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Up or out: Research incentives and career prospects of postdocs in Germany

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Research Incentives and Career
Prospects of Postdocs in Germany**

Bernd Fitzenberger and Ute Leuschner

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Wirtschaftsforschung GmbH

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Non-technical summary

The career prospects of young academics in Germany are the subject of an intensive public debate. During the early 2000s, the academic career path was characterized by the availability of only few tenured professorships, high rates of dropout from an academic career both right after completion of a PhD and at further stages as a postdoc, disproportionately high rates of dropouts by females, and a high average age of appointment to a full professorship. In the public debate, it is argued that postdocs in Germany are not sufficiently independent and that there are insufficient incentives to engage in excellent research. Furthermore, postdocs in Germany often seem to lack clear career perspectives. There is concern that excellent young academics leave Germany because of better working conditions and career prospects in countries like the U.S., or they choose to pursue a non-academic career after completion of a PhD. Responding to some of these concerns, the German government implemented a number of reforms during the 2000s, which aimed at improving the attractiveness of an academic career in Germany. Part of the reforms was the introduction of assistant professorships ('Juniorprofessor'), which should provide a more independent alternative to the 'Habilitation'. In addition, a new salary system with more flexible and performance-oriented payment was introduced.

Based on an online survey among postdocs in the fields of economics, business economics, sociology, and social sciences, this paper provides evidence on the perceptions and attitudes of postdocs regarding their research incentives, working conditions, and career prospects. Our data also allow to draw conclusions with respect to gender differences, especially in relation to parenthood. Based on a cluster analysis, we identify three types of postdocs, motivated optimists, confident academics, and frustrated academics, which differ with respect to age, gender, and the way they have obtained their PhD. Overall, the motivated optimists are more likely to have graduated from a PhD program rather than at the chair of a professor and they are more likely to be business economists. They are predominantly male and are on average younger than the confident academics and the frustrated academics. The latter might also explain the optimism among the motivated optimists, as career prospects are shown to deteriorate with age. In contrast, over 50% of all postdocs are pessimistic with regard to their academic career, mainly as a result of employment insecurity, and only 53% actually exhibit strong research incentives. However, research incentives differ strongly between different groups and are highest for assistant professors and for postdocs having participated in a PhD program, which may be due to the selection of these groups. In addition, research incentives are on average higher for female postdocs, which is, however, at least partly offset by significantly worse (perceived)

career prospects related to parenthood. Apart from this, we find little gender differences. In general, working conditions and career prospects are perceived as most insecure in the fields of sociology and social sciences. Overall, besides the small group of assistant professors, postdocs see only a small impact of the university reforms on their working conditions, research perspectives, and career prospects. Another interesting finding concerns the assessment of the importance of networks. Over 25% of the respondents state that networks are more important for a successful career than academic excellence, the exception being economists, who view networks to be of less importance. Finally, good career prospects outside academia do not seem to reduce the motivation and research incentive of postdocs, despite their rather uncertain academic career prospects.

Das Wichtigste in Kürze

Die Karriereaussichten junger AkademikerInnen sind in Deutschland seit einigen Jahren Gegenstand einer intensiven öffentlichen Debatte. Der universitäre Karriereweg war bislang aufgrund von wenig angebotenen Lebenszeit-Professuren sowie des hohen Durchschnittsalters bei der Berufung auf eine Professur geprägt von unklaren Karriereperspektiven und folglich hohen Abbrecherquoten. Sowohl in der Promotionszeit als auch in der Postdoc-Phase entschieden sich viele junge Wissenschaftler aufgrund der Arbeitsbedingungen und der mangelnden Karrierechancen für eine Fortsetzung der Karriere an ausländischen Institutionen oder außerhalb der Universität. Es wird häufig argumentiert, dass AkademikerInnen in Deutschland unzureichende Anreize für exzellente Forschung aufweisen und ihre Positionen in wissenschaftlichen Einrichtungen nicht hinreichend unabhängig sind. In den 2000er Jahren setzte die Bundesregierung einige Reformen des Hochschulsystems um, die die Attraktivität einer wissenschaftlichen Karriere an einer deutschen Universität steigern und dadurch im internationalen Wettbewerb konkurrenzfähiger machen sollte. Die im Rahmen der Reformen eingeführte Juniorprofessur zeichnet sich im Vergleich zur traditionellen Habilitation durch mehr Unabhängigkeit aus. Das neue Besoldungssystem zielt auf eine flexiblere und leistungsabhängige Bezahlung von Professoren ab.

Grundlage dieser empirischen Studie ist eine Online-Befragung von an Universitäten arbeitenden Postdocs der Fächer Betriebswirtschaft, Volkswirtschaft, Sozialwissenschaften und Soziologie zu deren Wahrnehmungen und Einstellungen hinsichtlich ihrer Forschungsanreize, Karriereaussichten und Arbeitsbedingungen. Mithilfe dieser Daten lassen sich geschlechtsspezifische oder altersabhängige Unterschiede sowie Diskrepanzen bezüglich der Fachdisziplin und des Familienstands analysieren. Eine Clusteranalyse zeigt, dass man zwischen drei Forscher-Typen differenzieren kann: "Motivated optimists" (motivierte Optimisten), "confident academics" (zuversichtliche Akademiker) und "frustrated academics" (frustrierte Akademiker). Die "motivierten Optimisten" haben überproportional oft ein Doktorandenprogramm absolviert, häufiger einen betriebswirtschaftlichen Hintergrund, sind im Durchschnitt jünger sowie eher männlich als die AkademikerInnen in den anderen beiden Gruppen. Für alle Postdocs nehmen die Karriereaussichten mit zunehmendem Alter ab und 50% aller Postdocs schätzen ihre akademischen Karrierechancen als schlecht ein. Allerdings berichten 53% der WissenschaftlerInnen von starken Forschungsanreizen, wobei sich diese deutlich zwischen verschiedenen Gruppen unterscheiden. Weibliche, kinderlose Postdocs, Absolventen eines Doktorandenprogramms sowie JuniorprofessorInnen haben die größte Motivation zur wissenschaftlichen Forschung, was der Selektion dieser Grup-

pen geschuldet sein kann. Es werden keine weiteren geschlechtsspezifischen Unterschiede festgestellt und der Einfluss der durchgeführten Reformen wird nur von JuniorprofessorInnen als bedeutsam eingestuft. Postdocs aus dem Bereich der Sozialwissenschaften und der Soziologie sind bezüglich ihrer Karriereaussichten am pessimistischsten. Bemerkenswert ist, dass 25% aller Befragten der Meinung sind, dass Netzwerke entscheidender als wissenschaftliche Exzellenz für eine akademische Karriere sind, wobei VolkswirtInnen den Einfluss von Netzwerken niedriger als Postdocs anderer Disziplinen einschätzen. Eine signifikante Reduktion der Forschungsanreize infolge von guten Karrierechancen außerhalb des universitären Bereichs konnte nicht festgestellt werden.

Up or Out: Research Incentives and Career Prospects of Postdocs in Germany

Bernd Fitzenberger*, Ute Leuschner**

March 2012

Abstract: Academic careers in Germany have been under debate for a while. We conduct a survey among postdocs in Germany, to analyze the perceptions and attitudes of postdocs regarding their research incentives, their working conditions, and their career prospects. We conceptualize the career prospects of a postdoc in a life-cycle perspective of transitions from academic training to academic or non-academic jobs. Only about half of the postdocs sees strong incentives for academic research, but there is quite a strong confidence to succeed in an academic career. Furthermore, postdocs who attended a PhD program show better career prospects and higher research incentives compared to others. Academic career prospects and motivation are strongest for assistant professors. Apart from this small group, however, postdocs report only a small impact of the university reforms of the last decade. Female postdocs show significantly higher research incentives but otherwise we find little gender differences. Finally, good prospects in non-academic jobs are not associated with a reduction in the motivation for research.

Keywords: Postdocs, Academic Career Prospects, Research Incentives, University Reforms.

JEL-Classification: A11, A29, I21, I23, J24, J49.

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1 Introduction

The academic career path in Germany is characterized by the availability of only few tenured professorships, high rates of dropout from an academic career both right after completion of a PhD and at further stages as a postdoc, disproportionately high rates of dropouts by females, and a high average age of appointment to a full professorship (BMBF, 2008). There is concern that the conditions for an academic career make academic research positions in Germany less attractive and less competitive in comparison with both jobs outside of academia and research positions abroad (Bulmahn, 2001; Enders and Bornmann, 2002b; Burkhardt, 2011). This may hold in particular for postdoc positions, a stage in which young academics should be most productive in research. Postdocs typically still work under the supervision of a tenured professor, lack independence in comparison to assistant professors in other countries, and have fairly insecure career prospects compared to a well-defined tenure-track system (Bareither, 2008; Buchholz et al., 2009; Bulmahn, 2001; Janson et al., 2007). Furthermore, key decisions relating to family formation are made during the postdoc phase, and there is concern that a disproportionate number of promising female PhD's do not continue an academic career because of the insecurity and the difficulties to combine an academic career with having a family (BMBF, 2008; Jung, 2011). However, little is known about the sentiments of postdocs on a statistically representative basis. For this reason, we conduct a survey among postdocs in the fields of business economics, economics, sociology, and social sciences.

The public debate reports negative sentiments and frustration among postdocs in Germany, and it is often argued that many of the most promising young researchers leave Germany or do not come back to Germany because of better working conditions in countries like the United States (Bulmahn, 2001; Janson et al., 2007; Prußky, 2008). Recognizing some of these concerns, the German government implemented various reforms of the university system during the 2000's (Bulmahn, 2001). Regarding the postdoc phase, the goals of the reforms were to strengthen the independence of postdocs and their incentives for excellent research as well as to lower the age at which a successful researcher can make the transition to a tenured professorship. Assistant professorships ('Juniorprofessur') were introduced with the right to supervise PhD students. Although, this was a goal of the reforms, most assistant professorships do not involve tenure-track. Over the last decade, there has been a decline of postdocs completing a Habilitation (Handelsblatt, 2009; StBA, 2011). However, assistant professorships have by no means replaced the Habilitation.

Based on a survey in the fields of business economics, economics, sociology, and social

sciences, our paper contributes to the understanding of the situation and the sentiments of postdocs in Germany. In a situation with a high dropout rate from an academic career, we emphasize the interplay between academic and non-academic career prospects. We first develop a number of hypotheses regarding career transitions after the completion of a PhD based on a theoretical framework. Drawing on our survey data, we then analyze the research incentives, the academic background, and the career prospects of postdocs. We also investigate their perception of the university reforms of the last decade. The comparison across different fields allows us to investigate the impact of different non-academic career opportunities (Chlosta et al., 2010).

Our results show quite a mixed picture. We identify three important types of postdocs: *motivated optimists*, *confident academics*, and *frustrated pessimists*. Only about half of the postdocs sees strong incentives for academic research, but there is quite a strong confidence to succeed in an academic career. There is evidence that research incentives increase due to stronger international competition. Employment insecurity results in a more pessimistic assessment of an academic career. The strongest research incentives and the best career prospects were found for assistant professors ('Juniorprofessoren/innen'). Apart from this small group, the postdocs see only a small influence of the university reforms of the last decade on incentives and prospects for researchers. There is no evidence for declining research incentives due to better non-academic career prospects. Female postdocs show significantly higher research incentives but otherwise we find little gender differences. Irrespective of gender, the presence of children is associated with significantly worse perceived career prospects.

The remainder of this paper is organized as follows. Section 2 describes the background, introduces a theoretical framework to analyze the career decision of a postdoc, and develops a number of hypotheses. Section 3 describes our survey among postdocs. Section 4 reports the result of a cluster analysis and section 5 reports our econometric analysis. Section 6 concludes. The appendix includes additional derivations, information about the data, and detailed empirical results. We have also prepared an additional appendix with further detailed information about the data and empirical results which we refer to in the paper.

2 Background and Theoretical Framework

2.1 Background and Review of the Literature

Traditionally, a postdoc at a German university completes a second postgraduate degree after the PhD, the so-called 'Habilitation' (postdoctoral lecture qualification) to become eligible for a tenured professorship. After completion of the Habilitation, the postdoc can apply for a tenured professorship, typically at other universities. During the Habilitation phase, the postdoc typically works as an assistant at the chair of a tenured professor. Over the last decade, there has been a decline of postdocs completing a Habilitation (Handelsblatt, 2009; StBA, 2011). The university reforms of the last decade introduced assistant professorships ('Juniorprofessur'). Such positions last no more than six years and are intended to provide a more independent alternative to the Habilitation. Bulmahn (2001) calls for the introduction of assistant professorships with a tenure-track option to make an academic career more attractive (see also Buchholz et al. (2009) and Jung (2011)), but the majority of assistant professorships today do not involve tenure-track.

As part of the university reforms, a new salary system for professors was introduced (Bulmahn, 2001; Zoske, 2008): since 2005, professors can only be appointed for a professorship in the new 'W-salary system', which replaces the old, fairly rigid 'C-salary system'. The 'W-salary system' implements a more flexible and performance-oriented pay system with lower base salaries. The base salary of assistant professors was lowered compared to the base salary of former assistants at a chair who had received a C1-salary during the Habilitation phase.

In addition, the debate about the best way to organize the PhD phase in Germany has been just as intense as the debate about postdocs (BMBF, 2008). There are strong calls for the introduction of structured U.S. style PhD programs to replace the traditional way of completing a PhD in Germany. It is argued that a traditional PhD does not allow PhD students to acquire a sufficiently broad range of research perspectives and that PhD students have insufficient independence when they are supervised by just one tenured professor. This discussion prompted the German government in the last decade to award the assistant professors with the right to supervise PhD students.

Even though there are strong differences in the academic system between Germany and, say, the U.S. (Buchholz et al., 2009), the academic system in the U.S. (and to some extent the UK) serves as a benchmark in the discussion about university reforms in Germany (Janson et al., 2007; Buchholz et al., 2009; Bulmahn, 2001). Gillmann (2006) notes that the career prospects for postdocs in the United States are still better than in Germany. Important reasons are the tenure-track-system, higher pay, and better promotion

prospects. We first review two studies for the U.S. (one of which involves a cross-country comparison) and then focus on Germany. Regarding the decision about whether to continue an academic career or not, the discussion distinguishes between push factors, such as good or bad working conditions as a postdoc and academic career prospects, and pull factors, such as non-academic career prospects.

Fox and Stephan (2001) analyze the career-preferences and the prospects of young researchers. The study does not include the fields economics, business economics, sociology, and social sciences. The authors conduct a mail survey among 3.800 PhD candidates and find a rather pessimistic assessment of career prospects. The study argues that this is related to the large increase in the number of PhD candidates, which reduces their respective academic career prospects. In a follow-up study, Stephan (2008) analyzes the academic job prospects for PhD's and their impact on research productivity in the U.S., Italy, and Germany for the fields of physics, life sciences, mathematics, and engineering. The study concludes that academic career prospects for PhD's have deteriorated in all three countries, which might lead to a fall in the number of PhD candidates. For Germany, the study points to a decreasing number of postdocs completing a habilitation and to the reduction in the number of professorships, both reflecting the poor academic job prospects. In addition, the study also finds that in the EU, the number of scientists with a PhD hired by industry has been falling as well. As a result, Stephan sees a risk of falling scientific productivity because an academic career has become less attractive. She also argues that good non-academic career prospects causes a shift away from basic to more applied research. Somewhat in contrast to the hypothesis that non-academic career prospects after completion of a PhD have deteriorated, the recent study by Lindley and Machin (2011) shows that the wage return to postgraduate education beyond a college degree (including the completion of a PhD) has been rising in the U.S. and the UK. All this suggests that future non-academic career prospects may play an important role for both PhD's and postdocs.

The weak career prospects for postdocs in Germany are reflected by the high average age when completing a habilitation, at which non-academic career prospects may have deteriorated compared to the options right after completion of the PhD, and the comparatively small number of professorships (BMBF, 2008; Fitzenberger, 2008; Schulze, 2008; Gülker, 2011). With increasing age, postdocs may become more present-oriented and thus less willing to invest into a risky academic career (Chlosta et al., 2010). Bareither (2008) emphasizes that the decision to pursue an academic career in Germany involves a big personal risk. As part of the university reforms a decade ago, the introduction of the junior professorship and the change of the salary-system should have improved the

independence and the working conditions of postdocs. However, because of the lack of tenure-track option for most assistant professors and because of lower salaries, the effect of the reforms on the research effort among postdocs may be ambiguous (Fitzenberger, 2008). In fact, Leffers (2007) argues that assistant professors have no better academic career prospects than other postdocs.

Female PhDs in Germany are less likely to continue an academic career compared to male PhDs (BMBF, 2008; Jung, 2011). This is often attributed to the difficulties in reconciling an academic career with having a family. Correspondingly, female PhDs may be more risk averse in their career decisions (Dohmen and Falk, 2011; Jung, 2011). Being in a partnership and/or having children may increase the present-orientation, thus reducing the incentives to invest in a risky academic career. Incidentally, for the U.S., Fox and Stephan (2001) find no significant gender effects with regard to how insecure career prospects affect academic decisions. This suggests that cross-country differences in academic systems and possibilities to reconcile an academic career with having a family may be important.

There exists only a scarce literature which deals explicitly with career prospects of academics in Germany. Enders and Bornmann (2002b) find that having a position at a university when completing the PhD is important for future academic career prospects. In addition, the integration into the scientific community, reflected by publications in journals or participation in conferences, is associated with better future academic career prospects. Chlosta et al. (2010) analyze the decision for an academic career in business economics, a field with presumably very good non-academic career prospects. The study finds that the number of publications, work satisfaction, as well as perceived career chances have a significant positive effect on the decision to continue an academic career. A higher individual rate of time preference (proxied by the presence of children) has a negative effect. In contrast, they found no significant effect of the expected earnings in a non-academic job within the same sub-discipline of business economics. This result may be due to the small number of cases and they nevertheless emphasize the importance of monetary factors. Furthermore, because of the possibility to switch subfields within business economics, this result does not necessarily imply that the stark differences in non-academic career prospects across fields have no impact on the decision to continue an academic career.

A number of studies analyze research productivity, mobility, and qualifications over the life cycle (Heining et al., 2008, 2007; Rauber and Ursprung, 2008a,b). Rauber and Ursprung (2008a,b) find that research output depends strongly upon the cohort of the researchers. Schulze et al. (2008) analyze the determinants of tenure decisions for those

who successfully completed a habilitation in economics or business economics. The study finds that publications are important determinants for receiving tenure, a finding also confirmed by Heining et al. (2007), and that publications are substantially more important in economics than in business economics.

Analyzing the international mobility of German PhDs, Enders and Bornmann (2002a) find no evidence for an increasing outmigration to foreign universities. However, about 25% of all economists go abroad after completion of their PhD, most of them to take a job in the private sector. While the number of postdocs going abroad is fairly small, these are often particularly excellent researchers. Thus, there seems to be a qualitative rather than a quantitative problem of outmigration.

Similar to our study, Jaksztat and Briedis (2009) conduct a survey on the individual perception and job satisfaction among postdocs and PhD candidates in nearly all fields in Germany. The study finds a negative assessment of the Bologna-reforms. Nevertheless, 40% of the survey respondents want to pursue an academic career. In a subsequent study, Jaksztat et al. (2010) conduct a large survey on work conditions, career plans, and competencies. They compare universities with research institutions outside of universities. The results show that young researcher have huge concerns regarding job insecurity (mainly because of fixed-term contracts) and they find it very difficult to plan a career.

2.2 Life-cycle Phase Framework

An academic career evolves through various stages (BMBF, 2008). Figure 1 depicts possible career transitions after the completion of a PhD. Obtaining a PhD is mainly a training phase when the PhD candidate learns how to successfully develop and implement a major research project which results in a significant contribution to the literature. After completing a PhD, a person may continue his/her academic career as a postdoc at a research institution (e.g. universities) or switch to a non-academic career. The postdoc position also includes assistant professorships (W1 positions, 'Juniorprofessur'). A postdoc will either eventually make the transition to a tenured professorship (W2/W3) along the academic career or exit to a non-academic career.¹ In the following, we simply refer to a tenured professorship (W2/W3) as professorship and explicitly say so when referring to a junior professorship.

¹Figure 1 excludes the possibility of tenured postdoc research positions, e.g. as a tenured lecturer ('Akademischer Rat/Rätin'). Nowadays, such positions are rare at German universities. A sizeable number of tenured positions as researcher do exist at research institutes. Typically, these positions involve contract research or consulting work, which we subsume as an exit to a non-academic career as opposed to obtaining a professorship. Our analysis also abstracts from the fact that W2/W3 professorship may at first involve temporary appointments and in a number of cases may not lead to tenure. Such positions are subsumed as part of the postdoc phase.

