	(0.158)
Most prestigious peer among top 5 (=1)	0.547***	0.945***	0.678***	0.356**	0.390**
	(0.186)	(0.154)	(0.156)	(0.162)	(0.159)
Length of initial contract (in years)	0.076*	0.099***	0.117***	0.076*	0.052
	(0.041)	(0.036)	(0.035)	(0.042)	(0.038)
Extension: 3 years (after evaluation)	0.462***	0.598***	0.259*	0.597***	0.590***
	(0.179)	(0.142)	(0.152)	(0.173)	(0.167)
Extension: tenure (availability and perf.)	0.500**	0.734***	0.471***	0.705***	0.768***
	(0.196)	(0.146)	(0.145)	(0.165)	(0.168)
Extension: tenure (performance)	0.342*	0.836***	0.567***	0.624***	0.847***
	(0.191)	(0.150)	(0.163)	(0.182)	(0.179)
Research autonomy (in %)	0.007***	0.010***	0.006***	0.005***	0.006***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Internal funds to be neg. with chairholder	−0.048	−0.100	−0.197	0.114	−0.188
	(0.158)	(0.124)	(0.136)	(0.144)	(0.133)
Internal funds to be neg. with university	−0.014	−0.041	−0.240*	−0.115	−0.185
	(0.150)	(0.122)	(0.128)	(0.140)	(0.134)
2nd job in list	0.075	0.350***	0.076	−0.136	0.233**
	(0.135)	(0.101)	(0.101)	(0.113)	(0.106)
3rd job in list	−0.099	0.102	−0.063	−0.295**	−0.013
	(0.135)	(0.103)	(0.103)	(0.124)	(0.114)
Observations	1,341	2,178	2,016	1,581	1,827
Pseudo-R^2	0.107	0.136	0.117	0.143	0.129
Log-likelihood	-438.5	-689.3	-652.1	-496.0	-583.0

Table 16: Conditional logit regressions of job choice for early stage researchers by field of science. Coefficients for fringe benefits not shown. Standard errors in parentheses. Standard errors for early stage researchers corrected for clustering within respondents. Based on 2,981 experiments among 994 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Humanities	(2) Social sciences	(3) Natural sciences	(4) Medical science	(5) Engineering
Net salary p. a. (in 1,000)	0.026***	0.027***	0.026***	0.035***	0.043***
	(0.006)	(0.004)	(0.005)	(0.006)	(0.006)
Health care patient contribution (in %)	−0.027	−0.004	−0.011	−0.090***	−0.018
	(0.021)	(0.016)	(0.021)	(0.022)	(0.021)
Retirement pension net replacement rate (in %)	0.012	0.029***	0.021	−0.004	0.013
	(0.014)	(0.011)	(0.014)	(0.013)	(0.014)
QoL worse than in country of residence (=1)	−0.934***	−0.903***	−0.680***	−0.686***	−1.038***
	(0.192)	(0.148)	(0.194)	(0.192)	(0.193)
QoL better than in country of residence (=1)	0.309*	0.102	0.171	0.016	0.242
	(0.176)	(0.136)	(0.172)	(0.179)	(0.169)
Teaching load (in %)	−0.004	−0.005**	−0.009***	−0.001	−0.001
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Short/long-term ext. funding poor/poor (=1)	−0.121	−0.307**	−0.342*	−0.707***	−0.599***
	(0.187)	(0.140)	(0.190)	(0.193)	(0.181)
Short/long-term ext. funding good/poor (=1)	−0.121	−0.318**	0.158	−0.391**	−0.317*
	(0.187)	(0.140)	(0.177)	(0.183)	(0.179)
Most prestigious peer among top 50 (=1)	0.095	0.144	0.270	0.406*	0.345*
	(0.226)	(0.162)	(0.203)	(0.220)	(0.205)
Most prestigious peer among top 25 (=1)	0.366	0.099	−0.111	0.444**	0.254
	(0.227)	(0.163)	(0.210)	(0.212)	(0.210)
Most prestigious peer among top 5 (=1)	0.274	0.445***	0.161	0.586***	0.391*
	(0.230)	(0.162)	(0.209)	(0.223)	(0.205)
Research continuity (in %)	−0.007***	−0.002	−0.010***	0.001	−0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
University research funding (in %)	0.007**	0.004*	0.003	0.005*	0.004
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Time devoted to administration (in %)	−0.045***	−0.014	0.001	−0.021	−0.023*
	(0.014)	(0.010)	(0.013)	(0.014)	(0.014)
Public salary scheme (=1)	−0.151	0.083	0.334*	−0.244	−0.049
	(0.193)	(0.147)	(0.183)	(0.186)	(0.186)
Public salary scheme with bonus (=1)	0.162	0.188	0.481***	0.025	0.304*
	(0.184)	(0.143)	(0.180)	(0.187)	(0.177)
2nd job in list	0.049	0.320***	0.082	0.122	0.232*
	(0.148)	(0.111)	(0.137)	(0.144)	(0.140)
3rd job in list	−0.143	0.064	−0.283*	−0.285*	0.060
	(0.154)	(0.117)	(0.151)	(0.155)	(0.146)
Observations	942	1,653	1,050	969	1,104
Pseudo-R^2	0.126	0.109	0.132	0.132	0.162
Log-likelihood	-301.6	-539.1	-333.8	-308.0	-338.8

