

2013 National Report on Junior Scholars



Statistical Data and Research Findings on
Doctoral Students and Doctorate Holders in Germany

Overview of Key Results

The report was produced under the direction of Dr. Anke Burkhardt from the Institute for Research on Higher Education at Martin Luther University Halle-Wittenberg (HoF) by an academic consortium which also included the two following institutes:

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International Centre for Higher Education Research Kassel (INCHER-Kassel), represented by Prof. Dr. Dr. h.c. Ulrich Teichler

The following institutions also contributed sections to the report:

Higher Education Information System (HIS)
Institute for Research Information and Quality Assurance (iFQ)
Leibniz Institute for the Social Sciences/Center of Excellence Women and Science (GESIS/CEWS)
Federal Statistical Office (destatis)
Center for Research on Higher Education at TU Dortmund (zhb)

The consortium was advised by an Academic Council chaired by Prof. Dr. Stefan Hornbostel (iFQ).

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Abbreviations:

BB	=	Brandenburg
BE	=	Berlin
BW	=	Baden-Wuerttemberg
BY	=	Bavaria
HB	=	Bremen
HE	=	Hesse
HH	=	Hamburg
MV	=	Mecklenburg-Western Pomerania
NI	=	Lower Saxony
NW	=	North Rhine-Westphalia
RP	=	Rhineland-Palatinate
SH	=	Schleswig-Holstein
SL	=	Saarland
SN	=	Saxony
ST	=	Saxony-Anhalt
TH	=	Thuringia

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Introduction

The “National Report on Junior Scholars” is based on the voluntary commitment of the Federal Government – in line with the decision taken by the Federal Parliament on 18/07/2009 – to produce a regular report once every legislative period on the situation of junior scholars in Germany with alternating focal points. The Federal Ministry of Education and Research (BMBF) is implementing this decision by publishing an independent academic report, the “2013 National Report on Junior Scholars”. This report focuses on the training and career development of researchers from their first professional qualification through to their doctorate, and then in the subsequent phase of further academic training right up to their transition into a professional career in research, academia or other fields. The “2013 National Report on Junior Scholars” takes stock of the current situation and also proposes an approach for the future. It adds to the analysis of periodically available official statistics and relevant research findings that was started in the first National Report. In 2008, the main focus was on training phases and degrees and on international comparability – especially up to the successful completion of the doctorate; the present report takes a close look at the professional situation in academia and other fields after conferral of doctorates and at the conditions of employment and career prospects facing junior scholars in higher education.

As this is a national report, it focuses on developments at a national level. The perspectives of individual higher education institutions and the specific situation of the Länder can only be considered in individual cases. The deadline for data submission was 31/12/2011; data that became available at a later date was only incorporated into certain sections and analyses. As the report focuses on current developments, most of the statistics documented are from 2000 to 2010.

The report is published by an independent academic consortium in cooperation with other researchers. The consortium, under the direction of Dr. Anke Burkhardt (HoF), included representatives of the following research institutions: the Institute for Research on Higher Education at Martin Luther University Halle-Wittenberg (HoF, coordinating), the Bavarian State Institute for Higher Education Research and Planning Munich (IHF), and the

International Centre for Higher Education Research Kassel (INCHER). The consortium was jointly responsible for the report and was advised by an Academic Council under the direction of Prof. Dr. Stefan Hornbostel (iFQ). The consortium also coordinated its work with a steering group, which included representatives of the Standing Conference of the Ministers of Education and Cultural Affairs (KMK), the German Rectors’ Conference (HRK), the German Research Foundation (DFG) and the German Council of Science and Humanities (WR), as well as the BMBF. In addition, intermediate stages within the project were discussed with the members of a feedback group that included many interest groups that represent junior scholars. The following institutes and institutions also prepared current research results specifically for this report: the Higher Education Information System (HIS), the Institute for Research Information and Quality Assurance (iFQ), the Leibniz Institute for the Social Sciences/Center of Excellence Women and Science (GESIS/CEWS), the Federal Statistical Office (destatis) and the Center for Research on Higher Education at TU Dortmund (zhb). The consortium would like to thank everybody who was involved.

The numbering of figures and tables in this report is the same as that in the overall report, which means that readers can refer to the full report for supplementary information.

A1 Higher education policy and law

Junior scholars in political debate

- **Public interest in junior scholars is growing:** As knowledge-based activities become more important, political debate is focussing increasingly on fostering this knowledge and encouraging junior scholars. Since the release of the “National Report on Support for Junior Scholars 2008” (BuWiN), the training of researchers has been on the agenda of the Federal Parliament on many occasions. Numerous academic organisations, interest groups and committees have contributed to the debate with analyses of the situation for junior scholars and have proposed improvements to training paths, conditions of employment and career prospects.
- **The focus of interest is shifting to the post-doctoral phase:** At the beginning of the millennium, the situation for doctoral students was the main priority, with particular attention given to the development and expansion of structured doctoral programmes. However, the focus of public debate has now shifted to the post-doctoral phase. There is an increasing demand for clear information regarding the career prospects of doctoral graduates at higher education institutions and research institutions.
- **The role of the Federal Government is changing:** The reform of the federal system in 2006 led to a reappraisal of the role of the Federal Government in supporting junior scholars. Together with the Länder, the Federal Government has emphasised key areas for fostering junior scholars as part of its support programmes, including its Excellence Initiative and the Programme for Women Professors. In the light of increasing international competition, higher education institutions in particular are calling for more support from the Federal Government and, together with this, for a relaxation of the ban on cooperation between the Federal Government and the Länder that has been in effect since 2006.

Priorities for higher education policy

- **The issue of the performance of the academic training system sets the tone for the debate on higher education policy:** The starting point of political debate is the importance of junior scholars for the higher education system and for the overall economic and social development of Germany.
- **Increasing concern regarding the attractiveness of academic professions:** With this importance in mind, the debate is characterised by concerns that the German system of academic training may not be attractive enough for excellent researchers due to the long periods of professional uncertainty, the high proportion of temporary positions and the lower levels of pay compared with other (research-related) professions for highly qualified graduates.
- **The flexibility of the training system will determine future performance:** The issue of attractiveness is closely associated with discussions regarding the relationship between competition and continuity within the training system. Competition should encourage high performance and also foster the recruitment of excellent junior scholars. At the same time, the demand for qualified academic personnel must be met by opening up longer-term career prospects. As the doctoral degrees that are usual in Germany qualify graduates not only for academic careers in a narrower sense, but also for a wide variety of professions in administration, industry and society, one of the key challenges here is to facilitate the transition from academic qualifications to careers in business and administration.
- **Equal opportunities are not yet a reality:** Despite numerous support programmes and the measurable successes of female researchers and academics, there are still significant

gender differences between academic qualifications and career paths. Other aspects of equal opportunities that still influence career prospects on the academic labour market – such as regional, social and ethnic background, culture or religion, family conditions, illnesses and disabilities – have not yet received sufficient public attention.

- **Germany is part of an international competitive environment:** International comparison provides the reference framework for successful policy on junior scholars. The aim should be to provide the best possible support for the mobility of junior scholars and to make Germany as attractive as possible for highly qualified junior scholars from other countries.
- **Quality assurance is becoming increasingly important:** Quality assurance is a relatively new aspect of the debate on higher education policy. On the one hand, this area relates to the issue of whether the academic training system (including the broad range of support programmes) is structured in a way that facilitates top-quality academic work; on the other hand, this area deals with standards for good academic work and the ensuring of compliance with these standards. In the context of the attractiveness of the German training system for junior scholars from Germany and abroad, increasing importance is being attached to the development and implementation of transparent and binding quality and procedural standards for doctoral degrees and other academic achievements.

Personnel structure in higher education laws of the Länder

- **The reform of the federal system has given the Länder increased freedom:** A major result of the 2006 reform of the federal system was the increased freedom granted to the Länder with regard to the legal framework for the personnel structure at higher education institutions. The Länder have used this freedom to revise the personnel laws. Relatively similar decisions were taken, which have resulted in some minor differences in personnel categories and the corresponding responsibilities between various Länder, but have not led to fundamental differences in the legal stipulations regarding higher education personnel.
- **Fundamental structure of academic personnel remains a two-class system:** In principle, all Länder have retained the distinction between professors, who research and teach independently, and academic assistants, who are bound by instructions from their superiors. However, discretionary provisions allow for deviations from this.
- **Distinction between specialists in teaching or research is becoming increasingly significant:** The higher education laws of nine Länder have introduced additional (new) personnel categories that involve exclusive or predominant teaching roles in addition to the personnel categories traditionally focused on teaching. Ten Länder explicitly mention personnel categories specialising in research in their higher education laws.