We conceptualize the academic career after obtaining a PhD in a life-cycle perspective of academic training and transitions to academic and non-academic jobs (figure 1). We focus on the postdoc phase and solve the decision problem backwards. The (present) value of a postdoc position V_{pd} depends both upon the value of obtaining a tenured professorship with associated present value V_{prof} and upon the value of a non-academic career with value V_2^{na} . Both V_{prof} and V_2^{na} are random variables for the postdoc. The transition probabilities along the academic career and the values of the two exits are affected by the training, the effort choice, and the working conditions during the postdoc phase.

The postdoc will choose the career path yielding the higher expected utility. When V_{prof} exceeds V_2^{na} , the postdoc makes the transition to a professorship at the next stage. Otherwise, he/she will eventually continue in a non-academic career. To model the effort decision during the postdoc phase, we specify

$$(1) \quad V_{pd} = \max_e \{u(e, wc) + E \max [V_{prof}(e, wc, a_a), V_2^{na}(e, wc, a_n)]\} ,$$

where $u(e, wc)$ is the utility while being a postdoc and $E \max[\cdot]$ is the ex ante expected value of the future career. e denotes the effort of the postdoc and wc denotes the working conditions of the postdoc. a_a and a_n are anticipated shift parameters which affect the relative attractiveness of a professorship or a non-academic career after a postdoc phase, respectively, with $\partial V_{prof}/\partial a_a > 0$ and $\partial V_2^{na}/\partial a_n > 0$.

The probability for a postdoc to obtain a professorship is given by $P_{pd}(prof) = P(V_{prof}(e, wc, a_a) > V_2^{na}(e, wc, a_n) \mid postdoc)$. We assume that the postdoc chooses effort e in order to maximize V_{pd} . We further assume that higher effort causes a disutility while being a postdoc ($\partial u(e, wc)/\partial e < 0$), but increases both future values ($\partial V_{prof}/\partial e > 0$, $\partial V_2^{na}/\partial e > 0$), the effect being uniformly stronger for the professorship.² Higher effort as a postdoc results in better training and higher research output for given working conditions. We assume that the higher effort also has a positive effect on V_2^{na} because the postdoc training creates useful human capital for the non-academic labor market (sic!).

We assume that the working conditions (wc) are exogenous for the postdoc.³ They have a positive effect on the current utility ($\partial u(e, wc)/\partial wc > 0$) and on both future

² Here, and analogously in similar cases, we assume that $\partial V_{prof}/\partial e > (\partial V_2^{na}/\partial e) + \delta$ for some small $\delta > 0$ and that all value functions are continuously differentiable. Furthermore, the continuous joint density of $(V_{prof}(e, wc, a_a), V_2^{na}(e, wc, a_n))$ is uniformly positive for all values with $V_{prof}(e, wc, a_a) = V_2^{na}(e, wc, a_n)$. These conditions are sufficient for the formal results in the appendix.

³ Obviously, this is a simplification since postdocs can search for a better postdoc position. Postdocs doing better research are more likely to find positions with better working conditions. In the field of economics, in fact, there exists a formalized international market for postdoc positions, which a number of leading economics departments in Germany participate in. Strictly speaking, our assumption refers to the working conditions in the current postdoc position.

values with $(\partial V_{prof}/\partial wc > \partial V_2^{na}/\partial wc > 0)$. Better working conditions for research result in better training and higher research output for a given effort. Again, we assume that the effect is stronger for the professorship.

Furthermore, we assume that (V_{prof}, V_2^{na}) both take only positive values and that they follow a joint continuous probability distribution $f(x, y)$ for given (e, wc, a_a, a_n) (we omit these arguments in the following discussion). The expected future value after the postdoc stage is then expressed by

$$(2) \quad FV \equiv E \max [V_{prof}(e, wc, a_a), V_2^{na}(e, wc, a_n)] = \int_0^\infty \int_0^\infty \max(x, y) f(x, y) dy dx$$

and the probability to obtain a professorship is

$$(3) \quad P_{pd}(prof) = \int_0^\infty \int_0^x f(x, y) dy dx \quad .$$

In the appendix, we formally show how these expressions respond to monotone shifts in one or both arguments of the probability distribution. Based on these results and some technical regularity conditions (see footnote 2), we can then unambiguously sign the effects of e , wc , a_a , and a_n on both FV and $P_{pd}(prof)$ as follows:

u	e	wc	a_a	a_n
$\frac{\partial FV}{\partial u}$	> 0	> 0	> 0	> 0
$\frac{\partial P_{pd}(prof)}{\partial u}$	> 0	> 0	> 0	< 0

u denotes the arguments e, wc, a_a, a_n

We can now continue to analyze the effort choice of the postdoc. Under standard assumptions such as $\partial^2 u(e, wc)/\partial e^2 < 0$ (increasing marginal disutility in effort) and $\partial^2 V_{prof}/\partial e^2 < 0, \partial^2 V_2^{na}/\partial e^2 < 0$ (decreasing returns), there exists a unique interior solution for the effort choice characterized by $-\partial u(e, wc)/\partial e = \partial FV/\partial e$ (marginal disutility of effort is equal to marginal future value of higher effort). Assuming complementarity between effort and working conditions wc , i.e. $\partial^2 u(e, wc)/\partial e \partial wc > 0$ and $\partial^2 V_{prof}/\partial e \partial wc > 0, \partial^2 V_2^{na}/\partial e \partial wc > 0$, we obtain the result that with better working conditions effort increases and, also taking the effort choice into account, the probability to obtain a professorship increases. Assuming complementarity between e and the attractiveness parameters a_a and a_n , i.e. $\partial^2 V_{prof}/\partial e \partial a_a > 0$ and $\partial^2 V_2^{na}/\partial e \partial a_n > 0$, we find that effort increases unambiguously with higher attractiveness of an academic career a_a , whereas the effect on a non-academic career a_n is ambiguous. Correspondingly, the probability to pursue an academic career increases with a_a and it falls with a_n (the latter result causes the ambiguity of the effect of a_n on effort).

Our life-cycle framework emphasizes that the value of a non-academic career has an impact on the decisions of the postdocs while still pursuing their academic career. Two

examples shall illustrate the point. First, if the type of research affects the value of the non-academic career, the postdoc may choose a more applied research agenda because it may pay off in the event he/she enters a non-academic career. Second, because research effort and working conditions positively affect the productivity in the non-academic career, this will reinforce the research incentives during the postdoc phase.

Analogous to the career decision of the postdoc, we sketch how to analyze the PhD phase and the decision to continue an academic career afterwards (see figure 1). In the German case, the majority of PhDs do not continue an academic career after completion of the PhD (BMBF, 2008). This means that the research effort and the choice of research topics during the PhD are both affected by academic and non-academic career prospects. Different fields may differ strongly with respect to the value of holding a PhD for a non-academic career. It is often argued that among the fields considered in our study, the payoff of a PhD in a non-academic career is highest for business economics and lowest for sociology or social sciences. Clearly, the chances to pursue either an academic career or a non-academic career affect the career and research decisions during the PhD phase. A higher research effort and better working (research) conditions during the PhD phase will raise the future value of both the academic career and the non-academic career, with the positive effect being stronger for the academic career.

2.3 Hypotheses

Based on the theoretical framework, we develop a number of hypotheses to be explored in our empirical analysis.

The research output results in papers or monographs. This output depends upon the research effort and the working conditions of the postdoc. The university reforms of the last decade have intended to improve the working conditions of postdocs, in particular by introducing junior professorships (Bulmahn, 2001) and granting them more independence. Scientific networks play a special role for academic careers, and potentially also for the motivation of young academics. Postdocs who think that networks are more important than research effort for a successful academic career have less research incentives.

Hypothesis 1 (*Incentives*) *Better working conditions in the current job enhance research incentives of postdocs. Junior professors have the highest research incentives. Research incentives are lower for postdocs who think that networks are more important for an academic career.*

Our theoretical framework implies that the current prospects in the non-academic labor market and the future academic and non-academic career prospects affect the research

and career decisions of a postdoc. Higher (international) competition reduces the chances to obtain a professorship, thus reducing the research effort of a postdoc (in Germany). However, higher (international) competition may raise the marginal return of research effort of a postdoc regarding the value of an academic career, thus resulting in higher research effort of postdocs.

Hypothesis 2 (*Career Prospects*) *Better chances for a future academic career or a future non-academic career enhance research incentives of postdocs. Better chances for a non-academic career at present reduce research incentives of postdocs. Better chances for a future non-academic career increase the research efforts in applied research as opposed to basic research. The effect of higher (international) competition for professorships on research effort is ambiguous. Better working conditions and higher research effort as a postdoc raise both the value of a future academic career and of a future non-academic career, with the effect being larger for an academic career.*

Similar to the postdoc phase, the PhD phase in Germany has also been the subject of a reform debate (BMBF, 2008). In Germany, the age of completion of a PhD is very high in international comparison. Obtaining a PhD at a chair may result in less independence and less research orientation during the PhD stage. This may be (partly) compensated if a PhD candidate is better integrated in the research projects of the chair and the scientific network of the chair. It is a widely held view that the effectiveness of PhD training and mentoring is improved by the participation in structured doctoral programs (BMBF, 2008, p. 140). Furthermore, multiple supervisors and training in advanced research oriented course may improve the quality of PhD research and to speed up graduation.

Hypothesis 3 (*PhD phase*) *Better supervision and mentoring as well as stronger involvement in the scientific community during the PhD phase raise the research effort of PhDs and shorten the time until completion of a PhD. Better working conditions and a higher research effort as a PhD raise both the value of a future academic career and of a future non-academic career for postdocs, with the effect being larger for an academic career. This results in higher research effort during the postdoc phase.*

Women are less likely to continue an academic career after completion of the PhD and the average age at which postdocs obtain a professorship is particularly high in Germany (BMBF, 2008; Schulze et al., 2008). One explicit goal of the university reforms was to reduce the age of first appointment as professor (Bulmahn, 2001). Creating independent junior professorships with an associated time limit and greater independence should allow postdocs to focus more on excellent research. In particular, this should benefit female

postdocs, for whom the difficulties to reconcile of family and career is a strong obstacle for an academic career. Having made the decision to work as a postdoc, female postdocs are likely to have a stronger research interest as they have higher opportunity costs of an academic career compared to males. Furthermore, females may see better opportunities to pursue an academic career if the male-female gap is higher in a non-academic career. However, females may be more risk averse than males in undertaking high-risk high-return research projects.

At higher age and in the presence of children, postdocs value current period utility more strongly than the future value of an academic and a non-academic career and find it more costly to get involved in the scientific community (see Chlosta et al., 2010 for a similar argument). Also, older cohorts are less likely to be affected by the university reforms. Furthermore, the higher the age, the more likely the postdoc may not have been considered for a professorship, resulting in older postdocs being more negatively selected.

Hypothesis 4 (*Gender, Age/Cohort, Children*) *Research incentives fall with higher age and in the presence of children. The gender effect on research incentives is ambiguous, depending upon whether the positive selection of females or the higher opportunity costs of research for females dominates. Female postdocs, postdocs with children, and older postdocs are less willing to take risks and are more likely to engage in applied research.*

Our empirical analysis comprises the fields of business economics, economics, sociology, and social sciences. By fields, the non-academic career prospects (expected earnings) are highest in business economics (Chlosta et al., 2010) and lowest in sociology and social sciences. Chairs in business economics have comparatively better contacts to private firms; thus resulting in better networks to pursue a non-academic career. In order to convince a PhD in business economics to pursue an academic career, working conditions as a postdoc and the value of a future academic career have to be even better than for the two other fields. The reverse argument should apply for sociology and social sciences.

Hypothesis 5 (*Different academic fields*) *Postdocs in business economics (sociology and social sciences) have the highest (lowest) value of a non-academic career. Correspondingly, research effort is highest (lowest) in sociology and social sciences (business economics), while the effect of the field on the chances to obtain a professorship is ambiguous.*

3 Data and Descriptives

3.1 Description of Survey

We conduct an email survey in September and October 2008 among postdocs who had a position at a German university in the fields of economics, business economics, sociology or social science. For the purpose of our survey, postdocs are defined as persons who hold a PhD degree, including junior professors, but who do not yet have a tenured professorship. Via an extensive internet research, we found eligible 1169 postdocs. As an incentive, the newspaper *Handelsblatt* sponsored a number of temporary free newspaper subscriptions, which were randomly distributed among the respondents.⁴ 47% of the postdocs (546 persons) completed the survey, 7% quit during the interview, and 46% did not respond at all. Unless indicated otherwise, we refer in the following to the sample of the 546 postdocs who completed the survey. We think the responses are quite reliable, as the topic of the survey is of high relevance for the respondents. Furthermore, it is an advantage that the data were collected some time after the university reforms of the last decade. There exists no comparable recent survey focusing on career prospects of postdocs in Germany.

The survey consists of two parts. The first part concerns information on the current postdoc position and on the academic background and assesses the academic and non-academic career prospects as well as the general situation in academia. Some of the assessment questions use a five to six points Lickert scale. Additionally, a 'no answer'-field was offered. Further questions involve statements the respondents could agree or disagree with (see Tables 11 and 12 in the additional appendix).

3.2 Descriptive Statistics

Table 1 summarizes key descriptive statistics of our data set; more detailed descriptive results can be found in the additional appendix. Among the 546 respondents, there are 360 males (66%) and 186 females (34%).⁵ 10% of the respondents hold a foreign citizenship. The average age in the sample is 38. Females are slightly older than males and 10% of the postdocs are older than 45 years (Table 1 in the additional appendix). Around 50% are married, another 30% live in a partnership, and around 40% have children. The distribution is quite similar for females and males (Table 2 in the additional appendix). Regarding the distribution of academic fields, about one-third graduated in Business Economics, a quarter in Economics, another quarter in Social Sciences or Sociology, and

⁴*Handelsblatt* published some descriptive results of the survey in 2009 (Heß, 2009).

⁵Six persons did not disclose their gender. We assume them to be females, because mostly females tend not to disclose their gender.

the rest in Business related subjects such as Business Informatics, Industrial Engineering, and others. On average, it took 5.6 years to obtain the PhD after completion of the highest academic degree. 93% obtained their PhD in Germany and around 70% obtained their PhD while working at the chair of a professor. At the time of the survey, on average three years had passed since the completion of the PhD. 50% are now working at the university where they obtained their PhD. Most of the postdocs are research assistants (48%) and/or have the status of a 'Habilitation' (42%). Among the 225 postdocs pursuing a Habilitation only 25% are women (Table 4 in the additional appendix). Regarding the integration into the scientific community, 84% of all postdocs have attended national or international conferences, 29% have visited another research institution, 38% have written referee reports, 58% have published in peer-reviewed journals, and 54% have been engaged in a third-party-funded research project. Table 10 in the additional appendix shows that there are some gender differences in these activities, with females being more likely to go abroad for a research stay and males being more likely to write referee reports. We will analyze these gender differences further as part of the subsequent multivariate analysis.

Figure 2 depicts the distribution of assessments regarding research motivation and career prospects of the postdocs. 53% of all postdocs say that the research incentives in their current job are rather strong or very strong. Only 29% think that the university reforms of the last decade have improved these incentives, whereas 55% believe that incentives have improved due to stronger competition from outside Germany. Whereas 49% assess their current non-academic employment prospects to be very good or good, only 21% think that this will be the case in five years from now. At the same time, merely 48% of all postdocs view their own academic career prospects as very good or rather good and 76% say that the competition for an academic career in their field is very strong or strong. Furthermore, 25% think that networks are more important for a successful career than academic excellence. 68% of all postdocs prefer an academic job at present and 66% expect to have an academic job in 5 years. 49% of all postdocs think that the current working conditions and the future employment prospects have a positive effect on the motivation to engage in an academic career. 51% of all postdocs say that the recent changes in career prospects have caused a shift towards applied research.

These findings provide a mixed picture of the research incentives, career plans, and career prospects of postdocs. On the one hand, the majority of postdocs is committed to an academic career, is to some degree integrated into the scientific community, thinks that the competition is hard, and is concerned about weak non-academic career prospects. On the other hand, the working conditions are often not conducive to excellent research and the university reforms have not improved the research incentives strongly enough. Due

to career concerns, postdocs do more applied research, and networking is often perceived to be more important than academic excellence. Based on these findings, the newspaper *Handelsblatt* concluded that a lot of postdocs are frustrated (Heß, 2009).

4 Cluster Analysis of Researcher Types

Next, we identify groups of postdocs based on their assessment of research motivation and career prospects. A k-means cluster analysis with 10.000 iterations and the Jaccard similarity measure was used to identify three types of researchers. Methodologically, as initial group centers the last three observations of our dataset were used. We experimented with different numbers of clusters, before we concluded that three clusters represent most of the data well. In total, the cluster analysis assigns 447 postdocs to the three clusters. The first cluster (Type *frustrated pessimists*) comprises 33% of the postdocs, the second 32% (Type *motivated optimists*), and the third 36% (Type *confident academics*), see Table 2. We labeled the clusters in light of the average responses given. Table 3 shows that the *motivated optimists* have the strongest research incentives and expect good career prospects. Their research motivation improves strongly by increased competition outside and slightly by the university reforms. In comparison, the group of *confident academics* has high research incentives as well but both *confident academics* and *frustrated pessimists* see low non-academic career prospects. Furthermore, almost all *confident academics* and *motivated optimists* prefer an academic job now and also expect to have an academic job in five years. The *frustrated pessimists* differ strongly from the two other types. Among them, research incentives and academic as well as non-academic career prospects are very weak. Also, the *frustrated pessimists* report the weakest increase of research motivation due to the university reforms. Altogether, the *frustrated pessimists* have a low research motivation and a very pessimistic assessment of their academic career prospects.

We analyze the differences in the composition of the researcher types (clusters) in Table 4. Overall, the share of females is lowest among the *motivated optimists* and quite similar among the two other types. The age distribution differs strongly. *Motivated optimists* are considerably younger and *confident academics* are on average the oldest. The optimism among the former group may be related to the fact that non-academic career prospects deteriorate with age. In contrast, *confident academics* are aware of the low non-academic career prospects at higher age, but are confident with respect to their academic career. Regarding fields, business economics is represented strongest among the *motivated optimists* (44%) and sociology/social sciences among the *confident academics* (30%). Most of the postdocs who did their PhD at the chair of a professor are to be found

among the *frustrated academics*, whereas graduates of a PhD program are most strongly represented among the *motivated optimists*. Similarly, the current position differs strongly across researcher types. Whereas there are almost no assistant professors among the *frustrated academics*, research assistants are most strongly represented among this group. Those aiming for a Habilitation are mostly *motivated optimists* and academic lecturers ('Akademischer Rat/Rätin') have the lowest share among the *frustrated academics*.

5 Econometric Analysis

We explore the hypotheses presented in section 2.3. We focus on binary probit regressions to account for key differences. The dependent variable is recoded as a dummy variable, where one extreme category of interest and the closest to it (e.g. very good and rather good) are recoded as one and the three remaining categories (e.g. neutral, rather bad, very bad) as zero. The categorical assessment variables used as control variables in our regressions are defined such that the two extreme categories and the closest to it are recoded as -1 or +1, respectively, with the middle category being 0. To investigate the robustness of our results, we also estimate ordered probit regressions which we report in the additional appendix.

For some key relationships, we consider three different specifications. The first and most parsimonious specification controls only for personal background variables as gender, age, family status, subject of highest academic degree before PhD/of PhD, and years since completion of highest academic degree/PhD graduation. The second specification additionally includes the type of position, information about the PhD phase and about the integration into the scientific community. The most comprehensive third specification further adds some categorical assessment variables and interaction effects of all control variables with gender. While we keep all control variables as linear effects, we only keep those interactions which are significant at conventional levels. All control variables (except the female dummy) are normalized as differences from their averages among females such that, in the presence of interaction effects, the 'average probit coefficient' of the dummy for female reflects the average gender difference. To discuss the estimation results, we mainly rely on the estimated average marginal effects (AME) of the control variables. We explain this more formally in the appendix.

Note that our subsequent results are descriptive in nature, i.e. they may partly reflect reverse causality or selection effects. To give one example, participants of PhD programs may be selected into such programs because they are more research oriented, i.e. PhD programs may not necessarily *cause* higher research incentives. The goal of our analysis is

simply to describe and interpret these relationships in light of the hypotheses put forward above. In fact, these hypotheses often concern the direction of the association between two *endogenous* variables.

5.1 Research Incentives

Our conceptual framework in section 2.2 focuses on the effort decision of the postdoc. As reported above, 53% of the postdocs report rather strong or very strong research incentives, i.e. for 47% of the postdocs pursuing an academic career, research incentives are only average or weak. We explore to what extent research incentives are associated with working conditions, background variables, and career prospects.