Table 17: Conditional logit regressions of job choice for later stage researchers by field of science. Coefficients for fringe benefits not shown. Standard errors in parentheses. Based on 1,906 experiments among 1,906 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Female	(2) Male	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.030***	0.041***	
	(0.002)	(0.002)	
Health care patient contribution (in %)	−0.018***	−0.010	0.355
	(0.006)	(0.006)	(0.266)
Retirement pension net replacement rate (in %)	0.008**	0.006	−0.125
	(0.004)	(0.004)	(0.169)
Relocation support (=1)	0.300***	0.218***	−4.682
	(0.086)	(0.083)	(3.558)
Childcare facility (=1)	0.322***	0.173**	−6.530*
	(0.083)	(0.084)	(3.488)
Company car (=1)	0.069	0.122	0.671
	(0.087)	(0.085)	(3.565)
Quality school for children (=1)	0.378***	0.252***	−6.456*
	(0.085)	(0.084)	(3.551)
University housing (=1)	0.161*	0.197**	−0.574
	(0.088)	(0.086)	(3.634)
Job offer for partner (=1)	0.462***	0.515***	−2.850
	(0.089)	(0.085)	(3.724)
QoL worse than in country of residence (=1)	−0.851***	−0.580***	14.260***
	(0.059)	(0.059)	(2.768)
QoL better than in country of residence (=1)	0.133**	0.126**	−1.349
	(0.052)	(0.053)	(2.191)
Teaching load (in %)	−0.007***	−0.008***	0.028
	(0.001)	(0.001)	(0.037)
Short/long-term ext. funding poor/poor (=1)	−0.431***	−0.360***	5.603**
	(0.057)	(0.057)	(2.440)
Short/long-term ext. funding good/poor (=1)	−0.164***	−0.140**	2.039
	(0.055)	(0.055)	(2.287)
Most prestigious peer among top 50 (=1)	0.326***	0.208***	−5.789**
	(0.063)	(0.064)	(2.703)
Most prestigious peer among top 25 (=1)	0.406***	0.341***	−5.231*
	(0.066)	(0.065)	(2.823)
Most prestigious peer among top 5 (=1)	0.680***	0.521***	−9.989***
	(0.065)	(0.066)	(2.922)
Length of initial contract (in years)	0.062***	0.095***	0.238
	(0.015)	(0.016)	(0.646)
Extension: 3 years (after evaluation)	0.580***	0.491***	−7.366**
	(0.066)	(0.066)	(2.899)
Extension: tenure (availability and perf.)	0.598***	0.746***	−1.770
	(0.066)	(0.066)	(2.943)
Extension: tenure (performance)	0.721***	0.808***	−4.356
	(0.069)	(0.069)	(3.086)
Research autonomy (in %)	0.006***	0.007***	−0.043
	(0.001)	(0.001)	(0.030)
Internal funds to be neg. with chairholder	−0.217***	−0.189***	2.646
	(0.057)	(0.056)	(2.350)
Internal funds to be neg. with university	−0.141***	−0.131**	1.524
	(0.054)	(0.055)	(2.265)
2nd job in list	0.180***	0.139***	
	(0.045)	(0.046)	
3rd job in list	−0.021	−0.073	
	(0.046)	(0.047)	
Observations	10,527	10,704	21,231
Pseudo-R^2	0.122	0.132	
Log-likelihood	-3385	-3403	

Table 18: Conditional logit regressions of job choice for early stage researchers by gender. Standard errors in parentheses. Standard errors corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Female	(2) Male	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.033***	0.043***	
	(0.002)	(0.002)	
Health care patient contribution (in %)	−0.035***	−0.018***	0.618**
	(0.008)	(0.006)	(0.293)
Retirement pension net replacement rate (in %)	0.016***	0.014***	−0.164
	(0.005)	(0.004)	(0.182)
Relocation support (=1)	0.278***	0.111	−5.798
	(0.106)	(0.079)	(3.669)
Childcare facility (=1)	0.209**	0.069	−4.692
	(0.105)	(0.078)	(3.663)
Company car (=1)	0.016	−0.037	−1.346
	(0.109)	(0.079)	(3.772)
Quality school for children (=1)	0.120	0.210***	1.301
	(0.107)	(0.076)	(3.667)
University housing (=1)	0.145	0.271***	1.966
	(0.111)	(0.077)	(3.807)
Job offer for partner (=1)	0.407***	0.296***	−5.365
	(0.109)	(0.078)	(3.830)
QoL worse than in country of residence (=1)	−1.029***	−0.859***	10.921***
	(0.074)	(0.054)	(3.113)
QoL better than in country of residence (=1)	0.065	0.133***	1.159
	(0.067)	(0.048)	(2.316)
Teaching load (in %)	−0.006***	−0.006***	0.055
	(0.001)	(0.001)	(0.038)
Short/long-term ext. funding poor/poor (=1)	−0.476***	−0.451***	3.783
	(0.072)	(0.052)	(2.646)
Short/long-term ext. funding good/poor (=1)	−0.144**	−0.259***	−1.745
	(0.069)	(0.050)	(2.420)
Most prestigious peer among top 50 (=1)	0.358***	0.318***	−3.366
	(0.082)	(0.059)	(2.897)
Most prestigious peer among top 25 (=1)	0.366***	0.371***	−2.363
	(0.084)	(0.059)	(2.967)
Most prestigious peer among top 5 (=1)	0.537***	0.453***	−5.601*
	(0.084)	(0.060)	(3.003)
Research continuity (in %)	−0.004***	−0.003***	0.049*
	(0.001)	(0.001)	(0.027)
University research funding (in %)	0.007***	0.005***	−0.084**
	(0.001)	(0.001)	(0.038)
Time devoted to administration (in %)	−0.021***	−0.018***	0.214
	(0.005)	(0.004)	(0.183)
Public salary scheme (=1)	−0.137*	−0.023	3.584
	(0.072)	(0.052)	(2.490)
Public salary scheme with bonus (=1)	0.041	0.206***	3.613
	(0.069)	(0.051)	(2.423)
2nd job in list	0.145***	0.076*	
	(0.056)	(0.040)	
3rd job in list	−0.037	−0.095**	
	(0.058)	(0.042)	
Observations	6,579	12,696	19,275
Pseudo-R^2	0.128	0.139	
Log-likelihood	-2101	-4002	