Regulations for appointing professors

- **Junior professorships have become accepted as a path for demonstrating suitability for full appointments:** Junior professorships and Habilitations (a post-doctoral academic qualification that is awarded in several European countries) are given equivalent status in the higher education laws of all Länder that specify appointment requirements in detail. General requirements for appointment to a junior professorship are teaching skills, a particular talent for academic work and an excellent doctorate (Tab. A1-5).
- **Tenure track has found little place in higher education laws so far:** Junior professors can generally apply for a professorship at their own higher education institution if they switched higher education institutions after their doctorate or worked at another higher

Tab. A1-5: Recognised additional academic achievements as professional requirements*

Additional achievements	BW	BY	BE	BB	HB	HH	HE	MV	NI	NW	RP	SL	SN	ST	SH	TH
Habilitation	x	x	–	x	m	–	m	x	x	x	x	x	x	x	x	x
Junior professorship	x	x	x	x	m	x	m	x	x	x	x	x	x	x	x	x
Junior lecturership	x	–	–	–	m	–	m	–	–	–	–	–	–	–	–	–
Work as academic assistant																
at higher education institutions	x	–	x	x	m	x	m	x	x	x	x	x	–	x	–	x
at non-university research institutions	x	–	x	x	m	x	m	x	x	x	x	x	–	x	–	x
Research work																
in industry	x	–	x	x	m	x	m	x	–	x	x	x	–	x	–	x
in other area of society	x	–	x	x	m	–	m	x	–	x	x	–	–	x	–	x
Other/equivalent research work	–	–	–	–	m	–	m	–	x	x	–	–	x	x	–	–
Other equivalent work/ Research work in practice	–	x	–	–	m	x	m	–	–	–	–	x	–	–	x	–

*Länder-specific provisions, see 2013 National Report on Junior Scholars, p. 75

m: Data is not available

Source: Own research

education institution for at least two years. In three Länder, subsequent appointment to a tenured professorship (tenure track option) is possible based on a positive evaluation.

- **Appointment rights largely transferred to higher education institutions:** In ten Länder, the right to appoint professors has been fully transferred to the higher education institutions. The higher education laws of three Länder require approval by the relevant ministry, while the appointment is made by the ministry in a further three Länder.

A 2 Developments and trends in support practice

Nature of the academic training system and funding profile

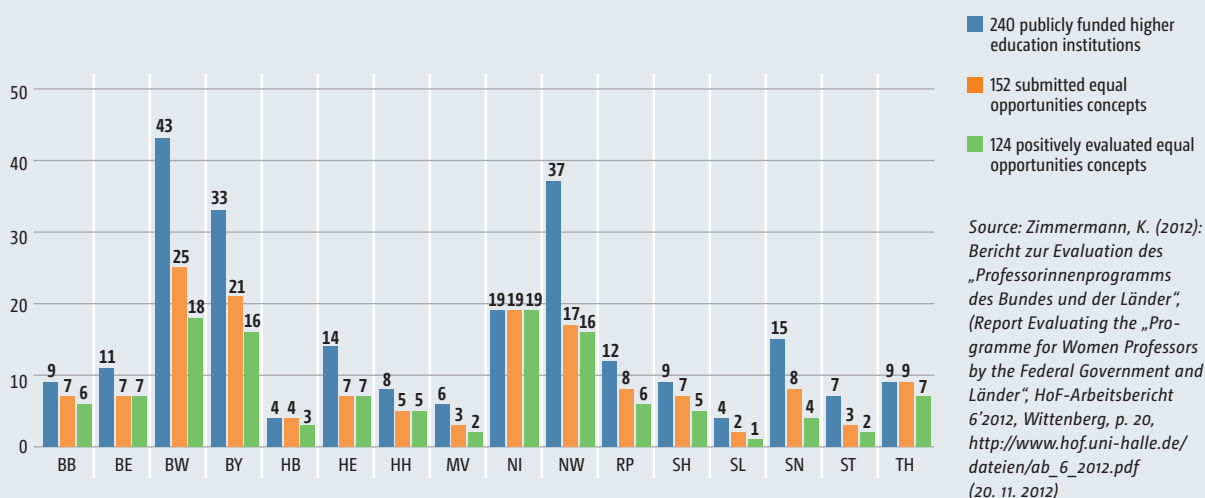
- **The training system for junior scholars is characterised by openness and diversity:** The strengths of the system of academic training in Germany include the openness of access in the doctoral phase in particular and the fact that career opportunities are largely independent of the specific training path. Successful outcomes do not depend formally on how the training was financed, which professional work was carried out or how long the training phase took. Graduates from Germany's universities of applied sciences are also entitled to pursue doctorates at universities. The system also allows for breaks and restarts and is not age-restricted. Ultimately, the only decisive factors are the acceptance of a thesis by a higher education institution entitled to award doctorates and the approval of the examiners.
- **The doctoral and post-doctoral phases have specific funding profiles:** Germany has a sophisticated training system with a variety of institutional forms and support options that takes into account the independent and distinct doctoral and post-doctoral phases with their specific requirements for junior scholars. The weighting of the various training paths and the range of support services varies depending on the culture of the particular

subject involved and on the training phase. Universities and equivalent higher education institutions entitled to award doctorates bear the main responsibility for academic training. Their efforts are aided by support programmes for junior scholars from the Federal Government and the Länder, research institutes and support organisations, whose objectives include promoting developments beneficial to higher education policy (e.g. equal opportunities, internationalisation) in a targeted manner, contributing to the financial security and improvement of the conditions for academic training, and recognising and rewarding above-average performance.

Goals and conditions of support

- **Support for junior scholars as the combined responsibility of the Federal Government and the Länder:** As a shared task, support for junior scholars is the focus of numerous higher education measures as part of a sophisticated support system that is employed by the Federal Government and the Länder to provide financial aid to higher education institutions and non-university research institutes in the context of increased international competition for qualified junior scholars and also to respond to the growing demand for academically educated specialists and to the increasing numbers of students in Germany.
- **Changed support environment due to reform of federal system:** The Federal Government supports the development of junior scholars in accordance with the newly formulated joint task of the Federal Government and the Länder to promote science and research as per Article 91b of the German Basic Law (Fig. A2-5). This support is primarily part of programme-based and project-based, short-term special financing – especially in the framework of the continuation and expansion of the three central Federal Government-Länder programmes (Higher Education Pact, Excellence Initiative and Pact for Research and Innovation). The Federal Government can also finance projects on its own based on other constitutional responsibilities. For example, it also finances the German Academic Exchange Service (DAAD), the Alexander von Humboldt Foundation (AvH) and major organisations that fund young gifted and talented students in higher education, which themselves contribute to the fostering of junior scholars with stipends and other personal support measures.

Fig. A2-5: Number of equal opportunities concepts positively evaluated as part of the Programme for Women Professors by Länder



- **The Federal Government supports the internationalisation of academic training:** As part of the EU's research and technology policy, Germany is actively involved in shaping the European Higher Education Area (EHEA) and the European Research Area (ERA). In the interest of competitiveness and enhancing international mobility and cooperation in science and research, the Federal Government supports the participation of junior scholars from Germany in the various EU research programmes and support measures by providing information, advisory services and points of contact.
- **Federal Government organisations with departmental research functions are making an important contribution to support for junior scholars:** These include 40 Federal Government organisations with R&D responsibilities and another six non-university R&D institutions that work on departmental research issues in continuous cooperation. These organisations provide research-based, practical policy advice in the area of activity of the relevant ministry. Taking the recommendations of the German Council of Science and Humanities into consideration, the Federal Government has drawn up concepts for further development of the organisations with departmental research functions, which include expanding support for junior scholars as part of modern personnel management.
- **The Länder rely on the combination of state support programmes and the independence of higher education institutions:** As part of efforts to increase the autonomy of higher education institutions, the Länder are transferring responsibility for support for junior scholars to the higher education institutions to an increasing extent. Support for junior scholars is integrated into the management of higher education institutions by means of goal agreements and performance-based awarding of funding. In addition to the programmes within the framework of Federal Government/Länder support, the Länder also offer Länder-specific support programmes for the doctoral phase (e.g. state scholarships, support for structured doctoral degrees) and the post-doctoral phase (e.g. junior professorships, junior research groups, awards, material resources).

Training paths and support practice in the doctoral phase

- Employment at higher education institutions remains the main path for obtaining a doctoral degree: The academic education of doctoral students, whose number far exceeds the higher education institutions' own demands, is largely organised in terms of employment at higher education institutions (which are entitled to award doctorates) with jobs financed by institutional or external third-party funding as part of larger research projects. According to estimates by the Federal Statistical Office, almost two thirds of the approximately 200,000 doctoral students follow this traditional path. Almost one fifth of them are employed by a non-university research institute or another employer (Fig. A3-66).