Table 5 reports the coefficient estimates of probit regressions of various covariates on research incentives. The most parsimonious specification (1) only shows significant effects for 'PhD in Germany' and Business Economics, i.e. research incentives are weaker among those postdocs who did their PhD in Germany and those postdocs who work in Business Economics. However, these significant effects disappear in the more comprehensive specifications (2) and (3). When conditioning on the position, the PhD background, and the integration into the scientific community, specifications (2) and (3) show that females, assistant professors, and participants in PhD programs report significantly higher research incentives, while those who did their PhD at their current university report significantly lower research incentives.⁶ Recall that these estimates may very well reflect selection effects such that e.g. participants of PhD program have a priori higher research incentives in comparison. Even in such a case, the positive association found is interesting, thus suggesting that those with higher research incentives prefer PhD programs.

Specification (3) further includes the assessments of career prospects, academic competition, and the importance of networks. In addition to the significant effects already obtained for specification (2), we find that females who have been involved in third-party-funded projects show significantly higher research incentives. The same holds for the perception of better academic career prospects, higher competition, and for female postdocs who feel that their working conditions improve their academic career. On the contrary, participation at national conferences and the perception that networks are more important than academic excellence are associated with significantly lower research incentives. Non-academic career prospects show no significant effects and there are no significant differences across fields. Table 6 shows the AME's for specification (3). Participation in

⁶Also, those with a missing or nonstandard PhD background report significantly higher research incentives in specification (2), but not in specification (3). We do not comment on this result as this group involves only 4% of all observations (Table 6 in the additional appendix).

a PhD program is associated with a 22 percent point (ppt) higher probability for strong research incentives. The AME's for 'academic career prospects' and 'strong competition' are 8 ppts and 10 ppts, respectively, and the perception that working conditions improve academic career show an AME of 14 ppts. The perception that networks are more important than academic excellence is associated with a reduction of 16 ppts. For instance, 49% feel that their working conditions positively affect their academic career and 29% report this effect to be negative (Figure 2). Thus, our regression estimates explain sizeable differences in research incentives. These results provide evidence supporting hypothesis 1. So far, the evidence on hypothesis 2 is mixed. On the one hand, we find positive effects of academic career prospects, which is in accordance with hypothesis 2. On the other hand, current and future non-academic career prospects do not affect research incentives, thus contradicting hypothesis 2.

As reported above, only 29% of the respondents think that the university reforms of the last decade have improved their incentives (Figure 2). Table 6 reports the estimated AME's for a probit regression of the dummy 'reforms improved incentives'. We find significantly negative effects of age, research assistant, habilitation status, and of the perception that networks are more important than academic excellence. In contrast, there are strong significantly positive effects for assistant professors and for those who think that working conditions improve the academic career. The age effect is as expected as older postdocs are less likely to be affected by the reforms. The same holds for those who are in a traditional postdoc position (research assistant, habilitation). At the same time, these groups may be negatively affected by the increased competition of those benefitting from the reforms (assistant professors) and by the deterioration of the attractiveness of an academic career because of the lower base salaries for W-professors. In contrast, assistant professors, whose positions were introduced by the reform, those with a positive view of conditions improving the academic career, and those who think that networks are not more important than academic excellence are more likely to say that the reforms improved incentives. This confirms the finding of the cluster analysis that the *motivated optimists* show the best assessment of the effects of the reforms on research incentives (Table 3).

Hypothesis 2 is agnostic about the direction of the association between increased competition and research incentives. The results so far show that strong academic competition is associated with higher research incentives. Table 6 shows the estimated AME's for a regression of the dummy variable indicating whether competition from outside improves incentives. Again, we find significantly negative effects for age, the network variable, and PhD at the current university. Competition, academic prospects, and the perception that working conditions improve academic career show a significantly positive associa-

tion. These results are in line with the discussion so far. The results also reveal strong differences across fields, with postdocs in economics saying most strongly and postdocs in sociology/social science least strongly that international competition improves incentives. With a difference of more than 30 ppts, the gap across fields is very strong. The strongest effect exists for postdocs in economics and the smallest one for sociology/social sciences.

5.2 Career Prospects

As reported above, more than 50% of the postdocs are pessimistic about their academic career (Figure 2), which according to our theoretical expectations leads to lower research incentives.

Table 7 reports the estimated AME's for probit regressions of academic and non-academic career prospects. We first consider academic career prospects. Living in a partnership and having children are associated with significantly lower career prospects (note that 'married' is the omitted category), e.g. having two children decreases the probability of good academic career prospects by 18 ppts. Assistant professor and habilitation is associated with significantly higher academic career prospects, with assistant professors showing the highest confidence. Some indicators of integration into the scientific community (national conferences, publications) are also associated with significantly higher prospects while a research stay in Germany is associated with lower prospects. Stronger competition and the perception that networks are more important than academic excellence are associated with significantly lower prospects, while those with a positive view of conditions improving the academic career report significantly better prospects. Clearly, the latter effects should not be interpreted in a causal way because optimism may be reflected in these variables and in the dependent variable.⁷ Non-academic career prospects show no significant effects.

Turning to non-academic career prospects, 49% of all postdocs assess their current non-academic employment prospects to be very good or good and only 21% think that this will be the case five years from now (Figure 2). Table 7 reports a significantly and sizeable negative age effect for current non-academic career prospects, but no age effect for prospects in five years. Germans have significantly better current prospects, but there is no such effect in 5 years. Incidentally, postdocs with a Master degree show significantly worse current prospects, but significantly better prospects in 5 years. This is difficult to explain. In addition, assistant professors and those having stayed at a German

⁷The effect of the perception of networks could be affected by a so-called 'Justification Bias'. A postdoc who believes that his/her chances for an academic career are bad, may 'explain' (rationalize) this with the importance of networks and not with his/her own lack of success.

research institute show significantly worse current prospects and no significant effects on prospects in 5 years. Academic career prospects show no significant effects whereas strong academic competition is associated with worse prospects in 5 years, possibly because the postdocs fear that, due to the strong competition for academic positions, there will be more competition for non-academic jobs in 5 years. Also, those with a positive view of 'conditions improving the academic career' report significantly better non-academic career prospects in 5 years, but no better current non-academic career prospects. This finding is in accordance with hypothesis 2. As expected, postdocs in sociology/social sciences report significantly worse current non-academic career prospects. However, there is no such effect for career prospects in 5 years. Overall, the lower non-academic career prospects in 5 years are less affected by the characteristics of the postdocs compared to current prospects. Most postdocs, irrespective of their background, seem to acknowledge that their non-academic career prospects in 5 years are only average or below average. The lack of coherent significant effects for indicators of the integration into the scientific community on research incentives and career prospects are difficult to rationalize and, thus, cast some doubt regarding hypotheses 1 and 2.

As mentioned before, a key question in the survey relates to whether the conditions in the current job and the future employment prospects affect the motivation and incentives ('conditions improve academic career'). This variable is strongly associated with research incentives and career prospects and 49% see a positive relationship. The probit regression results (Table 23 in the additional appendix) show that only career prospects (positive effects) and the perception that networks are more important than academic excellence (negative effect) are significantly associated with this variable. These findings provide further evidence for hypotheses 1 and 2. A majority of postdocs (69%) would still select an academic research job at present if given the choice, and a majority of postdocs expects to have an academic research job in 5 years. There are some interesting differences (Table 23 in the additional appendix). Better non-academic career prospects and the perception that networks are more important than academic excellence are associated with a significantly lower desirability/probability of an academic job at present and in five years, whereas better academic career prospects show a significantly positive association. Assistant professors expect a higher probability of an academic job in 5 years but there is no such effect at present. The habilitation status shows an even stronger significantly positive effect both at present and in 5 years. These results are even more remarkable in light of the finding that habilitation status and assistant professorship show a significantly positive association with the perception of strong competition in the field (Table 25 in the additional appendix). In contrast, there are no corresponding effects on the perception

that networks are more important than academic excellence.

In accordance with hypothesis 2, the type of research is affected by the goal to improve non-academic career prospects: more than 50% of the postdocs report that the recent changes in the career prospects of young academics induced a shift more towards applied research and over 40% say that they actually pursue applied research in order to improve their non-academic career prospects (Figure 2). Probit regression results show that better non-academic career prospects and the perception that networks are more important than academic excellence are associated with a higher probability to pursue applied research in order to improve non-academic career prospects (Table 24 in the additional appendix). This probability is significantly lower for postdocs in sociology or social sciences and for older postdocs.

Our survey also involves a number of statements with which the respondents could agree with (Table 11 in the additional appendix). 42% (51%) of the respondents agree with the statement that many established (young) academics leave German universities because of the moderate salaries. The approval rate for the statement that insecure working prospects cause many young academics to leave German universities is 78%. 60% agree with the statement that an academic job is more risky than a non-academic job. 61% perceive the lack of a tenure-track option as a flaw of the introduction of assistant professorships. Once again, these results confirm that a majority of postdocs is very concerned about insufficient career prospects in Germany, with likely negative effects on research incentives. These results provide further support for hypotheses 1 and 2.

5.3 PhD Background

The PhD phase paves the way for an academic career. We now discuss specifically the effect of the PhD background. Note that 68% of the postdocs in our sample did their PhD at the chair of a professor, whereas 12% obtained their PhD through a PhD program, 7% were at a research institution, and 9% were external doctoral candidates (Table 1 and Table 6 in the additional appendix).

Those who went through a PhD program show significantly higher research incentives (Table 5 and 6). The average marginal effect is 22 pts compared to a PhD obtained at a chair. These results are in accordance with hypothesis 3. Furthermore, former participants of PhD programs are more convinced that stronger international competition improves research incentives (Table 6) and report significantly better non-academic career prospects at present (Table 7). However, the variable does not show any significant effect on academic career prospects and non-academic career prospects in 5 years. Postdocs who did their PhD at the university they are currently working at show significantly lower

research incentives and are significantly less convinced that international competition improves research incentives (Table 6). The variable shows no significant effect on the career prospects. This provides some evidence for hypothesis 3; however, but the lack of significant effects on academic career prospects is in contrast to hypothesis 3. We find no significant differences in the assessment of the strength of competition and in the perception that networks are more important than academic excellence (Table 25 in the additional appendix).

Overall, we find some evidence supporting hypothesis 3. The most important result is that a PhD obtained in a PhD program dominates the PhD at a chair of a professor in terms of research incentives and current non-academic career prospects. These results are consistent with the view that participation in a PhD program results in better supervision and mentoring and that it shortens the time until completion of the PhD.

5.4 Gender, Age, Children

Gender and having children are likely to play an important role in the decision for an academic career, as formulated by hypothesis 4. We review the results obtained so far under this perspective. Female postdocs show significantly better research incentives (Table 6), but otherwise we find little gender differences (except for some significant interaction effects) in the assessment of reforms, the impact of competition, and career prospects (Tables 6, 7 and Tables 23, 25 in the additional appendix). At the same time, the share of females is lowest among the *motivated optimists* and highest among the *confident academics* identified in section 4.

The regression results reported in Tables 16 and 18 in the additional appendix reveal that the positive association of the variable 'conditions improve academic career' with career prospects is almost exclusively due to such an effect for females. Furthermore, the perception that networks are more important than academic excellence does not play any role for academic career prospects of female postdocs. The contrary is true for male postdocs. Possibly, enthusiasm plays a stronger role for those females who continue an academic career. These results are consistent with female postdocs being a positive selection in accordance with hypothesis 4. In contrast to hypothesis 4, females do not agree to a larger extent to the assessment that an academic research job is more risky than a job outside of academic research (Table 20 in additional appendix) - the insignificant point estimate would even imply the opposite. Again, this may be rationalized by female postdocs being a positive selection.

The effects of children and partnership are mostly insignificant, with some notable exceptions. Table 7 shows that academic career prospects are significantly worse for postdocs

with children and for postdocs living in a partnership (note that there is no significant interaction with gender). Correspondingly, Table 24 in the additional appendix shows that postdocs living in a partnership (but not postdocs with children) are significantly more likely to engage in applied research to improve their non-academic career prospects. Table 25 in the additional appendix shows that both singles and postdocs with children are significantly more likely to say that competition is strong. These findings and the lack of significance of interaction effects with gender in most cases, provide only mixed support for hypothesis 4.

Now, we turn to the effects of age. Table 6 shows that age has no significant effect on research incentives (again in contradiction to hypothesis 4). However, age proves significantly negative in a number of cases. At higher age, there is less agreement that the reforms and international competition improved incentives (Table 6). This is to be expected because the reforms were implemented when the older postdocs had already made important career steps. Correspondingly, postdocs at a middle-age (33-44 years) most strongly agree with the statement that the introduction of junior professorship is flawed since most assistant professorships do not involve a tenure-track option (Table 11 in the additional appendix). Non-academic career prospects deteriorate at higher age (Table 6) and there is a shift towards applied research to improve non-academic career prospects (Table 24 in the additional appendix). Postdocs at a higher age agree to a larger extent to the assessment that an academic research job is more risky than a job outside of academic research (Table 20 in additional appendix), however, the effect is quite small and insignificant. Overall, the age effects are mostly in accordance with hypothesis 4. In particular, concerns about non-academic career prospects, but not about academic career prospects, increase with age. This is in line with the finding that *motivated optimists* are younger and *confident academics* are older (section 4).

5.5 Different Academic Fields

Our survey involves postdocs from different academic fields with presumably very different non-academic career prospects. We find some remarkable differences across fields. Postdocs in sociology/social sciences are the most concerned about insecure working prospects, postdocs in business economics are the most concerned about the low salaries for young academics, and economists are the most concerned about the lack of the tenure-track options for assistant professors (Table 12 in the additional appendix, statements 6, 5, 8). For the regression results, economics is taken as the omitted category. We review the results obtained so far regarding different academic fields.

Most importantly, research incentives do not differ significantly across fields (Table

6), which is in contrast to hypothesis 5. Incidentally, we find only a small number of cases with significant differences across fields. Economists see a stronger impact of international competition on incentives (Table 6) and, in accordance with hypothesis 5, the perception of non-academic career prospects is significantly lower in sociology/social sciences than in the other fields (Table 7). Postdocs in business economics are more likely to choose an academic job again, if they could choose again, and expect a higher probability of an academic job in 5 years (Table 23 in the additional appendix). Postdocs in sociology/social sciences are more likely to undertake applied research to improve their non-academic career prospects (Table 24 in the additional appendix). Economists are the least likely to say that networks are more important than academic excellence, a finding which is in accordance with the finding of Schulze et al. (2008), that the academic market is more competitive in economics than in business economics.

Overall, research effort does not differ across fields despite differences in non-academic career prospects. Most likely there are important selection effects across fields. Postdocs in business economics are committed to an academic career and they see very good academic career prospects, possibly, because their less committed competitors have left an academic career after a PhD. Postdocs in sociology/social sciences are also committed to their more risky academic career (partly by intrinsic motivation) and they perceive poor non-academic career prospects. In response, they are more likely to shift towards more applied research.

6 Conclusions

This paper is based upon a survey among postdocs in Germany, conducted for the fields of business economics, economics, sociology, and social sciences. We first develop a number of hypotheses regarding career transitions after the completion of a PhD based on a theoretical framework. Our framework emphasizes the interaction between academic and non-academic career paths. Based on the survey data, we analyze the research incentives, the academic background, and the career prospects of the postdocs.

Our results show quite a mixed picture of the sentiments among postdocs in Germany. Through a cluster analysis, we were able to identify three important types of postdocs: *motivated optimists*, who are younger and optimistic about their academic and non-academic career, *confident academics*, who are older, optimistic about their academic career, but pessimistic about their non-academic career, and *frustrated pessimists*, who are pessimistic about career prospects in general. Only about half of the postdocs sees strong incentives for academic research but there is quite strong confidence to succeed in

an academic career. Also about half of the postdocs says that working conditions and future career prospects increase the motivation to engage in an academic career. There is evidence that research incentives increase due to stronger international competition. Employment insecurity is associated with a more pessimistic assessment of an academic career. The strongest research incentives and the best career prospects were found for assistant professors. Apart from this small group, the postdocs see only a small influence of the university reforms of the last decade on incentives and prospects of the researchers, which may be due to the specific selection of this group. Specifically, the university reforms were more negatively assessed by older postdocs. Both younger and older academics view their non-academic career prospects to deteriorate over time. For postdocs in business economics, we find better non-academic career prospects than in other fields, and there is no evidence for falling research incentives due to better non-academic career prospects. The perception that networks are more important than academic excellence is negatively associated with research incentives and career prospects. Finally, assistant professors, graduates of PhD programs, but also postdocs who pursue a habilitation mostly show better outcomes than others. Clearly, the specific working conditions of a postdoc matter. Female postdocs show better research incentives but otherwise we find little gender differences. For both males and females, the presence of children is associated with worse career prospects.

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Appendix

Formal Results for the Life-cycle Phase Model

Assume (X, Y) are non-negative random variables with joint continuous probability density function (pdf) $f(x, y)$ and define

$$FV = E \max [X, Y] = \int_0^\infty \int_0^\infty \max(x, y) f(x, y) dy dx$$

and

$$(4) \quad P = P(X > Y) = \int_0^\infty \int_0^x f(x, y) dy dx \quad .$$

We analyze the change in FV and $P(X > Y)$ in response to two types of monotone shifts in the joint distribution of (X, Y) . These results are summarized by the following theorem.

Theorem: Consider a uniform rightward shift of X and Y , i.e. $X' = X + a(X, Y)$ with $a(x, y) > 0$ for all x, y , $Y' = Y + b(X, Y)$ with $b(x, y) \geq 0$ for all x, y , and $a(x, y) > b(x, y) + \delta$ for some small $\delta > 0$. In response to this shift, FV strictly increases and P does not fall. If in addition, for each $\delta > 0$, there exists $\epsilon > 0$, such that $P(|X - Y| < \delta) > \epsilon$, then P strictly increases as well.

Proof: Note that

$$\begin{aligned} FV(X', Y') &= \int_0^\infty \int_0^\infty \max(x + a(x, y), y + b(x, y)) f(x, y) dy dx \\ &> \int_0^\infty \int_0^\infty \max(x, y) f(x, y) dy dx \end{aligned}$$

because $\max(x + a(x, y), y + b(x, y)) > \max(x, y)$ for all x, y . This shows that FV strictly increases.

Further note that

$$P(X' > Y') = \int_0^\infty \int_0^\infty f(x, y) I[y + b(x, y) < x + a(x, y)] dy dx \quad ,$$

where $I(\cdot)$ denotes the indicator function. Clearly, $y \leq x$ implies that $y + b(x, y) < x + a(x, y)$. Thus, $P(X' > Y') \geq P(X > Y)$. In addition, there exists cases for which $y > x$ and $y + b(x, y) < x + a(x, y)$ because $a(x, y) > b(x, y) + \delta$. As $P(|X - Y| < \delta) > \epsilon$, we know that $P(X' > Y')$ increases at least by ϵ , i.e. $P(X' > Y') - P(X > Y) > \epsilon$. \square

Corollary: Consider a rightward shift of X , i.e. $X' = X + a(X, Y)$ with $a(X, Y) > 0$, and Y remains unchanged. In response to this shift, FV strictly increases and P does not fall. If in addition, for each $\delta > 0$, there exists $\epsilon > 0$, such that $P(|X - Y| < \delta) > \epsilon$, then P strictly increases as well.

This Corollary follows immediately as a special case of the above Theorem.

Probit Regression, Interaction Effects, and Marginal Effects

To clarify our estimation results, let us say that we estimate a probit model based on a sample of size N as

$$(5) \quad P(Y = 1|x_i, D_i) = \Phi(\beta_1 + \beta_2 x_i + \beta_3 D_i + \beta_4 x_i D_i) \quad ,$$

where Φ is the cumulative standard normal distribution, x_i is a normalized control variable, and D_i is the gender dummy. We define x_i as deviations from the average of the original control variable in the subsample of females, i.e. $\sum_{D_i=1} x_i = 0$. Then, β_3 is the average effect of the female dummy D_i , i.e. the average marginal effect on the argument of the $\Phi(\cdot)$ function, because $\beta_3 = 1/N_1 \sum_{D_i=1} (\beta_3 + \beta_4 x_i)$ and N_1 is the number of females. The interpretation of the coefficient for x_i is as usual, with β_2 being the coefficient for males and $\beta_2 + \beta_4$ being the coefficient for females.

To discuss the estimation results, we report the following estimated average marginal effects (AME)

$$(6) \quad AME(x) = \frac{1}{N} \sum_{i=1}^N \frac{\partial P(Y = 1|x_i, D_i)}{\partial x_i} = \frac{1}{N} \sum_{i=1}^N \phi(\beta_1 + \beta_2 x_i + \beta_3 D_i + \beta_4 x_i D_i) (\beta_2 + \beta_4 D_i) \quad ,$$

assuming a continuous x -variable and ϕ denoting the density of the standard normal. For the dummy variable D_i , we report

$$(7) \quad AME(D) = \frac{1}{N} \sum_{i=1}^N [P(Y = 1|x_i, D = 1) - P(Y = 1|x_i, D = 0)]$$

$$= \frac{1}{N} \sum_{i=1}^N [\Phi(\beta_1 + \beta_2 x_i + \beta_3 + \beta_4 x_i) - \Phi(\beta_1 + \beta_2 x_i)].$$

When x is a dummy variable, we estimate $AME(x)$ analogous to equation (7). When x is a categorical variable with more than two outcomes, we rely on equation (6) as an approximation.