Table 19: Conditional logit regressions of job choice for later stage researchers by gender. Standard errors in parentheses. Based on 6,425 experiments among 6,425 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) No mobility	(2) Mobility	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.030***	0.043***	
	(0.002)	(0.002)	
Health care patient contribution (in %)	−0.012**	−0.017**	0.019
	(0.006)	(0.007)	(0.254)
Retirement pension net replacement rate (in %)	0.007**	0.008	−0.066
	(0.004)	(0.005)	(0.163)
Relocation support (=1)	0.209***	0.350***	1.204
	(0.075)	(0.098)	(3.384)
Childcare facility (=1)	0.191***	0.329***	1.294
	(0.073)	(0.100)	(3.353)
Company car (=1)	0.014	0.232**	4.898
	(0.076)	(0.101)	(3.414)
Quality school for children (=1)	0.225***	0.449***	2.963
	(0.075)	(0.099)	(3.390)
University housing (=1)	0.101	0.305***	3.725
	(0.078)	(0.102)	(3.475)
Job offer for partner (=1)	0.316***	0.786***	7.730**
	(0.078)	(0.101)	(3.518)
QoL worse than in country of residence (=1)	−0.675***	−0.801***	3.689
	(0.051)	(0.070)	(2.528)
QoL better than in country of residence (=1)	0.090*	0.183***	1.246
	(0.047)	(0.061)	(2.095)
Teaching load (in %)	−0.006***	−0.010***	−0.041
	(0.001)	(0.001)	(0.035)
Short/long-term ext. funding poor/poor (=1)	−0.371***	−0.425***	2.365
	(0.050)	(0.068)	(2.334)
Short/long-term ext. funding good/poor (=1)	−0.167***	−0.133**	2.421
	(0.049)	(0.064)	(2.196)
Most prestigious peer among top 50 (=1)	0.291***	0.233***	−4.177
	(0.057)	(0.074)	(2.571)
Most prestigious peer among top 25 (=1)	0.367***	0.392***	−3.013
	(0.059)	(0.075)	(2.666)
Most prestigious peer among top 5 (=1)	0.542***	0.706***	−1.549
	(0.058)	(0.078)	(2.749)
Length of initial contract (in years)	0.056***	0.114***	0.767
	(0.014)	(0.018)	(0.624)
Extension: 3 years (after evaluation)	0.445***	0.719***	1.965
	(0.058)	(0.078)	(2.743)
Extension: tenure (availability and perf.)	0.543***	0.917***	3.321
	(0.058)	(0.079)	(2.834)
Extension: tenure (performance)	0.659***	0.965***	0.603
	(0.062)	(0.080)	(2.954)
Research autonomy (in %)	0.006***	0.008***	0.006
	(0.001)	(0.001)	(0.029)
Internal funds to be neg. with chairholder	−0.188***	−0.225***	0.990
	(0.049)	(0.067)	(2.244)
Internal funds to be neg. with university	−0.133***	−0.139**	1.170
	(0.049)	(0.064)	(2.174)
2nd job in list	0.154***	0.164***	
	(0.040)	(0.052)	
3rd job in list	−0.049	−0.043	
	(0.041)	(0.053)	
Observations	13,017	8,214	21,231
Pseudo-R^2	0.0982	0.173	
Log-likelihood	-4299	-2489	

Table 20: Conditional logit regressions of job choice for early stage researchers by mobility behaviour. Standard errors in parentheses. Standard errors corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) No mobility	(2) Mobility	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.037***	0.042***	
	(0.002)	(0.002)	
Health care patient contribution (in %)	−0.025***	−0.023***	0.138
	(0.006)	(0.007)	(0.252)
Retirement pension net replacement rate (in %)	0.013***	0.016***	0.032
	(0.004)	(0.005)	(0.156)
Relocation support (=1)	0.171**	0.171*	−0.560
	(0.083)	(0.098)	(3.216)
Childcare facility (=1)	0.079	0.168*	1.859
	(0.082)	(0.097)	(3.212)
Company car (=1)	−0.032	0.000	0.873
	(0.084)	(0.099)	(3.282)
Quality school for children (=1)	0.145*	0.232**	1.589
	(0.081)	(0.095)	(3.174)
University housing (=1)	0.225***	0.247**	−0.212
	(0.082)	(0.099)	(3.241)
Job offer for partner (=1)	0.242***	0.452***	4.179
	(0.083)	(0.098)	(3.279)
QoL worse than in country of residence (=1)	−0.902***	−0.932***	2.247
	(0.057)	(0.067)	(2.477)
QoL better than in country of residence (=1)	0.089*	0.148**	1.097
	(0.051)	(0.060)	(1.996)
Teaching load (in %)	−0.003***	−0.010***	−0.145***
	(0.001)	(0.001)	(0.032)
Short/long-term ext. funding poor/poor (=1)	−0.429***	−0.505***	−0.395
	(0.055)	(0.065)	(2.229)
Short/long-term ext. funding good/poor (=1)	−0.194***	−0.251***	−0.725
	(0.053)	(0.063)	(2.085)
Most prestigious peer among top 50 (=1)	0.355***	0.305***	−2.347
	(0.063)	(0.073)	(2.469)
Most prestigious peer among top 25 (=1)	0.339***	0.424***	0.897
	(0.064)	(0.074)	(2.520)
Most prestigious peer among top 5 (=1)	0.429***	0.556***	1.620
	(0.064)	(0.075)	(2.544)
Research continuity (in %)	−0.004***	−0.003***	0.026
	(0.001)	(0.001)	(0.024)
University research funding (in %)	0.005***	0.006***	−0.000
	(0.001)	(0.001)	(0.031)
Time devoted to administration (in %)	−0.018***	−0.021***	−0.028
	(0.004)	(0.005)	(0.156)
Public salary scheme (=1)	−0.058	−0.068	−0.042
	(0.055)	(0.065)	(2.140)
Public salary scheme with bonus (=1)	0.142***	0.160**	−0.022
	(0.054)	(0.063)	(2.112)
2nd job in list	0.085**	0.118**	
	(0.043)	(0.050)	
3rd job in list	−0.111**	−0.026	
	(0.045)	(0.052)	
Observations	10,938	8,337	19,275
Pseudo-R^2	0.124	0.150	
Log-likelihood	-3510	-2596	

Table 21: Conditional logit regressions of job choice for later stage researchers by mobility behaviour. Standard errors in parentheses. Based on 6,425 experiments among 6,425 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) R1	(2) R2	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.032***	0.038***	
	(0.002)	(0.002)	
Health care patient contribution (in %)	−0.008	−0.018***	−0.225
	(0.007)	(0.006)	(0.271)
Retirement pension net replacement rate (in %)	0.003	0.012***	0.217
	(0.004)	(0.004)	(0.172)
QoL worse than in country of residence (=1)	−0.669***	−0.753***	1.531
	(0.061)	(0.056)	(2.661)
QoL better than in country of residence (=1)	0.075	0.169***	2.024
	(0.056)	(0.050)	(2.214)
Teaching load (in %)	−0.005***	−0.009***	−0.061*
	(0.001)	(0.001)	(0.037)
Short/long-term ext. funding poor/poor (=1)	−0.403***	−0.379***	2.867
	(0.061)	(0.054)	(2.451)
Short/long-term ext. funding good/poor (=1)	−0.186***	−0.123**	2.683
	(0.058)	(0.053)	(2.297)
Most prestigious peer among top 50 (=1)	0.338***	0.219***	−5.008*
	(0.068)	(0.060)	(2.734)
Most prestigious peer among top 25 (=1)	0.398***	0.359***	−3.227
	(0.070)	(0.062)	(2.820)
Most prestigious peer among top 5 (=1)	0.566***	0.627***	−1.550
	(0.070)	(0.063)	(2.887)
Length of initial contract (in years)	0.039**	0.110***	1.640**
	(0.017)	(0.015)	(0.654)
Extension: 3 years (after evaluation)	0.455***	0.605***	1.374
	(0.069)	(0.063)	(2.854)
Extension: tenure (availability and perf.)	0.475***	0.837***	6.808**
	(0.069)	(0.064)	(2.907)
Extension: tenure (performance)	0.563***	0.923***	6.276**
	(0.073)	(0.066)	(3.067)
Research autonomy (in %)	0.006***	0.007***	−0.014
	(0.001)	(0.001)	(0.030)
Internal funds to be neg. with chairholder	−0.142**	−0.251***	−2.042
	(0.059)	(0.054)	(2.340)
Internal funds to be neg. with university	−0.065	−0.197***	−3.081
	(0.057)	(0.052)	(2.274)
2nd job in list	0.221***	0.107**	
	(0.048)	(0.042)	
3rd job in list	−0.062	−0.040	
	(0.051)	(0.043)	
Observations	9,135	12,096	21,231
Pseudo-R^2	0.104	0.144	
Log-likelihood	-2996	-3794	