Fig. A3-66: Doctoral students by selected subject groups and types of doctorate in the 2010/11 winter semester (in %)

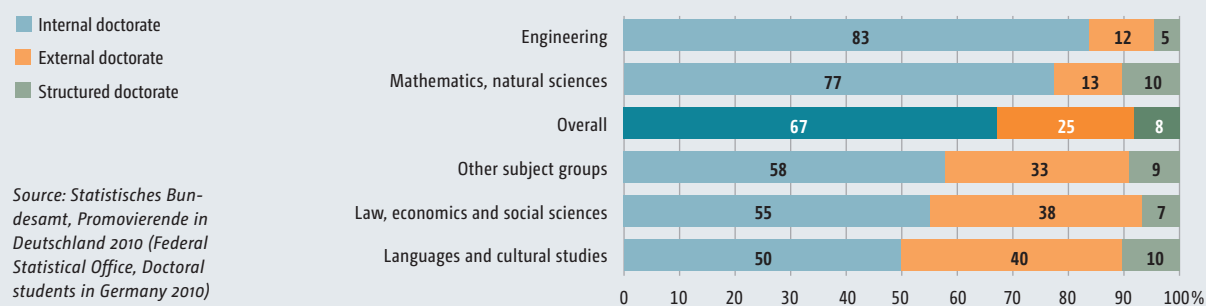
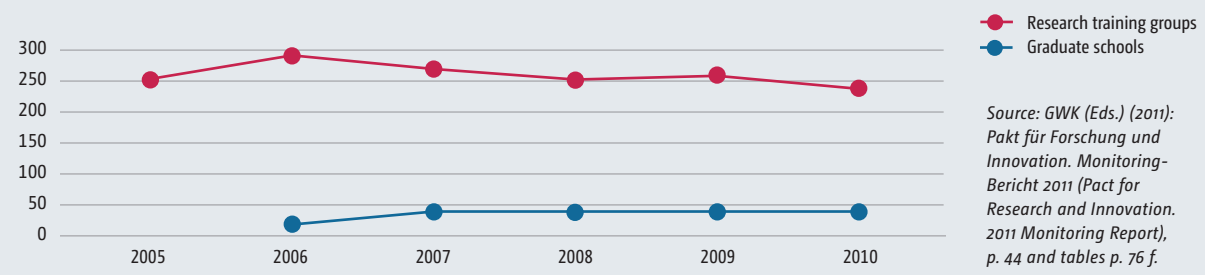


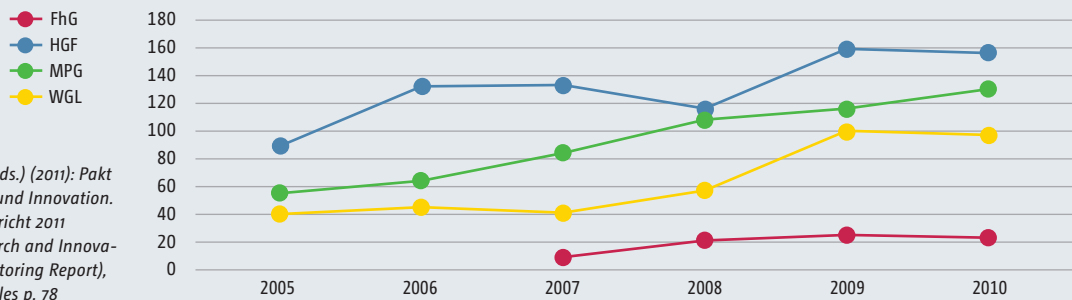
Fig. A2-8: Number of research training groups and graduate schools in the Excellence Initiative supported by the DFG between 2005 and 2010



- Support for structured doctorates through research training groups and graduate schools:** One quarter of doctoral students are supported by public funding for doctoral studies. The leader in this area is the DFG, followed at some distance by the support programmes of the Länder Ministries of Science, major organisations that fund young gifted and talented students, foundations and the DAAD. Structured doctoral courses, i.e. support as part of research training groups and graduate schools that are financed by the DFG, non-university research institutes or other bodies, have grown in importance (Fig. A2-8).
- Broad range of support for doctorates at higher education institutions' own initiative:** Around two thirds of higher education institutions have established umbrella structures – in the form of a higher-level organisational unit for educating doctoral students – that are not financed or supported by external third-party funds. The goal of these umbrella structures is to teach non-subject-specific skills and soft skills and to support, advise and network the doctoral students. Around two thirds of higher education institutions also offer self-financed structured doctoral education programmes.

Training paths and support practice in the post-doctoral phase

- The primary aim of the post-doctoral phase is to prepare candidates for appointments as university professors:** It is difficult to determine the content and limits of the post-doctoral phase precisely. However, it can be stated that a completed doctorate is a requirement. This is followed by an orientation phase, which may lead to a phase of preparation for a professorship if the candidate chooses a university career. The content and duration of this phase, in which the training aspect increasingly gives way to independent academic work, are characterised by diversity. The focus is on preparing the candidate for an appointment as a professor. The required additional academic performance can be demonstrated in a variety of ways. The higher education laws of the Länder generally require either a Habilitation, work that is equivalent to a Habilitation, or a junior professorship. However, work as an academic assistant at a higher education institution or non-university research institute or academic work in industry, administration or another area of society may also be recognised.
- Leadership of junior research groups has become established as a new path for post-doctoral training:** In the area of post-doctoral support, the instrument of leadership of junior research groups has become a permanent part of the support environment. The leadership of junior research groups is intended to give excellent young researchers an opportunity to carry out research independently with their own team and suitable equipment and, in this way, to prepare themselves for a professorship. The model was conceived as an alternative to the traditional route of long-term work as an assistant followed by a Habilitation, and it is becoming increasingly popular. The number of independent junior research groups has increased significantly in recent years, in particular as part

Fig. A2-11: Number of independent junior scholar groups between 2005 and 2010

Source: GWK (Eds.) (2011): *Pakt für Forschung und Innovation. Monitoring-Bericht 2011 (Pact for Research and Innovation. 2011 Monitoring Report)*, p. 47 f. and tables p. 78

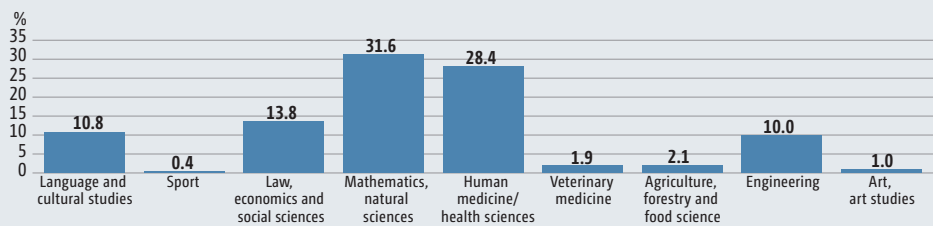
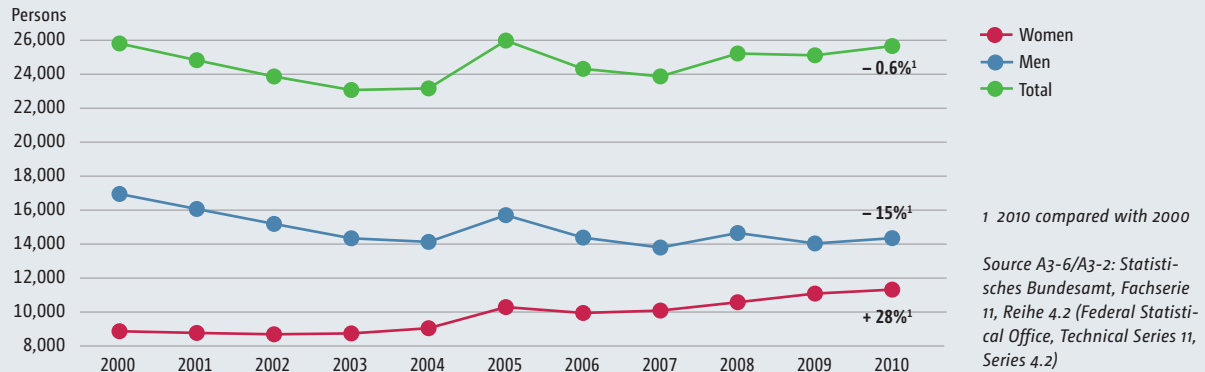
of support programmes funded by the DFG and BMBF and at non-university research institutes (Fig. A2-11).

- **The DFG plays an important role in post-doctoral support:** The DFG supports the academic training of post-doctoral students by means of junior research groups, with its research scholarships, Heisenberg scholarships and Heisenberg professorships, and also as part of collaborative research centres and research training groups. Alongside the above-mentioned support measures, it also finances “temporary positions for principal investigators” to a considerable extent as part of its standard research grants, known as the “normal process”. In addition to this, various research institutes and support organisations have established subject-oriented programmes for post-docs in recent years or are supporting interdisciplinary networks and programmes for the development of expertise in management and leadership.