Tables and Figures

Table 1: Descriptive statistics for the 546 respondents who completed the survey

Variable	Mean	Std.Deviation	Min	Max	No. Answers ^a
Male (Dummy)	0.66	0.47	0	1	546
Age	38	6.35	25	72	546
Married (Dummy)	0.47	0.5	0	1	546
Partnership (Dummy)	0.31	0.46	0	1	546
Children (Dummy)	0.42	0.5	0	1	546
Business Economics	0.32	0.47	0	1	541
Economics	0.26	0.44	0	1	541
Sociology/Social Sciences	0.24	0.43	0	1	541
Other Field ^b	0.18	0.38	0	1	541
Assistant Professor	0.09	0.29	0	1	546
Research Assistant	0.48	0.5	0	1	546
Habilitand	0.42	0.49	0	1	546
Academic Lecturer	0.14	0.35	0	1	546
PhD Program (Dummy)	0.12	0.33	0	1	546
Years since completion of highest academic degree	10.8	5.65	1	44	546
Years since completion of PhD	5.6	5.04	1	36	534
Conferences (national/international)	0.84	0.36	0	1	546
Research Stay	0.29	0.45	0	1	546
Referee Reports	0.38	0.49	0	1	546
Publication peer-reviewed journal	0.58	0.49	0	1	546
Third Party Funded Projects	0.54	0.5	0	1	546

^a: Number of respondents with valid answers for respective survey question.

^b: Business Informatics, Industrial Engineering, others.

Table 2: Distribution of researcher types

Researcher Type	Absolute Frequency	Percent
<i>Frustrated pessimists</i>	146	33 %
<i>Motivated optimists</i>	142	32 %
<i>Confident academics</i>	159	36 %
Total	447	100 %

Note: Result of a k-means cluster analysis with Jaccard similarity measure.

Table 3: Researcher Types identified by cluster analysis of assessments

Type	Strong research incentives	Reforms implemented	Competition outside incentives	Good outside prospects in five years	Good academic prospects	Strong academic competition	Choose academic job	Network is important	Academic job in five years	Conditions to improve engagement in academic career
<i>Frustrated pessimists</i>	.22	.18	.29	.19	.12	.68	.14	.39	.10	.19
<i>Motivated optimists</i>	.73	.42	.73	.45	.80	.75	.97	.16	.92	.68
<i>Confident academics</i>	.68	.30	.64	.04	.63	.81	.94	.19	.91	.63
Total	.54	.30	.56	.22	.52	.75	.70	.25	.65	.50

Remark 1: Result of a k-means cluster analysis with Jaccard similarity measure.

Remark 2: All variables are binary coded.

Table 4: Characterization of researcher types regarding background variables

Background Variable	<i>Frustrated pessimists</i>	<i>Motivated optimists</i>	<i>Confident academics</i>
Female	33 %	25 %	36 %
Below 37 years	51 %	68 %	41 %
37-40 years	23 %	21 %	29 %
Older than 40 years	26 %	11 %	30 %
Business Economics	35 %	44 %	25 %
Economics	22 %	29 %	26 %
Sociology, Social Sciences	22 %	9 %	30 %
Other Field ^a	21 %	18 %	19 %
PhD program	9 %	15 %	10 %
PhD at the chair of a professor	78 %	65 %	69 %
Assistant professor	1 %	11 %	14 %
Research assistant	59 %	37 %	48 %
Habilitand	25 %	59 %	48 %
Academic lecturer	11 %	16 %	16 %

^a: Business Informatics, Industrial Engineering, others.

Table 5: Probit regression of research incentives on background and assessments

Dependent variable: Research incentives are rather strong or very strong						
	(1)		(2)		(3)	
Female	0.150	(0.124)	0.220*	(0.133)	0.285*	(0.146)
Age	-0.0136	(0.0176)	-0.00746	(0.0182)	0.0120	(0.0195)
Partnership	-0.0599	(0.152)	-0.141	(0.159)	-0.0216	(0.175)
Single	-0.0422	(0.181)	-0.120	(0.189)	0.00474	(0.214)
Other family status	-0.0319	(0.376)	-0.0699	(0.399)	0.00375	(0.438)
One child	-0.0463	(0.161)	-0.0330	(0.167)	-0.0303	(0.185)
Two children	-0.133	(0.191)	-0.154	(0.201)	-0.126	(0.223)
More children	0.0971	(0.263)	0.0999	(0.275)	0.128	(0.302)
German	-0.152	(0.217)	-0.205	(0.233)	-0.122	(0.251)
Years since final degree	-0.0275	(0.0235)	-0.0112	(0.0241)	-0.00635	(0.0262)
Master	-0.107	(0.274)	-0.164	(0.286)	-0.379	(0.308)
Magister	0.0647	(0.203)	0.0625	(0.218)	-0.131	(0.244)
Other academic degree	-0.0586	(0.223)	-0.0646	(0.236)	-0.218	(0.255)
Years since graduation	0.00176	(0.0244)	-0.0192	(0.0253)	-0.0435	(0.0281)
PhD in Germany	-0.581**	(0.261)	-0.202	(0.300)	-0.0173	(0.324)
Business Studies	-0.345**	(0.151)	-0.196	(0.168)	-0.0860	(0.187)
Sociology, Social Sciences	-0.163	(0.183)	-0.0904	(0.197)	0.0430	(0.219)
Other subject	-0.197	(0.179)	-0.142	(0.191)	0.0686	(0.211)
Assistant Professor			0.749***	(0.248)	0.508*	(0.282)
Research Assistant			0.0550	(0.137)	0.0121	(0.152)
Status Habilitation			0.299**	(0.127)	0.0869	(0.142)
Lecturer, Admin, Officer			0.185	(0.187)	0.0644	(0.204)
PhD program			0.436*	(0.226)	0.729***	(0.255)
PhD research institution			0.154	(0.246)	-0.0708	(0.274)
External Phd scholarship			0.112	(0.208)	0.0268	(0.226)
Other PhD			0.703*	(0.377)	0.594	(0.411)
PhD current university			-0.217*	(0.128)	-0.299**	(0.141)
National conferences			-0.0781	(0.163)	-0.596***	(0.191)
International conferences			0.179	(0.154)	0.226	(0.173)
German research institute			-0.212	(0.251)	-0.202	(0.275)
Foreign research institute			0.169	(0.144)	0.198	(0.159)
Referee reports			0.112	(0.147)	0.0635	(0.163)
Publications			0.0797	(0.136)	0.0265	(0.151)
Third-party project			0.0721	(0.151)	0.192	(0.166)
Third-party project×fem			0.363	(0.254)	0.576**	(0.283)
Prospects outside, dummy					-0.109	(0.102)
Prospects outside 5y, dummy					0.0411	(0.0971)
Prospects academia, dummy					0.290***	(0.0953)
Competition academia, dummy					0.373***	(0.134)
Networks					-0.545***	(0.130)
Conditions prospects, dummy					0.498***	(0.0838)
No. observations	529		529		528	

Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Average marginal effects for probit regressions of research incentives, reforms, and international competition

Dependent Variable	Research Incentives		Reforms improved Incentives ^a		Competition outside improved Incentives ^b	
Female	0.0789**	(0.0396)	0.0578	(0.0430)	0.00140	(0.0440)
Age	0.00379	(0.00547)	-0.0145**	(0.00683)	-0.0149**	(0.00716)
Partnership	-0.0127	(0.0487)	0.0305	(0.0473)	0.0260	(0.0537)
Single	-0.00562	(0.0597)	-0.0181	(0.0577)	0.0820	(0.0651)
Other family status	-0.0176	(0.122)	0.0372	(0.116)	-0.158	(0.126)
One child	-0.0161	(0.0515)	-0.0584	(0.0520)	0.0526	(0.0560)
Two children	-0.0433	(0.0620)	-0.0184	(0.0626)	0.0473	(0.0670)
More children	0.0393	(0.0842)	0.143*	(0.0806)	0.0690	(0.0953)
German	-0.0246	(0.0700)	0.0879	(0.0729)	-0.0528	(0.0777)
Years since final degree	-0.000846	(0.00736)	0.000565	(0.00767)	0.00397	(0.00985)
Master	-0.106	(0.0860)	-0.0670	(0.0865)	0.0156	(0.0939)
Magister	-0.0386	(0.0678)	-0.121	(0.0770)	0.0360	(0.0737)
Other academic degree	-0.0745	(0.0708)	0.126*	(0.0729)	0.175**	(0.0849)
Years since graduation	-0.0147*	(0.00776)	0.00370	(0.00781)	0.0114	(0.00959)
PhD in Germany	-0.00743	(0.0906)	0.108	(0.0936)	0.164*	(0.0912)
Business Studies	-0.0199	(0.0522)	0.0693	(0.0489)	-0.0931*	(0.0565)
Sociology, Social Sciences	0.00912	(0.0610)	-0.0743	(0.0619)	-0.317***	(0.0621)
Other subject	0.0173	(0.0589)	0.0218	(0.0570)	-0.236***	(0.0609)
Assistant Professor	0.147*	(0.0783)	0.201***	(0.0693)	0.0230	(0.0817)
Research Assistant	-0.00252	(0.0425)	-0.0367	(0.0432)	-0.0327	(0.0463)
Status Habilitation	0.0265	(0.0395)	-0.106***	(0.0401)	0.101**	(0.0430)
Lecturer, Admin, Officer	0.00972	(0.0568)	-0.0165	(0.0547)	0.0722	(0.0640)
PhD program	0.222***	(0.0695)	0.0357	(0.0677)	0.147**	(0.0752)
PhD research institution	-0.00597	(0.0758)	-0.103	(0.0779)	0.0139	(0.0792)
External PhD scholarship	0.00460	(0.0629)	-0.0227	(0.0675)	0.0133	(0.0702)
Other PhD	0.197*	(0.114)	0.157	(0.105)	-0.0411	(0.117)
PhD current university	-0.0888**	(0.0389)	-0.0185	(0.0388)	-0.0876**	(0.0439)
National conferences	-0.168***	(0.0518)	-0.0375	(0.0501)	-0.0713	(0.0560)
International conferences	0.0624	(0.0479)	0.0116	(0.0484)	-0.0455	(0.0532)
German research institute	-0.0527	(0.0771)	-0.0640	(0.0784)	-0.0437	(0.0867)
Foreign research institute	0.0556	(0.0443)	0.00475	(0.0428)	0.0813*	(0.0478)
Referee reports	0.0209	(0.0456)	0.0504	(0.0445)	0.0856*	(0.0491)
Publications	0.0109	(0.0420)	-0.0156	(0.0412)	0.0326	(0.0458)
Third-party project	0.106***	(0.0393)	0.0178	(0.0382)	-0.0431	(0.0437)
Prospects outside	-0.0365	(0.0282)	-0.0185	(0.0278)	-0.0316	(0.0310)
Prospects outside 5y	0.0161	(0.0270)	0.0328	(0.0260)	0.0127	(0.0296)
Prospects academia	0.0813***	(0.0259)	0.0263	(0.0276)	0.0641**	(0.0294)
Competition academia	0.100***	(0.0363)	0.0440	(0.0365)	0.0731*	(0.0383)
Networks	-0.155***	(0.0345)	-0.147***	(0.0339)	-0.0630*	(0.0377)
Conditions prospects	0.143***	(0.0210)	0.0696***	(0.0234)	0.0581**	(0.0255)
No. observations	528		503		474	

Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The results for research incentives are based on specification (3) in Table 5.

a: Dependent Variable: Reforms improved or slightly improved incentives.

b: Dependent Variable: International competition improved or slightly improved incentives.

Table 7: Average marginal effects for probit regressions of career prospects

Dependent Variable	Good academic Career Prospects ^a		Good non-academic Career Prospects ^b		Good non-academic Career Prospects in 5 years ^c	
Female	0.0476	(0.0388)	-0.0338	(0.0437)	-0.0237	(0.0361)
Age	-0.00704	(0.00639)	-0.0260***	(0.00689)	-0.00181	(0.00569)
Partnership	-0.105**	(0.0486)	0.00393	(0.0528)	-0.0607	(0.0462)
Single	-0.0712	(0.0586)	0.0109	(0.0641)	0.00971	(0.0534)
Other family status	-0.0619	(0.111)	0.0419	(0.132)	0.0713	(0.105)
One child	-0.123**	(0.0503)	-0.0788	(0.0557)	-0.0395	(0.0491)
Two children	-0.181***	(0.0596)	-0.0650	(0.0669)	-0.0129	(0.0567)
More children	-0.250***	(0.0865)	0.0588	(0.0922)	0.0225	(0.0779)
German	-0.0141	(0.0677)	0.135*	(0.0749)	0.0459	(0.0647)
Years since final degree	-0.000406	(0.00759)	-0.00296	(0.00822)	-0.000183	(0.00703)
Master	0.0376	(0.0851)	-0.171*	(0.0921)	0.154**	(0.0762)
Magister	0.0866	(0.0654)	-0.102	(0.0762)	-0.00272	(0.0693)
Other academic degree	0.0935	(0.0688)	0.0356	(0.0777)	0.0880	(0.0648)
Years since graduation	0.00258	(0.00779)	0.0154*	(0.00831)	0.00156	(0.00718)
PhD in Germany	-0.128	(0.0846)	0.0260	(0.0926)	0.0984	(0.0843)
Business Studies	0.0613	(0.0510)	0.0929*	(0.0541)	0.0184	(0.0466)
Sociology, Social Sciences	0.00942	(0.0591)	-0.144**	(0.0646)	-0.0458	(0.0591)
Other subject	-0.0360	(0.0572)	0.0352	(0.0619)	-0.000133	(0.0541)
Assistant Professor	0.271***	(0.0752)	-0.215***	(0.0782)	-0.0113	(0.0643)
Research Assistant	-0.0402	(0.0412)	-0.0930**	(0.0459)	-0.0984**	(0.0387)
Status Habilitation	0.160***	(0.0367)	-0.0680	(0.0439)	-0.00434	(0.0379)
Lecturer, Admin, Officer	-0.0707	(0.0558)	-0.0308	(0.0614)	-0.0949*	(0.0519)
PhD program	-0.0189	(0.0645)	0.139*	(0.0712)	0.00337	(0.0622)
PhD research institution	0.0343	(0.0726)	0.0436	(0.0792)	-0.118	(0.0734)
External PhD scholarship	0.0218	(0.0644)	-0.0458	(0.0735)	-0.0620	(0.0667)
Other PhD	0.128	(0.107)	-0.0632	(0.119)	0.0154	(0.0945)
PhD current university	-0.0300	(0.0388)	0.0179	(0.0429)	0.0220	(0.0369)
National conferences	0.152***	(0.0486)	-0.0650	(0.0548)	-0.0466	(0.0472)
International conferences	-0.0291	(0.0470)	0.102*	(0.0524)	-0.00851	(0.0455)
German research institute	-0.158**	(0.0752)	-0.284***	(0.0867)	-0.135	(0.0855)
Foreign research institute	0.0596	(0.0429)	-0.0317	(0.0478)	-0.0413	(0.0415)
Referee reports	0.102**	(0.0429)	-0.0267	(0.0490)	0.0362	(0.0418)
Publications	0.101***	(0.0392)	0.0470	(0.0448)	0.0413	(0.0395)
Third-party project	-0.0399	(0.0381)	0.0736*	(0.0415)	0.00598	(0.0358)
Prospects outside	0.0318	(0.0274)	-	-	-	-
Prospects outside 5y	-0.00799	(0.0262)	-	-	-	-
Prospects academia	-	-	0.0135	(0.0296)	0.0147	(0.0256)
Competition academia	-0.0638*	(0.0361)	-0.0378	(0.0393)	-0.0632**	(0.0317)
Networks	-0.124***	(0.0333)	0.0281	(0.0375)	-0.0376	(0.0326)
Conditions prospects	0.145***	(0.0192)	0.0335	(0.0251)	0.0747***	(0.0220)
No. observations	528		528		528	

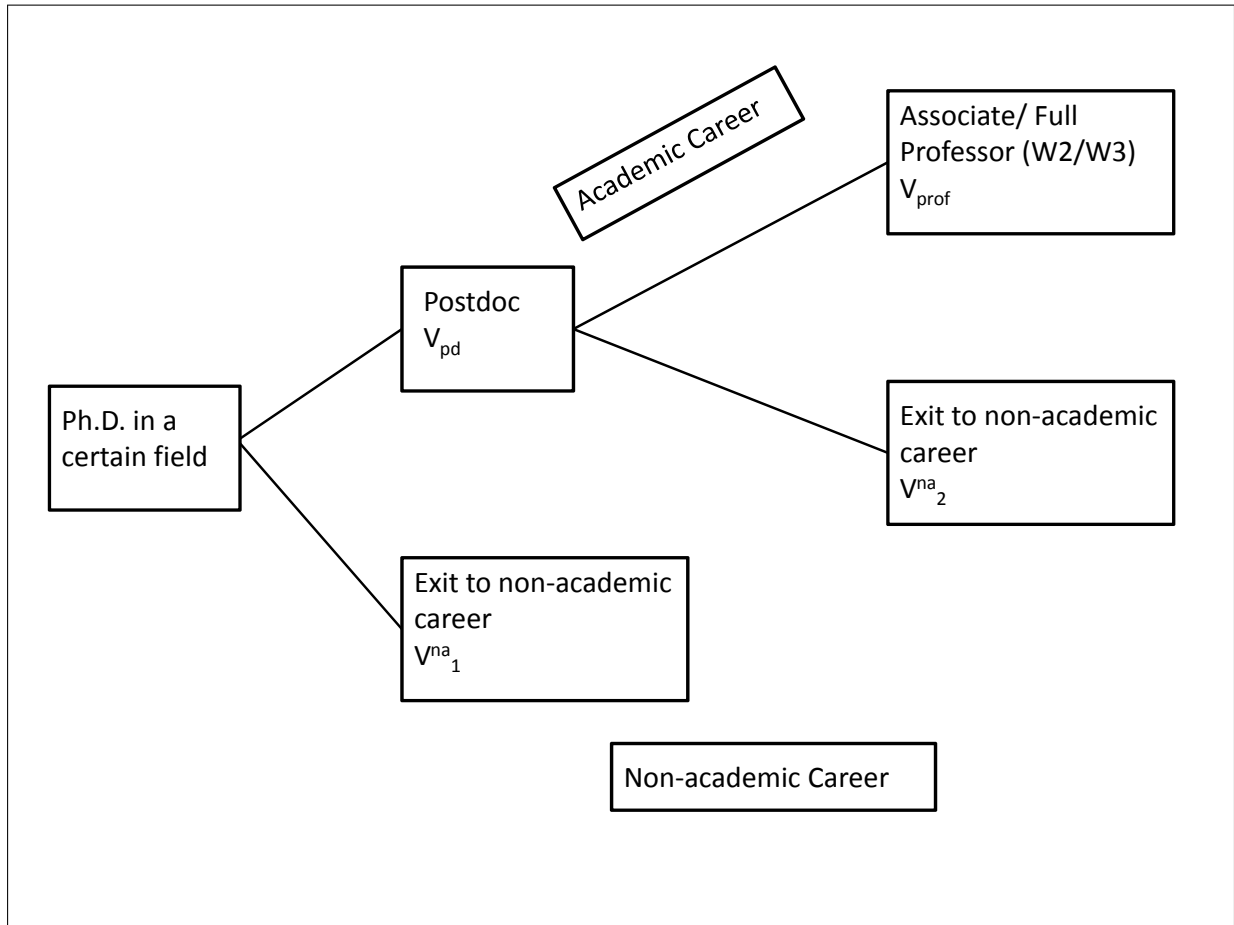
Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

a: Dependent Variable: academic career prospects rather good or very good.

b: Dependent Variable: non-academic career prospects rather good or very good.

c: Dependent Variable: non-academic career prospects in five years rather good or very good.

Figure 1: Career path after PhD



Note: This figure depicts in a stylized way the possible career transitions after obtaining a PhD. The variable V denotes the expected value (utility) after having reached a certain stage of the career.