Table 22: Conditional logit regressions of job choice for early stage researchers by careerstage. Standard errors in parentheses. Standard errors corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Not highly confident R2	(2) Highly confident R2	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.037***	0.050***	
	(0.002)	(0.006)	
Health care patient contribution (in %)	−0.014**	−0.048**	0.578
	(0.006)	(0.020)	(0.447)
Retirement pension net replacement rate (in %)	0.013***	−0.003	0.398
	(0.004)	(0.012)	(0.270)
QoL worse than in country of residence (=1)	−0.721***	−1.110***	3.086
	(0.059)	(0.175)	(4.254)
QoL better than in country of residence (=1)	0.205***	−0.145	8.407**
	(0.053)	(0.160)	(3.545)
Teaching load (in %)	−0.009***	−0.011***	−0.002
	(0.001)	(0.003)	(0.059)
Short/long-term ext. funding poor/poor (=1)	−0.377***	−0.395**	−2.111
	(0.057)	(0.185)	(4.057)
Short/long-term ext. funding good/poor (=1)	−0.089	−0.432**	6.317
	(0.055)	(0.192)	(4.148)
Most prestigious peer among top 50 (=1)	0.198***	0.459**	−3.955
	(0.063)	(0.203)	(4.324)
Most prestigious peer among top 25 (=1)	0.338***	0.522**	−1.473
	(0.066)	(0.207)	(4.513)
Most prestigious peer among top 5 (=1)	0.592***	0.976***	−3.840
	(0.066)	(0.213)	(4.770)
Length of initial contract (in years)	0.114***	0.084*	1.352
	(0.015)	(0.050)	(1.084)
Extension: 3 years (after evaluation)	0.622***	0.571***	5.127
	(0.067)	(0.203)	(4.476)
Extension: tenure (availability and perf.)	0.825***	1.077***	0.379
	(0.067)	(0.205)	(4.753)
Extension: tenure (performance)	0.897***	1.310***	−2.411
	(0.069)	(0.210)	(4.734)
Research autonomy (in %)	0.007***	0.008***	0.021
	(0.001)	(0.002)	(0.045)
Internal funds to be neg. with chairholder	−0.248***	−0.319*	−0.212
	(0.057)	(0.165)	(3.622)
Internal funds to be neg. with university	−0.211***	−0.042	−4.782
	(0.056)	(0.161)	(3.563)
2nd job in list	0.104**	0.134	
	(0.044)	(0.148)	
3rd job in list	−0.058	0.167	
	(0.045)	(0.152)	
Observations	10,845	1,251	12,096
Pseudo-R^2	0.140	0.212	
Log-likelihood	-3415	-360.9	

Table 23: Conditional logit regressions of job choice for early stage researchers by careerstage. Standard errors in parentheses. Standard errors corrected for clustering within respondents. Based on 4,032 experiments among 2,016 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

Appendix

A Full list of job attributes and characteristics

Early stage researchers

Remuneration and fringe benefits

- Net salary p. a. (incl. bonuses)
  - ... 35000
  - ... 45000
  - ... 55000
  - ... 65000
- Health care is...
  - ... covered, in case of illness patient contribution (max. 10 % of yearly salary)
  - ... covered, in case of illness patient contribution (max. 7.5 % of yearly salary)
  - ... covered, in case of illness patient contribution (max. 5 % of yearly salary)
  - ... covered, in case of illness patient contribution (max. 2.5 % of yearly salary)
  - ... fully covered
- Retirement pension: Expected net replacement rate is...
  - ... 70 % of net pre-retirement earnings
  - ... 75 % of net pre-retirement earnings
  - ... 80 % of net pre-retirement earnings
  - ... 85 % of net pre-retirement earnings
- Fringe benefits covered
  - ... Relocation support (flat search, etc.)
  - ... Parking lot at university
  - ... Childcare facility available
  - ... Company car (medium-sized), private use included
  - ... Guaranteed place at nearby quality school for children
  - ... University housing
  - ... Job offer for partner

Country characteristics

- The quality of life (consider e. g. education, health, income) in the target country is...
  - ... worse than in your current country of work
  - ... comparable with your current country of work
  - ... better than in your current country of work

Working Conditions

- Career perspectives I: Length of initial contract is...
  - ... 2 years
  - ... 3 years
  - ... 4 years
  - ... 6 years
- Career perspectives II: Extension of initial contract...
  - ... is not possible
  - ... is possible for 3 years in case of positive performance evaluation
  - ... is possible, with tenure contingent on availability of position and performance evaluation
  - ... is possible, with tenured position/full professorship contingent purely on performance evaluation (tenure track)
- Split between teaching and research tasks is...
  - ... teaching (75 %), research (25 %)
  - ... teaching (50 %), research (50 %)
  - ... teaching (25 %), research (75 %)
  - ... research only
- Research autonomy: Time for own research
  - ... No own research, support of chair holder/research group leader
  - ... 25 % of research time (remainder for chairholder, group leader)
  - ... 50 % of research time (remainder for chairholder, group leader)
  - ... 75 % of research time (remainder for chairholder, group leader)
  - ... 100 % of research time (full research independence)
- University-internal funds for research...
  - ... must be negotiated with the chairholder/research group leader
  - ... must be negotiated with university management (quality of the research proposal)
  - ... are provided by the university without strings attached
- University-external funds for research: Availability of...
  - ... both long-term and short-term grants is poor (stiff competition)
  - ... short-term grants (up to 3 years) is good, while that of long-term grants (5 years) is poor (stiff competition)
  - ... both long-term (5 years) and short-term grants (up to 3 years) is good
- Your most prestigious peer at your department...
  - ... is not among the top 50 worldwide in your field
  - ... is among the top 50 worldwide in your field
  - ... is among the top 25 worldwide in your field
  - ... is among the top 5 worldwide in your field