A 3 Scope, structure and sequence of academic training

Doctorates

- **Number of doctorates relatively constant:** Between 2000 and 2010, the number of doctorates fluctuated around an average of 24,500, with a variation of 1,500. In 2010, 25,600 doctorates were completed.
- **Shift in the subject breakdown for doctorates:** While doctorates in human medicine/health sciences accounted for the greatest share in the past, mathematics/natural sciences (32%) took first place in 2010 (Fig. A3-6; Fig A3-2).
- **Graduation rate at doctoral level remains high:** At 19%, the graduation rate at doctorate level (three-year averages of doctorates between 2008 and 2010 relative to selected university degrees from 2003-2005) is the same as the figure for the corresponding periods five years previously. If the human medicine/health sciences group is ignored due to the special nature of doctorates in medicine, there is a slight increase of one percentage point in the graduation rate at doctorate level to 15%. Germany’s doctorate rate is above average when compared with other countries. At 2.7, the number of doctorates per 1,000 citizens aged between 25 and 34 in Germany in 2010 was above the EU-27 average of 1.5. Compared with 2005, Germany’s lead increased slightly.
- **Age on award of doctorates varies from subject to subject:** On average, doctoral graduates are 33 when their degree is awarded. The variation from subject to subject covers a

Fig. A3-2: Analysis of doctorates in 2010 by subject groups (in %)**Fig. A3-6: Development of doctorates 2000 to 2010 by gender (in persons)**

range of 31 to 38 years of age. Junior scholars in art, art studies, language and cultural studies and sports are the oldest when they receive their doctorates, while those in human medicine/health sciences and veterinary medicine are youngest.

- **Constant student/supervisor ratio:** The student/supervisor ratio, which is calculated as the ratio of doctorates to professors at universities and equivalent higher education institutions, was stable at 1.2 to 1 in 2000, 2005 and 2010. Excluding medical subjects, which have a particular tradition of doctorates, the mathematics and natural science subjects had the most unfavourable ratio in 2010 (1.3 to 1), while the language and cultural studies and sports (0.5 to 1) and art and art studies (0.4 to 1) subject groups had the most favourable ratios.
- **Very high marks as a rule:** In 2010, over two thirds of doctorates were awarded the marks “magna cum laude” (52%) and “summa cum laude” (16%), with these figures increasing by 6 percent compared with 2000. The percentage of doctorates in the two highest categories is above average in the subject groups of mathematics, natural sciences, engineering, and language and cultural studies. The percentage in human medicine/health sciences and veterinary medicine is below average. The percentage is lowest in agricultural, forestry and food sciences.

Habilitation

- **Number of Habilitations decreasing:** On average, around 2,000 Habilitations (a post-doctoral academic qualification that is awarded in several European countries) were completed annually between 2000 and 2010. The number has been decreasing since 2004. In 2010, around 1,750 Habilitations were registered. In contrast with the general trend, the absolute numbers in the subjects human medicine/health sciences increased. One Habilitation in every two is now undertaken in the field of medicine (Fig. A3-12; Fig. A3-15).

Fig. A3-12: Analysis of Habilitations in 2010 by subject groups (in %)

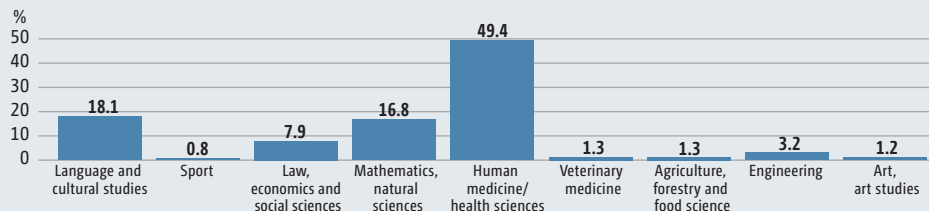
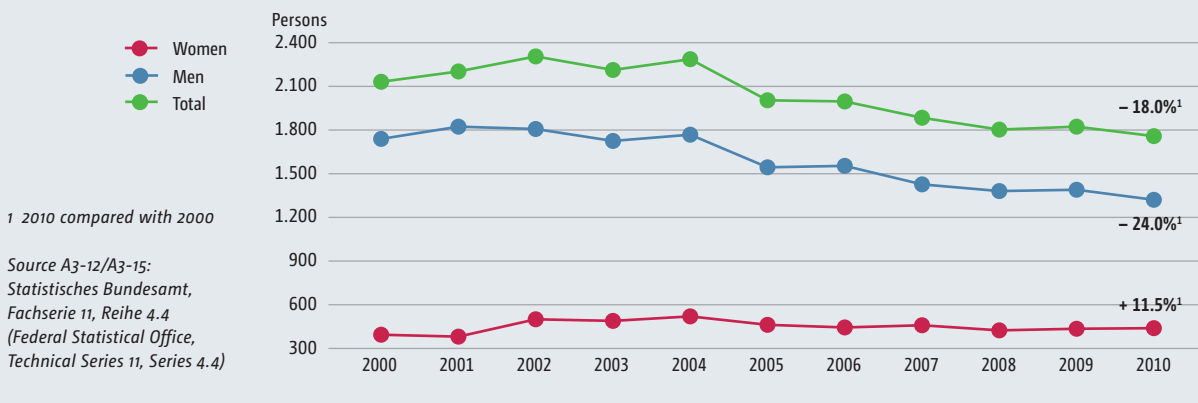
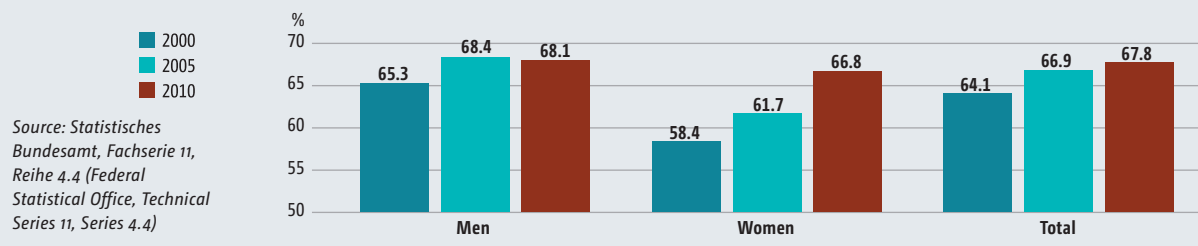


Fig. A3-15: Development of Habilitations 2000 to 2010 by gender (in persons)



- Decreasing Habilitation rate:** The Habilitation rate (three-year averages of Habilitations from 2008-2010 relative to doctorates from 2003-2005) is 7%. It fell by two percent compared with the comparable assessment periods five years previously. The highest Habilitation rates are in language and cultural studies (13%) and human medicine/health sciences (11%), while the lowest are in engineering and veterinary medicine (3% each).
- Candidates completing their Habilitation are still in their early forties:** On completion of their Habilitation, the average age of candidates was 40.8 in 2010, continuing the trend to above the 40 year-old mark. There is a slightly increasing trend. Overall, the main subjects contributing to the average age are mathematics, natural sciences, law, economic and social sciences and, in particular, human medicine/health sciences (all of which have averages of around 40).
- The majority of candidates complete their Habilitation while working at higher education institutions:** A statistic virtually unchanged for many years, over two thirds of junior scholars are employed by higher education institutions when they complete their Habilitation, almost all of them with employee status (Fig. A3-20).

Fig. A3-20: Percentage of Habilitations by the academic personnel in primary employment below professor level among total Habilitations in 2000, 2005 and 2010 by gender (in %)



- **Expanded range of paths to qualify for professorial appointment:** On average, one professor retires at a university for every three Habilitations. When estimating the opportunities for professorial appointments, it must be borne in mind that new academic training routes for post-docs have become established in recent years alongside the traditional Habilitation (e.g. junior professorship, leadership of groups of junior researchers) and that the higher education laws of the Länder have created various openings for people to demonstrate suitability for professorial appointments.

Junior professorship

- **Increasing number of junior professors:** Following the introduction of junior professorships in 2002, the number of junior professors increased rapidly during the duration of the Federal Government support up to 2006, followed by a brief slowing down and another increase from 2008 onwards. Nonetheless, at 1,230, the number of junior professors in 2010 remained lower than originally expected (Fig. A3-24).
- **Junior professors are concentrated in three subject groups:** In 2010, junior professors worked primarily in the fields of mathematics and natural sciences (30%), language and cultural studies (26%) and law, economic and social sciences (22%) (Fig. A3-21). The subject breakdown differs significantly from the subject breakdown for Habilitations.
- **Junior professorship is contributing to progress in equality:** The gender split of women to men in 2010 was 38% to 62%. This is significantly above the percentage of women completing their Habilitation (25%). The percentage of female junior professors is highest in the art/art studies and language and cultural studies/sport subject groups at 58% and 53%, respectively. There are more men than women in all other subject groups.

Fig. A3-21: Junior professors* in 2010 by subject groups (in persons)

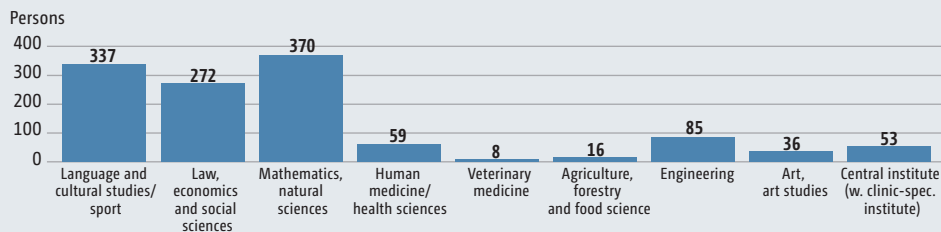


Fig. A3-24: Junior professors* from 2002 to 2010 by gender (in persons)



- **Junior professorships facilitate early independence in research and teaching:** The average age on initial appointment for a junior professorship was 35 in both 2005 and 2010. On average, newly appointed junior professors were youngest in mathematics/natural sciences (2010: 34 years of age), and oldest in medicine/health sciences (37 years of age) and in art/art studies (41 years of age).