Figure 2: Assessments of research motivation and career prospects

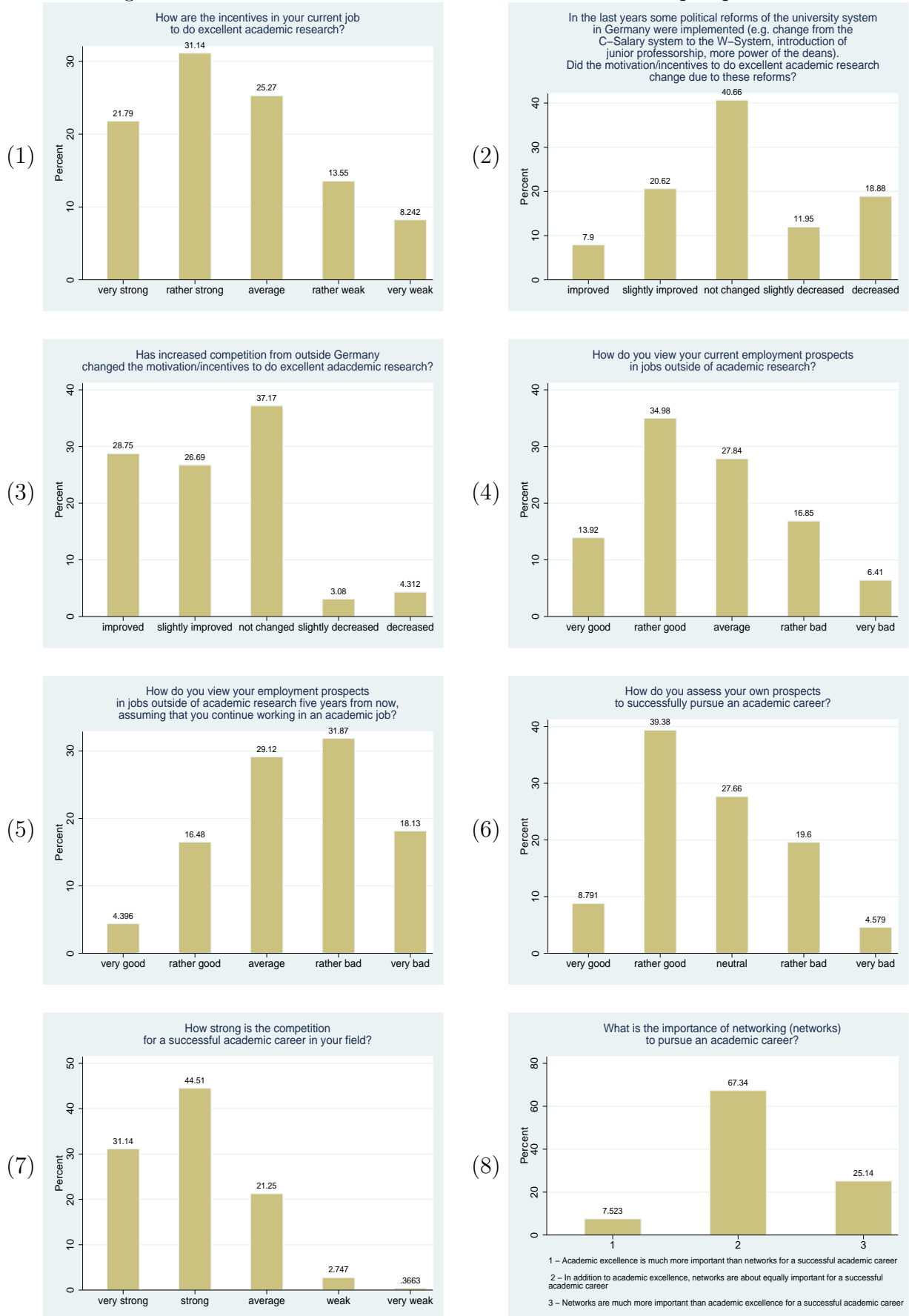


Figure 2: Assessments of research motivation and career prospects <continued>

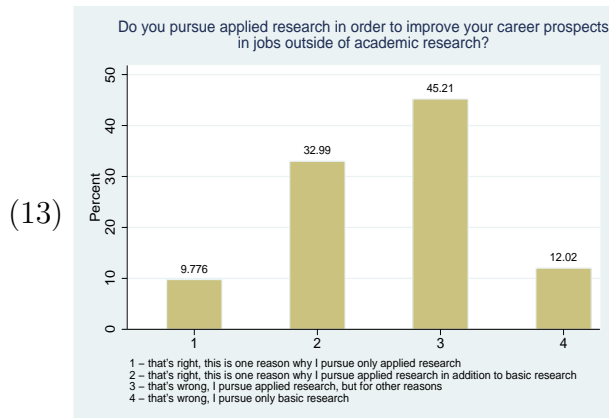
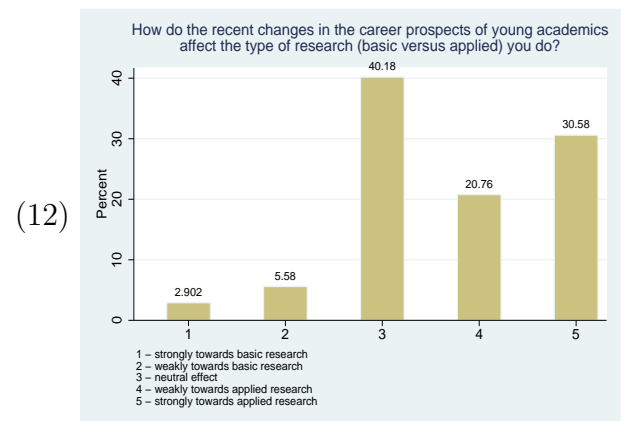
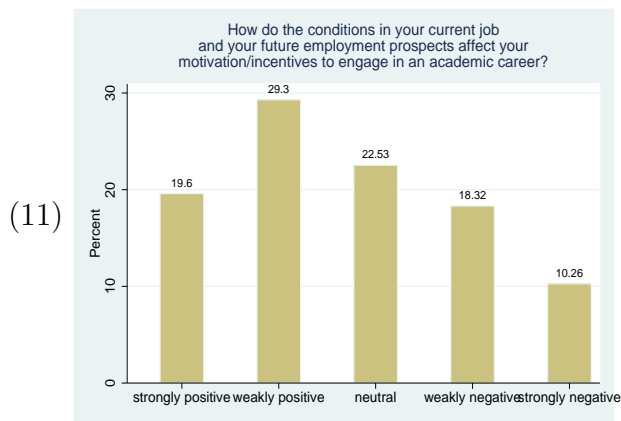
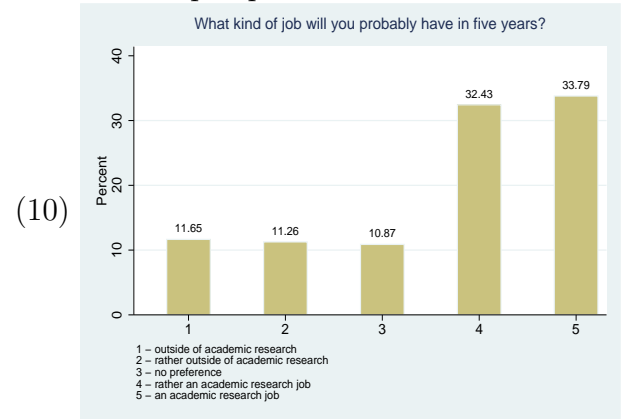
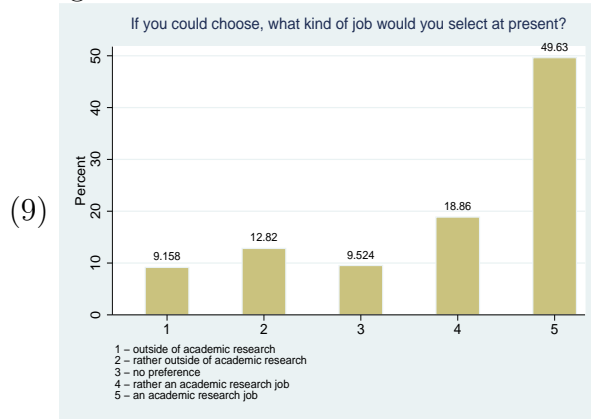


Table 8: Summary of all variables and their abbreviations (A)

Abbreviation in all regression tables	Variable type	Variable name
Female	Dummy	...is female.
Age	Absolute value	Age of the respondent.
<i>Married (omitted category)</i>	<i>Dummy</i>	...is married.
Partnership	Dummy	...lives in a partnership.
Single	Dummy	...is single.
Fam.Status unknown	Dummy	...gave no information about his family status.
<i>No children (omitted category)</i>	<i>Dummy</i>	...has no children.
One child	Dummy	...has one child.
Two children	Dummy	...has two children.
More children	Dummy	...has three or more children.
German	Dummy	...has the German nationality.
Years since final degree	Absolute value	Number of years since completing his studies.
<i>Diplom (omitted category)</i>	<i>Dummy</i>	...holds a <i>Diplom degree</i> .
Master	Dummy	...holds a master degree.
Magister	Dummy	...holds a magister degree.
Other Academic degree	Dummy	...holds a staatsexamen degree or gave no information.
Years since graduation	Absolute value	Number of years since completion of doctoral thesis.
PhD in Germany	Dummy	...obtained his PhD in Germany.
<i>Economics (omitted category)</i>	<i>Dummy</i>	...obtained his <i>PhD in Economics</i> .
Business Studies	Dummy	...obtained his PhD in Business Studies.
Sociology/Social Science	Dummy	...obtained his PhD in Sociology or Social Science.
Other Subject	Dummy	...obtained his PhD in other subject or gave no information.
Assistant Professor	Dummy	...works as Assistant Professor.
Research Assistant	Dummy	...works as Research Assistant.
Habilitation	Dummy	...is working on his habilitation thesis.
Lecturer/Academic Council	Dummy	...works as Lecturer or Academic Council.
<i>PhD at a chair (omitted category)</i>	<i>Dummy</i>	...obtained his <i>PhD at a Chair of a professor</i> .
PhD Program	Dummy	...obtained his PhD through a PhD-program.
PhD Research Institution	Dummy	...obtained his PhD at a Research Institution.
External PhD /scholarship	Dummy	...obtained his PhD as external doctoral candidate or by receiving a scholarship.
Other PhD	Dummy	...obtained his PhD by any other means.
Phd at current university	Dummy	...obtained his PhD at his current university.

Table 9: Summary of all variables and their abbreviations (B)

Abbreviation in all regression tables	Variable type	Variable name Dummy is equal to one if the respondent...
National conferences	Dummy	...attended national conferences.
International conferences	Dummy	...attended International conferences.
German research institute	Dummy	...spent time at another German research institute/university to do research.
Foreign research institute	Dummy	...spent time at another foreign research institute/university to do research.
Referee reports	Dummy	...wrote referee reports.
Publications	Dummy	...published in peer-reviewed journals or in a similar publication forum.
Third party funded project	Dummy	...cooperated in academic third-party-funded projects.

... when he was a doctoral candidate.

Abbreviation in all regression tables	Variable type	Question
Prospects outside	Ordinally scaled	"How do you view your current employment prospects outside of academic research?"
Prospects outside in 5y	Ordinally scaled	"How do you view your current employment prospects outside of academic research five years from now, assuming that you continue working in an academics job?"
Prospects in academia	Ordinally scaled	"How do you assess your own prospects to successfully pursue an academic career?"
Competition in academia	Ordinally scaled	"How strong is the competition for a successful academic career in your field?"
Networks	Ordinally scaled	"What ist the importance of networking (networks) to pursue an academic career?"
Conditions and motivation	Ordinally scaled	"How do the conditions in your current job and your future employment prospects affect your motivation/incentives to engage in an academic career?"

<i>Abbreviation</i> , dummy	Dummy	Original Variable recoded as binary variable.
<i>Abbreviation</i> ×fem	Interaction term	Interaction effect with gender (female dummy).

Additional Appendix for the paper 'Career Prospects of Postdocs in Germany'

By Bernd Fitzenberger and Ute Leuschner

Tables

Table 1: Age distribution of the postdocs in classes and sex ratio

Classes	Women (n)	Women	Men (n)	Men	All (n)	All
Below 33 years	20	11 %	58	16 %	78	14 %
33-36 years	62	33 %	137	38 %	199	37 %
37-40 years	44	24 %	88	24 %	132	24 %
41-44 years	33	18 %	45	13 %	78	15 %
Older than 44	27	14 %	32	9 %	59	11 %
Sex ratio	186	34 %	360	66 %	546	100 %

Table 2: Partnership status and children by sex

Status	Women (n)	Women	Men (n)	Men	All (n)	All
Married	85	46 %	173	48 %	258	47 %
Partnership	50	27 %	120	32 %	170	31 %
Single	46	25 %	56	16 %	102	19 %
No answer	5	2 %	11	3 %	16	3 %
Children						
No children	103	55 %	212	59 %	315	58 %
One child	46	25 %	70	19 %	116	21 %
Two children	30	16 %	52	15 %	82	15 %
Three or more children	7	4 %	26	7 %	33	6 %

Table 3: Subject of the highest academic degree and of the PhD

Subject	Subject Highest Academic Degree (before PhD)			Subject PhD		
	Women	Men	All	Women	Men	All
Business Economics	24 %	33 %	30 %	27 %	35 %	32 %
Economics	19 %	23 %	22 %	25 %	26 %	26 %
Sociology, Social Sciences	28 %	18 %	19 %	33 %	20 %	24 %
Business Informatics, Ind. Engineering, Other	34 %	26 %	29 %	15 %	19 %	18 %

Table 4: Current employment status (multiple answers possible)

Status	Women (n)	Women	Men (n)	Men	All (n)	All
Assistant professor (Juniorprofessor/in)	19	10 %	30	8 %	49	9 %
Research assistant	95	51 %	168	47 %	263	48 %
Habilitand	58	31 %	170	47 %	228	42 %
Academic lecturer	18	10 %	59	16 %	77	14 %
Do not work any- more in academia	9	5 %	14	4 %	23	4%
Other	32	17 %	40	11 %	72	13 %

Table 5: Highest academic degree before PhD

Degree	Women	Men	All
Master	9 %	6 %	7 %
Magister	14 %	10 %	11 %
Diplom	65 %	78 %	74 %
No answer	12 %	6 %	8 %

Table 6: Did you obtain your PhD through a PhD programm
(e.g. Graduiertenkolleg, PhD-Programm, Graduiertenschule)?

Item	Females (n)	Females	Men (n)	Men	All (n)	All
Yes	19	10 %	48	13 %	67	12 %
No, I did my PhD at the chair of a professor	123	66 %	250	70 %	373	68 %
No, I did my PhD at a re- search institution	16	9 %	21	6 %	37	7 %
External doctoral candi- date, non academic job or scholarship	20	11 %	30	8 %	50	9 %
Other/No answer	8	4 %	11	3 %	19	4 %

Table 7: Years since completion of highest academic degree before PhD

Classes	Females (n)	Females	Males (n)	Males	All (n)	All
5 years and less	14	8 %	35	10 %	49	9 %
6-9 years	75	40 %	150	42 %	225	41 %
10-13 years	49	26 %	121	33 %	170	31 %
14-17 years	27	15 %	27	7 %	54	10 %
18-21 years	12	6 %	10	3 %	22	4 %
More than 21 years	9	5 %	17	5 %	26	5 %

Table 8: Years since completion of PhD

Classes	Females (n)	Females	Males (n)	Males	All (n)	All
1-2 years	41	22 %	92	26 %	133	24 %
3-4 years	47	25 %	99	28 %	146	27 %
5-6 years	33	18 %	76	21 %	109	20 %
7-9 years	34	18 %	51	14 %	85	16 %
More than 9 years	31	17 %	42	12 %	73	13 %

Table 9: Years between highest academic degree and completion of PhD

Classes	Females (n)	Females	Males (n)	Males	All (n)	All
Less than 2 years	15	9 %	25	7 %	40	8 %
2-3 years	15	8 %	35	10 %	50	9 %
4 years	32	18 %	75	21 %	107	20 %
5 years	34	19 %	67	19 %	101	19 %
6 years	29	16 %	72	21 %	101	19 %
7-9 years	43	24 %	62	18 %	105	20 %
More than 9 years	11	6 %	14	4 %	25	5 %

Table 10: Integration in the scientific community as PhD student
(multiple answers possible)

Item	Females (n)	Females	Males (n)	Males	All (n)	All
National Conferences	133	72 %	283	79 %	416	76 %
International Conferences	117	63 %	242	67 %	359	66 %
Research Stay at a German institute/ university	10	5 %	21	6 %	31	6 %
Research Stay at a foreign institute/ university	59	32 %	82	23 %	141	26%
Referee Reports	51	27 %	158	44 %	209	38 %
Publications in peer-reviewed journals	96	52 %	220	61 %	316	58 %
Third party funded projects	96	52 %	200	56 %	296	54 %
No participation	25	13 %	32	9 %	57	10 %
Other	14	8 %	10	3 %	24	4 %

Table 11: Agreement with statements by age

Statement	32 years and younger	33-36 years	37-40 years	41-44 years	45 years and older	All
(1) The implementation of junior-professorship has improved the academic career prospects of those who want to stay in academia.	36 %	21 %	13 %	22 %	22 %	21 %
(2) As a result of the moderate salaries many established academics leave German universities in order to work at universities/research institutions abroad.	51 %	47 %	36 %	44 %	27 %	42 %
(3) As a result of the moderate salaries many established academics leave German universities in order to work outside of academic research.	40 %	25 %	24 %	31 %	34 %	28 %
(4) As a result of the moderate salaries many young academics leave German universities in order to work at universities/research institutions abroad.	60 %	61 %	46 %	50 %	32 %	52 %
(5) As a result of the moderate salaries many young academics leave German universities in order to work outside of academic research.	63 %	56 %	46 %	45 %	36 %	51 %
(6) As a result of the insecure working prospects (part-time work, temporary employment), many young academics leave German universities.	59 %	78 %	80 %	87 %	81 %	78 %
(7) In comparison to a job outside of academic research, an academic research job is more risky.	50 %	64 %	65 %	60 %	46 %	60 %
(8) The introduction of Junior Professorship is flawed because most positions do not involve a tenure-track option.	55 %	66 %	60 %	63 %	51 %	61 %

Table 12: Agreement with statements by fields

Statement	Business Eco- nomics	Eco- nomics	Sociology, Social Sciences	Business Infor- matics, Industrial Engineer- ing, Others	All
(1) The implementation of junior-professorship has improved the academic career prospects of those who want to stay in academia.	23 %	21 %	24 %	17 %	21 %
(2) As a result of the moderate salaries many established academics leave German universities in order to work at universities/research institutions abroad.	44 %	46 %	38 %	39 %	42 %
(3) As a result of the moderate salaries many established academics leave German universities in order to work outside of academic research.	28 %	22 %	32 %	34 %	28 %
(4) As a result of the moderate salaries many young academics leave German universities in order to work at universities/research institutions abroad.	56 %	60 %	44 %	46 %	52 %
(5) As a result of the moderate salaries many young academics leave German universities in order to work outside of academic research.	61 %	48 %	40 %	49 %	51 %
(6) As a result of the insecure working prospects (part-time work, temporary employment), many young academics leave German universities.	73 %	78 %	85 %	67 %	78 %
(7) In comparison to a job outside of academic research, an academic research job is more risky.	59 %	63 %	58 %	62 %	60 %
(8) The introduction of Junior Professorships is flawed because most positions do not involve a tenure-track option.	55 %	73 %	61 %	55 %	61 %

Table 13: How are the incentives in your current job to do excellent academic research?