Later stage researchers

Remuneration and fringe benefits

- Net salary p. a. (incl. bonuses)
  - ... 45000
  - ... 55000
  - ... 65000
  - ... 75000
  - ... 85000
- Health care is...
  - ... covered, in case of illness patient contribution (max. 10 % of yearly salary)
  - ... covered, in case of illness patient contribution (max. 7.5 % of yearly salary)
  - ... covered, in case of illness patient contribution (max. 5 % of yearly salary)
  - ... covered, in case of illness patient contribution (max. 2.5 % of yearly salary)
  - ... fully covered
- Retirement pension: Expected net replacement rate is...
  - ... 70 % of net pre-retirement earnings
  - ... 75 % of net pre-retirement earnings
  - ... 80 % of net pre-retirement earnings
  - ... 85 % of net pre-retirement earnings
- Fringe benefits covered
  - ... Relocation support (flat search, etc.)
  - ... Parking lot at university
  - ... Childcare facility available
  - ... Company car (medium-sized), private use included
  - ... Guaranteed place at nearby quality school for children
  - ... University housing
  - ... Job offer for partner

Country characteristics

- The quality of life (consider e. g. education, health, income) in the target country is...
  - ... worse than in your current country of work
  - ... comparable with your current country of work
  - ... better than in your current country of work

Working conditions

- University-internal funds for research can fund...
  - ... 25 % of research tasks, remainder via grants
  - ... 50 % of research tasks, remainder via grants
  - ... 75 % of research tasks, remainder via grants
  - ... 100 % of research tasks
- University-external funds for research: Availability of...
  - ... both long-term and short-term grants is poor
  - ... short-term grants (up to 3 years) is good, while that of long-term grants (5 years) is poor (stiff competition)

... both long-term (5 years) and short-term grants (up to 3 years) is good

- Split between teaching and research tasks is...
  - ... teaching (75 %), research (25 %)
  - ... teaching (50 %), research (50 %)
  - ... teaching (25 %), research (75 %)
  - ... research only
- Ease of starting new lines of research: The position replaces...
  - ... an existing chair (100 % research continuity necessary)
  - ... an existing chair (66 % research continuity necessary)
  - ... an existing chair (33 % research continuity necessary)
  - ... no existing chair, researcher is 100 % free to choose line of inquiry
- Quality of administrative support: The researcher needs to devote...
  - ... a lot of time to administrative tasks (15 %)
  - ... some time to administrative tasks (10 %)
  - ... not much time to administrative tasks (5 %)
  - ... almost no time to administrative tasks
- Your most prestigious peer at your department...
  - ... is not among the top 50 worldwide in your field
  - ... is among the top 50 worldwide in your field
  - ... is among the top 25 worldwide in your field
  - ... is among the top 5 worldwide in your field
- Salary advancement is according to...
  - ... public salary scheme
  - ... public salary scheme, with possible bonus for research or teaching performance
  - ... individual research performance evaluation

B Marginal effects

Although changes in the odds are easier to interpret for CL models we also calculated the marginal effects which are reported in tables C1 and C2. For a continuous variable x_{mk}, the marginal effect on the probability of choosing alternative k is given by:

$$\frac{\partial P(y_k = 1)}{\partial x_{mk}} = \beta_m P(y_k = 1)[1 - P(y_k = 1)] \tag{10}$$

where $P(y_k = 1)$ is the predicted probability of choosing job k. Because the marginal effect of a change in variable x_{mk} on the probability of choosing alternative k depends on the value of $P(y_k = 1)$, the marginal effects will generally vary over the alternatives. For dummy variables, the marginal effects are computed as differences in predicted probabilities:

$$\frac{\partial P(y_{ik} = 1)}{\partial x_{ik}} = P(y_{ik} = 1|x_{ik} = 1) - P(y_{ik} = 1|x_{ik} = 0). \tag{11}$$

In contrast to the change in the odds, the marginal effect of an independent variable varies not only over alternatives; it also varies with the values of all covariates for all alternatives: the marginal effect of x_{mk} on the probability of choosing alternative k not only dependens on the values of the independent variables for alternative k, but also on the values of the independent variables for all other alternatives $j \neq k$. Because the sum of all probabilities must sum to one, an increase in the attractiveness of an alternative job offer $j \neq k$ decreases the probability of choosing alternative k, and via equations (10) and (11) also changes the marginal effects of the independent variables on $P(y_k = 1)$. There is thus not one marginal effect, but a whole range of marginal effects that could be calculated, including cross-derivatives of changes in the independent variables of alternative k on the probabilities of choosing all other alternatives. The marginal effects in tables C1 and C2 were calculated at the mean of all independent variables for all alternatives.

[Table B1 about here.]

[Table B2 about here.]

C Additional tables

[Table C1 about here.]

[Table C2 about here.]

[Table C3 about here.]

[Table C4 about here.]