Need for replacements due to age, and new appointments

- **No wave of retirements in this decade:** It is expected that around 6,600 professors will have retired (permanently) for age reasons at German universities and colleges of art by 2020. Relative to the total number of professors in 2010, this is equivalent to over one third (36%) between 2011 and 2020. This will be a relatively continuous process, and no wave of retirements is to be expected.
- **The scale of new appointments corresponds to the number of people retiring for age reasons:** On average, around 630 new professors were appointed at universities (excluding junior professors) each year between 2000 and 2010; the figure was approximately 650 in 2010. Around one in every four new appointments was a woman (27%). Their number has increased by almost two thirds compared with 2000. For W3 professorships, the average age on appointment of around 42 was one year older than for W2 professorships.

Personnel structure and conditions of employment

- **Decreasing number of professors:** The main developments in the situation of academic personnel at universities include the reduction of the percentage of professors (from 12% in 2000 to 9% in 2010), a percentage increase in personnel in secondary employment (from 21% to 25%) and a relatively constant percentage of academic personnel in primary employment below the professorial level (from 67% to 66%) (Fig. A3-37).
- **Personnel structure at German universities demonstrates particular features:** When compared with other countries, it is evident that the percentage of senior staff (permanently employed, independent lecturers and researchers) at universities in Germany is unusually low. In addition, when a distinction is made between junior staff (in primary employment independent lecturing and research staff below professorial level) and assistant staff (teaching and research personnel obliged to follow instructions from a higher level), it becomes clear that the junior staff level is almost completely non-existent in Germany. In contrast with the situation in France, England and the USA, the vast majority of academics and researchers at German universities have to follow the instructions of a superior (Fig. A1-8).

Fig. A3-37: Analysis of the academic personnel at universities* in 2000, 2005 and 2010 by employee groups (in %)

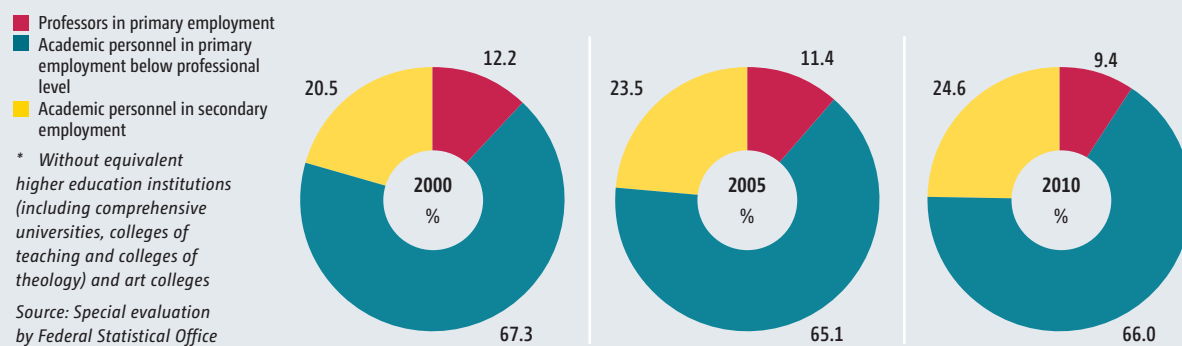
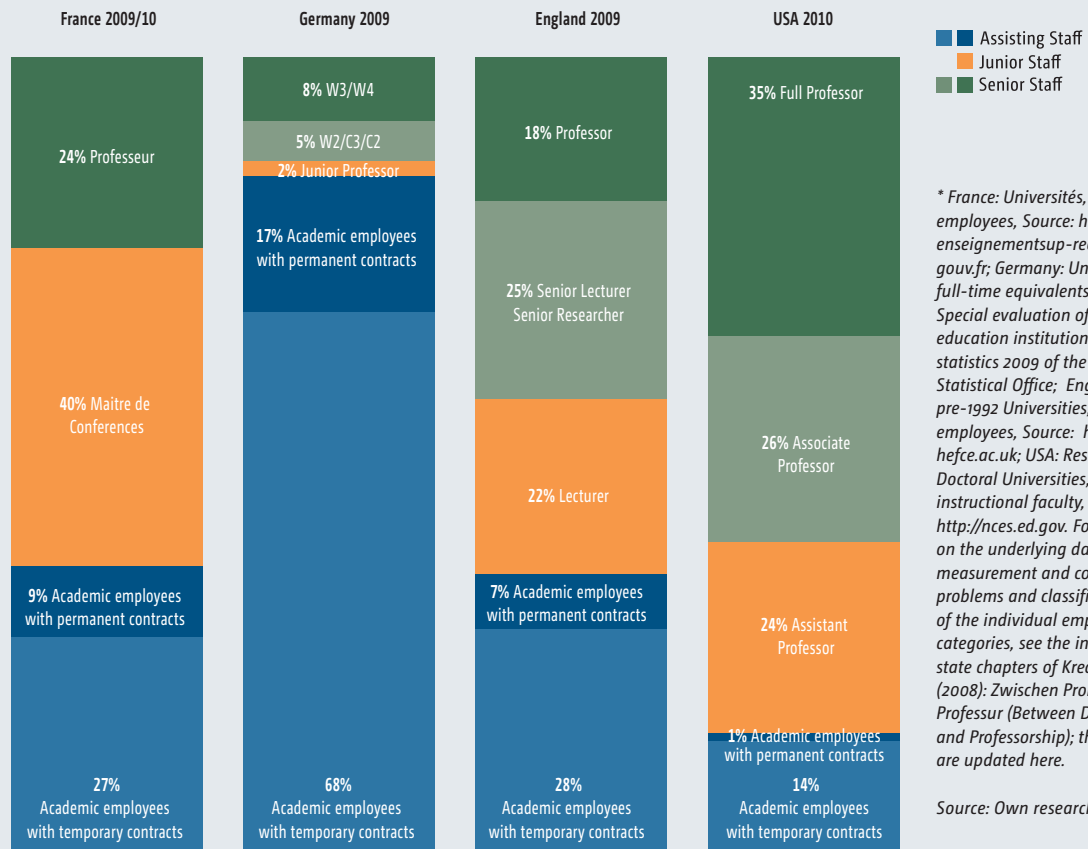
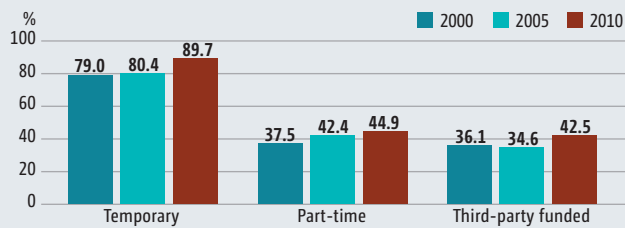


Fig. A1-8: Full-time academic personnel at universities in Germany, France, England and the USA*



- **Employment at higher education institutions is typical for the phase of academic training:** Almost two thirds of doctoral students are employed at higher education institutions. The percentage of researchers employed at higher education institutions on completion of their Habilitation was even higher in 2010 at 71%.
- **Increased prevalence of temporary employment and third-party funding for academic assistants:** Academic assistants account for 86% of the academic personnel in primary employment below professorial level at universities, making them the largest personnel group. This group experienced an increase in temporary contracts (from 79% in 2000 to 90% in 2010), an increase in part-time employment (from 38% to 45%) and an increase in third-party funding (from 36% to 43%) (Fig. A3-40 and A3.41).
- **Relatively similar situation in most subject groups:** The percentage of temporary contracts in all subjects was over 80% in 2010 – with the highest values in engineering (94%) and law, economics and social sciences (95%). In virtually all subjects, significantly more than half of the employees are part-time. Engineering and human medicine/health sciences are the exceptions, as full-time employment dominates there. The highest percentages of third-party funding, with values over 50%, are in engineering, agricultural, forestry and food sciences, and mathematics and the natural sciences.