	(1)		(2)		(3)	
	Incentives_research		Incentives_research_bin		Marginal Effects	
main						
Women	0.0986	(0.109)	0.285*	(0.146)	0.0789**	(0.0396)
Age	0.00429	(0.0155)	0.0120	(0.0195)	0.00379	(0.00547)
Partnership	0.125	(0.132)	-0.0216	(0.175)	-0.0127	(0.0487)
Single	-0.0973	(0.159)	0.00474	(0.214)	-0.00562	(0.0597)
Other18	0.352	(0.326)	0.00375	(0.438)	-0.0176	(0.122)
One_child	0.00334	(0.139)	-0.0303	(0.185)	-0.0161	(0.0515)
Two_children	-0.0718	(0.167)	-0.126	(0.223)	-0.0433	(0.0620)
More_children	0.255	(0.228)	0.128	(0.302)	0.0393	(0.0842)
German	-0.0181	(0.188)	-0.122	(0.251)	-0.0246	(0.0700)
Years_since_final_degree	-0.0132	(0.0200)	-0.00635	(0.0262)	-0.000846	(0.00736)
Master	-0.220	(0.235)	-0.379	(0.308)	-0.106	(0.0860)
Magister	0.215	(0.185)	-0.131	(0.244)	-0.0386	(0.0678)
Other23	-0.123	(0.193)	-0.218	(0.255)	-0.0745	(0.0708)
Years_since_graduation	-0.0182	(0.0210)	-0.0435	(0.0281)	-0.0147*	(0.00776)
PhD_in_Germany	0.0667	(0.235)	-0.0173	(0.324)	-0.00743	(0.0906)
Business_Studies	-0.158	(0.139)	-0.0860	(0.187)	-0.0199	(0.0522)
Sociology_SocialScience	-0.0636	(0.161)	0.0430	(0.219)	0.00912	(0.0610)
Other30	0.0390	(0.157)	0.0686	(0.211)	0.0173	(0.0589)
Assistant_Professor	0.283	(0.202)	0.508*	(0.282)	0.147*	(0.0783)
Research_Assistant	0.0931	(0.116)	0.0121	(0.152)	-0.00252	(0.0425)
Status_Habilitation	0.0163	(0.109)	0.0869	(0.142)	0.0265	(0.0395)
Lecturer_Admin_Officer	-0.0512	(0.155)	0.0644	(0.204)	0.00972	(0.0568)
PhD_program	0.344*	(0.182)	0.729***	(0.255)	0.222***	(0.0695)
PhD_research_institution	0.00434	(0.200)	-0.0708	(0.274)	-0.00597	(0.0758)
ExternalPhd_scholarship	0.101	(0.175)	0.0268	(0.226)	0.00460	(0.0629)
Other27	0.583*	(0.298)	0.594	(0.411)	0.197*	(0.114)
PhD_current_university	-0.227**	(0.107)	-0.299**	(0.141)	-0.0888**	(0.0389)
National_conferences	-0.476***	(0.140)	-0.596***	(0.191)	-0.168***	(0.0518)
International_conferences	0.111	(0.129)	0.226	(0.173)	0.0624	(0.0479)
German_research_institute	-0.0410	(0.209)	-0.202	(0.275)	-0.0527	(0.0771)
Foreign_research_institute	0.103	(0.120)	0.198	(0.159)	0.0556	(0.0443)
Referee_reports	0.0106	(0.122)	0.0635	(0.163)	0.0209	(0.0456)
Publications	0.131	(0.112)	0.0265	(0.151)	0.0109	(0.0420)
Third_party_funded_project	0.0139	(0.124)	0.192	(0.166)	0.106***	(0.0393)
Prospects_outside_cat	0.0159	(0.0758)	-0.109	(0.102)	-0.0365	(0.0282)
Prospects_outside_5y_cat	0.0323	(0.0740)	0.0411	(0.0971)	0.0161	(0.0270)
Prospects_academia_cat	0.311***	(0.0733)	0.290***	(0.0953)	0.0813***	(0.0259)
Competition_academia_cat	0.440***	(0.0998)	0.373***	(0.134)	0.100***	(0.0363)
Networks_n	-0.456***	(0.0958)	-0.545***	(0.130)	-0.155***	(0.0345)
Conditions_prospects_cat	0.477***	(0.0649)	0.498***	(0.0838)	0.143***	(0.0210)
Third_party_funded_projectI	0.405*	(0.211)	0.576**	(0.283)		
<i>N</i>	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=very weak, 2=rather weak

3=average 4=rather strong, 5=very strong

Values of the dependent variable (binary): 1=rather strong + very strong, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 14: In the last years, some political reforms of the university system in Germany were implemented (e.g. change from C-salary system to the W-system, introduction of junior professorship, more power of the deans). Did the motivation/incentives to do excellent academic research change due to these reforms?

	(1)		(2)		(3)	
	Incentives_due_reforms		Incentives_due_reforms_bin		Marginal effects	
main						
Women	0.143	(0.113)	0.124	(0.168)	0.0578	(0.0430)
Age	-0.0286	(0.0175)	-0.0505*	(0.0273)	-0.0145**	(0.00683)
Partnership	0.233*	(0.136)	0.205	(0.189)	0.0305	(0.0473)
Single	0.0967	(0.162)	0.00850	(0.228)	-0.0181	(0.0577)
Other18	0.351	(0.330)	0.269	(0.455)	0.0372	(0.116)
One_child	-0.122	(0.145)	-0.153	(0.206)	-0.0584	(0.0520)
Two_children	0.0770	(0.171)	-0.0538	(0.248)	-0.0184	(0.0626)
More_children	0.390*	(0.233)	0.509	(0.316)	0.143*	(0.0806)
German	-0.0348	(0.196)	0.360	(0.288)	0.0879	(0.0729)
Years_since_final_degree	-0.0106	(0.0211)	0.00922	(0.0305)	0.000565	(0.00767)
Master	0.206	(0.247)	-0.220	(0.341)	-0.0670	(0.0865)
Magister	-0.0981	(0.188)	-0.529*	(0.312)	-0.121	(0.0770)
Other23	0.0776	(0.211)	0.388	(0.290)	0.126*	(0.0729)
Years_since_graduation	0.0255	(0.0220)	0.000974	(0.0314)	0.00370	(0.00781)
PhD_in_Germany	0.492*	(0.254)	0.348	(0.371)	0.108	(0.0936)
Business_Studies	0.117	(0.142)	0.263	(0.192)	0.0693	(0.0489)
Sociology_SocialScience	-0.122	(0.201)	0.0273	(0.294)	-0.0743	(0.0619)
Other30	-0.0305	(0.183)	0.403	(0.251)	0.0218	(0.0570)
Assistant_Professor	0.679***	(0.209)	0.765***	(0.277)	0.201***	(0.0693)
Research_Assistant	-0.107	(0.120)	-0.180	(0.170)	-0.0367	(0.0432)
Status_Habilitation	-0.156	(0.112)	-0.396**	(0.159)	-0.106***	(0.0401)
Lecturer_Admin_Officer	-0.0229	(0.156)	-0.107	(0.214)	-0.0165	(0.0547)
PhD_program	0.144	(0.187)	0.0615	(0.267)	0.0357	(0.0677)
PhD_research_institution	0.00747	(0.211)	-0.359	(0.305)	-0.103	(0.0779)
ExternalPhd_scholarship	-0.254	(0.218)	-0.426	(0.329)	-0.0227	(0.0675)
Other27	0.552*	(0.299)	0.536	(0.415)	0.157	(0.105)
PhD_current_university	-0.0553	(0.109)	-0.0959	(0.152)	-0.0185	(0.0388)
National_conferences	-0.201	(0.141)	-0.154	(0.196)	-0.0375	(0.0501)
International_conferences	0.0373	(0.135)	0.00799	(0.190)	0.0116	(0.0484)
German_research_institute	-0.130	(0.217)	-0.150	(0.306)	-0.0640	(0.0784)
Foreign_research_institute	0.0669	(0.121)	0.00334	(0.169)	0.00475	(0.0428)
Referee_reports	-0.0395	(0.126)	0.165	(0.174)	0.0504	(0.0445)
Publications	-0.0231	(0.115)	-0.0553	(0.161)	-0.0156	(0.0412)
Third_party_funded_project	0.0874	(0.108)	0.0394	(0.150)	0.0178	(0.0382)
Prospects_outside_cat	0.00696	(0.0781)	-0.0594	(0.109)	-0.0185	(0.0278)
Prospects_outside_5y_cat	0.0875	(0.0754)	0.129	(0.101)	0.0328	(0.0260)
Prospects_academia_cat	0.0972	(0.0760)	0.133	(0.108)	0.0263	(0.0276)
Competition_academia_cat	0.0671	(0.102)	0.177	(0.144)	0.0440	(0.0365)
Networks_n	-0.448***	(0.0968)	-0.569***	(0.139)	-0.147***	(0.0339)
Conditions_prospects_cat	0.262***	(0.0662)	0.243***	(0.0929)	0.0696***	(0.0234)
Sociology_SocialScienceI	-0.574**	(0.262)	-0.785*	(0.402)		
Other30I	-0.432	(0.301)	-1.216**	(0.473)		
ExternalPhd_scholarshipI	0.354	(0.373)	1.155**	(0.559)		
<i>N</i>	503		503		503	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=decreased

2=slightly decreased, 3=not changed, 4=slightly improved, 5=improved

Values of the dependent variable (binary): 1=slightly improved + improved, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Has increased competition from outside Germany changed the motivation/incentives to do excellent academic research?

	(1)		(2)		(3)	
	Competition_outside		Competition_outside_bin		Marginal effects	
main						
Women	-0.0134	(0.118)	0.00458	(0.149)	0.00140	(0.0440)
Age	-0.0364**	(0.0175)	-0.0487**	(0.0245)	-0.0149**	(0.00716)
Partnership	0.158	(0.143)	0.0851	(0.182)	0.0260	(0.0537)
Single	0.291*	(0.172)	0.269	(0.222)	0.0820	(0.0651)
Other18	-0.403	(0.361)	-0.517	(0.429)	-0.158	(0.126)
One_child	0.114	(0.151)	0.173	(0.190)	0.0526	(0.0560)
Two_children	0.115	(0.181)	0.155	(0.227)	0.0473	(0.0670)
More_children	0.359	(0.262)	0.226	(0.323)	0.0690	(0.0953)
German	-0.0244	(0.206)	-0.173	(0.264)	-0.0528	(0.0777)
Years_since_final_degree	-0.0124	(0.0255)	0.0130	(0.0334)	0.00397	(0.00985)
Master	0.0703	(0.254)	0.0512	(0.318)	0.0156	(0.0939)
Magister	0.362*	(0.198)	0.118	(0.250)	0.0360	(0.0737)
Other23	0.500**	(0.227)	0.573**	(0.292)	0.175**	(0.0849)
Years_since_graduation	0.0487*	(0.0256)	0.0372	(0.0326)	0.0114	(0.00959)
PhD_in_Germany	0.373	(0.248)	0.537*	(0.311)	0.164*	(0.0912)
Business_Studies	-0.278*	(0.152)	-0.305	(0.193)	-0.0931*	(0.0565)
Sociology_SocialScience	-0.974***	(0.181)	-1.039***	(0.226)	-0.317***	(0.0621)
Other30	-0.743***	(0.169)	-0.775***	(0.214)	-0.236***	(0.0609)
Assistant_Professor	-0.130	(0.217)	0.0754	(0.277)	0.0230	(0.0817)
Research_Assistant	-0.152	(0.125)	-0.107	(0.157)	-0.0327	(0.0463)
Status_Habilitation	0.112	(0.119)	0.331**	(0.148)	0.101**	(0.0430)
Lecturer_Admin.Officer	0.192	(0.172)	0.237	(0.218)	0.0722	(0.0640)
PhD_program	0.385*	(0.199)	0.483*	(0.257)	0.147**	(0.0752)
PhD_research_institution	-0.0228	(0.211)	0.0456	(0.268)	0.0139	(0.0792)
ExternalPhd_scholarship	0.00284	(0.191)	0.0437	(0.238)	0.0133	(0.0702)
Other27	-0.0604	(0.315)	-0.135	(0.396)	-0.0411	(0.117)
PhD_current_university	-0.225*	(0.119)	-0.287*	(0.150)	-0.0876**	(0.0439)
National_conferences	-0.174	(0.151)	-0.234	(0.190)	-0.0713	(0.0560)
International_conferences	0.00501	(0.143)	-0.149	(0.181)	-0.0455	(0.0532)
German_research_institute	-0.211	(0.224)	-0.143	(0.294)	-0.0437	(0.0867)
Foreign_research_institute	0.0581	(0.128)	0.266	(0.163)	0.0813*	(0.0478)
Referee_reports	0.215	(0.134)	0.280*	(0.168)	0.0856*	(0.0491)
Publications	-0.0437	(0.122)	0.107	(0.156)	0.0326	(0.0458)
Third_party_funded_project	-0.0961	(0.116)	-0.141	(0.148)	-0.0431	(0.0437)
Prospects_outside_cat	-0.121	(0.0831)	-0.104	(0.105)	-0.0316	(0.0310)
Prospects_outside_5y_cat	0.0327	(0.0798)	0.0415	(0.100)	0.0127	(0.0296)
Prospects_academia_cat	0.244***	(0.0803)	0.210**	(0.101)	0.0641**	(0.0294)
Competition_academia_cat	0.192*	(0.105)	0.240*	(0.131)	0.0731*	(0.0383)
Networks_n	-0.169	(0.103)	-0.207	(0.129)	-0.0630*	(0.0377)
Conditions_prospects_cat	0.188***	(0.0693)	0.190**	(0.0875)	0.0581**	(0.0255)
<i>N</i>	474		474		474	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=decreased

2=slightly decreased, 3=not changed, 4=slightly improved, 5=improved

Values of the dependent variable (binary): 1=slightly improved + improved, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16: How do you view your current employment prospects in jobs outside of academic research?

	(1)		(2)		(3)	
	Prospects_outside		Prospects_outside.bin		Marginal effects	
main						
Women	-0.160	(0.106)	-0.112	(0.137)	-0.0338	(0.0437)
Age	-0.0461***	(0.0152)	-0.0769***	(0.0222)	-0.0260***	(0.00689)
Partnership	-0.0313	(0.130)	-0.00558	(0.165)	0.00393	(0.0528)
Single	0.0829	(0.154)	0.0228	(0.201)	0.0109	(0.0641)
Other18	-0.00710	(0.310)	0.127	(0.413)	0.0419	(0.132)
One_child	-0.226*	(0.135)	-0.256	(0.175)	-0.0788	(0.0557)
Two_children	-0.165	(0.163)	-0.205	(0.210)	-0.0650	(0.0669)
More_children	0.00737	(0.225)	0.123	(0.288)	0.0588	(0.0922)
German	0.221	(0.183)	0.410*	(0.236)	0.135*	(0.0749)
Years_since_final_degree	-0.00648	(0.0197)	-0.00906	(0.0258)	-0.00296	(0.00822)
Master	-0.299	(0.228)	-0.507*	(0.292)	-0.171*	(0.0921)
Magister	-0.325*	(0.177)	-0.293	(0.240)	-0.102	(0.0762)
Other23	-0.145	(0.188)	0.152	(0.243)	0.0356	(0.0777)
Years_since_graduation	0.0165	(0.0207)	0.0434*	(0.0262)	0.0154*	(0.00831)
PhD_in_Germany	0.280	(0.228)	0.130	(0.291)	0.0260	(0.0926)
Business_Studies	0.293**	(0.137)	0.259	(0.171)	0.0929*	(0.0541)
Sociology_SocialScience	-0.107	(0.157)	-0.440**	(0.205)	-0.144**	(0.0646)
Other30	0.253	(0.154)	0.0946	(0.194)	0.0352	(0.0619)
Assistant_Professor	-0.450**	(0.195)	-0.677***	(0.249)	-0.215***	(0.0782)
Research_Assistant	-0.338***	(0.113)	-0.304**	(0.146)	-0.0930**	(0.0459)
Status_Habilitation	-0.125	(0.108)	-0.188	(0.138)	-0.0680	(0.0439)
Lecturer_Admin_Officer	-0.0311	(0.152)	-0.0909	(0.192)	-0.0308	(0.0614)
PhD_program	0.379**	(0.176)	0.438*	(0.225)	0.139*	(0.0712)
PhD_research_institution	0.00510	(0.195)	0.106	(0.247)	0.0436	(0.0792)
ExternalPhd_scholarship	-0.246	(0.172)	-0.137	(0.230)	-0.0458	(0.0735)
Other27	-0.0652	(0.275)	-0.174	(0.372)	-0.0632	(0.119)
PhD_current_university	0.0751	(0.105)	0.0366	(0.134)	0.0179	(0.0429)
National_conferences	-0.187	(0.134)	-0.193	(0.172)	-0.0650	(0.0548)
International_conferences	0.203	(0.127)	0.319*	(0.166)	0.102*	(0.0524)
German_research_institute	-0.339*	(0.206)	-0.895***	(0.282)	-0.284***	(0.0867)
Foreign_research_institute	-0.0488	(0.116)	-0.104	(0.150)	-0.0317	(0.0478)
Referee_reports	-0.0135	(0.120)	-0.0752	(0.154)	-0.0267	(0.0490)
Publications	0.0976	(0.110)	0.153	(0.141)	0.0470	(0.0448)
Third_party_funded_project	0.187*	(0.103)	0.215*	(0.131)	0.0736*	(0.0415)
Prospects_academia_cat	0.0725	(0.0728)	0.00877	(0.0937)	0.0135	(0.0296)
Competition_academia_cat	-0.0822	(0.0969)	-0.126	(0.124)	-0.0378	(0.0393)
Networks_n	0.0227	(0.0925)	0.0979	(0.118)	0.0281	(0.0375)
Conditions_prospects_cat	-0.0298	(0.0718)	0.00178	(0.0903)	0.0335	(0.0251)
Conditions_prospects_catI	0.285**	(0.119)	0.348**	(0.154)		
<i>N</i>	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=very bad, 2=rather bad
3=average, 4=rather good, 5=very good

Values of the dependent variable (binary): 1=rather good + very good

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 17: How do you view your employment prospects in jobs outside of academic research five years from now, assuming that you continue working in an academic job?

	(1)		(2)		(3)	
	Prospects_outside_5y		Prospects_outside_bin		Marginal effects	
main						
Women	-0.213**	(0.106)	-0.112	(0.137)	-0.0237	(0.0361)
Age	-0.0353**	(0.0159)	-0.0769***	(0.0222)	-0.00181	(0.00569)
Partnership	-0.0275	(0.129)	-0.00558	(0.165)	-0.0607	(0.0462)
Single	0.181	(0.153)	0.0228	(0.201)	0.00971	(0.0534)
Other18	0.214	(0.307)	0.127	(0.413)	0.0713	(0.105)
One_child	-0.0746	(0.135)	-0.256	(0.175)	-0.0395	(0.0491)
Two_children	-0.0886	(0.163)	-0.205	(0.210)	-0.0129	(0.0567)
More_children	0.177	(0.221)	0.123	(0.288)	0.0225	(0.0779)
German	0.193	(0.184)	0.410*	(0.236)	0.0459	(0.0647)
Years_since_final_degree	-0.00265	(0.0199)	-0.00906	(0.0258)	-0.000183	(0.00703)
Master	0.504**	(0.227)	-0.507*	(0.292)	0.154**	(0.0762)
Magister	-0.133	(0.178)	-0.293	(0.240)	-0.00272	(0.0693)
Other23	-0.0349	(0.191)	0.152	(0.243)	0.0880	(0.0648)
Years_since_graduation	0.0420**	(0.0205)	0.0434*	(0.0262)	0.00156	(0.00718)
PhD_in_Germany	0.239	(0.227)	0.130	(0.291)	0.0984	(0.0843)
Business_Studies	0.00912	(0.135)	0.259	(0.171)	0.0184	(0.0466)
Sociology_SocialScience	-0.0365	(0.157)	-0.440**	(0.205)	-0.0458	(0.0591)
Other30	-0.0225	(0.153)	0.0946	(0.194)	-0.000133	(0.0541)
Assistant_Professor	-0.176	(0.193)	-0.677***	(0.249)	-0.0113	(0.0643)
Research_Assistant	-0.252**	(0.112)	-0.304**	(0.146)	-0.0984**	(0.0387)
Status_Habilitation	0.00496	(0.107)	-0.188	(0.138)	-0.00434	(0.0379)
Lecturer_Admin_Officer	-0.164	(0.151)	-0.0909	(0.192)	-0.0949*	(0.0519)
PhD_program	0.332*	(0.174)	0.438*	(0.225)	0.00337	(0.0622)
PhD_research_institution	-0.141	(0.194)	0.106	(0.247)	-0.118	(0.0734)
ExternalPhd_scholarship	0.0173	(0.172)	-0.137	(0.230)	-0.0620	(0.0667)
Other27	-0.0108	(0.276)	-0.174	(0.372)	0.0154	(0.0945)
PhD_current_university	0.125	(0.104)	0.0366	(0.134)	0.0220	(0.0369)
National_conferences	-0.0371	(0.134)	-0.193	(0.172)	-0.0466	(0.0472)
International_conferences	-0.0938	(0.127)	0.319*	(0.166)	-0.00851	(0.0455)
German_research_institute	-0.0678	(0.204)	-0.895***	(0.282)	-0.135	(0.0855)
Foreign_research_institute	-0.148	(0.117)	-0.104	(0.150)	-0.0413	(0.0415)
Referee_reports	-0.142	(0.119)	-0.0752	(0.154)	0.0362	(0.0418)
Publications	0.220**	(0.110)	0.153	(0.141)	0.0413	(0.0395)
Third_party_funded_project	0.134	(0.102)	0.215*	(0.131)	0.00598	(0.0358)
Prospects_academia_cat	0.0615	(0.0724)	0.00877	(0.0937)	0.0147	(0.0256)
Competition_academia_cat	-0.240**	(0.0959)	-0.126	(0.124)	-0.0632**	(0.0317)
Networks_n	-0.0694	(0.0920)	0.0979	(0.118)	-0.0376	(0.0326)
Conditions_prospects_cat	0.200***	(0.0623)	0.00178	(0.0903)	0.0747***	(0.0220)
Conditions_prospects_catI			0.348**	(0.154)		
<i>N</i>	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=very bad

2=rather bad, 3=average, 4=rather good, 5=very good

Values of the dependent variable (binary): 1=rather good + very good, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 18: How do you assess your own prospects to successfully pursue an academic career?