	Marginal effects		
	(1)	(2)	(3)
	$k = 1$	$k = 2$	$k = 3$
Net salary p. a. (in 1,000)	0.008^{***}	0.008^{***}	0.008^{***}
	(0.000)	(0.000)	(0.000)
Health care patient contribution (in %)	-0.003^{***}	-0.003^{***}	-0.003^{***}
	(0.001)	(0.001)	(0.001)
Retirement pension net repl. rate (in %)	0.002^{**}	0.002^{**}	0.002^{**}
	(0.001)	(0.001)	(0.001)
Relocation support (=1)	0.058^{***}	0.062^{***}	0.057^{***}
	(0.014)	(0.014)	(0.014)
Childcare facility (=1)	0.054^{***}	0.058^{***}	0.053^{***}
	(0.014)	(0.014)	(0.013)
Company car (=1)	0.021	0.022	0.020
	(0.014)	(0.014)	(0.013)
Quality school for children (=1)	0.070^{***}	0.074^{***}	0.069^{***}
	(0.014)	(0.015)	(0.014)
University housing (=1)	0.039^{***}	0.042^{***}	0.038^{***}
	(0.014)	(0.015)	(0.014)
Job offer for partner (=1)	0.112^{***}	0.118^{***}	0.111^{***}
	(0.015)	(0.015)	(0.015)
QoL worse than in country of residence (=1)	-0.147^{***}	-0.160^{***}	-0.144^{***}
	(0.008)	(0.009)	(0.008)
QoL better than in country of residence (=1)	0.027^{***}	0.029^{***}	0.027^{***}
	(0.008)	(0.009)	(0.008)
Teaching load (in %)	-0.002^{***}	-0.002^{***}	-0.002^{***}
	(0.000)	(0.000)	(0.000)
Short/long-term ext. fndng. poor/poor (=1)	-0.083^{***}	-0.089^{***}	-0.081^{***}
	(0.008)	(0.009)	(0.008)
Short/long-term ext. fndng. good/poor (=1)	-0.033^{***}	-0.035^{***}	-0.032^{***}
	(0.008)	(0.009)	(0.008)
Most prestigious peer among top 50 (=1)	0.059^{***}	0.063^{***}	0.058^{***}
	(0.010)	(0.011)	(0.010)
Most prestigious peer among top 25 (=1)	0.083^{***}	0.088^{***}	0.082^{***}
	(0.011)	(0.011)	(0.011)
Most prestigious peer among top 5 (=1)	0.136^{***}	0.144^{***}	0.134^{***}
	(0.011)	(0.011)	(0.011)
Length of initial contract (in years)	0.017^{***}	0.018^{***}	0.017^{***}
	(0.002)	(0.003)	(0.002)
Extension: 3 years (after evaluation)	0.122^{***}	0.129^{***}	0.120^{***}
	(0.011)	(0.011)	(0.011)
Extension: tenure (availability and perf.)	0.154^{***}	0.162^{***}	0.152^{***}
	(0.011)	(0.011)	(0.011)
Extension: tenure (performance)	0.175^{***}	0.184^{***}	0.173^{***}
	(0.012)	(0.012)	(0.012)
Research autonomy (in %)	0.001^{***}	0.002^{***}	0.001^{***}
	(0.000)	(0.000)	(0.000)
Internal funds to be neg. with chairholder	-0.042^{***}	-0.046^{***}	-0.041^{***}
	(0.008)	(0.009)	(0.008)
Internal funds to be neg. with university	-0.029^{***}	-0.031^{***}	-0.028^{***}
	(0.008)	(0.009)	(0.008)
$P(y_{ik} = 1)$	0.319	0.372	0.309
Observations		21,231	

Table C1: Marginal effects on probability of choosing a specific job based on conditional logit regression for early stage researchers (see table 2). Marginal effects computed as $\beta_k P(y_{ik} = 1)[1 - P(y_{ik} = 1)]$ for continuous variables and as $P(y_{ik} = 1|x_{ik} = 1) - P(y_{ik} = 1|x_{ik} = 0)$ for discrete variables at the mean of all other independent variables. Standard errors in parentheses. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Marginal effects		
	(1)	(2)	(3)
	$k = 1$	$k = 2$	$k = 3$
Net salary p. a. (in 1,000)	0.009^{***}	0.009^{***}	0.008^{***}
	(0.000)	(0.000)	(0.000)
Health care patient contribution (in %)	-0.005^{***}	-0.006^{***}	-0.005^{***}
	(0.001)	(0.001)	(0.001)
Retirement pension net repl. rate (in %)	0.003^{***}	0.003^{***}	0.003^{***}
	(0.001)	(0.001)	(0.001)
Relocation support (=1)	0.039^{***}	0.041^{***}	0.038^{***}
	(0.014)	(0.015)	(0.014)
Childcare facility (=1)	0.027^{*}	0.029^{*}	0.026^{*}
	(0.014)	(0.015)	(0.014)
Company car (=1)	−0.004	−0.004	−0.003
	(0.014)	(0.015)	(0.014)
Quality school for children (=1)	0.041^{***}	0.043^{***}	0.040^{***}
	(0.014)	(0.015)	(0.014)
University housing (=1)	0.054^{***}	0.056^{***}	0.052^{***}
	(0.015)	(0.015)	(0.014)
Job offer for partner (=1)	0.077^{***}	0.080^{***}	0.075^{***}
	(0.015)	(0.015)	(0.015)
QoL worse than in country of residence (=1)	-0.187^{***}	-0.199^{***}	-0.180^{***}
	(0.008)	(0.009)	(0.008)
QoL better than in country of residence (=1)	0.025^{***}	0.026^{***}	0.024^{***}
	(0.009)	(0.009)	(0.008)
Teaching load (in %)	-0.001^{***}	-0.001^{***}	-0.001^{***}
	(0.000)	(0.000)	(0.000)
Short/long-term ext. fndng. poor/poor (=1)	-0.098^{***}	-0.104^{***}	-0.095^{***}
	(0.009)	(0.009)	(0.008)
Short/long-term ext. fndng. good/poor (=1)	-0.047^{***}	-0.050^{***}	-0.045^{***}
	(0.009)	(0.009)	(0.008)
Most prestigious peer among top 50 (=1)	0.076^{***}	0.079^{***}	0.073^{***}
	(0.011)	(0.011)	(0.011)
Most prestigious peer among top 25 (=1)	0.085^{***}	0.088^{***}	0.082^{***}
	(0.011)	(0.012)	(0.011)
Most prestigious peer among top 5 (=1)	0.110^{***}	0.115^{***}	0.107^{***}
	(0.011)	(0.012)	(0.011)
Research continuity (in %)	-0.001^{***}	-0.001^{***}	-0.001^{***}
	(0.000)	(0.000)	(0.000)
University research funding (in %)	0.001^{***}	0.001^{***}	0.001^{***}
	(0.000)	(0.000)	(0.000)
Time devoted to administration (in %)	-0.004^{***}	-0.004^{***}	-0.004^{***}
	(0.001)	(0.001)	(0.001)
Public salary scheme (=1)	−0.014	−0.015	−0.013
	(0.009)	(0.010)	(0.009)
Public salary scheme with bonus (=1)	0.033^{***}	0.034^{***}	0.032^{***}
	(0.009)	(0.010)	(0.009)
$P(y_{ik} = 1)$	0.327	0.364	0.308
Observations		19,275	