Fig. A3-40: Fraction of temporary, part-time and third-party funded academic employees* among all academic employees at universities in 2000, 2005 and 2010 (in %)**

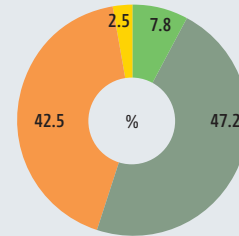


* In employment relationships

** Without equivalent higher education institutions (incl. comprehensive universities, colleges of teaching and colleges of theology) and art colleges

Fig. A3-41: Contract conditions of the academic employees* at universities in 2010 (in %)**

■ Full-time, permanent
■ Full-time, temporary
■ Part-time, temporary
■ Part-time, permanent

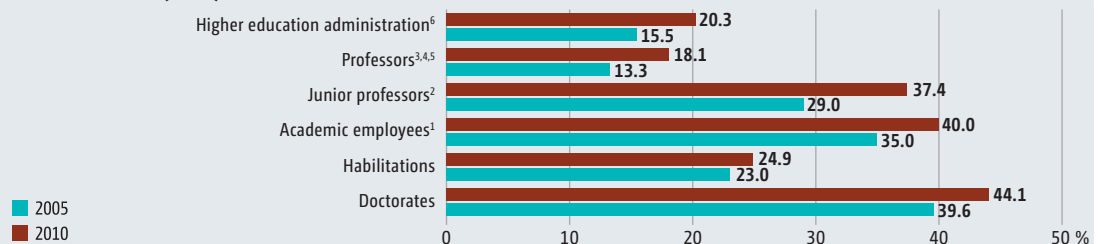


Source: Special evaluation by Federal Statistical Office

Equal opportunities

- Progress towards equality is being made over time:** Between 2000 and 2010, the percentage of women increased at all investigated levels of academic training and careers. This includes doctoral studies, Habilitations, academic assistants at universities, junior professors, university professors and administrators at higher education institutions. Nonetheless, the percentages for all positions throughout the entire period studied are still below 50%, in some cases significantly so, and thus lag behind the figures for access to higher education, third-level studies and graduation (Fig. A3-43).
- Percentage of women continues to drop along path to professorship:** Women accounted for 44% of doctorates and 25% of Habilitations in 2010. Four out of ten academic assistants employed at universities are female (40%). Over one quarter of new appointments (including junior professorships) at universities and equivalent higher education institutions are women (28%). Women account for just under one fifth of professors (19%). Women also occupy one fifth (20%) of positions in higher education institution administration (Fig. A3-81/82).

Fig. A3-43: Development of the percentage of women in training and careers at higher education institutions in 2005 and 2010 (in %)



1 Teachers and assistants, academic and artistic employees, teachers with special responsibilities at universities and equivalent higher education institutions (including comprehensive universities, colleges of teaching and colleges of theology) and colleges of applied science (without colleges of administration)

2 The fifth amendment to the Framework Higher Education Act in 2002 introduced junior professorships in Germany, which were then added to the statistics in 2002 for the first time. Statistics refer to junior professors at universities.

3 Professors without junior professors

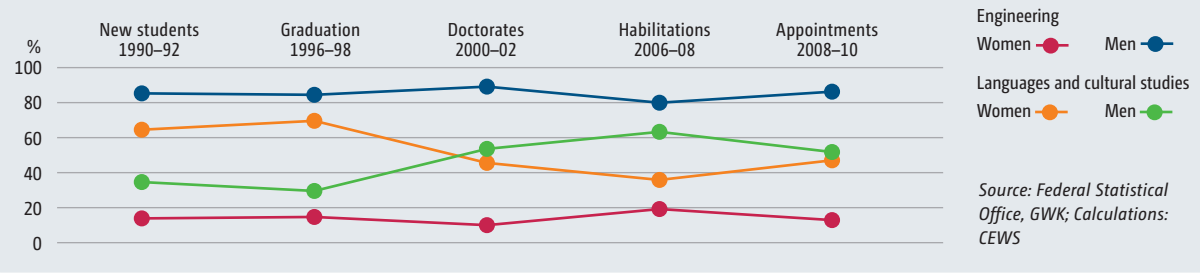
4 Professors including salary groups C2 with permanent contracts and temporary C2 contracts

5 At universities and equivalent higher education institutions (including comprehensive universities, colleges of education and colleges of theology) and universities of applied science (without colleges of administration)

6 Higher education administration includes the rector, president, representative and founding rector, representative and prorector, vice president and chancellor.

Source: Statistisches Bundesamt, Fachserie 11, Reihen 4.2, 4.4 (Federal Statistical Office, Technical Series 11, Series 4.2, 4.4); GWK (2011) *Chancengerechtigkeit in Wissenschaft und Forschung. Fünfzehnte Fortschreibung des Datenmaterials (2009/2010) zu Frauen in Hochschulen und außerhochschulischen Forschungseinrichtungen, (Equal Opportunities in Science and Research. Fifteenth Continuation of the Data Material (2009/2010) on Women in Higher Education Institutions and Non-University Research Institutes)* Volume 22, Bonn; BLK (2006): *Frauen in Führungspositionen an Hochschulen und außerhochschulischen Forschungseinrichtungen. Zehnte Fortschreibung des Datenmaterials (Women in Leadership Positions in Higher Education Institutions and Non-University Institutes. Tenth Continuation of the Data Material)*, Bonn; BLK (2002): *Frauen in Führungspositionen an Hochschulen und außerhochschulischen Forschungseinrichtungen. Zehnte Fortschreibung des Datenmaterials (Women in Leadership Positions in Higher Education Institutions and Non-University Institutes. Sixth Continuation of the Data Material)*, Bonn

Fig A3-81/82: Percentages of women and men in training from start of higher education between 1990 and 1992 to appointment to a professorship between 2008 and 2010 in language and cultural studies and engineering (in %)



- Percentage of women in research remains below the EU average:** In 2009, women accounted for just over one fifth of research personnel (full-time equivalent) in Germany (21%). The percentage of women is thus below the EU-27 average of 30%. This applies for all three sectors, and the gap is between 6 and 8 percentage points. The percentage of female researchers in Germany is highest in the university sector (32%), closely followed by the state sector (30%). The commercial sector (13%) has the lowest percentage of female researchers.

Internationalisation

- Increasing numbers of foreigners obtaining doctorates:** In 2010, around 3,800 doctorates were completed by foreign students. Overall, their percentage doubled from 7.5% in 2000 to 14.9% in 2010. In four out of six cases, these doctorates were awarded to women, with a steadily increasing percentage (Fig. A3-52).
- Breakdown of doctorates has significant subject and regional focuses:** The highest percentages of doctorates by foreigners are in agriculture, forestry and food science, mathematics, the natural sciences and engineering. Almost every second doctorate by foreign students was in mathematics and the natural sciences. The People’s Republic of China accounts for the highest number of students, followed by India, Italy and the Russian Federation.

Fig. A3-52: Development of the number of doctorates by foreigners between 2000 and 2010 by gender (in persons)

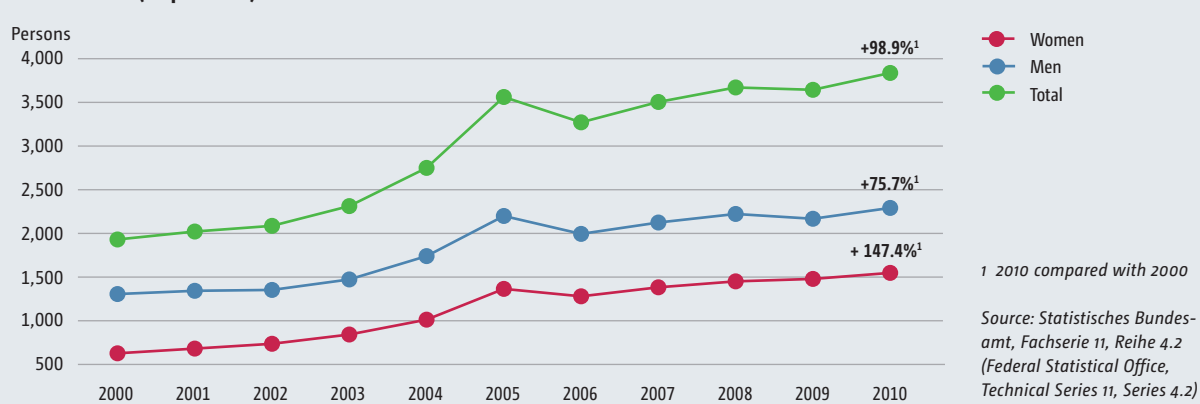
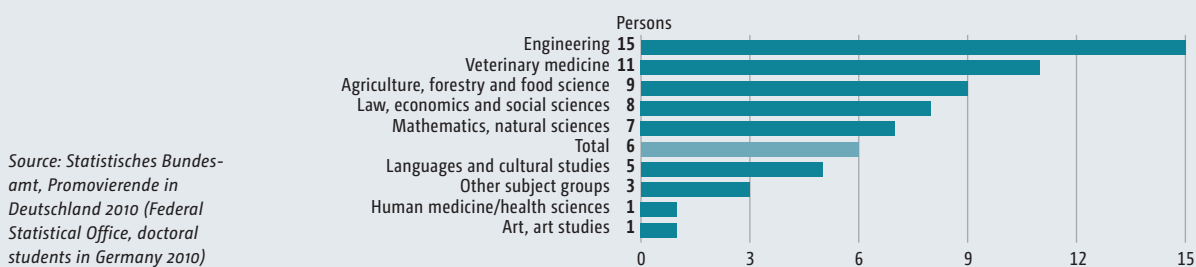
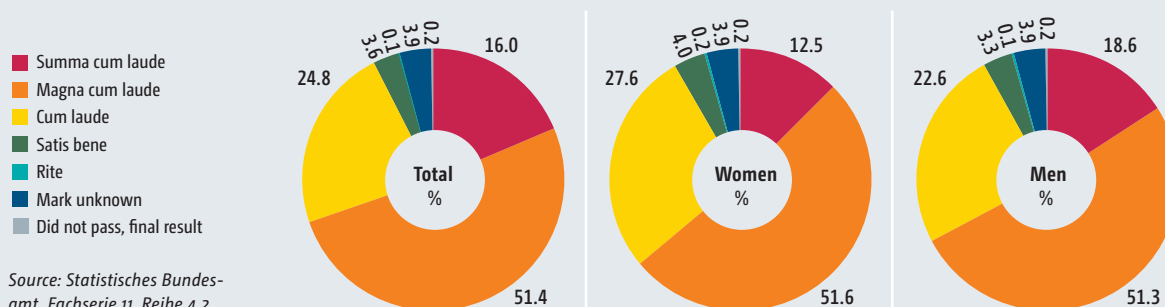