	(1) Prospects		(2) Prospects_bin		(3) Marginal effects	
main						
Women	0.0760	(0.109)	0.166	(0.149)	0.0476	(0.0388)
Age	-0.0135	(0.0158)	-0.0124	(0.0237)	-0.00704	(0.00639)
Partnership	-0.319**	(0.134)	-0.414**	(0.184)	-0.105**	(0.0486)
Single	-0.271*	(0.160)	-0.217	(0.222)	-0.0712	(0.0586)
Other18	0.0501	(0.320)	-0.122	(0.413)	-0.0619	(0.111)
One_child	-0.347**	(0.140)	-0.454**	(0.191)	-0.123**	(0.0503)
Two_children	-0.490***	(0.167)	-0.683***	(0.227)	-0.181***	(0.0596)
More_children	-0.651***	(0.227)	-0.982***	(0.333)	-0.250***	(0.0865)
German	-0.128	(0.190)	-0.104	(0.257)	-0.0141	(0.0677)
Years_since_final_degree	-0.00904	(0.0202)	-0.0104	(0.0291)	-0.000406	(0.00759)
Master	-0.0705	(0.239)	0.191	(0.325)	0.0376	(0.0851)
Magister	0.301*	(0.183)	0.363	(0.249)	0.0866	(0.0654)
Other23	0.148	(0.195)	0.261	(0.260)	0.0935	(0.0688)
Years_since_graduation	-0.00634	(0.0221)	-0.0153	(0.0320)	0.00258	(0.00779)
PhD_in_Germany	-0.198	(0.237)	-0.380	(0.323)	-0.128	(0.0846)
Business_Studies	0.332**	(0.141)	0.224	(0.193)	0.0613	(0.0510)
Sociology_SocialScience	0.169	(0.163)	0.0160	(0.222)	0.00942	(0.0591)
Other30	0.0422	(0.158)	-0.128	(0.216)	-0.0360	(0.0572)
Assistant_Professor	0.436**	(0.203)	0.988***	(0.290)	0.271***	(0.0752)
Research_Assistant	-0.134	(0.117)	-0.157	(0.156)	-0.0402	(0.0412)
Status_Habilitation	0.445***	(0.109)	0.581***	(0.145)	0.160***	(0.0367)
Lecturer_Admin_Officer	-0.0518	(0.156)	-0.256	(0.213)	-0.0707	(0.0558)
PhD_program	0.0359	(0.182)	-0.00946	(0.245)	-0.0189	(0.0645)
PhD_research_institution	0.224	(0.202)	0.122	(0.274)	0.0343	(0.0726)
ExternalPhd_scholarship	0.0772	(0.176)	0.0887	(0.245)	0.0218	(0.0644)
Other27	0.378	(0.289)	0.481	(0.405)	0.128	(0.107)
PhD_current_university	-0.285***	(0.108)	-0.138	(0.146)	-0.0300	(0.0388)
National_conferences	0.398***	(0.137)	0.515***	(0.187)	0.152***	(0.0486)
International_conferences	-0.0567	(0.151)	0.129	(0.204)	-0.0291	(0.0470)
German_research_institute	-0.161	(0.212)	-0.637**	(0.286)	-0.158**	(0.0752)
Foreign_research_institute	0.339***	(0.121)	0.206	(0.163)	0.0596	(0.0429)
Referee_reports	0.331***	(0.123)	0.376**	(0.163)	0.102**	(0.0429)
Publications	0.140	(0.113)	0.396***	(0.151)	0.101***	(0.0392)
Third_party_funded_project	-0.141	(0.106)	-0.126	(0.144)	-0.0399	(0.0381)
Prospects_outside_cat	0.0108	(0.0765)	0.0953	(0.104)	0.0318	(0.0274)
Prospects_outside_5y_cat	0.141*	(0.0743)	-0.0441	(0.0988)	-0.00799	(0.0262)
Competition_academia_cat	-0.0655	(0.101)	-0.226*	(0.137)	-0.0638*	(0.0361)
Networks_n	-0.444***	(0.115)	-0.603***	(0.163)	-0.124***	(0.0333)
Conditions_prospects_cat	0.393***	(0.0729)	0.371***	(0.0967)	0.145***	(0.0192)
Years_since_graduationI	0.0434**	(0.0208)	0.0419	(0.0302)		
International_conferencesI	-0.00995	(0.226)	-0.667**	(0.311)		
Networks_nI	0.166	(0.199)	0.545**	(0.276)		
Conditions_prospects_catI	0.356***	(0.127)	0.543***	(0.180)		
<i>N</i>	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=very bad

2=rather bad, 3=neutral, 4=rather good, 5=very good

Values of the dependent variable (binary): 1=rather good + very good, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 19: How do the conditions in your current job and your future employment prospects affect your motivation/incentives to engage in an academic career?

	(1)		(2)		(3)	
	Conditions		Conditions_bin		Marginal effects	
main						
Women	0.0605	(0.108)	0.0173	(0.140)	0.0161	(0.0441)
Age	-0.0317*	(0.0165)	-0.0259	(0.0221)	-0.00902	(0.00703)
Partnership	-0.0560	(0.132)	0.0140	(0.167)	0.00378	(0.0533)
Single	-0.0781	(0.157)	-0.0578	(0.201)	-0.0255	(0.0638)
Other18	-0.359	(0.306)	-0.157	(0.381)	-0.0730	(0.123)
One_child	0.00348	(0.138)	0.0563	(0.175)	0.0152	(0.0558)
Two_children	0.268	(0.167)	0.334	(0.211)	0.108	(0.0669)
More_children	0.427*	(0.228)	0.400	(0.282)	0.127	(0.0908)
German	-0.0826	(0.186)	-0.107	(0.233)	-0.0344	(0.0745)
Years_since_final_degree	0.0136	(0.0202)	0.0277	(0.0274)	0.00717	(0.00860)
Master	-0.362	(0.233)	-0.0806	(0.294)	-0.0300	(0.0945)
Magister	0.123	(0.180)	0.166	(0.227)	0.0562	(0.0728)
Other23	0.237	(0.193)	-0.0321	(0.248)	-0.0222	(0.0788)
Years_since_graduation	0.00109	(0.0210)	-0.0233	(0.0277)	-0.00415	(0.00872)
PhD_in_Germany	0.0449	(0.227)	0.317	(0.287)	0.114	(0.0926)
Business_Studies	-0.0933	(0.138)	-0.0654	(0.175)	-0.0235	(0.0561)
Sociology_SocialScience	0.0746	(0.160)	0.0417	(0.205)	0.0118	(0.0658)
Other30	-0.0730	(0.156)	-0.0643	(0.197)	-0.0235	(0.0629)
Assistant_Professor	0.0367	(0.200)	0.321	(0.251)	0.114	(0.0802)
Research_Assistant	-0.0237	(0.114)	0.103	(0.145)	0.0422	(0.0465)
Status_Habilitation	0.0599	(0.109)	0.109	(0.138)	0.0240	(0.0440)
Lecturer_Admin_Officer	0.0192	(0.153)	0.113	(0.191)	0.0422	(0.0616)
PhD_program	-0.321*	(0.177)	-0.234	(0.222)	-0.0787	(0.0708)
PhD_research_institution	0.341*	(0.203)	0.412	(0.265)	0.134	(0.0844)
ExternalPhd_scholarship	-0.176	(0.174)	-0.0432	(0.225)	-0.00909	(0.0719)
Other27	0.0606	(0.280)	-0.0339	(0.368)	-0.00598	(0.117)
PhD_current_university	-0.157	(0.126)	-0.170	(0.156)	-0.00458	(0.0429)
National_conferences	0.165	(0.136)	0.108	(0.174)	0.0387	(0.0559)
International_conferences	0.191	(0.127)	0.255	(0.162)	0.0880*	(0.0518)
German_research_institute	0.0708	(0.209)	0.0626	(0.259)	0.0376	(0.0834)
Foreign_research_institute	-0.101	(0.118)	-0.0687	(0.148)	-0.0268	(0.0476)
Referee_reports	-0.203*	(0.121)	-0.238	(0.152)	-0.0790	(0.0487)
Publications	-0.175	(0.111)	0.0156	(0.140)	0.00175	(0.0449)
Third_party_funded_project	0.157	(0.104)	0.0329	(0.131)	0.00706	(0.0422)
Prospects_outside_cat	-0.0373	(0.0754)	-0.0108	(0.0966)	-0.00210	(0.0309)
Prospects_outside_5y_cat	0.245***	(0.0729)	0.157*	(0.0914)	0.0518*	(0.0289)
Prospects_academia_cat	0.517***	(0.0822)	0.420***	(0.102)	0.185***	(0.0248)
Competition_academia_cat	0.143	(0.0996)	0.105	(0.126)	0.0391	(0.0397)
Networks_n	-0.255***	(0.0925)	-0.270**	(0.117)	-0.0854**	(0.0372)
PhD_current_universityI	0.475**	(0.208)	0.515*	(0.269)		
Prospects_academia_catI	0.300**	(0.126)	0.420**	(0.171)		
N	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical):

1=strongly negative, 2=weakly negative, 3=average, 4=weakly positive, 5=strongly positive

Values of the dependent variable (binary): 1=weakly positive + strongly positive, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal Effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 20: In comparison to a job outside of academic research, an academic research job is more risky.

	(1)		(2)	
	Academic job risk, probit		Academic job risk, AME	
Female	-0.101	(0.134)	-0.0346	(0.0460)
Age	0.0303	(0.0215)	0.0103	(0.00728)
Partnership	0.279	(0.163)	0.0947	(0.0548)
Single	-0.0255	(0.192)	-0.00867	(0.0652)
Other family status	0.255	(0.402)	0.0867	(0.137)
One child	-0.0717	(0.170)	-0.0244	(0.0579)
Two children	0.265	(0.207)	0.0900	(0.0700)
More children	-0.0848	(0.277)	-0.0288	(0.0942)
German	0.253	(0.231)	0.0860	(0.0783)
Years since final degree	-0.0627*	(0.0269)	-0.0213*	(0.00899)
Master	-0.594*	(0.296)	-0.202*	(0.0994)
Magister	0.0491	(0.226)	0.0167	(0.0767)
Other academic degree	0.174	(0.241)	0.0593	(0.0820)
Years since graduation	0.0187	(0.0269)	0.00636	(0.00914)
PhD in Germany	-0.193	(0.301)	-0.0656	(0.102)
Business Studies	0.0502	(0.171)	0.0171	(0.0581)
Sociology, Social Sciences	-0.153	(0.199)	-0.0519	(0.0674)
Other subject	-0.0558	(0.196)	-0.0190	(0.0668)
Assistant Professor	-0.100	(0.248)	-0.0340	(0.0843)
Research Assistant	-0.00860	(0.142)	-0.00292	(0.0482)
Status Habilitation	0.179	(0.135)	0.0608	(0.0459)
Lecturer, Admin, Officer	0.0948	(0.192)	0.0322	(0.0652)
PhD program	0.327	(0.234)	0.111	(0.0792)
PhD research institution	-0.0811	(0.240)	-0.0276	(0.0815)
External PhD scholarship	-0.0467	(0.216)	-0.0159	(0.0733)
Other PhD	-0.799*	(0.352)	-0.272*	(0.118)
PhD current university	-0.179	(0.131)	-0.0608	(0.0444)
National conferences	-0.109	(0.168)	-0.0371	(0.0571)
International conferences	0.467**	(0.159)	0.159**	(0.0529)
German research institute	-0.177	(0.259)	-0.0603	(0.0881)
Foreign research institute	-0.136	(0.150)	-0.0462	(0.0508)
Referee reports	-0.135	(0.152)	-0.0458	(0.0516)
Publications	0.0553	(0.139)	0.0188	(0.0472)
Third-party project	-0.0552	(0.130)	-0.0188	(0.0442)
Prospects outside	-0.106	(0.0951)	-0.0360	(0.0322)
Prospects outside 5y	-0.277**	(0.0895)	-0.0940**	(0.0296)
Prospects academia	0.0198	(0.0917)	0.00674	(0.0312)
Competition academia	0.339**	(0.121)	0.115**	(0.0401)
Networks	0.0519	(0.116)	0.0176	(0.0394)
Conditions prospects	-0.0299	(0.0794)	-0.0102	(0.0270)
<i>N</i>	528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (binary): 1=Yes 0=No

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 21: What kind of job will you probably have in five years?

	(1)		(2)		(3)	
	Job_in5y		Job_in5y_bin		Marginal effects	
main						
Women	-0.101	(0.118)	-0.00751	(0.174)	-0.00163	(0.0365)
Age	0.00424	(0.0171)	0.0165	(0.0243)	0.00358	(0.00509)
Partnership	-0.178	(0.141)	-0.150	(0.203)	-0.0325	(0.0425)
Single	-0.0229	(0.171)	0.173	(0.251)	0.0377	(0.0527)
Other18	0.100	(0.349)	0.0920	(0.479)	0.0200	(0.101)
One_child	0.0708	(0.150)	0.183	(0.218)	0.0397	(0.0457)
Two_children	-0.158	(0.181)	0.0231	(0.265)	0.00503	(0.0558)
More_children	-0.0000140	(0.251)	0.579	(0.369)	0.126	(0.0770)
German	-0.0729	(0.213)	0.180	(0.322)	0.0390	(0.0677)
Years_since_final_degree	0.0146	(0.0257)	-0.0356	(0.0364)	-0.00772	(0.00764)
Master	0.212	(0.259)	0.344	(0.394)	0.0748	(0.0827)
Magister	0.203	(0.197)	0.544*	(0.292)	0.118*	(0.0607)
Other23	0.0391	(0.216)	0.128	(0.308)	0.0278	(0.0647)
Years_since_graduation	0.0204	(0.0259)	0.0398	(0.0358)	0.00865	(0.00751)
PhD_in_Germany	-0.437*	(0.257)	-1.092***	(0.422)	-0.237***	(0.0868)
Business_Studies	0.418***	(0.151)	0.391*	(0.223)	0.0849*	(0.0464)
Sociology_SocialScience	0.300*	(0.174)	0.373	(0.251)	0.0811	(0.0525)
Other30	0.331*	(0.170)	0.414*	(0.250)	0.0899*	(0.0521)
Assistant_Professor	0.206	(0.222)	0.697*	(0.367)	0.151**	(0.0765)
Research_Assistant	-0.170	(0.123)	-0.344**	(0.174)	-0.0748**	(0.0361)
Status_Habilitation	0.313***	(0.117)	0.322*	(0.165)	0.0700**	(0.0344)
Lecturer_Admin_Officer	0.456***	(0.172)	0.489*	(0.252)	0.106**	(0.0524)
PhD_program	-0.281	(0.193)	-0.340	(0.273)	-0.0738	(0.0572)
PhD_research_institution	-0.161	(0.221)	-0.295	(0.328)	-0.0640	(0.0687)
ExternalPhd_scholarship	0.142	(0.187)	0.231	(0.263)	0.0503	(0.0553)
Other27	-0.221	(0.340)	-0.485	(0.503)	-0.105	(0.106)
PhD_current_university	-0.154	(0.115)	0.151	(0.168)	0.0327	(0.0351)
National_conferences	-0.149	(0.149)	-0.123	(0.218)	-0.0266	(0.0457)
International_conferences	0.195	(0.140)	0.325	(0.198)	0.0705*	(0.0414)
German_research_institute	-0.358	(0.227)	-0.138	(0.320)	-0.0300	(0.0672)
Foreign_research_institute	-0.0361	(0.127)	-0.144	(0.186)	-0.0312	(0.0391)
Referee_reports	0.167	(0.133)	0.158	(0.189)	0.0343	(0.0395)
Publications	-0.0644	(0.120)	-0.141	(0.174)	-0.0307	(0.0366)
Third_party_funded_project	0.158	(0.113)	0.189	(0.166)	0.0411	(0.0347)
Prospects_outside_cat	-0.277***	(0.0826)	-0.411***	(0.122)	-0.0893***	(0.0249)
Prospects_outside_5y_cat	0.0517	(0.0789)	-0.0298	(0.112)	-0.00647	(0.0236)
Prospects_academia_cat	0.770***	(0.0809)	0.865***	(0.111)	0.188***	(0.0192)
Competition_academia_cat	0.148	(0.106)	-0.0424	(0.151)	-0.00920	(0.0317)
Networks_n	-0.367***	(0.102)	-0.241*	(0.145)	-0.0524*	(0.0303)
Conditions_prospects_cat	0.285***	(0.0676)	0.431***	(0.0928)	0.0936***	(0.0182)
<i>N</i>	498		498		498	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=a job outside of academic research

2=rather a job outside of academic research

3=no preference, 4=rather an academic research job, 5=an academic research job

Values of the dependent variable (binary):

1=rather an academic research job + an academic research job, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 22: If you could choose, what kind of job would you select at present?

	(1) Choice		(2) Choice_bin		(3) Marginal effects	
main						
Women	-0.000778	(0.119)	0.0899	(0.165)	0.0212	(0.0350)
Age	0.0124	(0.0178)	0.0275	(0.0257)	0.00575	(0.00566)
Partnership	-0.103	(0.145)	-0.194	(0.199)	-0.0485	(0.0433)
Single	0.00875	(0.173)	-0.179	(0.237)	-0.0421	(0.0513)
Other18	-0.196	(0.334)	-0.817**	(0.412)	-0.215**	(0.0880)
One_child	0.250	(0.155)	0.288	(0.215)	0.0594	(0.0469)
Two_children	-0.0517	(0.184)	-0.217	(0.247)	-0.0507	(0.0537)
More_children	0.0766	(0.242)	0.295	(0.327)	0.0708	(0.0716)
German	0.111	(0.210)	-0.0975	(0.299)	-0.00626	(0.0639)
Years_since_final_degree	-0.00516	(0.0213)	-0.0308	(0.0303)	-0.00651	(0.00665)
Master	0.359	(0.269)	0.281	(0.386)	0.0572	(0.0815)
Magister	0.296	(0.205)	0.400	(0.297)	0.0891	(0.0644)
Other23	0.217	(0.227)	-0.153	(0.305)	-0.00734	(0.0660)
Years_since_graduation	-0.0151	(0.0223)	-0.00752	(0.0312)	-0.00220	(0.00686)
PhD_in_Germany	0.186	(0.252)	0.00169	(0.366)	-0.0130	(0.0787)
Business_Studies	0.317**	(0.153)	0.442**	(0.211)	0.0904**	(0.0450)
Sociology_SocialScience	0.199	(0.175)	0.309	(0.238)	0.0685	(0.0517)
Other30	0.298*	(0.172)	0.383	(0.236)	0.0809	(0.0509)
Assistant_Professor	0.287	(0.228)	0.133	(0.298)	0.0254	(0.0648)
Research_Assistant	-0.0753	(0.126)	-0.154	(0.170)	-0.0382	(0.0368)
Status_Habilitation	0.313***	(0.120)	0.543***	(0.165)	0.125***	(0.0346)
Lecturer_Admin_Officer	0.0698	(0.169)	0.320	(0.243)	0.0681	(0.0524)
PhD_program	0.212	(0.198)	0.334	(0.272)	0.0598	(0.0581)
PhD_research_institution	0.0983	(0.226)	0.344	(0.307)	0.0584	(0.0659)
ExternalPhd_scholarship	0.424**	(0.197)	1.069***	(0.312)	0.244***	(0.0656)
Other27	0.529	(0.352)	0.435	(0.464)	0.113	(0.101)
PhD_current_university	0.0209	(0.117)	0.0349	(0.158)	0.0124	(0.0344)
National_conferences	-0.192	(0.150)	-0.151	(0.210)	-0.0274	(0.0454)
International_conferences	0.269*	(0.141)	0.403**	(0.190)	0.0902**	(0.0410)
German_research_institute	0.0349	(0.231)	0.0193	(0.314)	0.0112	(0.0675)
Foreign_research_institute	0.0463	(0.134)	0.245	(0.187)	0.0490	(0.0405)
Referee_reports	-0.0272	(0.133)	-0.141	(0.180)	-0.0319	(0.0392)
Publications	-0.0754	(0.121)	-0.0849	(0.166)	-0.0166	(0.0360)
Third_party_funded_project	0.272**	(0.116)	0.224	(0.159)	0.0501	(0.0342)
Prospects_outside_cat	-0.284***	(0.0828)	-0.381***	(0.113)	-0.0857***	(0.0238)
Prospects_outside_5y_cat	-0.0552	(0.0809)	-0.0252	(0.110)	-0.00543	(0.0238)
Prospects_academia_cat	0.644***	(0.0801)	0.725***	(0.108)	0.162***	(0.0204)
Competition_academia_cat	0.0573	(0.109)	0.103	(0.149)	0.0144	(0.0320)
Networks_n	-0.311**	(0.122)	-0.490***	(0.170)	-0.0548*	(0.0294)
Conditions_prospects_cat	0.344***	(0.0689)	0.377***	(0.0908)	0.0793***	(0.0188)
Networks_nI	0.222	(0.203)	0.700**	(0.278)		
<i>N</i>	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=a job outside of academic research

2=rather a job outside of academic research

3=no preference, 4=rather an academic research job, 5=an academic research job

Values of the dependent variable (binary):

1=rather an academic research job + an academic research job , 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 23: Average marginal effects for probit regressions of conditions and academic job