Table C2: Marginal effects on probability of choosing a specific job based on conditional logit regression for later stage researchers (see table 2). Marginal effects computed as $\beta_k P(y_{ik} = 1)[1 - P(y_{ik} = 1)]$ for continuous variables and as $P(y_{ik} = 1|x_{ik} = 1) - P(y_{ik} = 1|x_{ik} = 0)$ for discrete variables at the mean of all other independent variables. Standard errors in parentheses. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Humanities vs. Natural sciences	(2) Humanities vs. Medical science	(3) Natural sciences vs. Medical science	(4) Social sciences vs. Engineering	(5) Natural sciences vs. Engineering
Health care patient contribution (in %)	−0.615	−1.177	−0.562	0.817	0.261
	(0.803)	(0.828)	(0.683)	(0.684)	(0.634)
Retirement pension net replacement rate (in %)	0.225	−0.698	−0.923**	−0.258	−0.321
	(0.512)	(0.520)	(0.458)	(0.422)	(0.411)
QoL worse than in country of residence (=1)	6.143	2.390	−3.753	5.869	4.701
	(8.708)	(9.224)	(7.324)	(6.440)	(6.188)
QoL better than in country of residence (=1)	2.063	11.946*	9.882*	−2.052	6.639
	(6.434)	(6.695)	(5.848)	(5.737)	(5.210)
Teaching load (in %)	0.009	0.111	0.103	0.105	0.030
	(0.112)	(0.110)	(0.093)	(0.097)	(0.088)
Short/long-term ext. funding poor/poor (=1)	−5.716	−12.660*	−6.944	5.232	4.364
	(7.602)	(7.592)	(6.498)	(5.910)	(5.863)
Short/long-term ext. funding good/poor (=1)	−18.756**	−18.160**	0.596	−3.683	4.866
	(7.567)	(7.570)	(6.184)	(5.458)	(5.556)
Most prestigious peer among top 50 (=1)	4.956	−8.147	−13.103*	−12.354	−10.536
	(8.195)	(7.944)	(7.232)	(7.538)	(6.605)
Most prestigious peer among top 25 (=1)	10.793	−4.284	−15.076**	−17.036**	−18.955***
	(8.729)	(8.249)	(7.566)	(7.862)	(7.050)
Most prestigious peer among top 5 (=1)	2.453	−9.206	−11.658	−23.462***	−11.948*
	(9.020)	(8.766)	(7.271)	(8.200)	(6.839)
Length of initial contract (in years)	1.084	−0.495	−1.579	−2.167	−2.457
	(1.895)	(1.897)	(1.702)	(1.690)	(1.560)
Extension: 3 years (after evaluation)	−8.138	0.913	9.051	−5.892	6.905
	(8.598)	(8.828)	(7.378)	(7.485)	(6.820)
Extension: tenure (availability and perf.)	−2.599	2.730	5.329	−6.096	4.657
	(9.050)	(9.062)	(7.051)	(8.070)	(6.869)
Extension: tenure (performance)	6.216	6.028	−0.189	−7.679	3.553
	(9.000)	(8.911)	(8.113)	(8.379)	(7.862)
Research autonomy (in %)	−0.055	−0.080	−0.026	−0.227***	−0.039
	(0.098)	(0.099)	(0.075)	(0.084)	(0.069)
Internal funds to be neg. with chairholder	−4.714	5.068	9.783	−1.345	1.536
	(7.194)	(7.082)	(6.160)	(5.542)	(5.619)
Internal funds to be neg. with university	−7.335	−2.869	4.466	−3.346	3.009
	(6.858)	(6.799)	(5.937)	(5.547)	(5.491)
Observations	3,357	2,922	3,597	4,005	3,843

Table C3: Differences in willingness to pay (WTP) calculated from conditional logit regressions of job choice for early stage researchers by field of science. Standard errors in parentheses. Standard errors for early stage researchers corrected for clustering within respondents. Based on 2,981 experiments among 994 early stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	Early stage		Later stage	
	(1)	(2)	(1)	(2)
	Female	Male	Female	Male
Health care patient contribution (in %)	0.595***	0.240	1.047***	0.429***
	(0.214)	(0.157)	(0.254)	(0.141)
Retirement pension net replacement rate (in %)	−0.268**	−0.144	−0.487***	−0.323***
	(0.136)	(0.101)	(0.159)	(0.088)
Relocation support (=1)	−10.023***	−5.341***	−8.403***	−2.605
	(2.909)	(2.049)	(3.228)	(1.851)
Childcare facility (=1)	−10.754***	−4.224**	−6.319**	−1.627
	(2.825)	(2.047)	(3.200)	(1.832)
Company car (=1)	−2.320	−2.991	−0.480	0.866
	(2.889)	(2.090)	(3.294)	(1.862)
Quality school for children (=1)	−12.627***	−6.171***	−3.628	−4.928***
	(2.890)	(2.064)	(3.242)	(1.783)
University housing (=1)	−5.390*	−4.816**	−4.380	−6.346***
	(2.959)	(2.111)	(3.359)	(1.806)
Job offer for partner (=1)	−15.455***	−12.605***	−12.307***	−6.942***
	(3.071)	(2.107)	(3.318)	(1.833)
QoL worse than in country of residence (=1)	28.442***	14.182***	31.070***	20.149***
	(2.357)	(1.451)	(2.868)	(1.381)
QoL better than in country of residence (=1)	−4.430**	−3.082**	−1.960	−3.119***
	(1.760)	(1.305)	(2.011)	(1.136)
Teaching load (in %)	0.224***	0.196***	0.194***	0.138***
	(0.030)	(0.022)	(0.034)	(0.018)
Short/long-term ext. funding poor/poor (=1)	14.411***	8.808***	14.371***	10.588***
	(1.982)	(1.423)	(2.275)	(1.241)
Short/long-term ext. funding good/poor (=1)	5.475***	3.435**	4.338**	6.083***
	(1.848)	(1.348)	(2.083)	(1.179)
Most prestigious peer among top 50 (=1)	−10.886***	−5.097***	−10.815***	−7.448***
	(2.206)	(1.563)	(2.523)	(1.394)
Most prestigious peer among top 25 (=1)	−13.568***	−8.336***	−11.062***	−8.699***
	(2.319)	(1.610)	(2.579)	(1.417)
Most prestigious peer among top 5 (=1)	−22.729***	−12.740***	−16.220***	−10.618***
	(2.415)	(1.647)	(2.641)	(1.423)
Length of initial contract (in years)	−2.074***	−2.311***		
	(0.515)	(0.390)		
Extension: 3 years (after evaluation)	−19.372***	−12.006***		
	(2.394)	(1.636)		
Extension: tenure (availability and perf.)	−20.004***	−18.233***		
	(2.416)	(1.680)		
Extension: tenure (performance)	−24.103***	−19.747***		
	(2.523)	(1.777)		
Research autonomy (in %)	−0.209***	−0.166***		
	(0.024)	(0.017)		
Internal funds to be neg. with chairholder	7.267***	4.621***		
	(1.918)	(1.357)		
Internal funds to be neg. with university	4.716***	3.192**		
	(1.829)	(1.337)		
Research continuity (in %)			0.123***	0.075***
			(0.024)	(0.013)
University research funding (in %)			−0.201***	−0.117***
			(0.033)	(0.018)
Time devoted to administration (in %)			0.639***	0.426***
			(0.157)	(0.089)
Public salary scheme (=1)			4.132*	0.548
			(2.188)	(1.211)
Public salary scheme with bonus (=1)			−1.229	−4.842***
			(2.100)	(1.207)
Observations	10,527	10,704	6,579	12,696