Fig. A3-63: Doctoral students per professor in the 2010/11 winter semester by selected subject groups (in persons)



Source: Statistisches Bundesamt, Promovierende in Deutschland 2010 (Federal Statistical Office, doctoral students in Germany 2010)

Fig. A3-56: Analysis of doctorate marks in 2010 by gender (in %)



Source: Statistisches Bundesamt, Fachserie 11, Reihe 4.2 (Federal Statistical Office, Technical Series 11, Series 4.2)

- **Decreasing percentage during further academic training and along career path:** At around 12% (2010), the percentage of academic employees at universities and equivalent higher education institutions from other countries is somewhat less than the corresponding percentage of doctorates. The percentages of Habilitations (around 7%) and at a professorial level (around 8%) are relatively low. However, there are upward trends here.

Quality assurance

Official higher education statistics include a variety of references to the issue of quality assurance/quality (both with reference to academic training and the academic performance of junior scholars) that is currently being debated in the arena of higher education policy, but these references are rather indirect in nature. For example, a professor supervises six doctoral students on average, with this number fluctuating significantly depending on the subject group (Fig. A3-63). Around half of all doctorates are awarded the mark “magna cum laude” and one quarter receive the mark “cum laude” (Fig. A3-56).

B Career prospects and development after doctoral studies

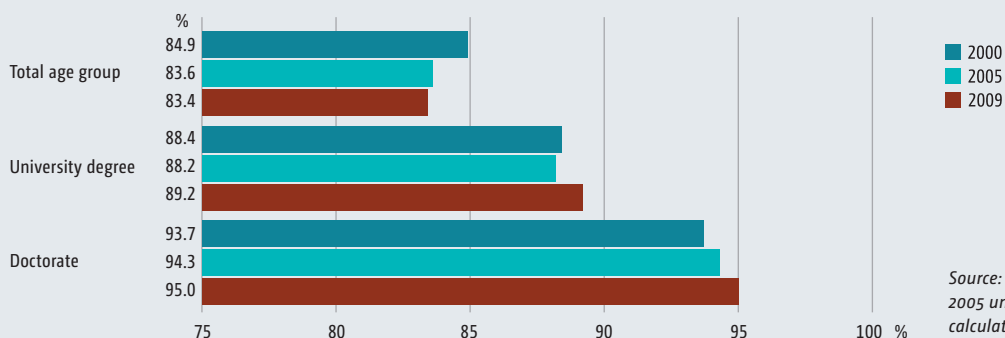
Career entry and employment

- **Doctorate holders are well-integrated in the job market:** After completing their doctorate, the vast majority of junior scholars succeed in finding employment quickly. Holders of doctorates aged between 35 and 45 in all subject groups are virtually fully employed. They are thus more likely to be working than comparable university graduates without doctorates (Fig. B1-1).
- **Almost half of all doctorate holders are employed in the private sector:** Almost half of all doctorate holders between the ages of 35 and 45 are employed in the private sector, while about one fifth are self-employed. Doctors and pharmacists form the largest group of professionals here (34% of employed doctorate holders in this age group).
- **Career start generally goes according to plan:** After they complete their doctorate, most junior scholars succeed in finding employment in the sector where they originally hoped to work. However, this only applies to around half of those who originally wanted to work in research and academia.

Conditions of employment

- **Over one fifth of doctorate holders have a temporary employment contract:** Over one fifth of doctorate holders in the age group between 35 and 45 have temporary contracts, making them more than twice as likely to have temporary contracts as those without doctorates in their age group. The fraction of doctorate holders in this age group with temporary contracts is highest in the public sector.
- **Doctorate holders earn an above-average income:** Working doctorate-holders earn an above-average income compared with the average for the entire workforce. They are far more frequently represented in the upper income classes. Almost two fifths of employees between 35 and 45 with doctorates, but only one fifth of comparable university graduates without doctorates have a monthly net income of € 3,600 or more. The income advantage is particularly high in law, economics and social sciences, and engineering. The average gross income of doctorate holders in full-time employment at higher education institutions and non-university research institutes is around one quarter lower than the income earned in the private sector (Tab. B1-4).

Fig. B1-1: Percentage of employees in the age group between 35 and 45 in 2000, 2005 and 2009 by educational achievement (in %)



Source: Micro census 2000, 2005 und 2009, own calculations

Tab. B1-4: Distribution of net income for employees in the age group between 35 and 45 in 2009 by educational achievement (in %)

Highest educational achievement	Income group				Total in %
	Under 1,700 €	1,700 to < 2,600 €	2,600 to < 3,600 €	3,600 € and over	
University degree	29.3%	28.5%	22.3%	19.9%	100
Doctorate	11.7%	24.8%	24.9%	38.6%	100
Average for age group	56.9%	27.0%	9.6%	6.4%	100

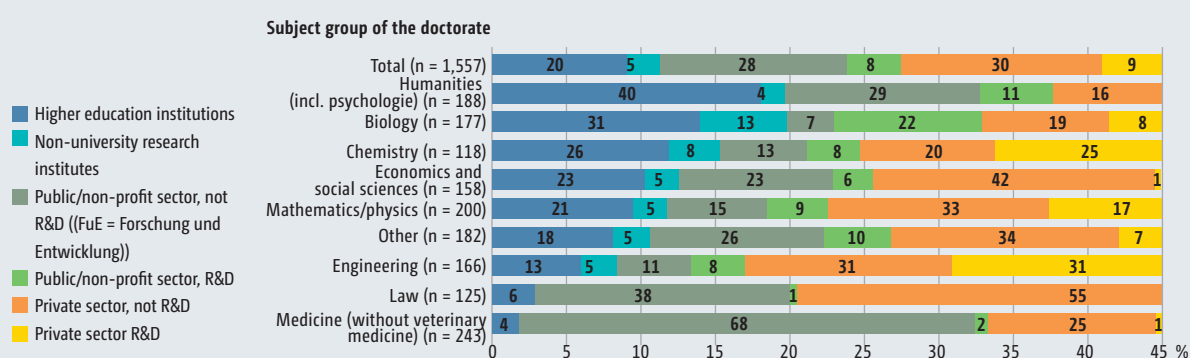
Source: Micro census 2009, own calculations

- **Mixed situation regarding benefits of doctorates for women:** Women with doctorates are in a less fortunate position than men with doctorates with regard to various conditions of employment. This applies to contract duration, extent of contract, salary, job satisfaction and the assignment of management positions. However, they still have an advantage over women without doctorates.

Subjective benefits of doctorates

- **In general, doctorate holders are adequately employed, around half of them in academically related areas:** About half of doctorate holders initially remain employed in academic or academically related fields after completing their doctoral studies. Overall, four in five doctorate holders believe they are adequately employed – this is a higher percentage than for graduates without doctorates.
- **Diverse benefits of doctorates:** Ongoing education and working on an interesting topic are often identified among the intrinsic benefits of doctorates, while others mention improved career opportunities and increased recognition in their professional contacts as extrinsic benefits.
- **Seven out of ten doctorate holders are satisfied with their professional situation:** Two thirds of women with doctorates and three quarters of men with doctorates are satisfied with their professional situation, but they are not more satisfied than graduates without doctorates. However, they look critically at the issues of promotion prospects, income, opportunities for advanced professional training and work-life balance, in particular the balancing of work and family life.

Fig. B1-19: Sector of the professional situation 1.5 years after receiving a doctorate in 2009 by subject groups (in %)



Source: KOAB-Absolventenstudien 2011 von Promovierten des Jahrgangs 2009; INCHER-Kassel (KOAB 2011 Graduate Studies of Doctorate Holders from 2009; INCHER-Kassel) (unpublished data)

Doctorate holders in private sector

- **Doctorate holders from STEM subjects in particular work in industrial research:** Around one tenth of doctorate holders, especially graduates in STEM subjects, work in research and development departments in the industrial sector. Their work is concentrated in automotive and mechanical engineering, product development, data processing and similar areas. Research in other fields is mainly carried out at state-financed higher education institutions (Fig. B1-19).
- **Doctorate holders are in demand as managers:** Personnel managers in the private sector often consider doctorate holders highly ambitious, persevering and self-motivating, and view a doctorate as a positive addition to a candidate's profile. In the private employment sector, doctorate holders are often regarded as having highly developed leadership, communication and motivation skills in addition to their subject-specific expertise.