Dependent Variable	Conditions improve engagement in academic career ^a		Academic Research Job in 5 years ^b		Select Academic Job at Present ^c	
Female	0.0161	(0.0456)	-0.00162	(0.0374)	0.0212	(0.0366)
Age	-0.00902	(0.00727)	0.00354	(0.00521)	0.00575	(0.00585)
Partnership	0.00378	(0.0551)	-0.0322	(0.0436)	-0.0485	(0.0447)
Single	-0.0255	(0.0660)	0.0373	(0.0540)	-0.0421	(0.0530)
Other family status	-0.0730	(0.127)	0.0198	(0.103)	-0.215**	(0.0910)
One child	0.0152	(0.0577)	0.0393	(0.0468)	0.0594	(0.0485)
Two children	0.108	(0.0691)	0.00497	(0.0571)	-0.0507	(0.0555)
More children	0.127	(0.0939)	0.125	(0.0788)	0.0708	(0.0741)
German	-0.0344	(0.0770)	0.0386	(0.0692)	-0.00626	(0.0661)
Years since final degree	0.00717	(0.00890)	-0.00764	(0.00781)	-0.00651	(0.00687)
Master	-0.0300	(0.0977)	0.0740	(0.0847)	0.0572	(0.0843)
Magister	0.0562	(0.0753)	0.117*	(0.0622)	0.0891	(0.0667)
Other academic degree	-0.0222	(0.0815)	0.0276	(0.0663)	-0.00734	(0.0682)
Years since graduation	-0.00415	(0.00902)	0.00856	(0.00768)	-0.00220	(0.00709)
PhD in Germany	0.114	(0.0958)	-0.235***	(0.0888)	-0.0130	(0.0813)
Business Studies	-0.0235	(0.0580)	0.0840*	(0.0475)	0.0904*	(0.0466)
Sociology, Social Sciences	0.0118	(0.0680)	0.0803	(0.0537)	0.0685	(0.0534)
Other subject	-0.0235	(0.0650)	0.0889*	(0.0532)	0.0809	(0.0526)
Assistant Professor	0.114	(0.0829)	0.150*	(0.0784)	0.0254	(0.0670)
Research Assistant	0.0422	(0.0481)	-0.0740**	(0.0370)	-0.0382	(0.0380)
Status Habilitation	0.0240	(0.0455)	0.0693**	(0.0352)	0.125***	(0.0359)
Lecturer, Admin, Officer	0.0422	(0.0637)	0.105*	(0.0536)	0.0681	(0.0542)
PhD program	-0.0787	(0.0732)	-0.0730	(0.0585)	0.0598	(0.0601)
PhD research institution	0.134	(0.0873)	-0.0634	(0.0703)	0.0584	(0.0681)
External PhD scholarship	-0.00909	(0.0743)	0.0498	(0.0565)	0.244***	(0.0679)
Other PhD	-0.00598	(0.121)	-0.104	(0.108)	0.113	(0.105)
PhD current university	-0.00458	(0.0443)	0.0324	(0.0360)	0.0124	(0.0356)
National conferences	0.0387	(0.0578)	-0.0264	(0.0468)	-0.0274	(0.0470)
International conferences	0.0880	(0.0535)	0.0698*	(0.0423)	0.0902**	(0.0425)
German research institute	0.0376	(0.0862)	-0.0297	(0.0688)	0.0112	(0.0698)
Foreign research institute	-0.0268	(0.0492)	-0.0309	(0.0400)	0.0490	(0.0419)
Referee reports	-0.0790	(0.0504)	0.0340	(0.0405)	-0.0319	(0.0405)
Publications	0.00175	(0.0464)	-0.0304	(0.0375)	-0.0166	(0.0372)
Third-party project	0.00706	(0.0437)	0.0407	(0.0356)	0.0501	(0.0354)
Prospects outside	-0.00210	(0.0320)	-0.0884***	(0.0255)	-0.0857***	(0.0246)
Prospects outside 5y	0.0518*	(0.0299)	-0.00641	(0.0241)	-0.00543	(0.0246)
Prospects academia	0.185***	(0.0257)	0.186***	(0.0194)	0.162***	(0.0211)
Competition academia	0.0391	(0.0410)	-0.00911	(0.0324)	0.0144	(0.0331)
Networks	-0.0854**	(0.0385)	-0.0518*	(0.0310)	-0.0548*	(0.0305)
Conditions prospects			0.0926***	(0.0187)	0.0793***	(0.0194)
<i>N</i>	528		498		528	

Marginal effects; Standard errors in parentheses

a: Dependent Variable: conditions improve research incentives weakly or strongly positive.

b: Dependent Variable: (rather) will have academic research job in 5 years.

c: Dependent Variable: (rather) select academic research job at present.

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 24: Do you pursue applied research in order to improve your career prospects in jobs outside of academic research?

	Applied_research		Applied_research		Applied_research	
Applied_research						
Women	-0.0212	(0.120)	0.00584	(0.118)	0.0131	(0.112)
Age	0.0342*	(0.0202)	0.0326*	(0.0195)	0.0214	(0.0190)
Partnership	0.256*	(0.142)	0.186	(0.140)	0.174	(0.137)
Single	-0.151	(0.169)	-0.187	(0.165)	-0.154	(0.161)
Other18	0.597	(0.391)	0.534	(0.386)	0.302	(0.370)
One_child	0.160	(0.151)	0.133	(0.148)	0.143	(0.145)
Two_children	-0.0524	(0.179)	-0.0297	(0.176)	-0.0190	(0.170)
More_children	-0.265	(0.247)	-0.232	(0.242)	-0.153	(0.236)
German	-0.00123	(0.203)	-0.150	(0.200)	-0.0202	(0.191)
Years_since_final_degree	0.0298	(0.0264)	0.0183	(0.0260)	0.00712	(0.0252)
Master	-0.357	(0.250)	-0.202	(0.243)	-0.149	(0.236)
Magister	0.123	(0.202)	0.273	(0.198)	0.256	(0.188)
Other23	-0.186	(0.213)	-0.0587	(0.209)	0.0137	(0.199)
Years_since_graduation	-0.0484*	(0.0261)	-0.0334	(0.0256)	-0.0121	(0.0245)
PhD_in_Germany	-0.0323	(0.247)	-0.124	(0.243)	-0.222	(0.215)
Business_Studies	0.00561	(0.153)	-0.109	(0.147)	-0.280**	(0.134)
Sociology_SocialScience	0.326*	(0.178)	0.261	(0.173)	0.156	(0.164)
Other30	0.136	(0.167)	0.0106	(0.163)	-0.0224	(0.156)
Assistant_Professor	0.00151	(0.256)	0.228	(0.248)		
Research_Assistant	0.0147	(0.125)	0.0674	(0.122)		
Status_Habilitation	-0.205	(0.139)	-0.0424	(0.133)		
Lecturer_Admin_Officer	0.263	(0.166)	0.300*	(0.163)		
PhD_program	0.201	(0.192)	0.0414	(0.187)		
PhD_research_institution	0.531**	(0.212)	0.546***	(0.209)		
ExternalPhd_scholarship	0.128	(0.196)	0.221	(0.193)		
Other27	0.0681	(0.317)	0.201	(0.313)		
PhD_current_university	-0.136	(0.116)	-0.0993	(0.114)		
National_conferences	-0.356**	(0.150)	-0.0916	(0.141)		
International_conferences	0.225	(0.140)	0.202	(0.137)		
German_research_institute	0.0716	(0.228)	-0.00603	(0.222)		
Foreign_research_institute	-0.0325	(0.125)	-0.0292	(0.123)		
Referee_reports	0.192	(0.131)	0.246*	(0.128)		
Publications	0.0556	(0.121)	0.0294	(0.119)		
Third_party_funded_project	-0.127	(0.133)	-0.182	(0.131)		
Prospects_outside_cat	-0.256***	(0.0844)				
Prospects_outside_5y_cat	0.0364	(0.0797)				
Prospects_academia_cat	0.183**	(0.0797)				
Competition_academia_cat	0.0918	(0.107)				
Networks_n	-0.279***	(0.103)				
Conditions_prospects_cat	0.171**	(0.0682)				
Assistant_ProfessorI	0.626	(0.384)	0.607	(0.376)		
Status_HabilitationI	0.647***	(0.247)	0.471*	(0.243)		
Third_party_funded_projectI	-0.377	(0.231)	-0.357	(0.228)		
<i>N</i>	475		476		476	

Standard errors in parentheses

Values of the dependent variable (categorical):

1=that's right, this is one reason why I pursue only applied research

2=that's right, this is one reason why I pursue applied research in addition to basic research

3=that's wrong, I pursue applied research, but for other reasons 4=that's wrong, I pursue only basic research

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 25: Average marginal effects for probit regressions of assessments of competition and networks

Dependent variable	Competition in academic field ^a		Networks are more important ^b	
Female	-0.0388	(0.0412)	0.0390	(0.0409)
Age	0.00256	(0.00637)	-0.000648	(0.00551)
Partnership	0.0126	(0.0478)	-0.0274	(0.0488)
Single	0.171***	(0.0599)	0.0671	(0.0568)
Other family status	0.299*	(0.165)	0.110	(0.108)
One child	0.0879*	(0.0518)	0.0216	(0.0506)
Two children	0.0144	(0.0590)	-0.00942	(0.0616)
More children	0.181**	(0.0855)	-0.0724	(0.0835)
German	-0.120	(0.0770)	0.0485	(0.0715)
Years since final degree	-0.00789	(0.00804)	0.0117	(0.00791)
Master	-0.0515	(0.0893)	-0.0526	(0.0951)
Magister	0.111	(0.0692)	0.0727	(0.0617)
Other academic degree	0.128*	(0.0761)	0.0438	(0.0700)
Years since graduation	-0.00155	(0.00806)	-0.0102	(0.00808)
PhD in Germany	-0.233**	(0.106)	-0.00256	(0.0890)
Business Studies	-0.0596	(0.0513)	0.0274	(0.0535)
Sociology, Social Sciences	-0.00323	(0.0605)	0.106*	(0.0580)
Other subject	-0.000216	(0.0593)	0.131**	(0.0572)
Assistant Professor	0.131*	(0.0763)	0.106	(0.0724)
Research Assistant	0.0292	(0.0427)	-0.0669	(0.0420)
Status Habilitation	0.0860**	(0.0408)	0.0330	(0.0405)
Lecturer, Admin, Officer	0.0290	(0.0572)	0.0255	(0.0567)
PhD program	-0.0181	(0.0708)	-0.0134	(0.0662)
PhD research institution	-0.0486	(0.0710)	-0.0462	(0.0755)
External PhD scholarship	0.0542	(0.0678)	0.0231	(0.0607)
Other PhD	-0.0548	(0.113)	-0.0683	(0.105)
PhD current university	-0.0213	(0.0394)	-0.0672*	(0.0385)
National conferences	0.0675	(0.0515)	-0.0576	(0.0486)
International conferences	-0.125***	(0.0476)	-0.0355	(0.0464)
German research institute	-0.0298	(0.0776)	-0.0128	(0.0795)
Foreign research institute	-0.00331	(0.0445)	0.0326	(0.0442)
Referee reports	0.140***	(0.0442)	-0.0342	(0.0452)
Publications	0.0186	(0.0421)	0.00635	(0.0403)
Third-party project	-0.0403	(0.0400)	0.0179	(0.0385)
Prospects outside	-0.00301	(0.0282)	0.0264	(0.0273)
Prospects outside 5y	-0.0436*	(0.0264)	-0.0127	(0.0274)
Prospects academia	0.0164	(0.0250)	-0.100***	(0.0249)
Networks	0.00156	(0.0352)		
Competition academia			-0.0236	(0.0363)
Conditions prospects			-0.0694***	(0.0222)
<i>N</i>	528		528	

Marginal effects; Standard errors in parentheses

a: Dependent Variable: competition for academic career strong or very strong.

b: Dependent Variable: networks are more important than academic excellence.

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 26: How strong is the competition for a successful academic career in your field?

	(1)		(2)		(3)	
	Competition		Competition_bin		Marginal effects	
main						
Women	-0.0743	(0.111)	-0.129	(0.150)	-0.0395	(0.0409)
Age	0.00161	(0.0160)	0.00727	(0.0233)	0.00274	(0.00614)
Partnership	0.0278	(0.134)	0.0371	(0.179)	0.0135	(0.0461)
Single	0.464***	(0.161)	0.609***	(0.226)	0.174***	(0.0579)
Other18	0.733**	(0.336)	1.346**	(0.649)	0.308*	(0.161)
One_child	0.226	(0.170)	0.662***	(0.247)	0.0878*	(0.0501)
Two_children	-0.0465	(0.169)	-0.00750	(0.219)	0.0112	(0.0571)
More_children	0.267	(0.231)	0.654**	(0.321)	0.175**	(0.0829)
German	-0.251	(0.193)	-0.372	(0.282)	-0.118	(0.0743)
Years_since_final_degree	-0.0138	(0.0204)	-0.0161	(0.0289)	-0.00807	(0.00775)
Master	-0.219	(0.241)	-0.163	(0.326)	-0.0475	(0.0863)
Magister	0.295	(0.186)	0.416	(0.256)	0.109	(0.0669)
Other23	0.480**	(0.203)	0.553*	(0.286)	0.130*	(0.0737)
Years_since_graduation	-0.00903	(0.0215)	-0.0216	(0.0297)	-0.00139	(0.00778)
PhD_in_Germany	-0.412*	(0.240)	-0.835**	(0.392)	-0.233**	(0.102)
Business_Studies	-0.103	(0.142)	-0.246	(0.190)	-0.0576	(0.0496)
Sociology_SocialScience	0.0215	(0.165)	-0.0744	(0.224)	-0.00256	(0.0584)
Other30	-0.113	(0.160)	-0.00885	(0.218)	0.000557	(0.0573)
Assistant_Professor	0.367*	(0.205)	0.470*	(0.283)	0.130*	(0.0738)
Research_Assistant	-0.00303	(0.118)	0.0774	(0.158)	0.0273	(0.0413)
Status_Habilitation	0.202*	(0.111)	0.307**	(0.153)	0.0853**	(0.0394)
Lecturer_Admin_Officer	0.140	(0.159)	0.125	(0.211)	0.0271	(0.0553)
PhD_program	-0.0696	(0.184)	0.0534	(0.261)	-0.0124	(0.0688)
PhD_research_institution	-0.126	(0.203)	-0.245	(0.262)	-0.0526	(0.0688)
ExternalPhd_scholarship	0.0969	(0.180)	0.207	(0.248)	0.0520	(0.0653)
Other27	-0.268	(0.288)	-0.123	(0.425)	-0.0572	(0.109)
PhD_current_university	-0.0480	(0.109)	-0.0933	(0.145)	-0.0210	(0.0381)
National_conferences	0.122	(0.140)	0.249	(0.193)	0.0668	(0.0497)
International_conferences	-0.341**	(0.133)	-0.505***	(0.180)	-0.128***	(0.0460)
German_research_institute	-0.196	(0.215)	-0.234	(0.285)	-0.0336	(0.0749)
Foreign_research_institute	0.0676	(0.122)	-0.0527	(0.166)	-0.00262	(0.0430)
Referee_reports	0.236*	(0.124)	0.580***	(0.170)	0.143***	(0.0428)
Publications	0.125	(0.115)	0.100	(0.156)	0.0202	(0.0407)
Third_party_funded_project	-0.0786	(0.108)	-0.171	(0.149)	-0.0420	(0.0387)
Prospects_outside_cat	0.0325	(0.0775)	-0.0341	(0.105)	-0.00338	(0.0272)
Prospects_outside_5y_cat	-0.180**	(0.0749)	-0.205**	(0.0986)	-0.0467*	(0.0257)
Prospects_academia_cat	-0.118	(0.0868)	-0.178	(0.116)	0.00739	(0.0259)
Networks_n	-0.0123	(0.0970)	-0.00317	(0.132)	0.00493	(0.0342)
Conditions_prospects_cat	0.0148	(0.0654)	0.0559	(0.0877)	0.0217	(0.0228)
One_childI	-0.264	(0.258)	-0.961***	(0.357)		
Prospects_academia_catI	0.438***	(0.128)	0.600***	(0.171)		
N	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical): 1=very weak

2=weak, 3=average, 4=strong, 5=very strong

Values of the dependent variable (binary): 1=strong + very strong, 0=other

(1): Ordered Probit, (2): Probit, (3): Marginal effects of Probit(2)

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 27: What is the importance of networking (networks) to pursue an academic career?

	(1)		(2)		(3)	
	Networks		Networks_bin1		Marginal effects	
main						
Women	0.128	(0.124)	-0.245	(0.283)	-0.0166	(0.0217)
Age	-0.000191	(0.0179)	-0.0182	(0.0424)	-0.00190	(0.00429)
Partnership	-0.147	(0.151)	0.230	(0.306)	0.0236	(0.0311)
Single	0.0325	(0.179)	0.590*	(0.341)	0.0627*	(0.0346)
Other18	0.0518	(0.353)	0.858	(0.598)	0.0854	(0.0597)
One_child	-0.0332	(0.158)	0.466	(0.319)	0.0362	(0.0320)
Two_children	-0.179	(0.191)	0.603*	(0.358)	0.0633*	(0.0361)
More_children	-0.239	(0.260)	0.472	(0.518)	0.0375	(0.0531)
German	0.0803	(0.214)	0.296	(0.428)	0.0237	(0.0424)
Years_since_final_degree	0.0323	(0.0234)	-0.00976	(0.0504)	-0.000737	(0.00518)
Master	-0.350	(0.268)	0.640	(0.430)	0.0674	(0.0434)
Magister	0.210	(0.205)	-0.0983	(0.459)	-0.00313	(0.0456)
Other23	0.238	(0.223)	-0.626	(0.672)	-0.0646	(0.0679)
Years_since_graduation	-0.0310	(0.0245)	0.0389	(0.0535)	0.00416	(0.00538)
PhD_in_Germany	0.0327	(0.265)	-0.348	(0.424)	-0.0281	(0.0430)
Business_Studies	0.417***	(0.159)	-1.185***	(0.310)	-0.123***	(0.0318)
Sociology_SocialScience	0.536***	(0.185)	-1.129***	(0.394)	-0.104***	(0.0379)
Other30	0.510***	(0.178)	-0.663**	(0.299)	-0.0641**	(0.0304)
Assistant_Professor	0.0773	(0.225)	0.572	(0.364)	0.0583	(0.0376)
Research_Assistant	-0.184	(0.132)	0.210	(0.275)	0.0188	(0.0281)
Status_Habilitation	0.147	(0.125)	-0.316	(0.251)	-0.0263	(0.0252)
Lecturer_Admin_Officer	-0.215	(0.175)	0.921***	(0.311)	0.0950***	(0.0321)
PhD_program	-0.0890	(0.203)	0.0919	(0.344)	0.0102	(0.0351)
PhD_research_institution	-0.100	(0.227)	0.131	(0.389)	0.00684	(0.0395)
ExternalPhd_scholarship	0.116	(0.200)	-0.0676	(0.427)	-0.0196	(0.0445)
Other27	-0.0354	(0.320)	-0.510	(0.713)	-0.0504	(0.0721)
PhD_current_university	-0.115	(0.121)	-0.00928	(0.246)	-0.00516	(0.0246)
National_conferences	-0.221	(0.155)	0.263	(0.304)	0.0266	(0.0311)
International_conferences	-0.00454	(0.148)	-0.409	(0.301)	-0.0424	(0.0304)
German_research_institute	0.150	(0.243)	-0.612	(0.562)	-0.0698	(0.0563)
Foreign_research_institute	0.0125	(0.135)	0.201	(0.250)	0.0251	(0.0253)
Referee_reports	-0.0198	(0.159)	0.222	(0.303)	-0.00716	(0.0269)
Publications	-0.0821	(0.152)	-0.0768	(0.289)	0.0140	(0.0255)
Third_party_funded_project	0.0398	(0.119)	0.00825	(0.221)	0.00407	(0.0225)
Prospects_outside_cat	0.0759	(0.0859)	0.0615	(0.172)	0.00225	(0.0174)
Prospects_outside_5y_cat	-0.0933	(0.0837)	0.208	(0.161)	0.0219	(0.0164)
Prospects_academia_cat	-0.346***	(0.0976)	0.152	(0.189)	0.0279	(0.0172)
Competition_academia_cat	-0.0255	(0.114)	-0.219	(0.208)	-0.0182	(0.0211)
Conditions_prospects_cat	-0.138	(0.0845)	0.221	(0.169)	0.0124	(0.0148)
<i>N</i>	528		528		528	

Marginal effects; Standard errors in parentheses

Values of the dependent variable (categorical):

1=Academic excellence is much more important than networks for a successful academic career

2=In addition to academic excellence,

networks are about equally important for a successful academic career

3=Networks are much more important than academic excellence for a successful academic career

Values of the dependent variable (binary1):

1=Academic excellence is much more important than networks for a successful academic career, 0=other

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$