Table C4: Willingness to pay (WTP) calculated from conditional logit regressions of job choice for early and later stage researchers by gender. Standard errors in parentheses. Standard errors for early stage researchers corrected for clustering within respondents. Based on 7,077 experiments among 3,790 early stage researchers and 6,425 experiments among 6,425 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) R3	(2) R4	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.035***	0.043***	
	(0.002)	(0.002)	
Health care patient contribution (in %)	−0.021***	−0.027***	−0.039
	(0.007)	(0.007)	(0.258)
Retirement pension net replacement rate (in %)	0.016***	0.014***	−0.123
	(0.004)	(0.004)	(0.159)
QoL worse than in country of residence (=1)	−0.962***	−0.871***	6.905***
	(0.064)	(0.060)	(2.605)
QoL better than in country of residence (=1)	0.136**	0.094*	−1.653
	(0.057)	(0.054)	(2.048)
Teaching load (in %)	−0.006***	−0.006***	0.022
	(0.001)	(0.001)	(0.033)
Short/long-term ext. funding poor/poor (=1)	−0.491***	−0.427***	3.958*
	(0.061)	(0.058)	(2.292)
Short/long-term ext. funding good/poor (=1)	−0.280***	−0.153***	4.361**
	(0.059)	(0.055)	(2.145)
Most prestigious peer among top 50 (=1)	0.323***	0.347***	−1.045
	(0.069)	(0.065)	(2.538)
Most prestigious peer among top 25 (=1)	0.324***	0.412***	0.430
	(0.070)	(0.067)	(2.586)
Most prestigious peer among top 5 (=1)	0.453***	0.513***	−0.854
	(0.071)	(0.067)	(2.619)
Research continuity (in %)	−0.003***	−0.004***	0.009
	(0.001)	(0.001)	(0.024)
University research funding (in %)	0.006***	0.006***	−0.031
	(0.001)	(0.001)	(0.032)
Time devoted to administration (in %)	−0.020***	−0.019***	0.128
	(0.004)	(0.004)	(0.159)
Public salary scheme (=1)	−0.038	−0.086	−0.907
	(0.061)	(0.058)	(2.194)
Public salary scheme with bonus (=1)	0.151**	0.139**	−1.025
	(0.060)	(0.056)	(2.159)
2nd job in list	0.153***	0.051	
	(0.047)	(0.045)	
3rd job in list	−0.049	−0.095**	
	(0.049)	(0.046)	
Observations	9,042	10,233	19,275
Pseudo-R^2	0.129	0.1393	
Log-likelihood	-2883	-3227	

Table C5: Conditional logit regressions of job choice for later stage researchers by careerstage. Standard errors in parentheses. Standard errors corrected for clustering within respondents. Based on 6,425 experiments among 6,425 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

	(1) Not highly confident R4	(2) Highly confident R4	(3) Difference in WTP
Net salary p. a. (in 1,000)	0.038***	0.050***	
	(0.002)	(0.003)	
Health care patient contribution (in %)	−0.023***	−0.033***	−0.042
	(0.009)	(0.011)	(0.318)
Retirement pension net replacement rate (in %)	0.014**	0.012*	−0.131
	(0.005)	(0.007)	(0.198)
QoL worse than in country of residence (=1)	−0.836***	−0.935***	3.466
	(0.078)	(0.093)	(3.003)
QoL better than in country of residence (=1)	0.068	0.118	0.551
	(0.070)	(0.085)	(2.521)
Teaching load (in %)	−0.006***	−0.007***	0.008
	(0.001)	(0.001)	(0.039)
Short/long-term ext. funding poor/poor (=1)	−0.362***	−0.518***	−0.756
	(0.076)	(0.091)	(2.775)
Short/long-term ext. funding good/poor (=1)	−0.127*	−0.187**	−0.347
	(0.073)	(0.086)	(2.584)
Most prestigious peer among top 50 (=1)	0.360***	0.328***	−2.980
	(0.085)	(0.103)	(3.039)
Most prestigious peer among top 25 (=1)	0.410***	0.426***	−2.359
	(0.087)	(0.105)	(3.173)
Most prestigious peer among top 5 (=1)	0.440***	0.625***	0.822
	(0.087)	(0.105)	(3.146)
Research continuity (in %)	−0.003***	−0.005***	−0.013
	(0.001)	(0.001)	(0.030)
University research funding (in %)	0.005***	0.006***	−0.000
	(0.001)	(0.001)	(0.039)
Time devoted to administration (in %)	−0.016***	−0.021***	−0.000
	(0.005)	(0.007)	(0.198)
Public salary scheme (=1)	−0.059	−0.122	−0.863
	(0.075)	(0.091)	(2.698)
Public salary scheme with bonus (=1)	0.123*	0.166*	0.043
	(0.073)	(0.089)	(2.632)
2nd job in list	0.055	0.038	
	(0.059)	(0.071)	
3rd job in list	−0.103*	−0.083	
	(0.060)	(0.073)	
Observations	5,877	4,356	10,233
Pseudo-R^2	0.117	0.175	
Log-likelihood	-1901	-1316	

Table C6: Conditional logit regressions of job choice for later stage researchers by careerstage. Standard errors in parentheses. Standard errors corrected for clustering within respondents. Based on 3,411 experiments among 3,411 later stage researchers. * significant at 10 %, ** significant at 5 %, *** significant at 1 % level.

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Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs a change: The financial crisis has exposed long neglected deficiencies in the present growth path, most visibly in unemployment and public debt. At the same time Europe has to cope with new challenges ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundations for a new development strategy that enables a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four year research project within the 7th Framework Programme funded by the European Commission started in April 2012. The consortium brings together researchers from 33 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). Project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: www.foreurope.eu

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