Career paths in research and academia in Germany

- **In the long term, most doctorate holders leave the higher education institutions:** Of those who were employed at higher education institutions (just over half of doctoral students), around half leave higher education institutions immediately after receiving their doctorate. In the following five years, at least another third move on to other sectors; the process of leaving higher education institutions appears to proceed continuously over time.
- **High percentage of temporary contracts at universities:** In the first six years after completing their doctorates, around five of six university employees and about six of ten employees at non-university research institutions have temporary contracts. Around one fifth of doctorate holders are in part-time employment at universities and non-university research institutions.
- **Junior scholars work in research and teaching:** Academic assistants with doctorates at universities generally have fewer teaching hours than professors and spend more time on research. On average, they spend more than 50% of their working time on research work.
- **Satisfaction of doctorate holders who work at universities varies:** Academic employees with doctorates at universities are (very) satisfied with the contents of their jobs, but tend to be unsatisfied with their employment situation (security, prospects for promotion, income) and the working atmosphere.
- **Doctorate holders would like more independence and feedback on their academic work:** Almost half of academic assistants with doctorates at universities would like greater independence and more leadership and feedback.

International comparison

- **High graduation rate at doctorate level in Germany, but above-average numbers who leave the field of academia and research:** As described above, the graduation rate at doctoral level is higher in Germany than in most other European countries. At three quarters, the fraction of those who work outside higher education institutions after completing their doctorates is high compared with other countries. In most countries, doctorate holders continue to work in academia to a greater extent.
- **Predominance of temporary employment and relatively low income at higher education institutions is not typical internationally:** In many countries, doctorate holders have more stable jobs at higher education institutions than in the private sector, but earn more in the private sector. In Germany, doctorate holders at higher education institutions are both more likely to have temporary contracts and have lower incomes than in the private sector on average.

C Lack of information and research needs

Interest in information and provision of information

Increasing interest in systematic information on the higher education and research system: In the context of the establishment of output-oriented control and an evaluation culture, demand is growing for data-based empirical information on the strengths and weaknesses of the higher education institutions and on the causes of varying outcomes of academic training in order to deliver a basis for identifying better solutions. Strategic action in higher education and research requires evidence-based knowledge to an increasing extent – for students, teachers, researchers and political administration.

Progress has been made in the provision of information: The official statistics have become more complex and sophisticated. A lot more empirical research work is being done on higher education and research, and this work is also becoming more diverse in terms of theory, methods and range of subjects. Government bodies, research support institutions and organisations for the support of students and junior scholars are emphasising the necessity for improved statistics and more empirical studies.

Current initiatives by the BMBF to improve the level of information: An expert discussion on new ways of gathering information on doctoral students was initiated in 2011, as a result of which a feasibility study on collecting data on doctoral students in Germany was drawn up. The following year, a working group headed by the Federal Statistical Office started developing an “Indicator Model for Reporting on Junior Scholars” in preparation for the third National Report on Junior Scholars. The “Support Announcement for Research on Career Conditions and Career Developments for Junior Scholars”, published in August 2012, addresses key research gaps in the area of junior scholars with a particular focus on the post-doctoral phase and the career outcomes of doctorate holders.

Knowledge gaps and information requirements

Knowledge gaps are very evident in many subject areas: There are knowledge gaps with regard to broader, descriptive issues and also with regard to in-depth information on more complex situational understanding. While quite detailed statistics are available on the researchers employed at higher education institutions and research institutes, there is a lack of empirically valid and representative information on the number of doctoral students and Habilitation candidates and also of detailed breakdowns of academic personnel by qualification level. The otherwise relatively good level of information on academic personnel at higher education institutions and research institutes is in contrast with the significantly less detailed information available for the R&D area. With regard to reliable information on the topic of mobility, which is important in terms of higher education policy, the current limitation of the statistics on researchers to classifications based on nationality is proving to be unsatisfactory. In general, it is difficult to trace academic training and professional activity based on the information that is available.

Official statistics, empirical research and institutional reporting are required in equal measure: In the interest of expanding knowledge on the situation of junior scholars, the further development of official statistics and the intensification of the empirical research on higher education and academia should be set as objectives. The increase in knowledge to be gained from reporting and evaluation analyses by the institutions involved should also be taken into consideration. In view of the growing demands for systematic data collection, particularly in the long term, coordination is necessary to guarantee the necessary breadth of representative information with a justifiable level of effort, without restricting the scope for concentrating on specific areas.

Special need for information on the situation of junior scholars after completing doctoral studies: The career development stage between doctoral degree and appointment as a professor or attainment of a similar position outside of higher education requires special attention, as this is a highly complex period with many competing influencing factors as compared with other professions and stages in career development. In a phase of life in which expectations and options are already being consolidated in other professions, junior scholars are often faced with decisions in situations that involve

high demands regarding performance, high selectivity and low security with regard to prospects.

Strategy for long-term reporting: The BMBF has developed a strategy based on three core components for future reporting: As part of a data collection strategy, it is currently being examined whether it is possible to record more detailed statistical information on doctoral students in the long term and thus to create a reliable data basis for all analyses of junior scholars. At the same time, a support announcement has been published that will facilitate further research on junior scholars. In autumn of 2012, a working group under the guidance of the Federal Statistical Office started work on the development of theory-driven indicators on junior scholars.

Research approaches and subject orientation

The topic of junior scholars is a demanding research area:

More extensive representative studies, long-term and progressive studies, complex effect analyses and international comparison would appear to be particularly promising approaches for achieving ongoing improvements in knowledge in light of the complexity and the long-term perspective of academic training, the overlap between the training and employment systems, and increasing internationalisation.

Expansion of analyses on “subjectively” measurable aspects:

When analysing the professional situations of junior scholars, information on their motives and values and their perception of employment conditions are of great significance – alongside standard structural information, mobility flows, contractually fixed elements of the employment situations, etc. This information influences their professional and living situations to at least the same extent as organisational requirements and routines.

The focus should not be solely on the so-called ideal path in researching the careers of junior scholars after their doctoral studies:

In addition to the central question of who succeeds in following the highly selective path to becoming a professor particularly smoothly and successfully under which conditions, another interesting issue is how researchers develop valuable skills for subsequent academic work on more indirect paths – e.g. with extended periods overseas or professional activities outside of research and academia – and to what

extent a flexible career system is considered desirable from a social policy perspective. Moreover, the issue of the value of a doctorate for the individual and for society as a whole outside of a purely academic career is worth considering in our knowledge society.

Tackling complex effect analyses: Research should provide answers as to how socio-biographical characteristics, financial and employment conditions, work situations, values, social policy environments and systemic configurations interact with one another and ultimately result in professional decisions and positions, in individual and social benefits, and in identity and satisfaction. To what extent can a discrepancy or a balance be detected in the views of researchers on their professional or living situations, on one hand, and on the performance of the academic system, on the other? To what extent do higher education and academic policy measures achieve their declared goals, or to what extent do they meet what could be termed as needs in the broadest sense?

Internationalisation

Facing up to increasing internationalisation: Although crossing borders is a natural thing for research and academic activity, most of the systematic information on junior scholars focuses on a national view. Far more attention should be given to international comparisons. This involves international cooperation in the development of statistics as well as a systematic comparison of the effects of different patterns of junior scholar careers.

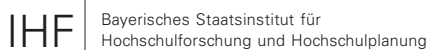
2013 National Report on Junior Scholars

Statistical Data and Research Findings on Doctoral Students and Doctorate Holders in Germany

Following on from the first report in 2008, the “2013 National Report on Junior Scholars” presents the second empirical report funded by the Federal Ministry of Education and Research on the situation of junior scholars in Germany. The report continues the comprehensive statistical analyses on the development of academic training in the doctoral and post-doctoral phases for the period from 2000 to 2010, thus creating the foundations for longer-term indicator-based reporting. The report provides an overview of the diverse support environment and of current trends in support practice.

The thematic focus of the 2013 report is on career situations after obtaining a doctorate, on the employment conditions, work conditions and career prospects of junior scholars at higher education institutions, and on the research labour market outside of the academic sector in particular.

It identifies knowledge gaps and offers proposals for the thematic and methodical orientation of future data collection and research projects. The report is thus targeted at junior scholars, at all actors and stakeholders in higher education and research, and at politicians, administration and practice, higher education research and the interested public.



The Institute for Research on Higher Education at Martin Luther University Halle-Wittenberg (HoF) is responsible for coordinating the report. The consortium includes the Bavarian State Institute for Higher Education Research and Planning Munich (IHF) and the International Centre for Higher Education Research Kassel (INCHER).



The following institutions were also involved in producing the report:

- Higher Education Information System (HIS)
- Institute for Research Information and Quality Assurance (iFQ)
- Leibniz Institute for the Social Sciences (gesis)
- Federal Statistical Office (destatis)
- Center for Research on Higher Education at TU Dortmund (zhb)